# SYMPOSIA

**S1- ESTABLISHING AN ICD-10 CODE FOR DIAGNOSING SARCOPENIC PATIENTS.** C.A. Bens *(Washington, USA)*

Background: Patients with sarcopenia typically experience mobility limitations and other functional issues such as an inability to carry out activities of daily living. Low grip strength and slow gait speed are associated with sarcopenia and strongly correlated with a decreased ability to recover from injury, falls, and disability. These factors contribute to greater hospital and nursing home admissions and increased mortality. Recognizing the substantial impact of sarcopenia on older adults, their families and healthcare system, the Alliance for Aging Research convened the Aging In Motion (AIM) Coalition in 2011 to press for greater awareness, regulatory consideration, and improved treatment of sarcopenia. While there have been impressive strides made by the scientific community to define sarcopenia as a clinically significant disorder, the diagnosis rate of this condition remains suboptimal. To address the lack of diagnosis of sarcopenia in the health care setting, the AIM Coalition took steps to uniquely identify the diagnosis of sarcopenia within ICD-10-CM. Methods: Sarcopenia was initially identified as a specific condition in 1989. Originally, it referred to the loss of muscle mass that occurs with age, and was seen as a characteristic state almost universal with aging. Over time, clinical perspectives on sarcopenia evolved. The Foundation for the National Institutes of Health Sarcopenia Project published its findings of an evidence-based approach to criteria for the diagnosis of sarcopenia. Together with the published findings of the European Working Group on Sarcopenia in Older Persons, and other national and international groups, a consensus has emerged based on clinically relevant thresholds. Although there are some regional variations in specific cutpoints, there is wide conceptual agreement on the base definition. Sarcopenia is now defined as a combination of low muscle mass together with weakness causing functional problems. The degree of muscle mass is measured by appendicular lean mass (ie. non-bone lean mass of the limbs), typically assessed by using dual-energy X-ray absorptiometry (DEXA). Strength level is measured using customary protocols for grip strength. Functional issues focus on mobility impairment, using standard tests such as gait speed or the «timed up and go» test. This definition served as the basis for a proposal made by the AIM Coalition to the Centers for Disease Control and Prevention and Centers for Medicare and Medicaid Services to urge the addition of an ICD-10 diagnosis code for sarcopenia. Results: The proposal was successfully presented to the Centers for Disease Control and Prevention and Centers for Medicare and Medicaid Services Coordination and Maintenance Committee in fall of 2014. The proposal was subsequently modified based on feedback from specialty societies to ensure that a primary diagnosis of sarcopenia would not be conflated with other muscle disorders. Once the proposal is accepted, the AIM Coalition will undertake an educational effort to inform health care providers of the code that would be available for use in October of 2017. Conclusion: Sarcopenia is an important but under recognized health challenge in the world today. It is estimated that sarcopenia costs as much as $18 billion in annual healthcare expenses. Establishing a diagnosis of sarcopenia would allow for interventions to improve muscle strength via physical therapy or a future pharmacologic treatment. It also allows for identification of individuals at risk for falls and future disability, for whom preventive measures may then be taken. ICFSR has become a leading forum for international experts to engage in exchanges about opportunities and challenges for research, development and care across the spectrum of frailty. ICFSR is the optimal venue to productively explore this important topic.

**S2- COMPARING AND CONTRASTING LOW APPENDICULAR LEAN MASS CRITERIA UTILIZED IN DEFINITIONS OF SARCOPENIA.** C.A. Bens *(Washington, USA)*

Introduction: Currently, different values and expressions of low appendicular lean mass (ALM) are used in combination with physical performance (walking speed) and/or muscle strength (grip strength) to define sarcopenia in older adults. The European Union (EU) Working Group on Sarcopenia and other organizations use ALM adjusted by height-squared (ALM/ht2) to calculate muscle mass. The Foundation for the National Institute of Health (FNIH) sarcopenia project investigators defined muscle mass in their sarcopenia definition as level of ALM adjusted by body mass index (BMI) (ALM/BMI) that contributes to clinically significant muscle weakness and/or slow walking speed. Each definition uses different cutpoints for their respective criteria of low ALM which in combination with physical performance and/or muscle strength classifies an individual as sarcopenic. ALM criteria have not been directly compared with regard to participant characteristics identified or their predictive value for negative outcomes from sarcopenia such as physical impairment, fractures, hospitalizations and mortality. Such information would help practitioners better understand the potential meaning of a low ALM for a given set of participant characteristics and how the choice of a sarcopenia definition influences its association with a physical impairment outcome. Objectives: To compare low ALM criteria chosen by the EU consensus panel and The Society of Sarcopenia, Cachexia and Wasting Disorders with criteria chosen by the FNIH sarcopenia project investigators in two ways: 1) participant characteristics and comorbidities that predict incident severe walking limitation (SWL) and 2) the magnitude of association that each low ALM criteria confers to incident SWL. Discussion: All analyses were conducted using data from the Health, Aging and Body Composition study (Health ABC) that enrolled 1,491 men (37% black) and 1584 women (46% black) aged 70 to 79 years (mean age at baseline: 73.8 ± 3.1 years). Participants originated from Medicare listings at two study sites, Pittsburgh, PA and Memphis, TN. Potential participants were included if they reported no difficulty walking 1/4 mile, climbing 10 steps, or performing activities of daily living; no history of active cancer treatment in the prior 3 years and no plans to move from the area within 3 years. The institutional review boards at both sites approved the research protocol and all participants gave informed written consent. ALM was assessed by dual-energy x-ray absorptiometry (DXA) in 3,051 participants enrolled at baseline. Annual measures for the first six years were used to categorize participants according to each criterion for low ALM. Thirty-three percent (n = 1,010) of participants met the ALM/ht2 criteria of sarcopenia (ALM/m2 < 7.2 kg/m2 for men and 5.6 kg/m2 for women), but only approximately 20% (n = 621) met the ALM/BMI criteria <0.789 for men and <0.512 for women. Only 229 participants (7.5% of the total sample) met the sarcopenia–related ALM cutpoints under both definitions. Overall, 1,673 participants (54%) were considered to have normal ALM by both definitions. However, 392 (12.8%) participants who met the ALM/BMI definition were considered normal by the ALM/ht2 definition and 781 (25% of the total sample) considered sarcopenic by the ALM/ht2 definition were deemed normal by the ALM/BMI definition. At baseline, individuals who met the low ALM/BMI criteria in comparison to those meeting the ALM/ht2 criteria were more likely to have: diabetes (12.4 vs. 8.1%), knee pain that limits activity (39.9 vs. 29.6%), polypharmacy (≥3 medications) (22.5 vs. 17.7%), high BMI (classified as overweight or obese with BMI≥ 25 kg/m2: 87.6 vs. 25.0%), high comorbidity index [≥3 health conditions (40.3 vs. 33.7%)], hypertension (65.4 vs. 57.5%), but were less likely to have a previous lower extremity fracture (11.9 vs. 16.4%) and to exercise on a regular basis (33.5 vs. 41.7%). However, the groups were similar in regard to sex distribution and mean interleukin-6 levels (IL-6), testosterone levels, age, smoking history, self-reported health and years of education. There were 1794 SWL events in 3051 participants who had valid DXA scans (58.3% cumulative event rate) over a median follow-up of 6.9 years. ISLW was defined as the first instance of reporting a lot of difficulty or being unable to walk a quarter of a mile. Table 1 displays the results of multivariate Cox proportional hazard models predicting incident SLW in individuals meeting the two low ALM criteria. Usual paced walking speed < 1m/s, a high co-morbidity index, polypharmacy and self-reporting poor health at baseline predicted SWL in individuals meeting either sarcopenia criteria. High levels of IL-6 and a history of diabetes predicted walking limitation only in older adults with respectively low ALM/ht2 or low ALM/BMI, respectively. The risk of SWL increased in ALM/ht2 sarcopenic participants who had a usual paced walking speed <1.0 m/sec [Hazard Ratio (HR): 2.2, 95% confidence interval (CI): 1.6-3.0)], had a high comorbidity index (HR: 2.5, 95% CI: 1.7-3.6), had high IL-6 (HR: 1.6, 95% CI: 1.3-2.1), had a history of smoking (HR: 1.6, 95% CI: 1.2-2.1), were taking 3 or more medications (HR: 1.6, 95% CI: 1.1-2.1), and had 3 or more health conditions (HR: 2.8, 95% CI: 1.7-3.6). These factors differed slightly in participants meeting the ALM/ht2 sarcopenia criteria where the risk of incident walking limitation increased with a usual paced walking speed <1.0 m/sec (HR: 1.6, 95% CI: 1.2-2.3), having 3 or more health conditions (HR: 1.8, 95% CI: 1.2-2.7) and diabetes (HR: 1.6, 95% CI: 1.0-2.4). Comparison of sarcopenia definitions were made with participants who either met the ALM/ht2 criteria only (n=781), the ALM/BMI criteria only (n=392), both ALM/ht2 and ALM/BMI criteria (n=229), or who met no criteria (n=1673) over 6 consecutive years. Event rates for those only meeting the ALM/ht2 definition (51%) were similar to those who did not meet this definition (58.5%) and both ALM/ht2 and ALM/BMI definitions (60.3%). Conversely, participants meeting the ALM/ht2 definition had the highest cumulative ISLW event rate (70.4%). Hazard rates among the 4 groups were compared with Cox proportional hazard regression models shown in Table 2. Older adults categorized as sarcopenic with the ALM/BMI definition had a higher risk of ISLW than older adults in the 3 other groups even after adjusting for age, sex, race, body mass index, having college education, history of smoking, physical activity, polypharmacy and comorbidities. Conclusion: The ALM/ht2 and ALM/BMI sarcopenia criteria categorize different older adults as being sarcopenic. Individuals who meet the ALM/BMI criteria of sarcopenia were more likely to be overweight or obese and tend to have more chronic health conditions than those meeting the ALM/ht2 criteria. These data suggest that subtle differences in defining sarcopenia (such as adjustment for BMI) can influence the prevalence of sarcopenia while also modifying the characteristics that predict walking limitation in the sarcopenic older adults. Despite these differences, slow walking speed, the presence of multiple co-morbidities, use of more than 3 medications and self-reported poor health, independently predict the occurrence of diverse negative outcomes associated with incident walking limitation in low muscle mass populations. Lastly, sarcopenia with low ALM/BMI is more predictive of walking limitation than a definition derived from ALM/ht2.

**Figure 1**

Comparing hazard ratios of participant characteristics associated with severe walking limitation in individuals meeting low ALM/ht2 or low ALM/BMI sarcopenia criteria

| Characteristics | Low ALM/BMI HR (95% CI) | P-value | Low ALM/ht² [HR (95% CI) | P-value |
|---|---|---|---|---|
| Age Greater Than Equal To 75 Vs. Less Than 75 years | 1.19 (0.89, 1.58) | 0.231 | 1.19 (0.93, 1.54) | 0.161 |
| BMI Greater Than Equal To 25 Vs. Less Than 25 kg/m² | 1.26 (0.78, 2.01) | 0.331 | 1.17 (0.84, 1.62) | 0.346 |
| Cancer Present Vs. Not Present | 0.61 (0.44, 0.84) | 0.002 | 0.68 (0.51, 0.90) | 0.007 |
| Cerebrovascular Disease or Stroke Present Vs. Not Present | 0.59 (0.39, 0.89) | 0.012 | 0.64 (0.46, 0.88) | 0.006 |
| Coronary Heart Disease Present Vs. Not Present | 1.15 (0.77, 1.72) | 0.485 | 0.97 (0.69, 1.35) | 0.862 |
| Impaired Cognition Low Vs. Normal | 0.85 (0.46, 1.57) | 0.624 | 0.69 (0.43, 1.08) | 0.107 |
| High Comorbidity Index Yes Vs. No | 1.79 (1.19, 2.70) | 0.005 | 2.48 (1.69, 3.63) | <0.001 |
| Depression Present Vs. Not Present | 0.82 (0.57, 1.19) | 0.315 | 0.74 (0.50, 1.09) | 0.135 |
| Diabetes Present Vs. Not Present | 1.58 (1.03, 2.42) | 0.035 | 1.18 (0.71, 1.94) | 0.509 |
| Years of Education Greater Than Equal To 12 Vs. Less Than 12 | 0.71 (0.50, 1.02) | 0.067 | 1.05 (0.71, 1.55) | 0.775 |
| Fracture Yes Vs. No | 1.23 (0.81, 1.87) | 0.323 | 1.30 (0.97, 1.75) | 0.074 |
| Gender Female Vs. Male | 1.09 (0.79, 1.49) | 0.583 | 1.13 (0.85, 1.51) | 0.373 |
| Gastro-Intestinal Disease Present Vs. Not Present | 0.70 (0.52, 0.96) | 0.027 | 0.76 (0.58, 0.99) | 0.047 |
| Low Grip Strength Normal Vs. Low | 0.70 (0.41, 1.19) | 0.192 | 0.67 (0.41, 1.07) | 0.099 |
| Hypertension Present Vs. Not Present | 0.64 (0.47, 0.88) | 0.005 | 0.84 (0.65, 1.10) | 0.218 |
| Self-Reported Fair Health Yes Vs. No | 0.49 (0.31, 0.77) | 0.001 | 0.47 (0.32, 0.68) | <.0001 |
| High IL-6 High (>2.82 pg/ml) Vs. Normal | 1.25 (0.93, 1.68) | 0.124 | 1.63 (1.26, 2.11) | <0.01 |
| Knee Pain Present Vs. Not Present | 1.14 (0.85, 1.54) | 0.368 | 0.86 (0.64, 1.15) | 0.327 |
| Low Free Testosterone Low (<0.3 pg/ml) Vs. Normal | 1.27 (0.93, 1.72) | 0.120 | 1.18 (0.90, 1.53) | 0.216 |
| High Intensity or Walking Exercise Yes Vs. No | 1.06 (0.79, 1.42) | 0.683 | 0.78 (0.60, 1.02) | 0.077 |
| Peripheral Arterial Disease Present Vs. Not Present | 1.20 (0.67, 2.16) | 0.532 | 0.63 (0.39, 1.03) | 0.068 |
| Pulmonary Disease Present Vs. Not Present | 0.62 (0.39, 1.01) | 0.055 | 0.71 (0.49, 1.05) | 0.089 |
| Polypharmacy Index Yes Vs. No | 1.40 (0.96, 2.03) | 0.074 | 1.56 (1.13, 2.16) | 0.006 |
| Ethnicity White/Caucasian Vs. Black/African-American | 1.23 (0.86, 1.77) | 0.250 | 1.01 (0.71, 1.44) | 0.936 |
| Smoking Yes Vs. No | 1.31 (0.95, 1.80) | 0.092 | 1.58 (1.20, 2.07) | <0.001 |
| Walking Speed Slow (<1.0 m/sec) Vs. Normal | 1.65 (1.18, 2.32) | 0.003 | 2.19 (1.59, 3.02) | <.0001 |

**Table 2**
Incidence rates and hazard ratio for Severe Walking Limitation according low ALM/ht2 and low ALM/BMI sarcopenia criteria

| Groups | Total (N) | ISLW Events | Incident Rate | Model 1 HR (95% CI) | Model 2 HR (95% CI) | Model 3 HR (95% CI) |
|---|---|---|---|---|---|---|
| No sarcopenia Criteria met | 1673 | 978 | 58.46 | Referent | Referent | Referent |
| Low ALM/ht$^2$ Criteria met | 781 | 402 | 51.47 | 0. 897 (0.79, 1.01) | 1. 289 (1.11, 1.49) | 1. 274 (1.09, 1.48) |
| Low ALM/BMI Criteria met | 392 | 276 | 70.41 | 1. 507 (1.32, 1.72) | 1. 548 (1.350, 1.77) | 1. 490 (1.29, 1.71) |
| Both Criteria met | 229 | 138 | 60.26 | 0. 947 (0.79, 1.13) | 1. 228 (1.01, 1.48) | 1. 132 (0.94, 1.37) |

Abbreviations: HR=Hazard Ratio; CI= Confidence Interval; ISLW= Incident Severe Walking Limitation
Model1: adjusted for age.
Model2: adjusted for age, sex, race, education, and body mass index.
Model3: adjusted for age, sex, race, education, body mass index, smoking, high intensity physical activity, polypharmacy, and comorbidities.

**S4- CURRENT DEVELOPMENTS IN THE TREATMENT OF SARCOPENIA: PHARMACOTHERAPY AND NOVEL TRIAL OUTCOMES.** D. Rooks *(Cambridge USA)*

Sarcopenia, the age-associated loss of skeletal muscle mass and physical function, affects a growing number of men and women over the age of 60 worldwide. The loss of skeletal muscle mass and strength are common consequences of many chronic diseases, hospitalizations and normal aging and are strongly associated with morbidity, disability, mortality, mobility disability and loss of independence. A decline in muscle mass and strength in the elderly often manifests as reduced physical functional capacity leading to lower quality of life and an increased risk of adverse health events (e.g., falls and fractures subsequent to falls). Currently, there is no standard treatment for the loss of skeletal muscle mass and function seen with aging. The objective of this symposium is to provide an update on key experimental approaches to treatments for sarcopenia and muscle wasting, including novel outcomes to evaluate the efficacy of interventions on physical function and health status. In addition, new data would be reported on the pharmacodynamic effects of an investigational drug on skeletal muscle and physical function in healthy older adults and those who meet the definition of sarcopenia. The first speaker would present an overview of new treatments for muscle wasting, including drugs with varying mechanisms of action. The second speaker would review technological approaches to quantifying gait and voluntary physical activity and documenting falls in community-dwelling older adults. Finally, data would be presented from recent trials with bimagrumab that focus on the safety and efficacy of this experimental antibody in men and women with and without sarcopenia.

**S6- REDUCING FRAILTY IN OLDER PEOPLE: A MULTIFACTORIAL INTERDISCIPLINARY INTERVENTION – INTERVENTION DESCRIPTION, RESULTS OF RANDOMIZED TRIAL AND ECONOMIC ANALYSIS.** I. Cameron *(Sydney, Australia)*

Background: Frailty has serious and costly consequences in older people. Evidence of effective interventions to reduce frailty and improve functioning in frail people is lacking. The purpose of this project is to evaluate whether a multifactorial intervention reduces frailty, improves functioning and is cost-effective in older people who are frail. Methods: A single center, randomised, controlled trial with 241 frail community-dwelling adults in Sydney, Australia. Participants met the Cardiovascular Health Study criteria for frailty, were aged 70 years or older and had no severe cognitive impairment. The experimental group received a 12-month multifactorial, interdisciplinary intervention targeting frailty characteristics with an individualised home exercise program prescribed and monitored in 10 home visits from a physiotherapist, together with interdisciplinary management of medical, psychological and social problems identified using geriatric evaluation and management principles. Case management by the physiotherapist facilitated the interdisciplinary delivery of the intervention. The intervention targeted identified characteristics of frailty, functional limitations, nutritional status, falls risk, psychological issues and management of health conditions. Intervention was provided and coordinated by two physiotherapists and supported by other health professionals as considered appropriate. Participants in the treatment group that were under or overweight received dietetic review and advice from the research dietician and those with concerning medical issues were visited at home by the study geriatrician. Some people in the treatment group received occupational therapy assessments; others required community services or referral to specialists. Many participants were provided with equipment such as hand weights, vests, exercise bands or stepping blocks to assist them with the strength building routines. The control group received usual healthcare and support services as would otherwise have been available to them. Blinded assessors measured outcomes at three and 12 months after study entry. Primary outcomes were frailty and mobility (using the Short Physical Performance Battery (SPPB)). Secondary outcomes included measures of functioning, health-related quality of life and use of health and social services. Results: The mean age of participants was 83.3 years (SD: 5.9 years); 68% were women. 216 participants (90%) were followed-up at 12 months. In the intention-to-treat analysis at 12 months, prevalence of frailty was 14.7% lower in the intervention group compared with the control group (95% CI 2.4 to 27.0%, p = 0.02), and the intervention group scored significantly better on the SPPB (mean difference between groups 1.44 (95% CI 0.80 to 2.07, p<0.001)). The intervention group walked 0.05 m/s faster over 4 m (95% CI 0.0004 to 0.1, p=0.048) than the control group, and had significantly better scores on the Goal Attainment Scale (odds ratio 2.1; 95% confidence interval (CI) 1.3 to 3.3, p=0.004) at 12 months. The cost for 1 extra person to transition out of frailty was $A15,955 (at 2011 prices). In the "very frail" subgroup (participants met >3 Cardiovascular Health Study frailty criteria), the intervention was both less costly and more effective than the control. Exercise-associated musculoskeletal symptoms constituted adverse events in two participants. Conclusion: For older people who are frail and reside in the community, a 12-month multifactorial intervention reduced frailty and increased functioning. The intervention provided better value for money than usual care, particularly for the very frail. References: Fairhall N, Langron C, Sherrington C, Lord SR, Kurrle SE, Lockwood K, Aggar C, Monaghan N, Gill L, Cameron ID. Treating frailty – a practical guide. BMC Medicine 2011;9:83. Cameron ID, Fairhall N, Langron C, Lockwood K, Monaghan N, Aggar C, Sherrington C, Lord S, Kurrle SE. A multifactorial interdisciplinary intervention reduces frailty in older people: randomised trial. BMC Medicine 2013, 11:65 doi:10.1186/1741-7015-11-65. Fairhall N, Sherrington C, Kurrle SE, Lord SR, Lockwood K, Howard K, Hayes A, Monaghan N, Langron C, Aggar C, Cameron ID. Economic evaluation of a multi-factorial, interdisciplinary intervention versus usual care to reduce frailty in frail older people. Journal of the American Medical Directors Association. 2014 http://dx.doi.org/10.1016/j.jamda.2014.07.006

**S7- FRAILTY ACROSS ALL AGES.** J.A. Ávila-Funes *(Mexico City, Mexico)*

Introduction: An increasing need of knowledge about how frailty relates to aging is needed. Data on this topic could help in the comprehension of the phenomenon. The frailty index is one of the current tools widely used in research to characterize frailty. Due to its adaptive character, this index could be measured along different age groups in order to see how it develops along life and its potential impact in other groups of age different from the older adults. Objectives: Describe the frailty index in different groups of age and test its association with sociocultural factors in these different stages of life. Overview of the symposium: Three communications will be presented. Data discussed is from the latest Nutrition and Health Survey in Mexico (2012). The first one in order to describe how the frailty index was estimated and the descriptive statistics of it. The second one to analyze the similarities of frailty with failure to thrive, which is mainly present in children and in particular in newborns, and present results of the associations between complicated pregnancies in women and higher indexes of frailty. Finally, there would be a presentation on how different socioeconomic factors impact frailty status in subjects from 20 to 101 years of age.

**Communication 1:** *A frailty index that fits across all ages,* M.U. Pérez-Zepeda (Mexico City, Mexico)

Background: Frailty has been studied in older adults, however some groups of age still have gaps in knowledge such as the very old and centenarians; on the other hand, there is no clarity about frailty trajectories or premorbid states in a younger population. This is due to different causes, but in particular a lack of a standardized measurement of frailty precludes from studying it along life course. However, the frailty index, can be integrated to be measured in any adult age group. The challenge was to make an index that represented deficits that could be present from 20-years old adults thru over 100-years old adults. The aim of this communication is to describe the integration of a frailty index with applicability in adults and their distribution in a population based survey of Mexicans. Methods: A frailty index of 30 items was estimated in the last Health and Nutrition Survey of Mexico (2012), which included a subsample of older adults. Included subjects were 20-years or older. Variables into the frailty index included: body mass index, waist-hip ratio, comorbidities, disability, sensorial problems, hemoglobin levels, depressive symptoms, accidents and violent events. Descriptive statistics of the index as a whole, as well as statistics for individual items. Results: From a total of 30,932 subjects with a mean age of 44.05 years (15.64 SD), the following age categories distribution was found: 20-40 years 44.7%, 40-60 years 37.35%, 60-80 years 15.88% and 80 or more years 2.07%. The 30-item frailty index mean was of .115 (.08 SD), zero as the lowest value and .576 as the highest. The distribution was negatively skewed with a median of .099. The lowest mean for a single deficit was for difficulty in understanding a conversation, .002 and the highest mean for the waist to hip ratio .767. The correlation between age and the frailty index was r=.323. Conclusion: A frailty index of 30-items could be estimated in a representative group of Mexican adults from 20 years of age to 101 years. Characteristics of the index are similar to those described in older adults.

**Communication 2:** *Failure to thrive in newborns and maternal health by the frailty index,* C. García-Peña (Mexico City, Mexico)

Background: As human beings age, a number of challenges should be faced by the individuals. These challenges can be overcome successfully or not; depending on this mechanism the individual could return to a previous state of health or start accumulating damage that in the future renders the body frail and incapable of responding to even minor challenges. There is some evidence that this process happens throughout life, and some authors point to a well-known entity in childhood similar to frailty, failure to thrive; in which a newborn is not able to respond to the challenges faced in the new surrounding environment, resembling the lack of ability of the frail older adults unable to adapt even to minor changes. We hypothesized that women with higher frailty index have complications during birth, including abortion and stillbirth, which in turn could reflect early stages of failure to thrive. Therefore the purpose of this communication is to describe the associations of the frailty index with birth complications in a group of Mexican adults. Methods: A frailty index of 30 items was estimated in the last Health and Nutrition Survey of Mexico (2012). Included subjects were 20-years or older. Variables into the frailty index included: body mass index, waist-hip ratio, comorbidities, disability, sensorial problems, hemoglobin levels, depressive symptoms, accidents and violent events. Only women who had been ever pregnant were chosen for this report. The child outcomes included were: abortion, stillbirth, death of the child in less than one year; and maternal

complications were: preeclampsia, vaginal bleeding and complications of chronic disease. Results: From a total of 30,932 subjects; 18,173 (58.75%) were women, and from this group 10,802 (59.4%) have ever been pregnant, the mean frailty index for this group was of .119. A total of 598 (5.53%) women had a child that died during their first year of life, with a significant difference in the frailty index (.118 vs .133 respectively), stillbirth 2.79% without difference in the frailty index, 16.31% abortion with highest index in those women with abortion (.13). The mean weight of the newborns was of 3.21kg (.6), a non-significant correlation with frailty index of .036 was found. Regarding maternal complications preeclampsia was present in 1.72%, transvaginal bleeding in 1.15% and a complication due to chronic disease during pregnancy of .61%. Women with preeclampsia or complication of chronic disease during pregnancy had a significantly higher frailty index. Conclusion: Frailty could be expressed in anticipatory way, and impact other outcomes such as pregnancy and the characteristics of the new born. As shown in this report, there are some associations that merit further study between the frailty index and outcomes of pregnancy. In particular, a question arises from these results, which is the direction of the association, because it is biological feasible to have it in both ways: a complicated pregnancy or the death of a child favor frailty or a higher frailty status give raise to complicated pregnancy or children unable to survive in a new challenging milieu.

**Communication 3:** *Associations of socioeconomic determinants with the frailty index in different age groups,* L.M. Gutiérrez-Robledo (Mexico City, México)

Background: Even that frailty is a concept mainly applied to older adults, one of the approaches to assess this condition (the frailty index) can be estimated practically in any group of age. This acquires more interest in populations with adverse social, economic and cultural contexts, were higher scores of the frailty index would be expected in younger populations. The aim of this communication is to present results from a Mexican national survey in order to describe the frailty index across adulthood (20 to 101 years) and its association with socioeconomic factors in different categories of age. Methods: A frailty index of 30 items was estimated in the last Health and Nutrition Survey of Mexico, which included a subsample of older adults. Included subjects were 20-years or older. Categories of age were integrated: 20-40, 40-60, 60-80 and 80 years or older. Comparisons between age categories to contrast the mean of the frailty index of each group were done with socio demographic variables, such as: sex, analphabetism, marital status, speaking indigenous language and considering himself as an indigenous, number of persons living in the same household and number of rooms in the household; also smoking and alcohol drinking were included in the models. All analyses were stratified by sex and group of age. Results: From a total of 30,932 subjects with a mean age of 44.05 years (15.64 SD), the following age categories distribution was found: 20-40 years 44.7%, 40-60 years 37.35%, 60-80 years 15.88% and 80 or more years 2.07%. A total of 18,173 (58.75%) were women. Frailty index mean was significantly different between groups of age: .089 (20-40 years), .129 (40-60 years), .151 (60-80 years) and .153 (80 years or older). Women had a mean of .131 (.084 SD) and men of .091 (.071), a significant difference. For men currently working was associated with a lower frailty index score, on the other hand smoking currently was associated with higher scores, across all age groups. For women, an indigenous origin was associated with a lower frailty index and smoking with a higher score in all groups of age, with the exception of the group of 80 years or older in which only analphabetism was associated with higher scores of frailty index. Conclusion: Even though that different variables were associated with the frailty index across age groups and sex, currently working and smoking status seem to be consistent between groups. In addition, indigenous origin associated with lower frailty index in women merits further research.

**S8- FRAILTY, FALLS, AND FRACTURES: COMMON PATHOPHYSIOLOGY AND THERAPEUTIC APPROACH.** G. Duque *(Sydney, Australia)*

There is strong evidence to suggest that falls and fractures are interconnected in terms of pathophysiology and risk factors. More recently, the term "sarco-osteoporosis" has been described as a subset of frailer individuals at higher risk of falls, fractures and poor outcomes, including higher prevalence of disability and mortality. There is therefore increasing interest to determine whether these entities share a common pathophysiology and, ultimately common therapeutic approaches. Analysis of the pathophysiological pathways of frailty, sarcopenia and osteoporosis reveals several overlapping components. These conditions are age-related, all involve multifactorial processes, and are characterized by progressive loss of tissue mass and function. Additionally, physical inactivity, low serum levels of vitamin D and poor nutrition accelerate the progression of these conditions. Despite these similarities, most interventions to date target these conditions separately. Here we propose a symposium to review the current state of knowledge about similarities and common pathophysiology of these entities. We will discuss the benefits and limitations of current diagnostic schemes (such as DXA) for these conditions. In addition, current and potential biomarkers will be presented. Then, we will discuss evidence-based diagnostic and therapeutic interventions that pose promising opportunities. This will include the review of nutritional, physical activity and current (i.e. vitamin D) and upcoming (i.e. Myostatin antibodies) pharmacologic interventions. Finally we will translate this information into practical approaches and recommendations that can improve older adult care.

**S10- PHYSICAL FRAILTY AND SARCOPENIA: BACKGROUND, RATIONALE, AND DESIGN OF THE SPRINT-T PROJECT.** *B. Vellas[1], R. Bernabei[2] (1. Toulouse, France; 2. Rome, Italy)*

Introduction. The demographic transition Europe is experiencing since the last decades poses an unprecedented challenge from both a societal and healthcare perspective. The existing healthcare systems built around the traditional medical paradigm of patients suffering from a single acute illness are largely unprepared to face the increasing demands for health services that can specifically address the medical needs of older, multimorbid people. In this scenario, the geriatric syndrome of frailty gains special interest and importance. Based on a recent consensus definition, frailty is «a multidimensional syndrome characterized by decreased reserve and diminished resistance to stressors». Detecting and contrasting frailty are of outstanding importance for impeding the progression of the syndrome and preventing its detrimental consequences. Indeed, once disability has emerged, the restoration of an adequate level of functioning is unlikely, especially when the age of the subject, the degree of disability or its duration increase. Unfortunately, to date, no healthcare programs or pharmacological treatments are available for frail elders. In the literature, different criteria have been validated to identify frail older subjects, but the physical frailty (PF) phenotype proposed by Fried and colleagues is surely the most well-known. At the same time, it cannot be ignored that PF presents substantial overlaps with sarcopenia, «a syndrome characterized by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes including physical disability, poor quality of life and death». The identification of a definite biological basis (i.e. skeletal muscle decline) opens new venues for the development of interventions to slow or reverse the progression of this condition (especially towards disabling conditions). Moreover, since all the components characterizing PF and sarcopenia (PF&S) are measurable and quantifiable, the operationalization and targeting become feasible and clinically possible: Objectives. The present symposium is aimed at presenting the background, rationale, and methods of the Sarcopenia and Physical frailty IN older people: multicomponenT Treatment strategies (SPRINT-T) project. Discussion, Conclusions: The SPRINT-T project is the result of the combined initiative between a large European consortium (including academia, clinicians, researchers, SMEs, patients' representatives, bioethics experts, health economists, ICT professionals) and the European Federation of Pharmaceutical Industries and Associations (EFPIA). The SPRINT-T protocol is currently in preparation for being submitted on March 1, 2014 to the Innovative Medicines Initiatives (IMI) agency for funding (overall budget €48,000,000, equally shared between EFPIA and European Community). It is noteworthy that the SPRINT-T project was selected from a competitive call for grant launched by IMI last July 2013. Primary aims of SPRINT-T are: 1) to clearly operationalize the presently vague concept of frailty; 2) to identify a precise target population with unmet medical needs; 3) to evaluate and validate a new methodology for implementing in Europe preventive and therapeutic strategies among frail elders at risk of disability; 4) to define an experimental setting serving as template for regulatory purposes and pharmaceutical investigations; 5) to identify biomarkers and health technology solutions to be implemented into clinical practice. The SPRINT-T project is indeed focused at providing all the necessary information and tools for identifying a specific subpopulation of older persons expressing precise clinical, biological, and functional characteristics. This project will be preliminary founded on a robust operational definition of PF&S. The ad hoc randomized controlled trial resulting from SPRINT-T will then demonstrate the possibility of translating the PF&S theories into a clinical intervention with potentially positive effects. A major output of the project will be the definition of a conceptual framework of PF&S, the implementation of which will identify a specific "nosographical entity" for healthcare professionals, research activities, pharmaceutical industry, regulators, and policy-makers. The intervention proposed in the SPRINT-T trial is original (although founded on solid background and data, a multicomponent intervention against the outcome of mobility disability has never been tested on a large scale), relevant (it targets conditions of high prevalence in European community-dwelling elders), pertinent (it is focused on function, that is a primary component of quality of life and the most important outcome in the elderly), easily applicable at a population level (thus facilitating the future clinical implementation of its findings), and scalable (it will validate health technology services and ICT infrastructures for optimal data acquisition/analysis, clinical decision-making, and accessibility to the interventions from the participant's home). The target population will be constituted by individuals with target organ damage (i.e. low muscle mass), specific clinical phenotype, and impaired physical performance.

**S11- INTERSECTION AND DISTINCTION BETWEEN PHYSICAL FRAILTY AND COGNITIVE IMPAIRMENTS AMONG OLDER ADULTS.** Q.-L. Xue *(Baltimore, USA)*

Introduction: Epidemiologic and experimental studies have found that physical function and cognition are associated in older adults, which has led to the popular view of cognitive impairments as components of frailty. However, the nature of their associations with physical frailty is not well-characterized. This symposium aims to provide descriptive and theory-informed, model-based evidence that we hope will reinvigorate the discussion on whether cognitive impairments and physical frailty belong to the same syndromic construct. Objectives: Communication #1 uses the National Health and Aging Trends Study (NHATS) to estimate the prevalence of frailty and cognitive impairment in the United States, separately and jointly. It explores population characteristics that may distinguish physical from cognitive impairments. Communication #2 uses latent class analysis (LCA) to assess the internal construct validity of a possible unified syndrome that includes both physical frailty criteria and cognitive impairments. The analysis was

conducted initially in the Women's Health and Aging Study II (WHAS II) and cross-validated using NHATS. Communication #3 explores the mechanistic link between domain-specific cognitive impairments and the development of frailty in the WHAS II. Discussion: NHATS data show that physical frailty and cognitive impairments frequently do not coexist in older adults, and meaningfully different profiles of individual characteristics emerge with their separate versus joint occurrence. The analysis further provides preliminary evidence consistent with the hypothesis that dementia in old age and Alzheimer disease-related pathology in particular may contribute to the coexistence of physical frailty and cognitive impairments. Findings from the LCA provided further validation of the dissociation between physical frailty and cognitive impairments in certain subgroups. The longitudinal study linking cognitive functioning to the development of physical frailty found that cognitive decline over time, and decline in executive functioning in particular, explains extra between-person heterogeneity in frailty development beyond baseline performance and age, suggesting potential causal links. Taken together, these findings highlight the complexity of the cognition-frailty relationship and the need for a more refined approach to the study of the integration between cognition and frailty. Progress on the clinical assessment, treatment, and management of frailty would benefit from a better understanding of overlapping and distinct pathophysiology underlying cognitive impairments and physical frailty, as well as improved specificity of frailty phenotype by distinguishing the frailty syndrome as its own entity from secondary signs and symptoms of other age-related diseases. Conclusion: Our findings indicate considerable distinction between physical frailty and cognitive impairment but also point to dementia as a key risk factor for physical frailty.

**Communication 1:** *U.S. national profile on the intersection between physical frailty and cognitive impairments among older adults residing in the community or residential care settings,* Q.-L. Xue, K. Bandeen-Roche, M.C. Carlson, R. Varadhan, B. Buta, J. Huang, J.D. Kasper (Baltimore, USA)

Background: The inclusion of cognitive impairment in the frailty definition is gaining popularity. However, the overlap and discordance between the frailty syndrome and cognitive impairments has not been well-characterized. This study aims to obtain nationally representative prevalence estimates of frailty and cognitive impairments separately and jointly, and compare the demographic and health characteristics of people with their separate and joint occurrence. Methods: NHATS is a study of functioning in later life using a nationally representative sample of 8,245 Medicare beneficiaries ages 65 and older. The analytic sample is comprised of a subset of 6,842 older adults from NHATS living in the community or residential care at baseline. Frailty was defined as having 3 or more criteria using the Fried/CHS Physical Frailty Phenotype. Cognitive impairment was defined as having impairment in executive functioning (EF) (scores of the Clock Drawing Test below 3 on a 0-5 scale) or memory (the summed scores of the 10-item immediate and delayed recall batteries <=5), or both. We compared demographic and health characteristics across four mutually exclusive groups (leaving out the pre-frail): physically and cognitively robust (g1), physically frail but cognitively robust (g2), physically robust but cognitively impaired (g3), and physically frail and cognitively impaired (g4). Sampling weights were incorporated in all analyses to yield estimates representative of all NHATS-eligible Medicare beneficiaries ages 65 and older in the US in 2011. Results: The prevalence of frailty and cognitive impairment were 12% and 30%, respectively. Among those who were frail, 52% had cognitive impairment. In contrast, 21% of those with cognitive impairment were frail. The prevalence of membership in g1-g4 was respectively 32%, 6%, 9%, and 6%. Frailty was associated with greater fear of falling, more chronic diseases, and higher rates of hospitalization, surgery, and falls than cognitive impairment. Cognitive impairment alone (g3) was not associated with conditions that had a major impact on frailty including arthritis, heart disease, high blood pressure, lung disease and osteoporosis. The characteristics distinguishing the group with coexisting frailty and cognitive impairments (g4) from the groups with either frailty or cognitive impairment (g2 and g3) were older age, poverty, and dementia. Conclusion: While physical frailty and cognitive impairments often coexist in older adults, particularly with increasing age, (group 4) there were sizeable subgroups who had frailty but not cognitive impairment or vice versa. That frailty and cognitive impairment were associated with different disease characteristics and health events suggests that these two syndromes, although co-occurring, may have distinct etiologic components.

**Communication 2:** *Frailty and cognition: one syndrome?* K. Bandeen-Roche[1], A. Gross[1], M. Carlson[1], L.P. Fried[2], J.D. Kasper[1], Q.L. Xue[1] (1. Baltimore, USA; 2. New York, USA)

Background: Frailty in older adults has been conceptualized either as a marker of heightened risk for adverse outcomes, or as a syndrome emerging from interconnected declines in multiple physiological systems. We addressed whether cognition should be incorporated as an element of a frailty syndrome. We hypothesized that cognitive impairment and frailty result from partially distinct physiological processes, hence cannot be considered as a single syndrome. Methods: We examined data from The Women's Health and Aging Study II (WHAS II) and the National Health and Aging Trends Study (NHATS). WHAS II enrolled 436 high-functioning, community dwelling women ages 70-79, examined upon study entry (1994-6) and thereafter. NHATS enrolled 8245 participants nationally representative of Medicare enrollees ages 65+ in 2011. We employed data from 5 WHAS II examinations, spanning 7.5 years, and from the NHATS baseline excluding nursing home residents (n=7608). We tested our hypothesis using latent class analysis (LCA). LCA conceptualizes that the population of older adults comprises subgroups which homogeneously present on indicators used to infer them. We identified 7 indicators —five defining the Physical Frailty Phenotype (PFP) proposed by Fried (slowness, weakness, low physical activity, exhaustion, and weight loss) and measures of memory (Hopkins Verbal Learning Test recall) and executive functioning (Trail Making-B completion time in WHAS II and Clock Drawing in NHATS). We adjudicated the number of subgroups needed to achieve homogeneity using standard goodness of fit measures (likelihood ratio; BIC; Lo-Mendell-Rubin likelihood ratio; residual examination). In WHAS II, we accommodated repeated measures by robust variance estimation. To strengthen inferences considering relatively low sample size, we determined the WHAS II subgroup number reducing PFP criteria to the most prevalent three (slowness, weakness, physical activity). We hypothesized four population subgroups: (1) minimal prevalence of any criterion, and considerable prevalence of (2) PFP but not cognitive criteria, (3) cognitive but not PFP criteria, (4) all criteria. Results: WHAS II did not evidence a four-group population structure; instead, three groups (Lo-Mendell-Rubin p-value=0.0002 with excellent residual fit): (1) minimal prevalence of any criterion (48% of persons), and considerable prevalence of (2) PFP but not cognitive criteria (28%), (3) all criteria (24%). This pattern was replicated analyzing 7 indicators. In NHATS, no goodness-of-fit measure admitted fewer than four subgroups. Three recapitulated those identified in WHAS II; a fourth was highly frail on both physical and cognitive criteria. Conclusion: Physical frailty often emerges without cognitive impairment (28% of WHAS II and 24% of NHATS), but cognitive impairments are less usual without the presence of physical criteria for frailty. We conclude that physical and cognitive criteria should not be considered as elements of a single syndrome. Our findings suggest that physical frailty criteria may emerge secondarily to cognitive decline; this possibility should be further elucidated.

**Communication 3:** *Domain-specific cognitive performance and development of physical frailty: Longitudinal evidence from the Women's Health and Aging Study II,* A.L. Gross[1], Q.L. Xue[1], R. Varadhan[1], K. Bandeen-Roche[1], L.P. Fried[2], M.C. Carlson[1] (1. Baltimore, USA; 2. New York, USA)

Background: Cognitive impairment and frailty often co-occur; it has been shown that executive functions, important to the maintenance of independent functioning, deteriorate prior to memory in community-dwelling older adults. However, it is unclear whether early impairment or decline in particular cognitive domains are associated with onset of frailty. We hypothesized that domain-specific cognitive impairments and rates of decline are associated with earlier onset of physical frailty. Methods: To evaluate these hypotheses, we used 9 years of data from the Women's Health and Aging Study II (N=424, 6-visits). We measured psychomotor speed and executive functioning using the Trail Making Test (TMT), Parts A and B, respectively, and immediate and delayed word-list recall using the Hopkins Verbal Learning Test. To facilitate comparisons, we standardized each test to a common scale, where 1SD differences correspond to 0.5 lines/minute on TMT-A, 0.2 lines/minute on TMT-B, and 5.0 and 2.7 words on immediate and delayed recall. Results: Of 424 women not frail by Fried/CHS criteria at baseline, 73 (17%) developed frailty. In Cox proportional hazards survival models with cognitive impairments as time-varying predictors, impaired executive functioning (TMT-B) was the strongest predictor of incident frailty (HR: 2.8, 95% CI: 1.6, 5.2) after adjustment for age and other cognitive domains. In joint survival-growth models, poorer baseline performance on all cognitive measures (p's<0.05), with the exception of immediate recall, were each associated with more rapid onset of frailty. After adjusting for baseline cognitive performance, faster deterioration in TMT-A (HR: 2.4, 95% CI: 1.2, 5.0), TMT-B (HR: 8.3, 95% CI: 1.2, 50.0), and immediate (HR: 2.0, 95% CI: 1.1, 4.0) and delayed (HR=1.5, 95% CI: 1.1, 2.2) recall were additionally predictive of earlier frailty onset. Discussion: Domain-specific cognitive impairments, particularly in executive functioning, were associated with earlier onset of frailty. Notably, trajectories of cognitive decline, especially for executive functioning, preceded and predicted frailty even after adjustment for baseline performance. These findings suggest a window for early detection and intervention prior to the onset of frailty, and have implications for selecting cognitive tests to assess risk of frailty.

**S12- MOLECULAR MECHANISMS OF SARCOPENIA.** P. Valet, M. Cesari *(Toulouse, France)*

A characteristic feature of aged humans and other mammals is the debilitating, progressive loss of skeletal muscle function and mass that is known as sarcopenia. Age-related muscle dysfunction occurs to an even greater extent during the relatively short lifespan of the fruit fly Drosophila melanogaster, that is emerging as an attractive system to investigate the mechanisms involved in muscle growth and atrophy during aging and disease. Studies in Drosophila and other model organisms indicate that sarcopenia is driven by a combination of muscle tissue extrinsic and intrinsic factors, and that it fundamentally differs from the rapid atrophy of muscles observed following disuse and fasting. Extrinsic changes in innervation and endocrine factors contribute to muscle aging. In addition, organelle dysfunction and compromised protein homeostasis are among the primary intrinsic causes. Some of these age-related changes can in turn contribute to the induction of compensatory stress responses that have a protective role during muscle aging. Moreover, epidemiological studies in humans suggest that skeletal muscle aging is a risk factor for the development of several age-related diseases in other tissues and that nutrient- and stresssensing in skeletal muscle can influence lifespan and overall aging of the organism via muscle-derived growth factors and cytokines, known as myokines. I review how studies in Drosophila can provide unique advantages to study the biological mechanisms of myokine signaling and the etiology of sarcopenia. References: Demontis F et al, Cell Reports 2014 Jun 12;7(5):1481-94, PMID: 24882005.Demontis F et al, Disease Models & Mechanisms 2013 Nov;6(6):1339-52, PMID: 24092876. Piccirillo R et al, Developmental Dynamics 2014 Feb;243(2):201-15, PMID: 24038488. Demontis F et al,

Aging Cell 2013 Dec;12(6):943-9, PMID: 23802635. Demontis F and Perrimon N, Cell 2010 Nov 24;143(5):813-25, PMID: 21111239. Demontis F and Perrimon N, Development 2009 Mar;136(6):983-93, PubMed PMID: 19211682.

**S13- LOSS OF MUSCLE QUALITY IN OLD AGE: MECHANISMS AND FUNCTIONAL CONSEQUENCES.** M. Narici[1], J.A. Kent[2] *(1. Derby, UK; 2. Massachusetts, USA)*

Backgrounds: Sarcopenia, the age-related loss of muscle mass, affects >50% of the population aged 75 yr and over and is a main cause of impaired physical performance and reduced mobility (Narici & Maffulli. Br Med Bull 2010; 95:139-59). Amongst the several factors contributing to sarcopenia neurodegenerative changes are regarded as primary drivers of this condition (Russ et al. J Cachexia Sarcopenia Muscle 2012; 3:95–109) and responsible for α-motoneurons and neuromuscular junction (NMJ) degeneration, for muscle fibre denervation (Gouspillou et al. Longev Healthspan. 2013; 2:13) which, also fuelled by mitochondrial dysfunction and oxidative damage (Hepple. Front Aging Neurosci. 2014;10;6:211), leads to loss of motor units and muscle weakness. One of the major functional characteristics of sarcopenia is the disproportionate decrease of muscle strength, known as loss of 'muscle quality': at the age of 80 yrs, the loss of muscle strength is about 4-fold greater than that of muscle size (Moore et al. J Am Geriatr Soc. 2014; 62:230-6). The decrease in contractile tissue is accompanied by a concomitant increase in non-contractile tissue (Kent-Braun et al. J Appl Physiol 2000; 88:662-8.) This symposium will address the causes of the decline in muscle quality with old age by discussing the contribution of changes in muscle connective tissue (Kragstrup et al.Scand J Med Sci Sports 2011; 21: 749-757), its role in force transmission, the changes in neuromuscular integrity and neuromuscular function (Kaya et al. Exp Gerontol. 2010;45:671-8.), and the role of mitochondrial dysfunction in driving muscle loss and neurodegenerative processes. Also the protective action of exercise in reducing inflammation (Mikkelsen et al. Mech Ageing Dev. 2013; 134:531-40), neuromuscular degeneration, oxidative stress and sarcopenia, together with the role of IGF-1 on muscle and tendon tissues (Boesen et al. J Appl. Physiol 2014; 116: 192-203; Nielsen et al J. Appl. Physiol. 2014; 116: 42-46), will be discussed. Methods: The contribution of connective tissue in aging skeletal muscle, and its importance for hypertrophy and function in animal models using aging rats, as well as in humans who are both elderly (65-80 yrs) or very old (>80 yrs) were studied either in the basal state, after a training intervention with strength exercise, or in master athletes with life-long activity. Structural, biochemical and cellular characteristics of skeletal muscle extracellular matrix (ECM) were studied. The neuromuscular basis of the aging-related loss of muscle quality was investigated through a combination of electrophysiological techniques, such as electromyography and non-invasive stimulation techniques (e.g., transcranial and cervico-medullary magnetic stimulation, trans-cranial direct current stimulation, electrical stimulation, etc.), were utilized to examine the influence of aging on indices of motor cortical and spinal excitability as well as motor unit number and size associated with aging. The role of mitochondrial dysfunction in the loss of muscle quality was investigated in muscle biopsies obtained from the vastus lateralis in human subjects across a range of ages (23-80 y) and physical activity levels. Mitochondrial function was assessed in saponin-permeabilized myofiber bundles and included measurements of respiration, hydrogen peroxide (H2O2) emission, and sensitivity to permeability transition following a calcium challenge. Results: Muscle connective tissue and aging: data will be presented demonstrating altered content, density, and mechanical properties of connective tissue – influencing the passive mechanical properties of skeletal muscle but also its ability to transmit force laterally in elderly individuals, and that regular exercise can influence this. Potentially, growth factors like IGF-I can stimulate the formation of connective tissue in skeletal muscle. Physical training was found to counteract age-related changes, and in particular, endurance training was found to be associated with higher skeletal muscle mass in elderly. Furthermore classical markers of inflammation, CRP and IL-6, were lower with training in both young and elderly, suggesting that life-long exercise may reduce aging-related inflammation and maintain muscle mass. Neuromuscular basis of ageing related loss of muscle quality: observations made in a series of experiments show that weaker seniors exhibit a 20% deficit in voluntary (neural) activation, ~20% smaller motor evoked potentials during moderate intensity muscle contractions, nearly 2-fold higher levels of intracortical inhibition under resting conditions, and a reduced number of functioning motor units. Role of mitochondrial disfunction in the loss of muscle quality: the results of the analyses revealed that up to the age of 75 y most of the changes in mitochondrial function with aging can be prevented through physical activity, with the exception of a greater sensitivity to permeability transition. Beyond this age there are more significant declines in mitochondrial function that prevail even in very physically active subjects. The potential contribution that these alterations make to the decline in skeletal muscle aerobic function and the erosion of skeletal muscle mass with aging will be discussed. Furthermore, we will also address how mitochondrial function alterations may relate to age-related deterioration of the neuromuscular junction. Conclusions: Structural, biochemical, cellular, and functional changes in skeletal muscle ECM contribute to the deterioration in muscle mechanical properties with aging and likely impair force transmission by contracting muscle fibres, contributing to the loss of muscle quality. Exercise can influence connective tissue in skeletal muscle by increased collagen turnover. Insulin-like growth factor can influence connective formation in skeletal muscle positively in elderly individuals, also during period with inactivity. Also regular endurance exercise seem to reduce inflammation, maintaining muscle mass with aging. The disproportionate ageing-related muscle weakness is associated with significant impairments in voluntary (neural) activation, and that this impairment may be mechanistically associated with increased GABAergic inhibition of the motor cortex as well as a loss of functioning motor units. Many facets of mitochondrial function with aging can be attenuated through physical activity up to the age of 75 y. However, regardless of physical activity status, the results implicate an increased mitochondrial susceptibility to permeability transition as a therapeutic target in seeking potential ways of attenuating age-related muscle mass decline. Our evidence also suggests that some aspects of mitochondrial function at ages >75 y may be the result of (rather than cause of) sporadic myofiber denervation, implicating failed reinnervation as a more relevant therapeutic target in very advanced age.

**S14- SARCOPENIA IN CHRONIC DISEASES - COMMON PATHWAYS VS. DISEASE SPECIFIC FEATURES.** W. Doehner[1], A. Sinclair[2] *(1. Berlin, Germany; 2. Luton, UK)*

The aim of the symposium is to present an overview on disease specific sarcopenia and to discuss common and distinct features between such diseases. There are indicators of certain common pathways applying independently of the primary underlying disease but there are also specific aspects of sarcopenia related to the individual underlying disease. Detailed information on these common and distinct pathways are crucial of identify common and disease specific treatment targets.

**S15- MUSCLE DISUSE AS A PIVOTAL PROBLEM IN SARCOPENIA-RELATED MUSCLE LOSS AND DYSFUNCTION.** S.M. Phillips *(Hamilton, Canada)*

Introduction: Disuse brings about muscle atrophy and strength loss. In aging, there is a general decline in overall physical activity and there are likely to be a greater frequency of periods of disuse due to more frequent illness and hospitalization. Thus, while population-based rates of sarcopenic muscle loss are often cited to be ~0.8% per year the focus of this symposium will be to highlight how even brief periods of disuse can accelerate both myopenia and dynapenia with age. Importantly, the symposium will also highlight that older people simply do not recover from disuse, despite aggressive rehabilitation, as well as younger persons. Thus, the consequences of disuse in the elderly will be discussed in a broad context but the bona fide research gaps will also be highlighted. The three presenters will discuss various aspects of disuse presenting their own published as well as new and novel data in three areas. Objectives: There are three broad objectives to this symposium: 1. To understand the role that disuse, both overt (bed-rest) and subtle (reduced physical activity), plays in sarcopenic loss of skeletal muscle mass and dynapenia; 2. To provide a pragmatic mechanistic framework to establish how many disease-related disuse syndromes are likely heavily underpinned by disuse; and 3. To understand the role of potential, and feasible, countermeasures for disuse. Discussion: Overt muscle disuse as a result of illness or injury can lead to significant reductions in of muscle mass and strength, even when the period of disuse is short (~5d) (1, 2). This short-term muscle disuse induces insulin resistance, 'anabolic resistance' of protein metabolism, results in decreases in basal metabolic rate and impairs functional capacity (3, 4). Similarly, short-term periods of reduced activity (~2 wk, < 1500 steps/d), an outwardly quite 'benign' model of relative muscle disuse, also result in muscle mass and strength losses, and induce insulin and anabolic resistance (5). While in younger individuals these functional and metabolic impairments are shorter-term and recover upon resumption of habitual activity, in older individuals, who are already at risk and are metabolically and/or functionally compromised, these periods of disuse can have permanent consequences. Given that these periods of muscle disuse become more common with age, they can have a significant impact on the development of sarcopenia and other metabolic diseases such as type II diabetes. Studies of overt and subtle muscle disuse have been shown to result in significant losses in muscle mass and strength oftentimes with greater losses being seen in older individuals. Particularly, during overt muscle disuse the rate of muscle mass loss has been found to be three-to-six fold greater in older as compared with younger adults (6, 7); whereby the loss of muscle mass in response to 10 days of bed rest in older adults was equivalent to that of younger adults following 28 days of bed rest. Concomitantly, during 10 days of bed rest in older adults, there was also a decline in quadriceps strength and functional capacity (7). In contrast, Suetta et al (8) found similar decreases in muscle strength between young and older individuals following 14 days of leg casting but a lesser decline in quadriceps volume in old as compared with young individuals (5.2% vs 8.9%). Perhaps even more alarming is that despite a complete recovery of muscle mass in young individuals following 4 weeks of intensive strength training (i.e., not standard rehabilitation) upon cast removal, older individuals only recovered 63% of their muscle mass following the same training protocol (8). Declines in muscle mass have also been found following acute periods of reduced activity. Two weeks of reduced ambulation (< 1500 steps/day) induced a 2.8 – 3.6% loss of lower limb lean mass (5, 9), which is 3 – 4 times the amount typically lost by an older adult in one year, which highlights the nature of short-term periods of muscle disuse and their impact in older adults. The loss of muscle mass resulting from muscle disuse has been attributed to an imbalance between the rates of muscle protein synthesis and muscle protein breakdown. Lower basal muscle protein synthesis rates have been found following bed rest and limb immobilization (10-12). In addition, a blunted increase in muscle protein synthesis in response to protein feeding has been found after overt and subtle muscle disuse (5, 10). On the other hand, it appears as though muscle protein breakdown is only increased in the first few days of muscle disuse (13), thus suggesting that it has a lesser role in the etiology of disuse-induced muscle mass loss. However, short-term periods of muscle disuse not only induce anabolic resistance, and decrease muscle mass and strength, but result in insulin resistance. Declines in insulin sensitivity in older adults are of particular concern given their increased risk of pre- and overt type 2 diabetes. It appears as if periods of overt muscle disuse primarily impact peripheral, not hepatic, insulin resistance in young individuals (14). However, in older, overweight individuals overt muscle disuse has been shown to impact both hepatic and peripheral insulin sensitivity (4). In addition, 2 weeks of step-reduction has also been

shown decrease peripheral insulin sensitivity as evidenced by a decrease in insulin-stimulated glucose disappearance (15), which was related to decreased insulin-stimulated phosphorylation of Akt, which in turn decreased GLUT4 translocation to the plasma membrane. Furthermore, Breen et al (5) found that following 2-weeks of reduced steps postprandial and postabsorptive insulin resistance increased by 43 and 21%, respectively in older adults. In addition, while not having been shown to change in response to step-reduction in young individuals, the inflammatory markers CRP and TNF-α increased following step-reduction in older adults (5). Together, these data suggest that shortterm muscle disuse may underpin the increased incidence of insulin resistance and chronic inflammation in older adults. Together with an accelerated loss of muscle mass, increase the risk for development of a variety of chronic health conditions. As such, strategies that enhance the anabolic sensitivity of muscle, inhibit proteolysis, enhance insulin sensitivity and reduce inflammation are attractive strategies to offset the deleterious consequences of muscle disuse. It has been recommended that older adults should consciously consume a higher protein diet and engage in an active lifestyle with habitual exercise (16). Research has shown that both resistance exercise and protein/amino acid consumption can offset the deleterious effects of muscle disuse. Several studies have shown that electrical stimulation can prevent muscle mass losses during leg immobilization in young individuals (1, 17). In addition, resistance training and essential amino acid supplementation were able to attenuate losses of muscle mass and strength during 28 days of bed rest in middle-aged men (18). Similarly, six-sessions of low-load, high-volume resistance exercise has been found to not only prevent losses in leg lean mass, but increase leg lean mass when performed during 2 weeks of reduced ambulation in older adults (19). While less is known about the effects of resistance exercise on insulin sensitivity during muscle disuse, resistance exercise performed after 7 days of bed rest has been found to increase insulin-stimulated leg glucose extraction (15). Furthermore, resistance exercise has been found to improve insulin sensitivity and decrease inflammation in older adults (20, 21). As such, it is evident that muscle activation, either via resistance exercise or neuromuscular electrical stimulation, is an important countermeasure to declines in muscle mass and insulin sensitivity induced by muscle disuse. While studies examining muscle activation during periods of disuse overwhelmingly support a role for continued muscle contraction to offset muscle mass losses, studies examining higher protein intakes during disuse have yielded conflicting results. The provision of 16.5 g EAA with 30 g of carbohydrate resulted in maintenance of muscle protein synthesis rates, leg lean mass and attenuated the decrease in strength as compared with a control group during 28 days of bed rest in healthy adult men (12). Similarly Stein et al (22) found that 11g BCAA per day during 6 days of bed rest resulted in a 3-fold increase in nitrogen balance as compared with NEAA supplementation. In contrast, a recent trial by Dirks et al (23) found that twice daily 3 protein supplementation during 5-days of limb immobilization did not prevent losses of muscle mass or strength in healthy older men. In addition, Trappe et al (24) found a greater loss in thigh muscle volume, but similar losses in strength, in a group consuming high protein (1.6 g/kg body weight/d) as compared with a group consuming lower protein (1.0 g/kg body weight/d). Of note, the lower protein group was still consuming protein amounts greater than the RDA. Lastly, despite maintained rates of muscle protein synthesis in a group consuming 15 g of EAA as compared with a 30% decrease in muscle protein synthesis rates in a control group following 10 days of bed rest in elderly subjects, Ferrando et al (25) found similar losses in leg lean mass in both groups, but better functional capacity in the EAA group. Clearly, more work is needed to understand the role of protein consumption in preventing muscle mass and strength losses during periods of muscle disuse. In sum, we propose that muscle disuse is at the core of a number of age-related diseases that are predispositions for morbidity, disability, and mortality. There is currently, we believe, an under-appreciation of the role that muscle disuse plays in age-related declines in health and this symposium is designed to draw greater attention to the issue and to propose worthwhile pragmatic solutions. This symposium will appeal to both basic mechanistic and clinically-oriented geroscientists. 1. Dirks, M., B. Wall, T. Snijders, C. Ottenbros, L. Verdijk, and L. van Loon 2014 Neuromuscular electrical stimulation prevents muscle disuse atrophy during leg immobilization in humans. Acta Physiol (Oxf). 210: 628-641. 2. Wall, B., M. Dirks, T. Snijders, J. Senden, J. Dolmans, and L. van Loon 2014 Substantial skeletal muscle loss occurs during only 5 days of disuse. Acta Physiol (Oxf). 210: 600-611. 3. Wall, B., T. Snijders, J. Senden, C. Ottenbros, A. Gijsen, L. Verdijk, and L. van Loon 2013 Disuse impairs the muscle protein synthetic response to protein ingestion in healthy men. J Clin Endocrinol Metab. 98: 4872-4881. 4. Coker, R., N. Hays, R. Williams, L. Xu, R.R. Wolfe, and W. Evans 2014 Bed rest worsens impairments in fat and glucose metabolism in older, overweight adults. J Gerontol A Biol Sci. 69: 363-370. 5. Breen, L., K. Stokes, T. Churchward Venne, D. Moore, S. Baker, K. Smith, P. Atherton, and S. Phillips 2013 Two weeks of reduced activity decreases leg lean mass and induces «anabolic resistance» of myofibrillar protein synthesis in healthy elderly. J Clin Endocrinol Metab. 98: 2604-2612. 6. Ferrando, A., H. Lane, C. Stuart, J. Davis Street, and R.R. Wolfe 1996 Prolonged bed rest decreases skeletal muscle and whole body protein synthesis. AJP Endo Metab. 270: E627-E633. 7. Kortebein, P., A. Ferrando, J. Lombeida, R.R. Wolfe, and W. Evans 2007 Effects of 10 days of bed rest on skeletal muscle in healthy older adults. JAMA. 297: 1772-1774. 8. Suetta, C., L. Hvid, L. Justesen, U. Christensen, K. Neergaard, L. Simonsen, N. Ortenblad, S. Magnusson, M. Kjaer, and P. Aagaard 2009 Effects of aging on human skeletal muscle after immobilization and retraining. J Appl Physiol. 107: 1172-1180. 9. Krogh-Madsen, R., J. Thyfault, C. Broholm, O. Mortensen, R. Olsen, R. Mounier, P. Plomgaard, G. van Hall, F. Booth, and B. Pedersen 2010 A 2-wk reduction of ambulatory activity attenuates peripheral insulin sensitivity. J Appl Physiol. 108: 1034-1040. 10. Glover, E., S. Phillips, B. Oates, J. Tang, M. Tarnopolsky, A. Selby, K. Smith, and M. Rennie 2008 Immobilization induces anabolic resistance in human myofibrillar protein synthesis with low and high dose amino acid infusion. J Physiol. 586: 6049-6061. 11. Gibson, J., D. Halliday, W. Morrison, P. Stoward, G. Hornsby, P. Watt, G. Murdoch, and M. Rennie 1987 Decrease in human quadriceps muscle protein turnover consequent upon leg immobilisation. Clin Sci. 72: 503-509. 12. Paddon-Jones, D., M. Sheffield-Moore, R. Urban, A. Sanford, A. Aarsland, R.R. Wolfe, and A. Ferrando 2004 Essential amino acid and carbohydrate supplementation ameliorates muscle protein loss in humans during 28 days of bedrest. J Clin Endocrinol Metab. 89: 4351-4358. 13. Glover, E., N. Yasuda, M. Tarnopolsky, A. Abadi, and S. Phillips 2010 Little change in markers of protein breakdown and oxidative stress in humans in immobilization induced skeletal muscle atrophy. Applied Physiology, Nutrition, and Metabolism. 35: 125-133. 14. Stuart, C., R. Shangraw, M. Prince, E. Peters, and R.R. Wolfe 1988 Bed rest induced insulin resistance occurs primarily in muscle. Metabolism. 37: 802-806. 15. Bienso, R., S. Ringholm, K. Kiilerich, N. Aachmann-Andersen, R. Krogh-Madsen, B. Guerra, P. Plomgaard, G. van Hall, J. Treebak, B. Saltin, C. Lundby, J. Calbet, H. Pilegaard, and J. Wojtaszewski 2012 GLUT4 and glycogen synthase are key players in bed rest-induced insulin resistance. Diabetes. 61: 1090-1099. 16. English, K. and D. Paddon-Jones 2010 Protecting muscle mass and function in older adults during bed rest. Curr Opin Nutr Metab Care. 13: 34. 17. Gibson, J., K. Smith, and M. Rennie 1988 Prevention of disuse muscle atrophy by means of electrical stimulation: maintenance of protein synthesis. The Lancet. 332: 767-770.

**S16- FRAILTY AND FALLS – EVIDENCE AND GAPS.** *C. Sieber (Nürnberg, Germany)*

Introduction: In community-dwelling older persons over 65 years about 30 % experience a fall once per year with many older persons having even more than one fall event per year. In the population > 80 years this prevalence rates increase up to 50%, with the highest fall rates in the residential care population. Therefore falls pose a major threat to independency, health and quality of life for older persons. Frailty has been recognized as a state of diminished functional reserve capacity and decreased resistance to stressors, and like falls, is associated with negative health outcomes such as hospitalization, institutionalization, and mortality [1, 2]. The prevalence of frailty is dependent of the definitions and methods used. Although inconsistency in methods and definitions exists prevalence rates are reported between 4.0–59.1% for community-dwelling persons, with increasing prevalence for women and in the oldest old [3]. Research in older persons investigating the relationship between frailty, falls, and possible moderators as fear of falling or physical activity are still rare [2]. Objectives: This symposium will expand the current knowledge on the relationship between frailty and falls by presenting data of several larger national cohorts of the older population (New Zealand, Germany and Ireland). Different population age cohorts will be addressed to gain further inside into the frailty-falls relationship. Furthermore, the symposium will identify gaps in our current understanding of the relationship between frailty and falls. Discussion: The British Geriatric Society recommend, to address falls and fall risk (gait speed, and Timed Up and Go Test)[4] for the management of frailty. Assembling data on this relationship will be the strength of the submitted symposium. Furthermore, by presenting data in national cohorts of older persons the submitted symposium will cover a broad range of older persons living in different countries. Conclusion: Development of appropriate screening methods to identify high risk older persons for possible interventions on a national basis is an urgent need for further research. Identifying the appropriate target group from the general older population is a prerequisite for research to design complex interventions for both entities. The symposium will target two important topics – frailty and falls – in older persons in order to stimulate further research in this area. 1. Fried, L., Tangen, CM., Walston, J., Newman, AB., Hirsch, C., Gottdiener, J., Seeman, T., Tracy, R., Kop, WJ. Burke, G., McBurnie, MA., Frailty in Older Adults: Evidence for a Phenotype. J Gerontol A Biol Sci Med Sci, 2001. 56(3): p. M146-157. 2. Morley, J.E., et al., Frailty consensus: a call to action. J Am Med Dir Assoc, 2013. 14(6): p. 392-7. 3. Collard, R.M., et al., Prevalence of frailty in community-dwelling older persons: a systematic review. J Am Geriatr Soc, 2012. 60(8): p. 1487-92. 4. Turner, G. and A. Clegg, Best practice guidelines for the management of frailty: a British Geriatrics Society, Age UK and Royal College of General Practitioners report. Age Ageing, 2014. 43(6): p. 744-7.

**Communication 1:** *Frailty and Falls in TILDA: Do frailty indices differ when they are constructed using exclusively self-reported or test-based measures?* O. Theou[1], M.D.L. O'Connell[2], B.L. King-Kallimanis[2], A.M. O'Halloran[2], K. Rockwood[1], R.A. Kenny[2] (1. Nova Scotia, Canada; 2. Dublin, Ireland)

This study examines the association of frailty and various adverse outcomes including falls in Irish resident over the age of 50 using data from The Irish LongituDinal study on Ageing (TILDA).

**Communication 2:** *Frailty and falls in the oldest old: LiLACS NZ,* N. Kerse, R. Mules, R.Teh, A. Rolleston (Auckland, New Zealand)

Frailty in octogenarians has been assessed, and falls and functional decline followed over 4 years. We show how frailty and falls predict outcomes and how physical activity level moderates the outcomes.

**Communication 3:** *Frailty and Falls in DEGS1. Findings from the German Health Interview and Examination Survey,* J. Fuchs[1], C. Scheidt-Nave[1], E. Freiberger[2] (1. Berlin, Germany; 2. Nuremberg, Germany)

In a representative national survey , data on physical, cognitive and social frailty were obtained as well as information on number of falls within the last 12 months. We show

how different components of frailty and falls are related.

**S17- PHYSICAL PERFORMANCE TESTS AND BODY COMPOSITION ASSOCIATIONS: FROM POPULATION TO CLINICAL SETTINGS.** *R. Salinas-Martínez (Nuevo León, Mexico)*

Clinically sound knowledge is urgently needed in those countries that are having an accelerated aging, such as Mexico. Diverse studies are available in the community setting, that have shown different associations between physical performance tests and body composition in older adults. However, studies on how these associations are in clinical settings are needed to increase the clinical utility of these assessments in older adults. The aim of this symposium is to describe research in the field from the viewpoint of the clinical setting and from the community.

**Communication 1:** *Correlation between muscle mass by bioelectrical impedance analysis, calf circumference and grip strength*, K. Rodriguez-Quintanilla, R. Salinas-Martinez, X. Ortiz-Jimenez, C. Quiñonez-Olivas, L. Miranda-Plata (Nuevo León, Mexico)

Background: Bioelectrical impedance analysis (BIA) is a well validated method for estimating body composition and it has been shown to indirectly predict muscle mass. The objective is to determine the correlation between muscle mass measured by BIA, calf circumference, and physical performance measured by grip strength. Methods: This is a descriptive study. Adults over 60 years of age who were independent in basic activities of daily life were randomly selected from the Geriatric outpatient clinic from the «Dr. José Eleuterio González» University Hospital. Anthropometric measurements of weight, height, BMI, calf circumference and grip strength were performed. The estimation of body composition was performed with BIA obtaining a muscle through the formula: [(size2/RX 0401) + (sex x 3825) + (age x-0.071) + 5.102. R is the resistance in ohms per BIA, gender male = 1 and female = 0, and age expressed in number of years. Descriptive statistics and Spearman´s correlation coefficient analysis were performed. The normality of the variables was tested through the Kolmogorov-Smirnov test. Results: Sixty patients, 43 women and 17 men with a mean age of 74.8 years were evaluated; descriptive statistics are expressed as means and standard deviation (SD) with a weight 65.87 ± 14.1 kg, height 1.54 ± 0.09 mt, BMI 27 ± 5.6 kg/m2, calf circumference of 34 ± 4.3cm, grip strength 21 ± 7.9 kg and muscle mass by BIA of 10.5 ± 2.5 kg. The result of the test of association was a positive Spearman correlation of muscle mass by BIA with calf circumference, r = 0.512 and grip strength, r = 0.768 (P <0.01). Conclusion: Grip strenght is one of the variables that has been used for the diagnosis of sarcopenia and as a marker of physical performance and fragility; and calf circumference as a marker of muscle mass and physical disability.2 Muscle measurement by DEXA has been shown to correlate with calf circumference and physical performance.4 In this study we confirmed that the muscle mass estimated by BIA correlates with calf circumference and physical performance as measured by grip strength; a finding that has not been described previously. Electrical bioimpedance analysis is a reliable method of estimating muscle mass. It is an easy test to perform and reproduce, and is validated in the diagnosis of sarcopenia. It also predicts physical performance by its correlation with grip strength. Therefore the correlation found in this study supports the use of BIA in estimating muscle mass, constituting a useful tool in the initial evaluation of physical performance and longitudinal monitoring of patients with or without sarcopenia.

**Communication 2:** *Skeletal Muscle Mass Index In A Geriatric Outpatient Population,* K. Rodriguez Quintanila, R. Salinas Martinez, G. Guajardo Alvarez, J.A. Davila Olalde, D. Vega Morales, P.A. Garcia Hernandez, M.A. Garza Elizondo (Nuevo León, Mexico)

Background: Disability in old age is associated with incidental diseases and particular phenomena of aging such as cognitive impairment , sarcopenia and frailty.1-3 Loss of muscle mass resulting in decreased strength and aerobic capacity, with impaired functionality.3,4 This is due to several factors, one is the method of assessing muscle mass, the ethnical muscle mass variation between populations, etc. Because of the crucial role played by muscle mass and strength in the degree of physical performance, and the influence of the latter on the prognosis and mortality of older adults, the aim of our study is to calculate appendicular muscle mass index values, muscle strength and physical performance in a community dwelling elderly population. Methods: This is a prospective observational study performed. We randomly selected subjects over 60 years of age from our geriatric clinic in a tertiary care academic hospital with outpatient clinics. These individuals had to be independent in basic activities of daily living (Katz index ≥ 5). Skeletal muscle mass was measured by DXA, muscle mass with hand grip and physical performance by Short Physical Performance Battery. Results: Sixty-three patients participated in the study, three were eliminated. A total population of 60 patients was included; there were forty-three women (71.7%) and seventeen men (28.3%); mean age was 74.8 years. Mean apendicular skeletal muscle mass index by DXA was 6.31 kg/m2 in both genders, and 6.00 kg/m2 for women and 7.01 kg/m2 for men. The mean of muscle strength was 21.1 kg and 11 points for the Short Physical Performance Battery. Conclusions: It is necessary to establish skeletal muscle mass, strength and physical performance cutoff values adjusted for each population. Values currently used correspond to populations whose body composition is assumed to be different from the Mexican population. There is no studies in Mexican population that describes physical performance in older Mexican population. It´s being necessary cohort studies in the Mexican population to establish values of skeletal muscle mass, strength and physical performance in the young and elderly to more accurately define sarcopenia in Mexican population.

**Communication 3:** *Association Between Handgrip Strenght And Body Mass Index And Other Simple Clinical And Anthropometric Measurements: A Cross-Sectional Population Based Study*, R. Hernán Medina-Campos, M. Ulises Pérez-Zepeda, L. Miguel Gutiérrez-Robledo (Mexico City, México)

Background: Biomarkers may be suitable candidates for satisfying the need for screening tools for the elderly, provided that they are accurate, reliable, cheap, easy to measure and predictive of meaningful outcomes. However, only a few biomarkers display those features and none is free of fallbacks. Among the most widely studied, handgrip strength (HS) is a robust predictor of death. A systematic review found low HS to consistently predict death among diverse populations, including community-dwelling and hospitalized elderly men and women in varying states of health. Conversely, high HS was found to be a consistent predictor of survival. Still, little is known about the association, if any, of HS with other simple clinical/anthropometric measurements such as body mass index (BMI), girth circumference, waist circumference, blood pressure, gait speed, hemoglobin and glycated hemoglobin. Therefore the aim of this study was to determine the association between HS and BMI, and their respective associations with other simple clinical/anthropometric measurements in a population based sample of Mexican older adults. Methods: Out of the 15,723 subjects surveyed in the third wave of the MHAS, a subsample of 2,147 had anthropometric measurements, including 1,153 subjects who were 60 years or older. Only those with complete data (N=1,073) were included in this study. Results: General characteristics of population (N=1,073) stratified by sex, the anthropometric variables with statistical differences were: the weight with a mean of 71.73 kg for men vs 64.3 kg for women (p<0.001); the BMI was higher in the group of women with a mean of 29.11 kg/m2 vs 27.67 kg/m2 in the men ( p <0.001), the mean of waist circumference for men was 148.39 cm vs 145.23 cm for women (p<0.001) and the mean of hip circumference for men was 150.37 cm and for women was 157.76 cm (p<0.001). The relation between BMI and anthropometrics variables as weight with 0.852 (p<0.001) in men and 0.891 (p<0.001) in female, waist circumference with 0.871 (p<0.001) in men and 0.863 (p<0.001) in women and handgrip strength with 0.153 (p<0.001) in males and 0.163 in women (p=0.001). No relationship was observed between systolic pressure and gait speed with the BMI value; but a thigh correlation was identified between BMI and gait speed with 0.852 (p<0.001) men, 0.086 female (p<0.001) and finally gait speed and handgrip strength with 0.153(p<0.0010) in males and 0.163 (p<0.001) in females. Conclusion: A non-linear relationship between BMI and poor physical performance (namely chair rise, walking speed and balance tests) has already been found in another study, whereby BMI values corresponding to underweight and overweight are associated with poorer physical performance. In the same study, there was an association between weaker HS and poorer physical performance, and this association was stronger in women than men. Although BMI and HS were positively associated in men, they were independent from each other and exerted an additive effect on physical performance. It may be that the relationship between BMI and HS is mediated by different mechanisms than the relationship of either of them with physical performance or with mortality. It is also possible that different values of BMI reflect different body composition patterns in the elderly. Because higher BMI is associated with lower walking speed, higher values would be more representative of central adiposity, while lower values would be more representative of sarcopenia.

## ORAL COMMUNICATIONS

**OC2- EMA POINTS TO CONSIDER ON FRAILTY.** F. Cerreta *(London, UK)*

As part of its Geriatric medicines strategy, the EMA is developing a guideline: Points to Consider on the baseline frailty characterisation. This is aimed at finding a way to categorise patients enrolled in clinical trials and registries for new drug development on the basis of their frailty status, and to overcome the current limitations of ICH E7 guideline (STUDIES IN SUPPORT OF SPECIAL POPULATIONS: GERIATRICS) which categorises patients on the basis of chronological age (4 age groups: <65, 65-74, 75-84, 85+). The aim is to characterise the population enrolled in regulatory clinical trials and assess the representativeness of real life patients. The Points to Consider will look at three frailty domains: physical, cognitive and multimorbidity. The presentation will discuss the philosophy behind the points to consider, the stage of development of the guideline (which should be nearing public consultation by the time of the conference) and also the results of the session on geriatrics at the EMA dose finding workshop in December 2014.

**OC3- A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED, PARALLEL GROUP, MULTICENTER STUDY OF THE SAFETY AND BIOEFFECT OF REGN1033 WITH AND WITHOUT EXERCISE IN HEALTHY SUBJECTS (NCT01910220).** R.A. Fielding[1], S. Bhasin[1], S. Basaria[1], T. Storer[1], B.C. Clark[1], T. Law[1], M. Pahor[3], T.M. Manini[3], E. Binder[4], C. Liu[1], M.J. Koren[5], E. Gasparino[6], P.J. Tiseo[6], H. Ren[6], R. Kao[6], P. Banerjee[6], P. Kovalenko[6], S. Mellis[6], R. Pordy[6], S. Donahue[6], X. Qian[6] *(1. Boston, USA; 2. Athens, USA; 3. Gainesville, USA; 4. St. Louis, USA; 5. Jacksonville, USA; 6. Tarrytown, USA)*

Backgrounds: Poor skeletal muscle performance is a critical component in multiple diseases and is associated with functional deficits, mobility impairment, metabolic comorbidities, and loss of independence. Therapies intended to increase muscle mass may lead to improvement of strength and functional performance. REGN1033/SAR391786 is a fully human monoclonal antibody that specifically blocks myostatin, a major negative regulator of skeletal muscle growth. In preclinical pharmacology models, REGN1033

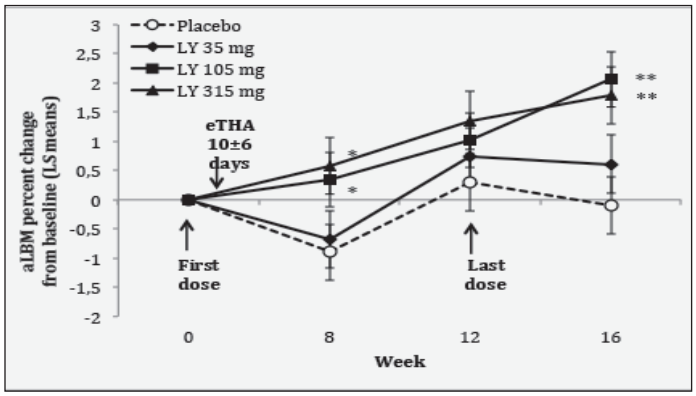
treatment has been shown to increase muscle mass and strength, and to prevent muscle atrophy induced by limb immobilization and glucocorticoid treatment. REGN1033 treatment also increased insulin sensitivity in obese animals. In aged mice, REGN1033 increased functional endurance in combination with exercise. In two previous phase 1 studies (NCT01507402, NCT01720576) conducted in healthy volunteers, including those aged 60 years and older, REGN1033, administered intravenously (IV) and subcutaneously (SC), did not reveal significant safety signals. Exploratory analysis showed that REGN1033 treatment resulted in sustained target engagement and increases of lean body mass over placebo. This current study is designed to evaluate the effects of REGN1033 further. Methods: A randomized, double-blind, placebo-controlled, multicenter, parallel-group study was conducted to evaluate the effects of repeated doses of SC REGN1033 treatment on safety, body composition, muscle strength and stair climb power in 120 healthy male and female subjects with a sedentary lifestyle, who are 60 years of age and older. The study employed a 2x2 factorial design, consisting of 4 arms of approximately 30 subjects each: 1) Placebo alone 2) Placebo with exercise 3) REGN1033 alone and 4) REGN1033 with exercise. Subjects who were randomized into the exercise groups performed low-to-moderate intensity progressive resistance training of upper and lower body muscle groups under the supervision of exercise physiologists at each study site. The primary endpoint was percent change from baseline to week 12 in total lean body mass. Subjects were followed for 10 weeks after the study drug administration. Results: This study was conducted at 7 US investigational sites. At the time of abstract submission, the study completed enrollment and all subjects completed their visits and assessments. Database lock activities are ongoing and all investigational sites and Regeneron study team are still blinded for treatment assignments. This study was monitored by an independent data monitoring committee who regularly reviewed safety data and had recommended continuing the study through its completion. Results will be provided when available. Conclusion: Conclusion will be provided when available.

**OC4- PHASE 2 RANDOMIZED STUDY OF MYOSTATIN ANTIBODY LY2495655 VERSUS PLACEBO IN OLDER PATIENTS UNDERGOING TOTAL HIP ARTHROPLASTY (THA).** L. Woodhouse[1], R. Gandhi[2], S.J. Warden[3], S. Poiraudeau[4], S.L. Myers[3], C.T. Benson,[3], L. Hu[3], Q. Ahmad[3], P. Linnemeier[3], E.Gomez[3], O. Benichou[5]
*(1. Alberta, Canada; 2. Toronto, Canada; 3. Indianapolis, USA; 4. Paris, France, 5. Neuilly, France)*

Background: Total hip arthroplasty (THA) is effective at relieving joint pain in patients with end stage osteoarthritis. However, these patients frequently have muscle atrophy after surgery which translates into suboptimal lower limb function. There is a need to improve the rate and extent of functional recovery after THA. Here we present the results of a randomized, double-blind, parallel study of LY2495655 (LY), a humanized monoclonal antibody targeting myostatin, in a population of older patients undergoing elective THA. NCT01369511. Methods: Eligible patients were aged ≥50 years, took ≥12 seconds to perform the Timed Up and Go (TUG) test, and were able to climb ≥6 steps without human assistance (gait aids and hand rail allowed). Patients were randomized 10±6 days prior to THA to receive monthly subcutaneous injections of either placebo or one of 3 doses of LY (35, 105, or 315 mg) at weeks 0 (randomization date), 4, 8, and 12. Patients were assessed at each dosing visit, with follow-up assessments at weeks 16 and 24. The primary efficacy endpoint was percent change in appendicular lean body mass (aLBM) measured by dual-energy x-ray absorptiometry (DXA), excluding the operated limb, from baseline to 12 weeks. Exploratory endpoints included whole body composition (DXA), Lower Extremity Functional Scale (LEFS), and the following performance based measures of physical function over time: TUG test, leg press strength of each leg, stair climbing (6 steps), and hand grip strength (dynamometer). Efficacy analyses were conducted on the modified intent-to-treat (mITT) population, including all randomized patients receiving at least 2 doses (including one at randomization/week 0) before week 12. The primary analysis used a Bayesian Normal Dynamic Linear model to assess the probability that aLBM increased from baseline in each LY group by at least 2.5% more than in the placebo group. A probability of 65% or greater was needed to declare that an LY dose had the desired effect. The probability of erroneously declaring that LY had an effect on aLBM when there was no true effect was <1%. Safety analyses were conducted on all randomized patients regardless of protocol compliance. All exploratory tests of treatment effects were conducted using a 2-sided alpha level of 0.1. Results: Patients (N=400) were randomized from 42 sites in 11 countries. Treatment groups were comparable at baseline for demographic characteristics (59% women, age 69±8 years, BMI 29±5 kg/m2), percentage of patients undergoing primary versus revision THA, planned surgical approach, aLBM, and physical performance measures. All treatment groups experienced increases in aLBM from baseline to week 12. The probability that [LY-placebo] was at least 2.5% in change from baseline to 12 weeks for aLBM was 0.7% or less, therefore the primary objective was not met. However, the mean percentage change in aLBM from baseline displayed a dose-dependent response pattern over the course of the study (Figure 1). At week 8, aLBM increased by 1.2% (p=0.066) in the LY 105 mg group and by 1.5% (p=0.031) in the LY 315 mg group, compared to placebo. At week 16, aLBM increased by 2.2% (p=0.002) in the LY 105 mg group and by 1.9% (p=0.007) in the LY 315 mg group, compared to placebo. In addition, decreases in whole body fat mass were seen with LY 315 versus placebo at week 8 (p=0.097) and week 16 (p=0.088). No meaningful differences were detected between treatment groups in changes from baseline in objective measures of physical performance, LEFS score, or whole body bone mineral density. No deaths or dose-response effect in the frequency of serious adverse events were reported during the study. Injection site reactions, most often mild, occurred in 4% of placebo patients, 10% of LY 35 mg patients, 17% of LY 105 mg patients, and 19% of LY 315 mg patients, and required treatment discontinuation in 1 LY patient. No clinically meaningful difference was observed between groups for postoperative complications. No other safety signal was observed. Conclusion: This study did not achieve its primary objective of LY increasing aLBM by 2.5% from baseline to 12 weeks. However, dose-dependent increases in aLBM and decreases in fat mass were observed, consistent with LY's expected mechanism of action. The absence of efficacy detected on physical performance might relate to the drug itself, the short duration of treatment, or the presence of confounding factors related to the elective THA patient population, including high BMI, major lower limb surgery, and disabling hip pain.

**Figure 1**

Percent change from baseline in aLBM of 3 limbs, excluding the leg on the operated side (mITT population). Dosing occurred at weeks 0 (randomization date), 4, 8, and 12. Patients underwent THA 10±6 days after randomization. Error bars represent Standard Error. *p<0.1, **p<0.01 LY versus placebo, Type 3 Tests.




**OC5- FISH OIL DERIVED N-3 POLYUNSATURATED FATTY ACID THERAPY INCREASES MUSCLE MASS AND FUNCTION IN OLDER ADULTS.** G.I. Smith, S.Julliand, D.N. Reeds, D.P. Sinacore, S. Klein, B. Mittendorfer *(St. Louis, USA)*

Background: Age-associated declines in muscle mass and function are major risk factors for an impaired ability to carry out activities of daily living, falls, prolonged recovery-time after hospitalization and mortality in older adults. New strategies that can slow the age-related loss of muscle mass and function are needed to help older adults reduce these risks and maintain adequate performance status and independence. Results from studies conducted in cancer patients, people with rheumatoid arthritis and resistance exercise-trained people suggest that fish oil derived n-3 polyunsaturated fatty acids (PUFA) can stimulate muscle growth and enhance strength. However, a robust assessment of their effects on muscle mass and function in the older adult population has not been made. We therefore evaluated the efficacy of fish oil-derived n-3 PUFA therapy to slow the age-associated loss of muscle mass, strength and power. Methods: We conducted a 6 months, double-blind, randomized controlled trial in 60 healthy 60-85 year old adults. Subjects were randomized in a 2:1 fashion to either n-3 PUFA therapy (four 1-gram pills of Lovaza® per day [providing 1.86 g eicosapentaenoic acid (20:5 n-3) and 1.50 g docosahexaenoic acid (22:6 n-3)] or placebo control (four identical looking pills containing corn oil per day) for 6 months. The primary outcome measures, which were assessed before starting the treatment and again after ~3 months and 6 months, were: i) thigh muscle volume (evaluated by using magnetic resonance imaging), ii) hand grip strength (evaluated by using a hand-held dynamometer), iii) one repetition maximum (1-RM) muscle strength (composite score for leg press, chest press, knee extension and knee flexion performed on a Hoist multi-station weight machine), and iv) muscle power [composite of isokinetic knee extension at 1.0472 rad/s (60 o/s), knee flexion at 1.0472 rad/s, knee extension at 3.1416 rad/s (180 o/s) and knee flexion at 3.1416 rad/s performed on a Biodex 3 dynamometer)]. Red blood cell n-3 PUFA content before and after treatment was evaluated as a measure of compliance with n-3 PUFA intake. Results: Forty-four subjects (73%) completed the study. Average compliance of subjects who completed the study, as judged by the leftover pill count, was (mean ± SD) 93.6 ± 7.4% in the n-3 PUFA and 91.8 ± 8.1% in the control group. Red blood cell n-3 PUFA content increased by 135% (95% CI: 115 to 154%) in the n-3 PUFA group [from 5.8 ± 1.0 to 13.2 ± 1.9% of total fatty acid content] and did not change [2% (95% CI: -6 to 9%)] in the control group [5.9 ± 1.0 % of total fatty acid content before and 6.0 ± 1.2 % after, respectively]. Compared with the control group, 6 months of n-3 PUFA therapy increased thigh muscle volume [3.43% (95% CI: 0.01 to 6.86%); P=0.0498], handgrip strength [5.0 % (95% CI: 0.3 to 9.8%); P=0.012], 1-RM muscle strength [6.0% (95% CI: 0.6 to 11.4%); P=0.031] and muscle power [6.4% (95% CI: 0.0 to 13.0%); P=0.054]. Conclusion: Fish oil-derived n-3 PUFA therapy slows the normal decline in muscle mass and function in older adults and should be considered as a therapeutic approach for preventing sarcopenia and maintaining physical independence in the older adult population.

**OC6- A COMMUNITY-BASED, TECHNOLOGY-SUPPORTED SERVICE MODEL FOR DETECTING AND PREVENTING FRAILTY.** L. van Velsen[1], M. Illario[2], S. Kosterink[1], C. Crola[2], M. Vollenbroek *(1. Enschede, the Netherlands; 2. Naples, Italy)*

Background: Today, health services that enable the identification of (pre-)frail individuals, and that facilitate the prevention of the development of frailty are dispersed over many initiatives and quite expensive. Ideally, one health service would incorporate the different aspects of frailty (e.g., cognitive and physical screening and training), and would be cost-effective, and easily accessible. Such a service can lead to a decreased the number of falls, hospitalizations and institutionalizations, and can result in huge cost savings and increased quality of life for older adults. In the European project PERSSILAA, we developed a community-based, technology-supported health service that identifies whether an older adult is robust, frail or prefrail, and that provides services for improving physical and cognitive functioning and education on healthy nutrition. Methods: Stakeholders were inventoried, and with older adults (or representatives) contributed to its design via participatory design meetings. These meetings were held in the Netherlands and Italy, and adapted to the way in which stakeholders expect to be involved in decision making for healthcare services in the different countries. In the Netherlands, a first group meeting was held with the goal to come to an 'ideal' service model. This ideal was aligned with realistic possibilities in nine further workshops and meetings. These workshops focused on the envisioned gains for each stakeholder, the role(s) they see for themselves, and the task(s) they are willing to carry out. In Italy, a first, central stakeholder meeting was organized to create awareness after which the attendants could spread news about the upcoming service in their local communities. Next, nine local workshops were held to identify the needs of those actually working with the service, to divide tasks, and to create standard working protocols. Based on the workshops, a service model was created, as well as a technology design that can support it. Results: The workshops led to a service model for detecting and preventing frailty. In it, older adults are invited for a screening via their general practitioner (a wish voiced in the Netherlands) or via a community service (such as a church; a wish voiced in Italy). Older adults can complete the screening via a dedicated website, paper questionnaires, or with the help of a trained volunteer. Next, they are classified as robust, frail or pre-frail. Frail individuals will be seen by a healthcare professional, while healthy ones are invited for a new screening a year later. Pre-frail individuals are invited for a second screening, administered by trained volunteers. From this screening, a fine-grained understanding of an individual's frailty status can be deduced on the physical, cognitive and nutritional domain. Individuals that show decline on one or more of these domains will be offered training services, while robust and frail persons are dealt with similarly as before. Training services for the pre-frail can be followed online (via the same website) or at locations in the community, where they are supported by trained volunteers. The training modules focus on physical and cognitive training, and education on healthy nutrition for older adults. All modules follow a pre-set program for improving one's general status on the domain. Progress is monitored via interim screenings. Conclusion: In this study we created a community-based, technology-supported service model for detecting and preventing frailty. The model can be embedded in a wide range of countries and healthcare systems with only small modifications; mostly in the route older adults follow for approaching the services. For example, where in Italy recruitment appeared to be done best via the local community in the form of churches, in the Netherlands, recruitment via a General Practitioner's office appeared to be more feasible. The service model allows for individuals to take control over their own health by using self-service technology for screening and training. Alternatively, community-based services are used to provide care close to home and in a social setting. Both options take away the burden of care from institutions. This way, older adults are offered services that can cope with the high number of persons that are eligible for screening and training, but at low costs. Furthermore, by offering services that can easily be integrated in the older adults' daily life (by allowing them to train at home or at well-known locations in the community) acceptance and use can be expected to be high. At the moment of writing, the services are being deployed in the Netherlands and Italy, where they will be evaluated by means of, respectively, a cohort multiple randomized controlled trial and a prospective cohort study, to provide evidence on the effectiveness and to determine adoption of the service model. During the presentation we will disclose full response numbers and outcomes. First analysis in the Netherlands with a population of 1,236 older adults showed a response rate of 51%, of which 55% was robust, 26% was frail, and 19% pre-frail.

**OC7- COMPARATIVE PERFORMANCE OF CURRENT DEFINITIONS OF SARCOPENIA AGAINST THE PROSPECTIVE INCIDENCE OF FALLS AMONG COMMUNITY-DWELLING SENIORS AGE 65 AND OLDER.** H.A. Bischoff-Ferrari[1], J.E. Orav[2], J.A. Kanis[3], R. Rizzoli[4], M. Schlögl[1], H.B. Staehelin[5], W.C. Willett[6], B. Dawson-Hughes[6] *(1. Zurich, Switzerland; 2. Boston, USA; 3. Sheffield, UK; 4. Geneva, Switzerland; 5. Basel, Switzerland; 6. Boston, USA)*

Aim: To compare the extent to which 7 available definitions of sarcopenia and 2 related definitions predict the prospective rate of falling. Methods: We studied a cohort of 445 seniors (mean age 71 years, 45% men) living in the community who were followed with a detailed fall assessment for 3 years. For comparing the rate of falls in sarcopenic versus non-sarcopenic individuals, we used multivariate Poisson regression analyses adjusting for gender and treatment (original intervention tested vitamin D plus calcium against placebo). Of the 7 available definitions, 3 were based on low lean mass alone (Baumgartner, Delmonico1 and 2) and 4 required both low muscle mass and decreased performance in a functional test (Fielding, Cruz-Jentoft, Morley, Muscaritoli). The 2 related definitions were based on low lean mass alone (Studenski1) and low lean mass contributing to weakness (Studenski2). Results: Among 445 participants, 231 fell, sustaining 514 falls over the 3-year follow-up. The prospective rate of falls in sarcopenic versus non-sarcopenic individuals was best predicted by the Baumgartner definition based on low lean mass alone (RR = 1.54; 95% CI: 1.09-2.18) with 11% prevalence of sarcopenia and the Cruz-Jentoft definition based on low lean mass plus decreased functional performance (RR = 1.82; 95% CI: 1.24-2.69) with 7.1% prevalence of sarcopenia. Consistently, fall rate was non-significantly higher in sarcopenic versus non-sarcopenic individuals based on the definitions of Delmonico1, Fielding and Morley. Conclusion: Among the definitions investigated, the Baumgartner definition and the Cruz-Jentoft definition had the highest validity for predicting the rate of falls.

**OC8- COMPARING MEASURES OF SARCOPENIA IN PREDICTING PHYSICAL FUNCTION POST HIP FRACTURE.** N. Chiles Shaffer, Y. Huang, A. Gruber-Baldini, M. Hochberg, J. Magaziner, D. Orwig *(Baltimore, USA)*

Background: Sarcopenia is a geriatric syndrome that is known to be associated with poor lower extremity function and functional recovery in older adults. Sarcopenia has been shown to be prevalent among hip fracture patients; however, there is limited research regarding the progression and onset of new sarcopenia after a hip fracture or its role in predicting poor functional recovery. Additionally, several definitions and measurement criteria for sarcopenia exist in the literature and provide various prevalence rates. This study compared several sarcopenia measures and definitions to determine which one best predicts functional recovery over the year post hip fracture. Methods: This longitudinal analysis was conducted using data from the 7th cohort of the Baltimore Hip Studies (BHS-7) that enrolled 362 male and female hip fracture patients age 65 and older. All participants were enrolled within 15 days post-admission for hip fracture and had a DXA scan and interview. Participants had the same measures performed, and additionally performance measures, at 2, 6, and 12 months post-fracture. The current analytic sample was comprised of 115 males and 123 females with complete sarcopenia and performance measures. The main outcome measures were the Lower Extremity Gain Scale (LEGS) and the Short Physical Performance Battery (SPPB) at 2, 6, and 12 months. LEGS (score range 0-36) is a performance-based measure that focuses on clinically relevant aspects of functioning for hip fracture patients. The SPPB (score range 0-12) is also an objective measure of function that assesses balance, gait speed, and chair rise time. The sarcopenia measures used included appendicular lean mass (ALM), ALM adjusted for BMI, and grip strength. The definitions of sarcopenia included in our assessment were the European Working Group on Sarcopenia in Older Persons (EWGSOP) definition, the Foundation for the National Institutes of Health (FNIH) definition, and the EWGSOP definition adjusted for BMI. To assess the effects of sarcopenia on LEGS and SPPB, logistic regression was used to calculate odds ratios of low physical function over time, adjusting for age, sex, BMI (when not adjusted for in outcome), and Charlson Comorbidity Index. Results: The mean age of participants was 81. Overall mean LEGS score over time was 18.4. The overall mean SPPB score over time was 3.9, indicating the severity of lower extremity dysfunction experienced post-fracture. Prevalence of sarcopenia over time varied greatly by measure/definition used (8% with the FNIH definition to over 58% by low lean mass). In the models predicting LEGS score, low grip strength [OR: 0.3, 95% CI: (0.2, 0.4)], the EWGSOP definition [OR: 0.5, 95% CI: (0.3, 0.9)], and EWGSOP adjusted for BMI [OR: 0.5, 95% CI: (0.3, 0.8)] significantly predicted odds of low LEGS score over time post-fracture. The FNIH definition was not associated low LEGS score over time. In the models predicting SPPB score, low grip strength [OR: 0.4, 95% CI: (0.3, 0.7)], the FNIH definition [OR: 0.4, 95% CI: (0.2, 0.8], and the EWGSOP definition adjusted for BMI [OR: 0.4, 95% CI: (0.2, 0.7)] predicted odds of low SPPB score post-fracture. The EWGSOP definition did not significantly predict low SPPB score over time. Low grip strength alone provided similar odds of low SPPB score over time as the FNIH definition and EWGSOP definition adjusted for BMI. Low ALM, the classic measure of sarcopenia, was not associated with either outcome. Conclusions: Only half of the assessments of sarcopenia predicted a higher odds of poor physical function after hip fracture in this population; this demonstrates that the measure/definition of sarcopenia chosen is an important aspect of the relationship between sarcopenia and physical function post-fracture. While the classic measure of sarcopenia was not associated with either outcome, both newer definitions predicted one of the two outcomes. This may provide evidence that the newer definitions have greater specificity for identifying hip fracture patients at greatest risk of poor physical function. Poor LEGS and SPPB scores were not predicted by all of the same definitions, indicating that each definition captures a different aspect of physical function. Of the measures/definitions that did show significant associations with SPPB, grip strength provided similar findings as the definitions from FNIH and EWGSOP adjusted for BMI. Both of these definitions include grip strength as well as ALM. These findings may indicate that grip strength alone, an easily administered and readily available assessment, may help differentiate which patients are at greatest risk of physical dysfunction after hip fracture. Additional research should be conducted to further assess the ability of grip strength to classify hip fracture patients, and to examine the different aspects of physical function captured by the FNIH and EWGSOP definitions.

**OC9- MOBILE ACCELEROMETRY: A «SWISS ARMY KNIFE» FOR AGING RESEARCH.** M. Daumer, C. Lederer *(Munich, Germany)*

Background: Aging is closely related to changes in physical activity. Physical activity plays a dual role both as treatment option and outcome. Mobile accelerometry allows to measure both dosage and effect. Obviously, falls are a particularly interesting outcome. Methods: We present results gained from an integrated IT and sensor platform

(«actibelt», a 3D accelerometer in a belt buckle). The results are based both on long term measurements in the patient's real life and rapid tests in controlled environments. Results: In two studies with - in total - more than 800 healthy subjects we could verify a significant correlation between real life walking speed and age. In studies with MS patients we found significant correlations of real life walking speed with disease status as measured by EDSS. In this sense, MS can be interpreted as accelerated aging. In an ongoing study with MS patients we evaluate the relationship between clinical gait and balance tests (6MWT, 2MWT) and gait patterns in real life. Assessing the ecologic validity of fall detection algorithms based on promising laboratory data is difficult. In a database of more than 360000 hours of accelerometric recordings sampled at 100 Hz, we found only one well documented fall resulting in a fracture. Conclusion: An open collaborative platform ("the human motion project") to share algorithms and data from suitable observational studies and RCTs, allowing for standardization and mutual cross-validation, will support the evaluation of algorithms based on rare events and eventually lead to regulatory acceptance of new outcomes/endpoints in drug trials – in particular sarcopenia, rehabilitation after fracture, MS - based on mobile accelerometry.

**OC10- FRAILTY MORE THAN MULTIMORBIDITY WAS PREDICTIVE OF MORTALITY AMONG SARCOPENIC OLDER PERSONS AGED 80 YEARS AND OLDER.** M. Tosato, E. Marzetti, R. Calvani, A.M. Martone, G. Savera, R. Bernabei, F. Landi *(Rome, Italy)*

Background: Some evidences suggest that sarcopenia has a greater effect on survival than other clinical characteristics. In this study we evaluate the impact of sarcopenia on all-cause mortality and the influence of physical performance and multi-morbidity on all-cause mortality after a 10-year follow-up among sarcopenic subjects. Methods: We analyzed data from the Aging and Longevity Study in the Sirente Geographic Area, a prospective cohort study that collected data on all subjects aged 80 years and older (n=364). The main outcome measure was all-cause mortality over ten years follow-up. According to the European Working Group on Sarcopenia in Older People (EWGSOP) criteria, diagnosis of sarcopenia required the documentation of low muscle mass plus the documentation of either low muscle strength or low physical performance. Crude and adjusted hazard ratios and 95% confidence intervals (CI) for mortality by sarcopenia were calculated using Cox proportional-hazards models. Furthermore, we investigated in the subjects with sarcopenia the combined effect of functional impairment and multimorbidity on the risk of death and tested the potential interaction between them. Results: A total of 253 deaths occurred during the 10-year follow-up. Ninety (87.4%) participants died among subjects with sarcopenia compared to 162 subjects (65.1%) without sarcopenia ($p<0.001$). Participants with sarcopenia had a higher risk of death for all causes compared with subjects without sarcopenia (HR 2.15, 95% CI: 1.02-4.54). When examining the combined effect of sarcopenia and physical function, the effect of low level of function on the risk of death was higher than that of higher level of function. On the contrary, no significant differences were observed for subjects according to their combined sarcopenia and multimorbidity. Conclusions: The evaluation of the impact of sarcopenia on survival among frail older subjects is an important and intricate issue. Our findings show that sarcopenia, as identified by the EWGSOP criteria (muscle mass, muscle strength, physical performance), is associated with higher rate of mortality in older adults living in the community, independently of age and other clinical and functional variables. Besides, our findings show that physical impairment and no multimorbidity exerts an important influence on mortality in older adults with sarcopenia living in the community.

**OC11- DEFINING SARCOPENIA IN TERMS OF INCIDENT ADVERSE OUTCOMES.** J. Woo[1], J. Leung[1,2], J.E. Morley[2] *(1. Hong Kong; 2. St Louis, USA)*

Background: For the diagnosis of sarcopenia, the Foundation of the National Institutes of Health (FNIH) recently proposed cut off values for appendicular skeletal mass(ASM)/ body mass index (BMI), grip strength (GS) and walking speed(WS) based on incident mobility limitations using data from existing longitudinal studies in the US. This study compares the performance of different diagnoses of sarcopenia using European (EWGSOP), International(IWGS), and Asian(AWGS) consensus panel definitions, the US Foundation of National Institutes of Health (FNIH )criteria, and the screening tool SARC-F, in predicting physical limitation, slow walking speed and repeated chair stand performance at four year follow-up in a Chinese population. Method: Data from the Mr and Ms Os cohort were used. Participants have been followed up for up to ten years. Information was obtained from questionnaire regarding activities of daily living, physical functioning limitations, and constituent questions of SARC-F. Measurements include BMI, GS,WS, and ASM (using DEXA). Outcome measures at four years include physical limitation, increase in physical limitation, repeated chair stand, walking speed. Outcome measures at seven years include walking speed, and days of hospital stay. Mortality at ten years was also recorded. For each of the six diagnostic criteria, the area under the curve (AUC) was used to measure the concordance of predictive values with actual outcomes, adjusting for the following potential confounders: age, education, chronic obstructive pulmonary disease, diabetes mellitus, hypertension, heart disease, smoking habit, Mini-Mental Status Examination, and depression. AUCs were compared with Wilcoxon Tests. P value of less than 0.05 was considered statistically significant. Results: FNIH, Consensus Panel definitions and the screening tool SARC-F have similar AUC values in predicting incident physical limitation and physical performance measures at four years, walking speed at seven years, days of hospital stay at seven years, and mortality at seven years. None of the definitions predicted increase in physical limitation at four years or mortality at seven years in women, and none predicted all the adverse outcomes. The highest AUC values were observed for walking speed at four and seven years. Conclusion: When applied to a Chinese elderly population, criteria used for diagnosis of sarcopenia derived from European, Asian and International Consensus Panels, from US cut-off values defined from incident physical limitation, and the SARC-F screening tool, all have similar performance in predicting incident physical limitation and mortality.

**OC12- THE RELATIONSHIP BETWEEN FUNCTIONAL IMPAIRMENT AND FALLS IN COMMUNITY-DWELLING OLDER WOMEN.** E. Freiberger, C. Sieber, C. Bollheimer, S. Goisser, W. Kemmler, K. Engelke, S. von Stengel, M. Teschler *(Erlangen-Nürnberg, Germany)*

Background: In the older population falls pose a major threat health, independence and quality of life. In community dwelling persons > 65 years fall rates of about 30% have been reported increasing up to 50% in the cohorts 80 years and older. Identifying older persons at risk of falling at an early stage is highly important for reducing public health care costs and maintaining independence in this population. In the FORMOSA project the objective was to characterize different levels of muscle function [handgrip and gait speed] and muscle mass in community-dwelling older women > 70 years, and to match these data with the frequency of falls events in this population. Methods: Based on population registers letters were sent out to about 10.000 older women living in the Metropolitan area of Erlangen-Nuremberg in Germany with an invitation to take part in a research project. Information was obtained on muscle mass with BIA, and muscle function with gait speed, and hand-grip strength. Data on self-reported physical activity, falls (retrospective over 6 months) was also reported. Results: 1300 women were tested with a mean age of 76, 4 years (SD 4.9). Mean gait speed was 1.26m/sec with a range of 0.25 to 2.07 m/sec. Handgrip strength ranged from 8 kg to 40kg. Muscle mass index (kg/m2 ) ranged from 3.89 to 9,41 with a mean of 6.59 kg/m2. Mean Appendicular lean muscles mass (kg) was 16.8 SD 2.7, with about 6% falling into the Baumgartner Index Score < 5.45 kg/m2 for sarcopenia [1]. The Body Mass Index (BMI) ranged from 14.2 to 47.8 with a mean of 26.6. 69 % of the tested women reported no fall event in the last 6 months, and 9,1 % reported more than two falls in the last 6 months. Conclusion: Prevalence of physical limitations measured with handgrip strength and gait speed was lower than reported in other studies. The prevalence of sarcopenia was also lower in our community.-dwelling older female cohort then previously reported [2]. Falls in contrast were comparable to other studies in this cohort [3]. The Formosa project (Forschungsverbund Muskelschwund (Sarkopenie) und Osteoporose – Folgen eingeschränkter Regeneration im Alter ) was supported by the Bavarian Research Foundation (BFS). 1. Baumgartner, R.N., et al., Epidemiology of Sarcopenia among the Elderly in New Mexico. American Journal of Epidemiology, 1998. 147(8): p. 755-763. 2. Batsis, J.A., et al., Variation in the prevalence of sarcopenia and sarcopenic obesity in older adults associated with different research definitions: dual-energy X-ray absorptiometry data from the National Health and Nutrition Examination Survey 1999-2004. J Am Geriatr Soc, 2013. 61(6): p. 974-80. 3. Gassmann, K.G., R. Rupprecht, and E. Freiberger, Predictors for occasional and recurrent falls in community-dwelling older people. Z Gerontol Geriatr, 2009. 42(1): p. 3-10.

**OC13- SARCOPLASMIC RETICULUM FUNCTION AND MEMBRANE SPHINGOLIPIDS IN ADULT AND AGED RODENT SKELETAL MUSCLE.** D.W. Russ, I.M. Boyd, K.W. McCorkle1 *(Athens, USA)*

Background: Musculoskeletal disorders and diseases are the leading cause of disability in the U.S., and sarcopenia (age-related loss of muscle mass) has been suggested to play a key role in virtually all of them. However, weakness is a stronger predictor of physical dysfunction and disability than sarcopenia. In fact, accumulating data suggest that loss of muscle quality (force per unit muscle tissue) is a major, overlooked factor driving age-related muscle weakness, as the weakness exceeds loss of muscle mass. These findings reflect a critical need to identify the mechanisms underlying age-related impairments in muscle quality. Previous findings from our laboratory indicate that reduced muscle quality in aging male rats is strongly associated with impaired sarcoplasmic reticulum (SR) function (i.e., Ca2+ release, a key step in excitationcontraction coupling). We have also reported changes in markers of sphingolipid metabolism. It is well known that membrane lipid composition can affect the function of membrane proteins, and that whole muscle lipid composition does not necessarily reflect organelle-specific lipid content. However, little data is available on the lipid composition of skeletal muscle SR, and there is less on its relation to age and function. The purpose of this study was therefore to compare SR function and sphingolipid composition in muscles of adult and aging ratss Methods: Sixteen, male F344/BN hybrid rats were used in this study (8 adult (6-8 months) and 8 aged (24 months). Animal use and all proceduresweare approved by the Ohio University Institutional Animal Care and Use Committee, and the "Principles of Laboratory Animal Care" (NIH Publication No. 86-23, revised 1985), were followed throughout the study. Crude homogenates were prepared from fresh portions of medial gastrocnemius (MG) muscles, and subsequently frozen in liquid N2 for later analysis of SR function. Both Ca2+ uptake and release were assessed via fluorometry, using a the ratiometric Ca2+ -indicator dye Fura-2, ATP to activate the SR Ca2+ pump and 4-chloro-m-cresol to selectively activate the RYR Ca2+ release channel A second portion of the MG muscles was processed to isolate SR vesicles. These were frozen in liquid N2 and shipped on dry ice to Lipomics (West Sacramento, CA), where they were subjected to the company's TrueMass Ceramides Panel of lipid analyses. Using positive electrospray tandem mass spectrometry ceramides and sphingosines were quantified against deuteriumlabeled internal standards. The composition of 67 markers were determined, including: the concentration and fatty acid composition (14:0, 16:0, 18:0, 18:1, 20:0, 20:1, 22:0, 22:1, 24:0, 24:1, 26:0, 26:1) of: ceramides, dihydroceramide, ceramide-1-phosphate (C-1-P), hexosylceramide and lactosylceramide, as well as dihydrosphingosine, dihydrosphingosine-1- phosphate,

sphingosine, sphingosine-1-phosphate (S-1-P), sphinganine and sphinganine-1- phosphate. Statistical comparisons were performed using unpaired t-tests, unless tests of normality failed, in which case non-parametric tests were used. Similarly, correlational analyses were conducted using Pearson correlation coefficients, or Spearman correlation coefficients if data were not normally distributed. Results: Peak rates of SR Ca2+ release from aging muscle samples were significantly lower than those from adult muscle samples (13.4 ± 2.2 vs. 22.0 ± 3.6 $\mu$g Ca2+/g protein/minute; P = 0.048). Peak rates of Ca2+ uptake showed no such differences (9.6 ± 1.0 vs. 7.7 ± 1.3 $\mu$g Ca2+/g protein/minute; P = 0.286). A significant age-related decrease in hexosylceramide concentration was observed, as was a trend for an age-related increase in C-1-P. When expressed relative to total sphingolipid concentration, both differences were significant (P = 0.045 and 0.039, respectively). A significant negative correlation (r = -0.678; P = 0.045) between C-1-P and SR Ca2+ release was observed. A less-robust, positive correlation (r = 0.538; P = 0.087) was found between hexosylceramide and SR Ca2+ release. Conclusion: Consistent with previous results, SR from aging MG muscles exhibited an impaired Ca2+ release, but not Ca2+ uptake, function. Contrary to our hypotheses, comprehensive analysis of the sphingolipid composition of the SR revealed no differences between old and young for ceramide concentrations. However, two principal age-related differences were observed: an increase in C-1-P and a decrease in hexosylceramides. Although the effect of age was more robust on the mean levels of hexosylceramides than on C-1-P, there was a significant negative correlation between C-1-P and SR Ca2+ release, suggesting a possible mechanistic role. Finally, there was a trend for aging to reduce the S-1-P:Ceramide ratio, a quantity that has been positively associated with survival/adaptative signaling. Together these results suggest that SR sphingolipids may be a potential target for improving aging muscle function. However, a question that remains open is whether SR lipid changes drive "SR stress," or vice versa.

**OC14- RELATION BETWEEN MUSCLE MASS, MOTOR UNITS AND TYPE OF TRAINING IN MASTER ATHLETES.** M. Drey[1], C.C. Sieber[2], H. Degens[3], J. McPhee[3], M.T. Korhonen[4], K. Müller[5], B. Ganse[5], J. Rittweger[5] *(1. München, Germany; 2. Nürnberg, Germany; 3. Manchester, United Kingdom; 4. Jyväskylä, Finland; 5. Cologne, Germany)*

Background: It was reported that low number of motor units are associated with sarcopenia. Master athletes have been training for large parts of their life and are characterized by a high level of physical activity beyond the age of 35 with a simultaneously low morbidity rate and are therefore suitable to study successful aging. The aim of the present study was to measure the number of motor units and muscle mass in power trained and endurance trained master athletes compared to community-dwelling older adults. Methods: 75 master athletes (52 power and 23 endurance trained athletes) were recruited at the 2012 European Veteran Athletics Championships in Zittau (Germany). 149 community-dwelling older adults served as controls. In all participants the Motor Unit Number Index (MUNIX) in the hypothenar muscle and whole body muscle mass was determined by Bioelectrical Impedance Analysis (BIA). Results: In both male and female master athletes, there were significant negative correlations between age and muscle mass (female: r=-0.510, p=0.002; male: r=-0.714, p<0.001). Master athletes showed a weak correlation (r=-0.295, p=0.010) between MUNIX and age. Master athletes exhibited significantly higher values than the control group with regard to both muscle mass (p=0.002) and motor units (p=0.004). Sub-analysis showed that only power trained master athletes had both a larger muscle mass (p<0.001) and a higher MUNIX (p=0.014) than the control group. Among the master athletes, power trained athletes had a larger (p<0.001) muscle mass than endurance trained athletes. Conclusion: The present data of master athletes are compatible with the hypothesis of an age-related decline in whole body muscle mass and motor units. Nevertheless, the data suggest that the master athletes' high level of physical activity may protect motoneurons. In addition, power training seems to have a positive effect on muscle mass, and could therefore be an effective method of training to prevent sarcopenia.

**OC15- AN INNOVATIVE STUDY DESIGN TO EVALUATE A TECHNOLOGY-SUPPORTED HEALTH SERVICE TO PREVENT FRAILTY.** S. Jansen-Kosterink, M. Vollenbroek *(Enschede, the Netherlands)*

Background: Demographic ageing is a global trend. Among older adults, frailty is highly prevalent and constitutes a major health problem, as frail individuals are vulnerable and at high risk of adverse health outcome. Early screening on risk on frailty and functional decline and training of those who start to deploy frail conditions is the key to successful prevention, and can take advantage from technology-supported health service to foster empowerment and self-care. In the European project PERSSILAA, we developed a community-based, technology-supported health service that identifies whether an older adult is robust, frail or pre-frail, and that provides services for improving physical and cognitive functioning and education on healthy nutrition. As part of the European project PERSSILAA this service will be validated. In healthcare large prospective randomized controlled trials (RCT's) are considered the gold standard for evaluating the safety and effectiveness of medical interventions. However the characteristics of an RCT do not match well with the evaluation of technology supported health services. An argument for this is that RCT's are taking a considerable period of time while concurrently technologies are rapidly evolving. It takes time to prepare and execute an RCT with sufficient power and this sets a hold on the technological development with the consequence that at the beginning of the trial the technology is new and at the end of the trial the technology is outdated. Another argument for this is that technology-supported health service should be evaluated in the way they are implemented into daily practice. Especially, when it is necessary to gain insight into the potential added value of the services as these are often shaped by interaction of the end-users with the technology. Given these issues it is currently acknowledged among experts that there is an urgent need for other study designs to adequately evaluate technology-supported health services. Methods: First, a literature search is performed to search for a study design as alternative for a conventional RCT. Second, during a workshop with specialist on the field of the evaluation of technology-supported health services and epidemiologist the eligible study designs are discussed. Taken in mind the various releases of the technology-supported health service and the urge for a control group the cohort multiple Randomized Controlled Trail (cmRCT) seemed feasible for the validation of this service. The cmRCT is an alternative for a conventional RCT being introduced by Relton et al., 2010. This design tackles some of the problems associated with pragmatic trial designs. The key features of this design are: (1) recruitment of a large observational cohort of patients with the condition of interest; (2) regular measurement of outcomes for the whole cohort; and (3) capacity for multiple randomized controlled trials with new releases of technology-supported service over time. In addition, the cmRCT design aims to replicate the in real world routine healthcare. For each randomized controlled trial, information from the cohort is used to identify all eligible participants. Some eligible participants are randomly selected and offered the intervention. Data on participants who are not willing to participate provides information on the acceptability of the intervention. Results: Translating this design to our validation of the technology-supported health service within the European project PERSSILAA a large observational cohort of pre-frail older adults (n=150) is recruited and their health status will be measured every three months for a period of three years. The health status of pre-frail older adults is assessed with various validated questionnaires, such as the SF-12 (physical component summary and mental component summary). When a new release of the technology-supported service is available pre-frail older adults are randomly selected to the trial intervention. These pre-frail older adults are asked to use the technology-supported health service. Each older adult can be randomly selected only once to the intervention group and will stay in this group for the remaining period of study. The health status of these randomly selected older adults is then compared with the health status of pre-frail older adults not randomly selected to provide evidence on the effectiveness of the technology-supported health service. Next to, effectiveness study parameters focus on user satisfaction, use regarding the technology-supported health service and the demand of care. Conclusion: In this study we searched for an innovative study design and the cohort multiple Randomized Controlled Trail (cmRCT) seemed feasible to evaluate the added value of technology-supported health services to prevent frailty. At the moment of writing, the services are being deployed and the screening for pre-frail older adults and recruitment of the cohort started. During the presentation we will disclose our first experience with this innovative study design and also the first results our evaluation of the technology-supported health service by means of a cmRCT.

**OC16- GHRELIN PLUS RESISTANCE TRAINING IN FRAILTY: A RANDOMIZED, PLACEBO-CONTROLLED STUDY.** A.R. Cappola, M.C. Garin, T. Scattergood, D.K Salvatore, S.J. Ratcliffe, K. Schmitz *(Philadelphia, USA)*

Background: Frailty is a common geriatric syndrome with no approved therapies. Key components of frailty include unintentional weight loss and sarcopenia. We hypothesized that a joint intervention of ghrelin plus home-based progressive resistance training would improve strength and lower extremity function in frail older individuals more than progressive resistance training alone would. Methods: The study design was a 12-week randomized, double-blind, placebo-controlled pilot study. Fifteen men and women aged 70 years or older who were frail by the Fried criteria were enrolled. Data from a previous dose finding study showed a 30% increase in food intake with a 7.5 mcg/kg ghrelin dose. Five participants were randomized to 7.5 mcg/kg/day of subcutaneous ghrelin dosed 30 minutes prior to breakfast and ten to placebo. A nationally certified exercise professional traveled to all participants' houses twice weekly for 3 weeks to implement a one hour resistance training session. For the remaining 9 weeks, the exercise professional returned once a week, with participants completing the other session each week on their own. The primary outcome was change in performance of the Short Physical Performance Battery (SPPB), which includes balance, walking speed, and chair rise tests. Additional outcomes included assessment of food intake by three-day diary, weight, body composition by DXA, upper and lower body strength testing (bench and leg press 1 repetition maximum), and the SF-36 quality of life measure. Outcomes were assessed at baseline, 6 and 12 weeks, except the DXA scan, which was assessed at baseline and 12 weeks. Data are reported as mean (SD). Longitudinal analyses were performed using generalized estimating equations (GEE). Results: Five men and 10 women enrolled with a mean age of 81.5 years (range 70-90 years). Participants who received ghrelin ate more than placebo group participants (mean 12 week between-group difference 350 kcal/day, longitudinal p-value p<0.001), but there was no between-group difference in change in weight. Both groups showed improvements in lean body mass, strength, and SPPB, but the ghrelin group gained less lean body mass and had less improvement in strength and SPPB than the placebo group did (all p<0.01). Adverse events and safety parameters did not differ between groups. When data were analyzed without respect to ghrelin arm, comparing outcomes pre and post 12 weeks of home-based resistance training, there was a 1.8 (2.0) point increase in SPPB (p<0.001) from a baseline of 7.7 (1.8) points. There were corresponding statistically and clinically significant gains in lean body mass, upper and lower body strength, and the physical function, role limitation, energy, and general health domains of the SF-36. Conclusion: A home-based resistance training protocol was highly effective at improving strength and physical function in frail older participants, with no additional benefit from ghrelin administration.

**OC17- SARCOPENIA AND AGE-RELATED MUSCLE IMPAIRMENT: HISTOLOGY AND IMAGING IN A CLOSE RELATIONSHIP.** E. Piccirilli, J. Baldi, M. Scimeca, E. Gasbarra, E. Bonanno, U. Tarantino *(Rome, Italy)*

Background: Sarcopenia is a pathological condition of impaired muscle quality that may be predictive of an increased fragility fracture risk in the elderly. Aging leads to macro and micro architectural muscular distortions, such as a decline of muscle fibers cross sectional area, particularly type II ones, denervation, neuromuscular junction remodeling, ultra structural and metabolic dysfunctions. The reduction of biomechanical properties of miofibers takes part in this complex muscle aging framework. In the elderly, in fact, the muscle patrimony becomes poorer in terms of power, strength and resistance. In this contest, our experience aims to describe in a multimodal way macro- and micro-structural changes that muscle tissue undergoes during the physiological aging process using histological analysis and Nuclear Magnetic Resonance imaging. Methods: We performed vastus lateralis biopsies in 25 women with osteoporosis undergoing primary Total Hip Arthroplasty (THA) for hip fracture (group OP) and in 25 women underwent surgery for hip osteoarthritis (group OA). Personal data and case histories of patients were collected and patients were included in two groups (OP and OA) after performing DeXA, T-score and after radiographic assessment by Kellgren-Lawrence scale. The study was approved by the local Ethical Committee. The anonymous muscle samples were prepared for histological analysis and for NMR Diffusion Tensor Imaging measurement. Morphometric analysis was performed on transverse sections and muscle fibers were counted and measured. To evaluate the areas occupied by the skeletal muscle and the adipose tissue for a single muscle fiber, H&E sections of 24 samples were scanned and muscle/fat ratio was calculated. Immunohistochemical analysis was performed to determine the presence of BMP-2, BMP-4, Myostatin, and the expression of cell markers CD 44 in myofibers. A Magnetic Resonance Diffusion tensor Imaging protocol was performed; we evaluated the T1, T2, Fractional Anisotropy , the Mean Diffusivity and the three eigenvalues (λ1,λ2,λ3). Results: in this study we measured vastus lateralis musculature diffusion properties of OP subjects and compared them with OA patients. Our findings revealed in OP a preferential type II fiber atrophy. The analysis of DTI parameters revels that MD, λ_1,λ_2,λ_3were significantly higher in OP compared to OA. Conversely the FA was significant lower in OP as compared to OA subjects. The correlation analysis showed a strong significant correlation between DTI parameters and the muscle fat of OP and OA subjects. In particular, a positive correlation was found between FA and fat fraction. In addition, the study demonstrated a positive correlation between concentration of BMP-2 and BMP-4 and BMD in OP. About the myostatin, we obtained high levels associated with a greater degree of muscle atrophy in OP. Conclusion: Our experience demonstrates the usefulness of new diagnostic techniques for understanding pathophysiological mechanisms shared by sarcopenia and osteoporosis. Our DTI analysis showed that the MD and the three eigenvalues were significantly higher in OP as compared to OA subjects. Moreover, an opposite trend was obtained for the FA parameter. Immunohistochemical results permit to speculate that the major degree of atrophy in OP group is due to low level of BMPs, but also to CD44 expression and high value of myostatin. Structural changes within muscle tissue are presumed to be the main cause for DTI parameters variation. Moreover this scenario can explain the evidence that OP muscles have a more isotropic diffusion (lower FA) than the OA ones. These data confirm that sarcopenia and increasing of age may cause several tissutal distortions and large quantities of fat infiltrations, modifying muscular properties and reducing functional performance.

**OC18- PROTEIN INTAKE AND INCIDENT MOBILITY LIMITATIONS IN OLDER ADULTS: THE HEALTH ABC STUDY.** D.K. Houston[1], J.A. Tooze[1], K.R. Garcia[1], M. Visser[2], F.A. Tylavsky[3], T.F. Hue[4], J.S. Lee[5], R.A. Murphy[6], E.M. Simonsick[6], T.B. Harris[6], A.B. Newman[7], S.B. Kritchevsky[1] *(1. Winston-Salem, USA; 2. Amsterdam, The Netherlands; 3. Memphis, USA; 4. San Francisco, USA; 5. Athens, USA; 6. Baltimore and Bethesda, USA; 7. Pittsburgh, USA.)*

Background: Current protein recommendations (0.8 g/kg body weight/d) are based on short-term nitrogen balance studies in young adults and may underestimate the intake needed to optimally preserve physical function in older adults. We examined the association between protein intake and the onset of mobility limitation over six years of follow-up in community-dwelling, initially well-functioning, older adults participating in the Health, Aging and Body Composition (Health ABC) study (n=1998). Methods: Protein intake was calculated using an interviewer-administered 108-item food frequency questionnaire in Health ABC participants (33% black, 49% female, mean age 74.6) attending the 12 month follow-up exam. Protein intake was categorized as <0.8, 0.8 - <1.0, and ≥1.0 g protein/kg body weight/d. Mobility limitation was assessed semi-annually and defined as reporting any difficulty walking 1/4 mile or climbing 10 steps on two consecutive 6-month contacts. The association between protein intake and incident mobility limitation was examined using Cox proportional hazard regression models adjusting for demographics, site, smoking, alcohol consumption, physical activity, total energy intake, depression, cognition, co-morbid conditions, oral steroid use, hospitalizations in the past year, IL-6, and height. Differences by gender and race were examined by testing for interactions with protein intake. Additional models adjusted for total fat or lean mass measured by dual energy x-ray absorptiometry. Results: Mean (SE) reported protein intake was 0.91 (0.01) g/kg body weight with 43.4% reporting intakes less than <0.8 g/kg body weight/d. The overall cumulative incidence of mobility limitation was 45.5% over 6 years of follow-up; the cumulative incidence was 55.4% among participants reporting protein intakes <0.8 g protein/kg body weight/d, 42.9% among those reporting protein intakes of 0.8 - <1.0 g protein/kg body weight/d, and 37.2% among those reporting protein intakes of ≥1.0 g protein/kg body weight/d (log rank p-value, 0.0001). Participants who reported protein intakes of <0.8 and 0.8 - <1.0 g protein/kg body weight/d were at significantly greater risk of developing mobility limitation (RR (95% CI): 1.95 (1.53-2.48) and 1.34 (1.06-1.69), respectively; p for trend, <0.0001) over 6 years of follow-up compared to participants who reported protein intakes of ≥1.0 g protein/kg body weight/d. The associations were attenuated but remained significant after further adjustment for total fat mass (RR (95% CI): 1.54 (1.19-2.00) and 1.20 (0.95-1.51) for protein intakes of <0.8 and 0.8 - <1.0, respectively, compared to ≥1.0 g protein/kg body weight/d; p for trend, 0.005) and total lean mass (RR (95% CI): 1.60 (1.24-2.07) and 1.22 (0.96-1.54) for protein intakes of <0.8 and 0.8 - <1.0, respectively, compared to ≥1.0 g protein/kg body weight/d; p for trend, 0.001). The associations did not differ appreciably by gender or race. Conclusion: Lower protein intake was associated with increased risk of mobility limitations in community-dwelling, initially well-functioning older adults. The role of dietary protein should be studied further as a potentially modifiable risk factor for declines in physical function. Acknowledgements: This work was supported in part by the Intramural Research Program of the National Institutes of Health, National Institute on Aging; NIA contracts N01-AG-6-2101, N01-AG-6-2103, and N01-AG-6-2106; NIA grants R01 AG028050 and R03 AG045492; NINR grant R01 NR012459; and the Wake Forest Claude D. Pepper Older Americans Independence Center (P30 AG021332).

**OC19- EFFECTS OF LONG-TERM TRAINING ON MUSCLE STRENGTH AND MOBILITY IN ≥75 YEAR OLD ADULTS.** E. Aartolahti[1], E. Lönnroos[2], S. Hartikainen[2], A. Häkkinen[1] *(1. Jyväskylä, Finland; 2. Kuopio, Finland)*

Backgrounds: Exercise interventions have shown to effectively improve muscle strength in old persons and having potential to counteract frailty process. Majority of the previous studies are based on short-term interventions among healthy older adults. When aiming to increase physical activity and health at the population level, also among older populations, knowledge of extended follow-up periods among population with wide variety of functioning is required. Therefore we aimed to assess the effects of long-term strength and balance training on muscle strength and physical function in a community-based sample of older adults aged ≥75 years. We also assessed remaining of the effects during post intervention follow-up. Methods: 182 community-dwelling individuals (130 women and 52 men, mean age 80 (SD 3.9) years) began supervised strength and balance training as part of a population-based Geriatric Multidisciplinary Strategy for the Good Care of the Elderly study. Training was offered once a week for 2.3 years. The intensity of training was determined individually by repetition maximum (RM): 60–85% of 1 RM, 8–12 repetitions and 2–3 sets. Isometric knee extension and flexion strength, Chair rise, walking speed, timed up and go (TUG) and Berg Balance Scale (BBS) was measured annually and after post intervention follow-up. Results: During the intervention both women and men improved chair rise capacity: 2.6 seconds (Effect Size ES -0.48, 95% CI [-0.72 to -0.15]) and 1.5 seconds (ES -0.40, [-0.68 to 0.09]) respectively. Women's knee extension and flexion strength improved by 14.7 N (ES 0.18, [-0.03 to 0.29]) and 16.7 N (ES 0.40, [0.26 to 0.56]) respectively. Also women's walking speed improved by 0.08 m/s (ES 0.21, [0.11 to 0.32]). During post intervention follow-up women's knee flexion strength declined 4.4 N (ES -0.10, [-0.19 to -0.01]). In men no changes occurred during the training or the subsequent follow-up in muscle strength or walking speed. No changes in BBS and TUG were observed at the end of the intervention but during post intervention follow-up these had decreased both for women and men. Conclusions: Long-term strength and balance training prevents decline in mobility and muscle strength in community-dwelling older population aged over 75 years. The gained effects partly turned to decrease after the intervention. Therefore sustaining strength and balance training in regular physical activity would be needed in prevention of functional limitations.

**OC20- EFFECTS OF SARCOPENIA ON SERUM MYOSTATIN AND PHYSICAL FUNCTIONING.** M. Gray, A. Binns, J.M. Glenn *(Fayetteville, USA)*

Background: Among older adults, adequate lean-tissue mass (LTM) is important to maintain physical independence. LTM is needed for proper muscle function including performing activities of daily living. Among older adults, LTM and is reduced by 3kg and 1kg per decade among older men and women, respectively and is reduced by 50% between the fifth and ninth decades. Termed sarcopenia, this age-related loss of LTM coincides with losses in muscular strength and physical function. Myostatin, a member of transforming growth factor-β (TGF-β) superfamily, is a potent anabolic inhibitor of LTM anabolism. Clinical studies have established a positive correlation between serum myostatin concentration and muscle atrophy, evident among HIV patients, cachexia, prolonged bed rest, and aging. Thus, reductions in myostatin among older adults may promote LTM, ultimately leading to increases in physical mobility. However, the effects of myostatin on the development of sarcopenia have not been adequately studied. Therefore, the purpose of the present investigation was to determine differences between community-dwelling older adults with and without sarcopenia on measures of serum myostatin and physical functioning. Methods: Forty-three community-dwelling older adults volunteered for the current investigation. All participants signed a written informed consent before any physical assessments were completed. Each subject underwent a peripheral venous blood draw for serum analysis; a trained phlebotomist performed all draws. All samples were measured in duplicate using the ELISA kit manufacturer's instructions (R&D Systems, Minneapolis, MN; Cat#DGDF80). Dual energy x-ray absorptiometry (DXA) was used to assess total body composition, including lean-tissue and fat mass. Sarcopenia was determined using appendicular skeletal mass (aSM; kg) divided by height squared (m2). aSM (kg/m2) was determined by adding the LTM of the right and left arms and legs from the DXA output. Cut-points for sarcopenia were 5.45 kg/m2 and 7.26 kg/m2 for women and men, respectively. The Short Physical Performance Battery (SPPB) is a series of tests

used to determine mobility disability among older adults. This test battery is comprised of three assessments: standing balance, walking speed, and lower-body strength. The total score is the sum of all three components, ranging from 0 to 12; a score of nine or less indicative of moderate mobility disability. Muscular strength was determined using hand-grip. The sum of both hands was used as the score. Sarcopenic groups were identified using the cut-points presented previously. To determine the relationship between myostatin and LTM, a Pearson's correlation was performed. One-way ANOVA was conducted to determine differences between groups. Statistical significance was set at .05 for all analyses. Where warranted the Bonferroni correction was used to correct for multiple comparisons. Results: Forty-three older adults (mean age = 77.2 + 6.2 years) were included in the final analyses. Among the community-dwelling sample, 11 (26%) were sarcopenic. Individuals in the sarcopenic group tended to be younger (74.2 + 8.3 vs. 78.3 + 5.0; p = .057), weighed less (60.38 + 8.40 vs. 76.78 + 15.64 kg; p = .002), and had less LTM (37.15 + 47.17 vs. 44.82 + 10.59 kg) than the non-sarcopenic group. There was a significant correlation between serum myostatin concentration and LTM for the sarcopenic group (r = -.62, p = .04), but not for nonsarcopenic group (r = -.18, p =.32). In addition, sarcopenic individuals had reduced muscular strength when compared to the non-sarcopenic group (p = .014) While not statistically significant, myostatin was 12% lower among the sarcopenic group when compared to the nonsarcopenic group (p = .53). Conclusion: Based on the results of this investigation, sarcopenia is related to elevated myostatin levels and leads to reduced muscular strength and LTM. These results are unique in the addition of myostatin to the list of variables. Myostatin is an inhibitor of skeletal muscle anabolism. In the present investigation there was not a significant different between sarcopenic groups with this variable; however, there was a high correlation between serum myostatin concentration and LTM. Physical functioning (SPPB) was similar between groups. Similar to other reports, sarcopenic individuals have less muscular strength compared to older adults with adequate LTM. In order to maintain physical functioning of older adults, adequate LTM is imperative. In the present investigation there was not a significant difference between any measure of physical functioning. It should be noted that among individuals with sarcopenia, 38% also had mobility disability as measured by SPPB. Follow-up studies are needed to determine the effect of sarcopenia on physical function among community-dwelling older adults. In addition, intervention strategies designed to improve both physical function and LTM among older adults are warranted.

**OC21- PHASE 2 TRIAL OF MYOSTATIN ANTIBODY LY2495655 IN OLDER PEOPLE WITH RECENT FALLS AND LOW MUSCLE STRENGTH.** Y. Rolland[1], C. Becker[2], S. Lord[3], S. Studenski[4], S. Warden[5], R. Fielding[6], C. Recknor[7], M. Hochberg[8], S. Ferrari[9], H. Blain[10], E. Binder[11], S. Poiraudeau[12], C.T. Benson[13], S.L. Myers[13], L. Hu[13], Q. Ahmad[13], K. Pacuch[13], E. Gomez[13], O. Benichou[14] *(1. Toulouse, France; 2. Stuttgart, Germany; 3. New South Wales, Australia; 4. Pittsburgh, USA; 5. Indianapolis, USA; 6. Boston, USA; 7. Gainesville, USA; 8. Baltimore, USA; 9. Geneva, Switzerland; 10. Montpellier, France; 11. St. Louis, USA; 12. Paris, France; 13. Indianapolis, USA; 14. Neuilly, France)*

Background: This phase 2, randomized, double blind, placebo controlled trial evaluated if the myostatin monoclonal antibody LY2495655 (LY) could increase appendicular lean body mass (aLBM) and improve physical performance in elderly people who had fallen recently and had low muscle strength. NCT01604408. Methods: Randomized subjects were aged ≥75 years, had fallen at least once in the past year, and had low hand grip strength (≤21 kg for women; ≤37 kg for men) and low performance on a 5-chair rise test with arms folded on the chest (≥12 s). Patients received placebo or LY 315 mg as 3 SC injections of 1.5 mL at weeks 0 (randomization), 4, 8 12, 16, and 20, followed by a 16-week observational period. The primary endpoint was the change from baseline to 24 weeks for the difference in aLBM between LY and placebo. Secondary and exploratory outcomes included the 5-chair rise test without arms (or with arms for subjects unable to do it without), 4-step stair climb time and power (and 12-steps at a subset of sites), fast and usual gait speed over 4 meters, 6-minute walking distance, isometric leg extension strength, hand grip strength, and incidence of falls. The 2-sided alpha level was set a priori at 0.05 for the primary analysis (ITT including all subjects with a baseline and at least one post-baseline value) and 0.1 for all performance based measures (PBMs). Results: Study groups (placebo n=99; LY n=102) were balanced for demographic characteristics (70% women, aged 82±5 years, with BMI=26.5±4 kg/m2), baseline aLBM (14.9±2.2 kg [women]; 21.9±3.1 kg [men]), and PBMs. LY subjects had more pre-existing conditions and a higher risk of falls and fractures. Treatment was discontinued early in 14.1% of placebo and in 19.6% of LY patients. The change in aLBM from baseline to 24 weeks was +0.43 kg (SE 0.12; p<0.001) greater in LY than in placebo (+2.5%). Several power intensive PBMs (stair climbing, 5-chair rise, and fast gait speed) were improved in LY versus placebo subjects (Table 1). The incidence of falls per patient-year was 2.0 (placebo) versus 1.6 (LY) (NS). One death due to ischemic colitis occurred in an 87-year old LY subject with a previous history of hypercholesterolemia and surgery for abdominal aortic aneurysm. At least 1 adverse event of fracture was reported in 6 placebo versus 10 LY subjects (NS). Injection site reactions (mostly mild), reported in 30% of the LY group and in 9% of the placebo group, required treatment discontinuation in 2 LY subjects. No muscle-related safety issues were observed. Conclusions: In older people with a history of falls and low muscle strength, 24 weeks of LY treatment increased aLBM and improved power intensive PBMs.

**OC22- HYPOENERGETIC DIET-INDUCED REDUCTIONS IN MYOFIBRILLAR PROTEIN SYNTHESIS ARE RESCUED BY RESISTANCE TRAINING AND BALANCED DAILY PROTEIN INGESTION IN OLDER MEN.** C.H. Murphy[1], T.A. Churchward-Venne[1], C.J. Mitchell[1], N.M. Kolar[1], L.M. Burke[2], J.A. Hawley[3,4], A. Kassis[5], L.G. Karagounis[5], S.M. Phillips[1] *(1. Hamilton, Canada; 2. Canberra, Australia; 3. Victoria, Australia; 4. Liverpool, UK; 5. Lausanne, Switzerland)*

Background: Sarcopenic muscle loss and dynapenia in aging are problematic and if excessive are predisposing factors for premature morbidity and mortality. Protein ingestion and loading are the two most potent 'drivers' of increases in muscle protein synthesis (MPS), which is the primary locus of control in determining muscle mass. In older adults, the majority of their daily protein intake is often 'skewed' toward the evening meal, with lower quantities of protein consumed at breakfast and lunch. This may be problematic since aging is associated with a reduced sensitivity of MPS to lower quantities (< 20 g•meal-1) of dietary protein, whereas moderate servings of ~30-40 g•meal-1 have been shown to maximally stimulate MPS, at rest. It has, therefore, been suggested that a 'balanced' distribution of daily protein of ~30-40 g•meal-1 would provide an optimal stimulation of MPS throughout the day and thus may slow the loss of muscle mass with aging. Such a thesis may be particularly true during energy restriction (ER). In overweight/obese older adults weight loss has numerous clinical benefits but may accelerate sarcopenia; thus, strategies to enhance weight loss with a high fat-to-lean ratio are paramount. We studied, in overweight/obese older men, how the distribution of dietary protein between meals affected the synthesis of specific muscle protein fractions during: energy balance (EB); after 2-wk of energy restriction (ER); and after 2-wk of ER plus resistance training (ER+RT). Our hypothesis was that a balanced (BAL) versus skewed (SKEW) protein feeding would support MPS during ER and that this effect would be enhanced with performance of RT. Methods: Overweight/obese older men (66 ± 4 yr, 31 ± 5 kg•m-2) were provided with a 4-wk long hypoenergetic (-300 kcal•d-1), higher protein (1.3 g•kg•d-1) diet. Total protein intake was distributed across four daily meals in the proportions 25:25:25:25% in participants randomized to the balanced group (BAL) and 7:17:72:4% in the skewed group (SKEW; n = 10 per group). In Phase 1 of ER (wk 0-2) participants continued their habitual physical activity and in Phase 2 (ER+RT; wk 3-4) participants performed whole body, progressive RT. Acute rates of MPS (%•h-1; myofibrillar and sarcoplasmic) were measured during a 13-h primed continuous infusion of L-[ring-13C6] phenylalanine in response to a BAL or SKEW pattern of protein intake while participants were in EB, during ER, and during ER+RT. Additionally, ingested D2O was used to quantify medium-term (%•d-1) myofibrillar protein synthesis and the synthesis of individual skeletal muscle proteins during Phase 1:ER (wk 0-2) and Phase 2:ER+RT (wk 3-4). Results: In the fasted state, acute myofibrillar fractional synthetic rate (FSR) was ~14% lower in ER and ER+RT versus EB ($p < 0.05$), with no difference between groups. In the fed state, acute myofibrillar FSR was lower in ER than EB in both groups ($p < 0.001$), but was ~19% higher in BAL than SKEW ($p = 0.014$). In ER+RT, fed-state acute myofibrillar FSR increased above ER in both groups and in BAL was not different from EB ($p = 0.903$). In contrast, myofibrillar FSR in SKEW remained ~14% lower than EB ($p = 0.002$) and ~16% lower than BAL ($p = 0.006$). Acute sarcoplasmic FSR was reduced to a similar extent in ER and ER+RT compared to EB in both the fasted (~22%) and the fed-state (~19%, $p < 0.01$), with no difference between groups. Medium-term myofibrillar protein synthesis was ~23% higher during Phase 2:ER+RT than Phase 1:ER ($p = 0.023$), with no difference between groups. The synthesis of 26 (of 69) individual structural, cytosolic and mitochondrial skeletal muscle proteins were higher during Phase 2: ER+RT than Phase1: ER ($p < 0.05$), with no difference between groups. Conclusions: During ER in overweight/obese older men, we discovered that a balanced distribution of daily protein intake (3 x 25 g evenly spaced doses of protein) acutely stimulated the synthesis of muscle contractile proteins more effectively than a skewed distribution of the same amount of protein (i.e. 10 g at breakfast, 15 g at lunch, 50 g at dinner). Furthermore, we show that combining resistance training (RT) with a balanced protein distribution restored acute rates of myofibrillar protein synthesis during ER to those observed during energy balance (EB). We also report, in addition to changes in myofibrillar protein synthesis, that individual protein synthetic rates were increased with RT showing the potency of this stimulus. Our data suggest that preservation of the MPS response during ER with BAL protein and RT is viable in supporting the maintenance of muscle mass while allowing for clinically indicated fat loss in aging.

**OC23- DEVELOPMENT OF A SELF-ADMINISTRATED QUALITY OF LIFE QUESTIONNAIRE SPECIFIC TO SARCOPENIA IN ELDERLY AGED 65 YEARS AND OLDER: THE SARQOL.** C. Beaudart, J.-Y. Reginster, R. Rizzoli, Y. Rolland, I. Bautmans, E. Biver, J. Petermans, S. Gillain, J. Van Beveren, M. Jacquemain, P. Italiano, N. Dardenne, O. Bruyère *(Liège, Belgium)*

Introduction: The impact of sarcopenia on quality of life is currently assessed generic tools. However, these tools may not detect subtle effects of this specific condition on quality of life. The aim of this study was to develop a sarcopenia-specific quality of life questionnaire (SarQoL, Sarcopenia Quality of Life), and designed for community-dwelling elderly subjects aged 65 years and older. Methods: The study was articulated in four stages: 1. Item generation – based on literature review, sarcopenic subjects' opinion, experts' opinion, focus groups ; 2. Item reduction – based on sarcopenic subjects' and experts' preferences ; 3. Questionnaire generation – developed during an experts' meeting; 4. Pre-test of the questionnaire – based on sarcopenic subjects' opinion. Results: The final version of the questionnaire consists of 55 items translated into 22 questions to be rated on a 4-point Likert scale. In view of the pre-test, the SarQoL is easy to complete, independently, in approximately 10 minutes. Discussion: Quality of life assessments are

important for health-care providers, researchers and regulatory agencies to understand the needs and preoccupation of specific populations, such as elderly subjects suffering from sarcopenia. With the expected future development of interventions targeting sarcopenia, this tool should help to assess their effectiveness and relevance for detecting quality of life changes in this highly emergent population.

**OC24- EFFECTS OF A VITAMIN D AND LEUCINE-ENRICHED WHEY PROTEIN ORAL NUTRITION SUPPLEMENT ON MEASURES OF SARCOPENIA IN OLDER ADULTS THE PROVIDE STUDY: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL.** J.M. Bauer[1], S. Verlaan[2], C. Sieber[3], T. Cederholm[4], for the PROVIDE study group *(1. Oldenburg, Germany; 2. Utrecht, The Netherlands; 3. Nürnberg, Germany; 4. Uppsala, Sweden)*

Background: Age-related losses of muscle mass, strength and function (sarcopenia) pose significant threats to physical performance, independence and quality of life. An impaired muscle response to nutritional anabolic stimuli may be one of the underlying mechanisms of sarcopenia. Recent studies have shown that a vitamin-D and leucine enriched whey protein supplement can stimulate muscle protein synthesis in healthy and sarcopenic elderly. As such, nutritional supplementation alone could positively influence aspects of sarcopenia and thereby prevent mobility disability. Our objective was to test the hypothesis that a specific nutritional supplement can result in improvements in measures of sarcopenia among non-protein-energy malnourished older adults with functional limitations. Methods: This was a randomized controlled, double blind trial from June 2010 to July 2013 among 380 adults ≥65 years old with Short Physical Performance Battery (SPPB, 0-12) scores between 4 and 9, and a low skeletal muscle mass index (SMI from BIA): ≤37% (men) and ≤28% (women). The active group (n=184) received a vitamin D and leucine-enriched whey protein nutritional supplement to consume twice daily for 13 weeks. The control group (n=196) received an iso-caloric control product to consume twice daily for 13 weeks. Primary outcomes handgrip strength and SPPB score, and secondary outcomes chair stand test, gait speed, balance score, and appendicular muscle mass were measured at baseline, week 7 and week 13. A mixed model for repeated measures (MMRM) was used for continuous outcomes, while adjusting for baseline protein intake, age and sex. Results: Among the 380 randomized participants, 302 were followed-up at 13 weeks. There were no significant between-group effects for the primary outcomes handgrip strength, between-group effect (95% confidence interval): 0.30 kg (-0.46, 1.05), p=0.44 and SPPB, between-group effect: 0.11 points (-0.21, 0.42), p=0.51. Both groups improved significantly from baseline to week 13 in SPPB and gait-speed, while the active group alone showed an increase in handgrip strength from baseline to week 13. There were no differences over time or between-groups in balance scores. The active group showed a greater improvement in the chair stand test compared to the control group, with a between group effect (95% confidence interval): -1.01 seconds (-1.77, -0.19), p=0.018. The active group gained more appendicular muscle mass than the control group, with a between group effect: 0.17 kg (0.01, 0.34), p=0.044. Conclusion: This 13-week exploratory intervention of a vitamin D and leucine-enriched whey protein nutritional supplement resulted in improvements in muscle mass and chair-stand test among sarcopenic older adults. This builds on earlier findings that the active product stimulates muscle protein synthesis in an acute-setting and over the long-term results in increased muscle mass. The improvement in the chair-stand test in the active group alone is of clinical relevance since the chair-stand test is an important proxy of lower-extremity function. Poor performance in the chair stand test is an independent risk factor for physical disability, hospitalization and mortality. This is the first intervention using nutritional supplementation alone, without exercise, to result in such improvements in muscle mass. These results warrant further investigations into the role of a specific nutritional supplement as part of multimodal approach to prevent adverse outcomes among older adults at risk for disability. Disclosure of Interest: The project was sponsored by Nutricia Research, Nutricia Advanced Medical Nutrition.

**OC25- FRAILTY AND THE USE OF ACUTE MEDICAL SERVICES.** N.D. Dattani[1], M.-J. Sirois[2], V. Fillion[2], J. Lee[1,2], M. Émond[2] *(1. Toronto, Canada; 2. Québec , Canada)*

Background: An injury leading to an emergency department (ED) visit for a functionally independent older patient in Canada does not usually necessitate inpatient admission. However, minor injuries among functionally independent older patients are associated with functional decline over at least the following six months. Moreover, as functional ability declines the need for medical and health services generally increases. Frailty is reduction of the physiological reserve needed to withstand stressors such as minor injuries. It is strongly associated with advanced age, yet not all older patients are frail. Thus, a measure of frailty could identify patients in this context who are particularly likely to require increased medical services. The objective of this study was to examine the association between "unreported" frailty and use of medical and health services within three and six months following a visit to the emergency department for a minor injury by a previously functionally independent older patient. Methods: This prospective multicentre cohort study was part of the Canadian Emergency Team Initiative research program. Patients aged 65 and older who presented to the emergency department for a minor injury were eligible for the study if they were independent in their basic daily activities prior to their injury and were discharged home within 48 hours. Included patients were interviewed within three days of their visit to the emergency department (T0), three (T3) and six (T6) months after their visit. Frailty was measured at the emergency department by the Canadian Study of Health and Ageing Clinical Frailty Scale (CSHA-CFS) which classifies patients along 7 levels (1=very fit, 2=well, 3= well with treated comorbidities, 4=apparently vulnerable, 5=mildly frail, 6=moderately frail, 7= severely frail). Use of hospital, emergency department, family physician (or another general practitioner) and home health services in the previous 3 months was recorded at all three study time points. Sociodemographic and clinical data were also collected at all time points. Generalized mix models (GLM) were used to test for difference between frailty levels and outcomes accounting for age, sex, comorbidities, cognitive impairment and fracture. Results: A total of 1287 patients participated in this study. There were 43% who were aged 65-74 years old, 40% who were 75-84 years old and 17% were 85 or older. Their minor injuries included fractures (29%), sprains (14%), lacerations (26%), contusions (46%) and concussions (20%). Due to inclusion criteria, no patient was severely frail (CSHA-CFS= 7). At T0, proportions of "frail" patients (CHSA-CFS ≥ 4) who reported having used hospital services in the previous months compared to "well" patients (CHSA-CFS=1,2,3) was 27% vs 18% (p< 0.001). At T3 and T6, these proportions were "frail": 23% vs "well":16 % (p< 0.01) and 22% vs 15% (p< 0.01) respectively. With regards to use of emergency services, at T0, proportions of "frail" patients who reported having used those services in the previous months compared to "well" patients was 19% vs 13% (p< 0.64). At T3 and T6, these proportions were "frail": 15% vs "well": 12 % (p< 0.16) and 14% vs 10% (p< 0.69) respectively. Regarding home health services at T0, proportions of "frail" patients who reported having used those services in the previous months compared to "well" patients was 16% vs 3% (p< 0.001). At T3 and T6, these proportions were "frail": 19% vs "well": 8 % (p< 0.001) and 15% vs 5% (p< 0.001) respectively. Finally, at T0, proportions of "frail" patients who reported having visited their family physician (or a general practitioner) in the previous months compared to "well" patients was 74% vs 61% (p< 0.001). At T3 and T6, these proportions were "frail": 72% vs "well": 63 % (p= 0.01) and 67% vs 56% (p= 0.03) respectively. Conclusion: Overall, community-dwelling patients with apparently vulnerable to moderately frail state (CSHA-CFS ≥ 4) show higher levels of hospital, family physician and home health services use than patients who are still fit or well, three months before and up to six months after a visit to emergency department for treatment of minor injuries. Moreover, levels of services use do not vary within frailty levels. As older people with such injury do not receive differential emergency department care, an easy to perform frailty measure such as the CSHA-CFS could help clinicians identify those who need more clinical attention in order to improve their long-term health status and reduce their need for costly hospital care.

**OC26- A MULTI-BLOCK PLS-DA MODELING APPROACH TO CHARACTERIZE THE AGE-DEPENDENT RELATIONS AMONG PATTERNS OF CIRCULATING INFLAMMATORY BIOMARKERS, CHANGES IN BODY COMPOSITION AND PHYSICAL PERFORMANCE.** R. Calvani[1], F. Landi[1], D.L. Vetrano[1], A.M. Martone[1], F. Marini[1], C. Leeuwenburgh[2], M. Pahor[2], R. Bernabei[1], E. Marzetti[1] *(1. Rome, Italy; 2. Gainesville, USA)*

Background. Chronic, low-grade inflammation, changes in body composition (reduced muscle mass to adipose tissue ratio) and declining physical function are three interrelated hallmarks of the aging process. Given the complexity of the inflammatory response and the non linear trajectories linking age-related changes in body composition and physical function, a multivariate modeling approach may represent a useful strategy to provide more insights into the relationships among these three crucial processes involved in aging (patho-)physiology. Methods. A total of 42 community-dwelling older (age 78.3±5.6 years) and 20 younger (age 23.8±3.9 years) healthy men and women were enrolled in the study. Older participants were further categorized into high-functioning (HF; n = 25) or low-functioning (LF; n = 17) groups according to their Short Physical Performance Battery (SPPB) summary score. Magnetic resonance images (MRI) were used to determine the volumes of skeletal muscle, subcutaneous fat (SAT), and intermuscular fat (IMAT) in the thigh (femoral) region of the dominant leg. MRI data were also used for muscle quality determination, which was calculated as the ratio between maximal peak torque and thigh MV (N*m/cm3). A panel of 14 serum cytokines was assessed by multiplex analysis. Multi-block Partial Least Squares Discriminant Analysis (PLS-DA) was used to explore the relations among the inflammatory mediators, functional and imaging parameters. Results. The optimal complexity of the PLS-DA model was found to be four latent variables. The proportion of correct classification was 72% for HF subjects (68% in cross-validation), 88.2% for LF individuals (82.4% in cross-validation) and 95% for young adults (90% in cross-validation). Younger subjects were characterized by lower values of IMAT that were correlated with lower levels of myeloperoxidase (MPO), P-Selectin, soluble intercellular adhesion molecule 1 (sICAM-1) and soluble vascular cell adhesion molecule 1 (sVCAM-1). Interestingly, our model could also discriminate HF from LF subjects. HF individuals were characterized by higher values of IMAT, MPO, sVCAM-1 and sICAM-1, while higher SAT values and higher circulating levels of the other inflammatory mediators identified LF subjects. Conclusions. A distinct age-related pattern of relationships among circulating pro-inflammatory cytokines, functional and imaging parameters characterize healthy subjects with varying level of physical performance. The dissection of these patterns may provide significant insights into the role played by inflammation in the morpho-functional changes associated with aging.

**OC27- AEROBIC EXERCISE MITIGATES FRAILTY IN AGING MICE.** L.V. Thompson, H. Liu, T.G. Graber *(Minneapolis, USA)*

Background: Frailty is a clinical syndrome associated with declining muscle strength and reduced metabolic quality that leads to increased morbidity, disability, and mortality. We previously developed a frailty index (FI) based on four clinically relevant criteria: grip strength, walking speed, endurance score and physical activity to identify frail mice and a Frailty Intervention Assessment Value (FIAV) to test the efficacy of interventions. Effective exercise interventions to reverse frailty and the cellular pathways involved have not been fully elucidated. Therefore, the aim of this study was to investigate the effect of

aerobic exercise on frailty in mice at the physical (FI and FIAV) and cellular levels (Akt pathway). We hypothesized that 4-weeks of aerobic exercise (voluntary wheel running) would be able to prevent and/or reverse frailty, improve physical measures (FI and FIAV), increase metabolic quality (PGC-1α content, a biomarker for mitochondrial biogenesis), and increase activation of the Akt pathway (Akt phosphorylation). Methods: Five adult and 11 old mice (6 and 28+ months, respectively) were housed individually in cages with running wheels for 4 weeks. Controls (adult, n=5, and old, n=17) were housed without wheels. Each mouse was tested on the four frailty criteria before and after the 4-week exercise period. The total PGC-1α, total Akt, p-Akt (Thr308), and p-Akt (Ser473) in hindlimb muscles were determined after 4 weeks. Results: We found two old mice deemed frail by FI were rescued by the aerobic exercise intervention. The adult mice demonstrated a far greater positive response (FIAV) to the exercise ($p<0.001$), though both age groups benefited significantly. Exercise induced more relative PGC-1α content ($p=0.016$). In addition, the adult exercise group exhibited higher p-Akt (Thr308 and Ser473) relative protein content compared to the control mice ($p<0.05$), though no difference in Akt phosphorylation was found after exercise in the oldgroup. Conclusion: Collectively, we conclude that the aerobic exercise reversed frailty and improved functional parameters. Although only of short-term duration, the intervention served as a positive exercise stimulus to activate the Akt anabolic pathway and initiate improved oxidative metabolism.

**OC28- DIFFUSION TENSOR MRI OF QUADRICEPS MUSCULATURE IN THE SETTING OF CLINICAL FRAILTY SYNDROME.** D.M. Melville, J. Mohler, M. Fain, A.E. Muchna, E. Krupinski, M.S. Taljanovic *(Tucson, USA)*

Background: Frailty is a common geriatric syndrome associated with lower muscle density and mass in skeletal muscle conferring an increased risk of rapid decline in health and function and vulnerability for adverse health outcomes. The development of diagnostic tools and biomarkers for clinical frailty syndrome enhances understanding and treatment of this common condition. The purpose of this study was to investigate the correlation of diffusion tensor values of the quadriceps muscle group between functional categories of frailty syndrome using diffusion tensor magnetic resonance imaging. Methods: Subjects were recruited from a sub-sample of the Arizona Frailty cohort composed of all females with frailty status based on Fried frailty criteria, including 6 non-frail and 10 pre-frail/frail adults, as well as a community sample of 11 young, healthy, non-frail female controls. Axial images of the both thighs were obtained on a 3T magnet from proximal thigh to knee joint with T1, T2 and diffusion weighted spin-echo echo planar pulse sequences, as well as vastus medialis and lateralis intramuscular fat content analysis with MR spectroscopic technique. Diffusion tensor indices and T2 values were determined by region of interest measurements at the proximal, mid and distal thirds of both thighs. Data were evaluated to determine the correlation between measured values and frailty status. Results: A final sample of 26 subjects consisted of 11 young, healthy controls (23.3 + 3.0 years old, 135.4 + 17.9 pounds), 6 non-frail subjects (72.8 + 4.6 years old, 128.2 + 11.5 pounds), and 9 pre-frail/frail subjects (81.3 + 8.8 years old, 155.6 + 40.5 pounds). Overall, the mean FA values in the bilateral quadriceps muscles demonstrated a statistically significant difference ($F = 7.558$, $p = 0.0030$) between the control (0.275 + 0.029) and pre-frail/frail (0.315 + 0.020) and non-frail (0.277 + 0.020) and pre-frail/frail groups; however, there was no statistically significant difference between the groups with respect to ADC ($F= 0.764$, $p=0.4770$) and T2 ($F=21.675$, $p<0.0001$). There was a statistically significant difference ($F = 19.266$, $p<0.001$) in average lipid content between all 3 groups with positive correlation between age and frailty status. Conclusion: The quadriceps musculature of pre-frail/frail adults demonstrated increased FA compared to young controls and non-frail adults reflecting frailty-related increased intramuscular fat content and other potential muscle architectural changes.

**OC29- LIPOLYTIC, BETA-OXIDATIVE AND ANTI-GLYCERONEOGENIC EFFECTS OF CITRULLINE ON WHITE ADIPOSE TISSUE DEPEND ON ITS MASS AND THE AGE OF RATS.** N. Joffin, A.-M. Jaubert, S. Durant, X. Coumoul, C. Forest, P. Noirez *(Paris, France)*

Backgrounds: Sarcopenic obesity associates a decrease in muscle mass and an increase in white adipose tissue (WAT) during aging. Previous studies showed that a diet enriched with citrulline (CIT) administered to 22-month-old rats for 3 months induced a ±40% decrease in visceral WAT, while muscle mass was increased. Our aim was to investigate whether CIT had a direct lipolytic action on WAT. Lipolysis is currently described as the release in the blood of non-esterified fatty acids (NEFA) and glycerol, from triglycerides stored in WAT. However, NEFA release can be limited as the result of their re-esterification to triglycerides through glyceroneogenesis (i.e. glycerol-3P synthesis from pyruvate, lactate or amino-acids) and / or their ß-oxidation. The induction of phosphorylation of the hormone-sensitive lipase (pHSL) is a strong lipolytic marker. Methods: We used retroperitoneal AT explants from young (4-month-old) rats that were fed either a control diet (CD) or a high-fat diet (HFD) for 2 months and from old (25-month-old) rats that were fed a CD. Cultured explants were exposed to 2.5 mmol/L CIT for 24h. We analyzed NEFA release and the amount of phosphorylated hormone-sensitive lipase (P-HSL) by western blot (WB), ß-oxidation, glyceroneogenesis and the expression of the key associated enzymes and transcription factors (Carnitine palmitoyltransférase 1b, CPT-1b; Very long chain acyl CoA dehydrogenase, VLCAD; Mitochondrial transcription factor A, TFAM; Phosphoenolpyruvate carboxykinase cytosolic, PEPCK-C; peroxisome proliferator-activated receptor, PPAR alpha and gamma). Results: CIT increased pHSL expression in all conditions, suggesting that lipolysis was induced. NEFA release from WAT was raised by CIT in explants from old rats and young HFD - but not CD - rats. CIT did not affect NEFA oxidation in WAT from old rats but stimulated β-oxidation and induced VLCAD, CPT-1b, PPAR-alpha and TFAM in explants from young rats whatever the diet. CIT reduced glyceroneogenesis, PEPCK-C and PPAR-gamma in WAT from all rats. The reduction of glyceroneogenesis was much more drastic in explants from young HFD rats. Nitric oxide was shown to be a mediator of these effects. Conclusions: CIT exerted a direct lipolytic and anti-glyceroneogenic effect whether rats were young or old. In WAT from old rats, CIT did not affect beta-oxidation and, as a consequence, NEFA are released. In WAT from young HFD rats, NEFA output appears to be the result of a drastic reduction of their re-esterification. In WAT from young CD rats, NEFA release was unchanged by CIT because of an increase in the oxidative capacity of the tissue. Altogether our results establish the basis for future clinical and fundamental investigations aimed at elucidating the mechanisms by which CIT reduces body fat and open new therapeutic perspectives to fight overweight and sarcopenic obesity. 1. Joffin et al. Mol Nutr Food Sci, 2014, 58(9):1765-75; 2. Joffin et al. Mol Nutr Food Sci, 2014, 58(12):2320-30; 3. Joffin et al. Adipocyte, 2015, DOI: 10.4161/21623945.2014.989748

**OC30- INCREASES IN CIRCULATING IL-15 AND CELL-FREE DNA CONCENTRATIONS AFTER TREADMILL RUNNING: POTENTIAL SYSTEMIC MEDIATORS FOR THE BENEFICIAL EFFECTS OF ENDURANCE EXERCISE.** Y. Tamura[1,2], R. Kaszynski[1], K. Watanabe[3], T. Kantani[3], J. Hayashi[4], H. Ito[2], M. Kaneki[1], N. Ishida[3] *(1. Charlestown, USA; 2. Tokyo, Japan; 3. Ome, Japan; 4. Mitaka, Japan)*

Background: Exercise and caloric restriction are the two major interventions that have been established to help prolong healthy lifespan in mammals. The beneficial effects of endurance exercise include insulin-sensitization, reduction of fat mass, and prevention of age-related declines in skeletal muscle mass and cognitive function. Limited knowledge is available, however, about the mechanisms by which endurance exercise exerts these salutary effects. Myokines, cytokines secreted by skeletal muscle, have been recognized as a potential mediator. Recent studies have shown the role of skeletal muscle-derived interleukin-15 (IL-15) in improvement of fat-lean body mass composition and insulin sensitivity in rodents. Yet, previous studies have reported that endurance training does not increase production or secretion of IL-15 in skeletal muscle in humans. Moreover, the hormesis theory purports that mild and transient or intermittent stress results in retardation of aging process and thereby prolongs healthy lifespan. It has been proposed that the hormesis is involved in the beneficial effects of exercise. Nonetheless, it is not known whether there exist systemic mediators that exert the hormesis effects by endurance exercise. Circulating cell-free DNA is observed in healthy individuals and can be secreted from alive cells as well as derive from dead cells. Cell-free DNA has been shown to activate inflammatory response. Therefore, we studied the effects of the treadmill running on circulating concentrations of IL-15 and cell-free DNA. Methods: Thirteen or ten young healthy untrained Japanese male subjects participated in the study. They were physically active but did not have habit of frequent periodical sports. None of them were taking any medication. The protocols were approved by the local Ethical Committee in accordance with the Declaration of Helsinki. The subjects underwent 30-min treadmill running at 70% of age-predicted maximal heart rate (HR (max)), after they refrained from exercise for 24 hours. The mean heart rate during the treadmill exercise was 143/min. Blood samples were drawn from antecubital vein just before and after the exercise. Serum and plasma samples were used for the measurements of IL-15 and cell-free DNA. Serum IL-15 concentrations were measured by ELISA. Plasma and serum cell-free DNA concentrations were measured using a fluorescent dye, PicoGreen, and fluorescence microplate reader. Time-dependent variability of each data was analyzed using a one-way ANOVA for repeated measures. Results: Serum IL-15 concentration was significantly increased at 10 minutes after the 30-min treadmill running as compared with that just before the inception of treadmill running ($p<0.001$). At 3 hours after the treadmill exercise, serum IL-15 concentrations were fully restored to the basal level. At 1 hour post-exercise, serum IL-15 concentration was not significantly increased compared with pre-exercise, but it was significantly greater than that at 3 hours post-exercise ($p<0.01$). Plasma and serum cell-free DNA levels were increased 1.5- and 1.7-fold, respectively, immediately after the 30-min treadmill running compared with pre-exercise ($p<0.001$). Immediately after the exercise serum creatine kinase, a biomarker of muscle damage, was not altered compared with pre-exercise. At 1 and 3 hours after the exercise, the cell-free DNA concentrations retuned to the basal levels. In contrast, white blood cell counts increased at 1 and 3 hours post-exercise, but not immediately after the exercise, as compared with pre-exercise. The increases in plasma and serum cell-free DNA immediately after the exercise significantly correlated with the increases in white blood cell counts at 1 and 3 hours post-exercise. Conclusions: Our data show that the 30-min treadmill running at 70% of age-predicted maximum heart rate resulted in a significant increase in circulating concentrations of IL-15 and cell-free DNA in untrained healthy young men. These findings suggest that IL-15 might play a role in the systemic anti-obesogenic and insulin-sensitizing effects of endurance exercise, not only as a paracrine and autocrine but also as an endocrine factor. Moreover, the treadmill running increased circulating cell-free DNA concentrations immediately after the exercise, which preceded the increases in serum creatine kinase and white blood cell counts. These data suggest that cell-free DNA may be secreted from alive cells during the endurance exercise, which, in turn, contribute to mild and transient systemic inflammatory response. Our data raise the possibility that circulating cell-free DNA and related molecules may function as a systemic mediator of the hormesis effects induced by endurance exercise.

**OC31- DERIVATION OF A FRAILTY INDEX FROM THE INTERRAI ACUTE CARE INSTRUMENT.** R.E. Hubbard[1], N.M. Peel[1], M. Samanta[1], L.C. Gray[1], B. Fries[2], A. Mitnitski[3], K. Rockwood[3] *(1. Queensland, Australia; 2. Michigan, USA; 3. Nova Scotia, Canada)*

Background: The care of older people with multiple co-morbidities is a core remit of our acute hospitals, yet the health care system is better designed to meet the needs of younger, fitter patients with single system problems. A measurement of frailty status for older inpatients may help target their care more appropriately. Frailty identifies individuals with a diminished capacity to effectively compensate for external stressors yet it has, to date, proven challenging to quantify in clinical practice. The prevalence of frailty varies widely according to the assessment instrument used; many inpatients are unable to complete the performance based tests integral to some frailty measures; counting accumulated deficits has been criticised as too complex for initial evaluation. Although some reports have evaluated a Frailty index based on deficit accumulation in patients admitted to acute care, each study is relatively small and has recruited patients from single hospital sites. The purpose of this multi-site study was to describe the derivation of a Frailty index from comprehensive geriatric assessment. Methods: 1418 patients aged ≥ 70 years admitted to 11 hospitals in Australia were assessed at admission using the interRAI assessment system for Acute Care (interRAI AC). This tool has been specifically developed for use in the acute setting, to support the comprehensive geriatric assessment of older inpatients. Trained Nurse Assessors gather data about the patient's physical, cognitive and psychosocial functioning, based on observations of patients during their first 24 hours in the ward. All available sources of information, including the patient, carers and medical/ nursing/ allied health staff are utilized to complete the instrument. Variables across multiple domains were selected as health deficits. Consistent with previous work, deficits needed to satisfy certain criteria, including being associated with health status; covering a range of systems; generally increasing in prevalence with age and not saturating. Dichotomous data were coded as symptom absent = 0 deficit, present = 1 deficit. Ordinal scales were recoded as 0, 0.5 or 1 deficit based on face validity and the distribution of data. Individual deficit scores were summed and divided by the total number considered (56) to yield a Frailty index (FI-AC) with theoretical range 0-1. Results: Mean (SD) age was 81.0 (6.8) years and the majority of patients were female (n=780; 55%). An FI-AC could be derived for 100% of the cohort. The FI-AC was normally distributed, with a mean score of 0.32 (± 0.14), interquartile range 0.22 to 0.41. The 99% limit to deficit accumulation was submaximal, 0.69. For those with the highest burden of frailty, the average slope of deficit accumulation was indistinguishable from zero. Random sampling of the FI-AC, creating the index 1000 times and each time picking 80% of the variables, showed negligible difference in slopes in relation to age. In logistic regression analysis including age, gender and FI-AC as covariates, each 0.1 increase in the FI-AC increased the likelihood of inpatient mortality twofold (OR: 2.05 [95% CI 1.70 – 2.48]). Conclusions: For older people admitted to hospital, a Frailty index can be derived from data collected using the interRAI-Acute Care instrument. It can be calculated for all inpatients, even those who are bed-bound and highly dependent. The FI-AC conforms to the usual characteristics of a Frailty index. While a gamma distribution is well-described in community-dwellers, a normal distribution is expected here in view of the more homogenous, more unwell population. The association of the FI-AC with in-hospital death, independent of chronological age, supports its predictive validity as a measure of health status. While the interRAI-AC does not yet have widespread international endorsement, it does have more uptake than any other omnibus assessment system, already being integral to inpatient care across many secondary and tertiary settings. The derivation of an FI-AC from this instrument does not depend on the collection of any additional data and hence this measure of frailty could potentially be implemented into routine clinical practice without the need for major financial investment, the employment of research personnel or additional examinations for the patient. A Frailty index based on a standardized interRAI-AC may therefore provide a feasible and highly cost-effective means of stratifying the health status of older adults who present to hospital. The interRAI-AC is compatible with other interRAI assessment systems used extensively across Europe and North America, New Zealand and Singapore. The variables used to derive the FI-AC are common to all interRAI instruments, and could be used to precisely measure frailty across the spectrum of health care.

**OC32- SARCOPENIA COEXISTING WITH ALZHEIMER'S DISEASE AND AMNESTIC MILD COGNITIVE IMPAIRMENT IN ELDERLY PATIENTS.** T. Sugimoto[1], S. Murata[1], R. Ono[1], K. Toba[2], T. Sakurai[2] *(1. Kobe, Japan. 2; Obu, Japan)*

Backgrounds: Weight loss is frequently observed in patients with Alzheimer's disease (AD) and amnestic Mild Cognitive Impairment (aMCI), and is also associated with disease severity and clinical progression. We generated a hypothesis that the prevalence of sarcopenia is associated with severity of dementia. The purpose of this study is to clarify the prevalence of sarcopenia at various cognitive stages and for the types of dementia, and to clarify factors, such as gender, associated with sarcopenia in dementia patients. Methods: Subjects were 762 outpatients (264 male, 498 female; age 77.9 ± 7.0 years) who visited the Medical Center for Dementia at National Center for Geriatrics and Gerontology in Obu, Japan. Composition of the subjects: 49 elderly adults with normal cognition (NC), 124 with aMCI, and 589 with AD. All subjects were classified into three groups by Mini-Mental State Examination (MMSE) score: MMSE30-21 group (n = 383), MMSE20-15 group (n = 281), MMSE14-0 group (n = 98). Cognitive function was assessed by the MMSE, mood by the Geriatric Depression Scale (GDS), and Activity Daily Living (ADL)-related vitality by Vitality Index (10 point scale). Serum levels of albumin, total protein and vitamin D were measured in blood samples. Sarcopenia was defined as the low muscle mass plus either low muscle strength or low physical function. We defined low muscle mass, muscle strength and physical function as the skeletal muscle index (male: < 7.0 kg/m2, female: < 5.7 kg/m2), hand grip strength (male: ≤26 kg, female: ≥18 kg) and the slowest quartiles for Timed Up and Go test (TUG) (≥14. 3 sec). Prevalence rate of sarcopenia was calculated for each of MMSE groups and types of dementia by using descriptive analysis. Univariate logistic regression analyses were performed separated by gender to explore associations between sarcopenia and age, years of education, MMSE groups, GDS, Vitality Index, serum levels of albumin, total protein, and vitamin D. When an independent variable showed a significant association ($p < .05$) with the sarcopenia, it was subsequently entered into a multivariate logistic regression analysis. Results: Total prevalence rate of sarcopenia was 22.8% (62 male, 112 female). In the MMSE30-21, 20-15 and 14-0 groups, prevalence rates of sarcopenia were 15.9 %, 28.1 % and 33.7 % respectively. In the patients with NC, aMCI and AD, prevalence of sarcopenia were 8.2 %, 13.7 % and 25.8% respectively. Excluding subjects with missing values, univariate and multivariate logistic analyses were performed with 315 subjects with AD or aMCI (103 male, 212 female). As a result of univariate logistic analysis in male, sarcopenia was associated with age (odds ratio (OR) 1.14, 95% confidence interval (CI) 1.05 - 1.24), MMSE groups (OR 2.68, 95% CI 1.39 - 5.21) and Vitality Index (OR 0.65, 95% CI 0.48 - 0.88). In female, sarcopenia was associated with age (OR 1.07, 95% CI 1.01 - 1.15), MMSE groups (OR 1.93, 95% CI 1.18 - 3.15), Vitality Index (OR 0.76, 95% CI 0.59 - 0.98) and serum level of Vitamin D (OR 0.93, 95%CI 0.88 - 0.98). In the multivariate analysis in male, sarcopenia was associated with age (OR 1.12, 95% CI 1.03 - 1.22), MMSE groups (OR 2.34, 95% CI 1.14 - 4.80) and Vitality Index (OR 0.72, 95% CI 0.53 - 0.99). In female, sarcopenia was associated with age (OR 1.07, 95% CI 1.00 - 1.15), MMSE groups (OR 1.73, 95%CI 1.01 - 2.96) and serum level of Vitamin D (OR 0.93, 95% CI 0.88 - 0.98). Conclusion: Our results show that the prevalence rate of sarcopenia increase as the cognitive function decline. The results also indicates that, in male, sarcopenia may potentially be associated with ADL-related vitality. In female, sarcopenia may potentially be associated with serum level of vitamin D. It is suggested that, in dementia patients, sarcopenia should be approached gender specific from early stage of cognitive decline.

**OC33- FEASIBILITY AND RELIABILITY OF PSOAS MUSCLE AREA AS A NOVEL MEASURE FOR SARCOPENIA AND FRAILTY IN PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE IMPLANTATION.** S. Mamane[1], N. Piazza[1], K. Nelson[1], S. Ohayon[1], G. Martucci[1], A. Vigano[1], J. Morais[1], M. Levental[1], R. Lange[6], J. Afilalo[1] *(1. Montreal, Canada; 2. Munich, Germany)*

Background: Assessment of pre-operative frailty is critical in the evaluation of elderly patients referred for transcatheter aortic valve implantation (TAVI). Existing tools to measure frailty are largely based on physical performance tests, which are often not feasible in patients with high degrees of acuity such as those with severe aortic stenosis referred for TAVI. Muscle mass is a core indicator of frailty that has the advantage of being objectively quantifiable regardless of illness severity and acuity. However, muscle mass is not currently included in routine frailty assessments that instead rely on weight loss as a blunt surrogate. Weight loss is an imprecise reflection of muscle mass since losses in muscle may be masked by gains in adiposity, a condition now known as sarcopenic obesity. Therefore, there is an unmet need to incorporate a direct measure of muscle mass as part of frailty assessment in TAVI patients. Importantly, to ensure clinical uptake, accessibility and time are critical factors for clinicians. Psoas muscle area is a promising measure of muscle mass that meets these criteria as it can be efficiently measured in a few minutes from CT scans routinely performed prior to TAVI. Methods: A retrospective two-center cohort study was conducted to demonstrate whether measurement of psoas muscle area from pre-TAVI CT scans was feasible, to determine the optimal level and technique to measure TPMA, to assess the inter-observer reliability, and to determine in a hypothesis-generating fashion if TPMA was predictive of outcomes after TAVI. The pre-operative CT scans of 235 patients that underwent TAVI at the Royal Victoria Hospital (McGill University, Montreal, QC) and German Heart Center (Munich, Germany) were analyzed. The cross-sectional area of the psoas muscles was manually planimetered on axial images at several pre-defined levels (top, mid, and bottom of the L3, L4, and L5 vertebrae; 9 total levels) using the Osirix software package. The same measurements were repeated on multi-plane reconstructed images aligned perpendicular to the psoas muscle. Areas of the left and right muscles were summed to calculate the total psoas muscle area (TPMA). Independent observers performed duplicate measurements in a subset of 30 cases to assess inter-observer reliability. Lastly, the three-dimensional total psoas muscle volume (TPMV) between the L1-L5 levels was measured with the Materialise software package in a subset of 50 cases. Linear regression analysis was used to test the relationship between TPMA and post-procedural complications, mortality, and length of stay (LOS). Results: The cohort consisted of 235 patients with a mean age of 80.9 ± 6.8 years and 45.5% males. TPMA at the superior aspect of the L4 level on the straight axial image was more closely correlated to three-dimensional psoas muscle volume ($r=0.91$; $p<0.001$) than TPMA at the other levels tested. TPMA at L4 was normally distributed with a mean of 21.8 +/- 4.2 cm2 in males and 14.1 +/- 3.3 cm2 in females. The psoas muscle density was 37.0 +/- 9.2 Hounsfield units in males and 38.6 +/- 9.9 Hounsfield units in females. Bivariate analysis revealed that in males TPMA was correlated with age ($r=-0.23$; $p=0.02$), weight ($r=0.39$; $p<0.001$), body surface area (BSA) ($r=0.39$; $p<0.001$) and body mass index (BMI) ($r=0.34$; $p<0.001$), but not height ($r=0.02$; $p=0.10$). In females, TPMA was correlated with age ($r=-0.22$; $p=0.001$), weight ($r=0.51$; $p<0.001$), BSA ($r=0.53$; $p<0.001$), BMI ($r=0.42$; $p<0.001$), and height ($r=0.26$; $p=0.003$). The incidence of 30-day mortality was 8.1% (n=19), major complications was 24.3% (n=57), and mean LOS was 10.4 ± 8.1 days. Linear regression analysis showed that there was no association between TPMA and 30-day mortality or

complications according to the VARC classification (OR 1.00, 95% CI 0.94, 1.05). TPMA was not significantly correlated with length of stay in hospital (r=-0.15, 95% CI -0.35, 0.06). Sensitivity analysis using various cut-points instead of continuous TPMA yielded the same results. In the subset of 30 patients with duplicate measurements, Bland Altman analysis showed 95% limits of agreement of -3.14 to 2.67 cm2 with a mean difference of -0.23 cm2 between observer 1 and observer 2; and 95% limits of agreement of -3.33 to 2.27 with a mean difference of -0.53 between observer 1 and observer 3. Moreover, Conclusion: TPMA can be efficiently measured from CT scans performed before TAVI with the optimal level being the superior aspect of the L4 vertebrae on straight axial images. Reliability is very good using this method. TPMA does not appear to predict short-term morbidity or mortality post-TAVI although this was not the powered aim of this study and the impact on functional recovery remains to be evaluated.

**OC34- FRAILTY TRANSITIONS OVER 12-MONTH PERIOD IN RELATION TO COGNITIVE STATUS IN COMMUNITY-DWELLING OLDER ADULTS WITH COGNITIVE IMPAIRMENT ATTENDING A TERTIARY MEMORY CLINIC.** M.S. Chong, L. Tay, M. Chan, W.S. Lim, R. Ye, Y.Y. Ding *(Singapore)*

Background: Frailty and cognitive impairment are seemingly distinct syndromes, but have shared vulnerability to stress in older adults, resulting in poorer health outcomes. Although there has been recent interest in cognitive frailty, frailty transitions in relation to cognitive deterioration in older adults with cognitive impairment have not yet been well studied. Methods: We studied mild cognitive impairment (MCI), mild and moderate Alzheimer's Disease (AD) subjects and obtained data on demographics, comorbidities, socioeconomic factors, physical activity level, lifestyle activities, cognition-related, nutritional and neuroimaging measures, functional status, muscle mass measurements, Vitamin D level, apolipoprotein E (APOE) status and physical performance measures. Frailty was classified at baseline, 6 and 12 months according to modified Buchmann criteria into dichotomous frail and non-frail categories. Frailty transitions (defined as regression, unchanged, progression) between baseline and 12-months were assessed. Univariate analyses and multinomial logistic regression were performed. Results: We recruited a total of 135 cognitively impaired older adults which included 52 MCI, 68 mild and 15 moderate AD subjects. 42.2%, 36.8% and 60% were frail at baseline respectively. Of the whole group, 19.3% frailty status regressed, 59.6% remained unchanged and 21.1% frailty status progressed at 12 months. This appeared independent of their cognitive subgroups (p=0.44). Significant differences were noted in activities of daily living (ADL) (98.1+3.7, 98.5+5.4, 95.4+8.5), baseline grip strength (16.5+5.1, 20.6+7.3, 17.3+8.7 kg), appendicular skeletal mass/ht2 (5.7+0.9, 7.4+10.9, 5.4+0.8 kg/m2), high-density lipoprotein level (1.8+0.9, 1.6+0.6, 1.5+0.4 mmol/L), triglyceride level (1.3+0.5, 1.3_0.8, 1.2+0.6 mmol/L), and daily fish intake (42.9%, 52.8%, 21.1%) between frailty status regression, unchanged and progression respectively (all p<0.05). Of note, CDR-sum-of-boxes (SOB), reflective of cognitive reserve, neurodegeneration measures (of medial temporal atrophy score) and vascular burden (both multimorbidity score and neuroimaging age-related white matter changes) did not appear to influence frailty status progression. Multinomial logistic regression including significant univariate variables above, together with gender and CDR-SOB, showed only daily fish intake to contribute significantly to frailty status progression (OR 0.25, 95% CI 0.06-0.97). Conclusion: This study is the first to show frailty state transitions in 12 months among subjects with cognitive impairment. Contrary to expectations of frailty progression to be most significantly affected with increasing levels of cognitive impairment, the frailty transitions appear independent of stage of cognitive impairment/ dementia. Daily fish intake contributed most to frailty transitions, which could potentially serve as a modifiable factor to address physical frailty progression in cognitive impairment.

**OC35- THE CHANGES OF LOWER MUSCULAR MASS, WEAKNESS AND PHYSICAL PERFORMANCE IN ROBUST AND PRE-FRAIL OUTPATIENT OLDER ADULTS.** T.-C. Chen, C.-Y. Chen, C.-C. Hsu, M.-H.Hu *(Taipei, Taiwan)*

Backgrounds. Frailty is a geriatric syndrome and sarcopenia is seen as the main contributor to the vicious cycle of frailty. Muscle mass loss, muscle strength decline and poor physical performance, slow gait speed and decreased mobility are characteristics of sarcopenia and the frailty syndrome. Frailty is a dynamic state and it may transit to different status with aging. The purpose of this study was to examine the changes and associations among relative lower extremity muscle mass, muscle strength and physical performances observed longitudinally for 3 years in robust and pre-frail outpatient older adults. Methods. This was a 3-year longitudinal cohort study of outpatient older adults recruited from geriatric clinics. Frailty status was characterized according to Fried's Frailty Phenotype (weight loss, weakness, exhaustion, slowness, and low level of activity). Predicted muscle mass (PMM) of lower extremities was measured by bioelectrical impendence analysis (Tanita BC-418 Pro Segmental Body Composition Analyzer). Cybex Norm dynamometer was used to measure knee extensors and flexors isokinetic muscle strength at 0, 60, and 180 degrees/second. Physical performances were assessed by the 5-times sit-to-stand test (5tSTS), timed up and go test (TUGT) and 5-meter walk test (5MWT). Data were collected annually and then analyzed by analysis of variance (ANOVA) and Pearson correlation. Results. Overall, 95 subjects (49 males, 46 females) completed all three follow-up examinations. The mean age was 77.48 (±5.79) years. There were 26.3% of subjects in the robust and 73.7% in the pre-frail status. The PMM was significantly decreased in robust older adults (p=0.04), the isokinetic muscle strength of knee extensors at 180 degrees/second decreased significantly both in robust (p=0.005) and pre-frail (p=0.002) group. Regarding physical performance, TUGT was significantly worse in follow up from baseline in both groups (robust p=.05; pre-frail p<0.001). The change of TUGT from baseline to follow up correlated significantly with the change of isokinetic muscle strength of knee extensors at 0 degrees/second (r=.23, p=0.024). Conclusion. Knee extensor muscle strength was critical for detecting the ageing related changes of muscle strength in robust and pre-frail outpatient older adults. Furthermore, it was significantly related to the ability to stand up, walk, and turn.

**OC36- LOW INTENSITY RESISTANCE TRAINING, BUT NOT CITRULLINE SUPPLEMENTATION, ATTENUATES DECLINES IN SKELETAL MUSCLE MASS, STRENGTH AND 'ANABOLIC RESISTANCE' INDUCED BY TWO-WEEKS OF INACTIVITY IN OLDER MEN.** M.T von Allmen[1], M.C. Devries[1], L. Breen[1,2], S.M. Phillips[1] *(1. Hamilton, Canada; 2. Birmingham, UK)*

Background: Aging results in a progressive loss of muscle mass and strength which is accelerated by periods of muscular disuse. Even a relative disuse is increasingly recognized as having adverse consequences. For example, we have previously shown that 14 days of reduced daily ambulation in older adults induces muscle loss and blunts postprandial rates of muscle protein synthesis (MPS), which we have termed 'anabolic resistance'. The etiology of anabolic resistance remains unclear, however, reduced blood flow may be important. Citrulline supplementation has been found to increase peripheral blood flow in humans and augment MPS in human and rodent models. Therefore, the aim of this study was to examine whether decreased blood flow and thus nutrient delivery to the muscle with muscular disuse could be ameliorated. We aimed to assess the effects of step-reduction (SR), with/without unilateral resistance training (RT; to create a within-person comparison) and citrulline (CIT) supplementation, on MPS, strength and body composition in older men. Methods: Thirty healthy, older men underwent 14 days of SR (< 1500 steps/d) while supplemented with either 5g/d CIT or placebo (glycine). Participants also performed low load unilateral (single leg) RT thrice weekly with the last set performed to momentary muscle failure. Participants underwent a primed constant infusion of [13C6]-phenylalanine with serial muscle biopsies obtained from the SR and SR + RT legs in both the fasted and fed states (20g whey protein + either CIT or placebo) to assess MPS. Peak torque production of the knee extensors was assessed via isometric knee extensor torque and body composition was quantified with DXA prior to and following the step-reduction protocol. Results: Daily steps were reduced by ~80% in both groups ($p < 0.0001$) with no differences between groups. There was no effect of CIT on leg fat-free mass (FFM) in either leg, however, the change in FFM in the SR+RT leg (+201 ± 75g) differed significantly from that of the SR leg (-60 ± 82g; $p = 0.01$). CIT had no effect on knee extensor peak torque production, however the SR+RT leg did not exhibit the same decreases in strength as seen in the SR leg ($p = 0.04$). MPS was lower in the SR as compared with SR+RT legs in both the fasted (SR: 0.025 ± 0.001%/h vs SR+RT: 0.044 ± 0.001%/h) and fed (SR: 0.053 ± 0.002%/h vs SR+RT: 0.116 ± 0.004%/h) states with no effect of CIT. Conclusion: Six sessions of low-load RT were sufficient to mitigate the deleterious effects of SR on muscle mass and isometric strength. Furthermore, RT resulted in a SR+RT leg that exhibited greater anabolic sensitivity to feeding than the SR leg alone. In contrast to RT, supplementation with CIT does not rescue anabolic sensitivity or attenuate the consequences of SR in older men. Our results highlight the potency of muscle contraction, but not CIT supplementation, as a countermeasure to the deleterious consequences of inactivity.

**OC37- MUSCLE MRNA EXPRESSION SIGNATURES IN WASTED AND NON-WASTED COPD PATIENTS AT REST AND 24 HR AFTER RESISTANCE EXERCISE.** D. Constantin[1], M. Menon[2], M.C. Steiner[2], P.L. Greenhaff[1] *(1. Nottingham, UK; 2. Leicester, UK)*

Background: Skeletal muscle wasting is systemic feature of COPD, which predicts mortality and morbidity independently from lung function impairment. Therapies that increase muscle mass may therefore have clinical efficacy in a disease where the primary pulmonary pathophysiology is often irreversible. Proof of concept that this approach is successful comes from the clear benefits of exercise training in COPD. We aimed to extend our understanding of resting muscle genomic signatures allied to wasted and non-wasted COPD patient phenotypes, and also the muscle genomic response to a bout of resistance exercise in these groups. Methods: Following ethics approval, 20 clinically stable COPD patients were recruited from outpatient clinics (University Hospitals of Leicester NHS Trust). Criteria for inclusion were severe airflow obstruction on spirometry (FEV1/FVC ratio<70%, FEV1<50% predicted), a clinical picture consistent with COPD and significant exercise limitation (MRC Grade 3-5). COPD patients were divided into wasted (n=8) and non-wasted (n=12) using dual energy X-ray absorptiometry (DEXA) and BMI. Subjects performed 5 sets of 30 maximal isokinetic knee extensions at an angular velocity of 180o/s on a Cybex dynamometer, each set being separated by 1 min resting recovery. Vastus lateralis biopsies were obtained at rest before (baseline) and 24 hr following resistance exercise. mRNA gene expression was measured using Low Density array (LDA) microfluidic cards and PCR (ABI 7900HT); providing quantitative data for all genes studied. Target genes were selected from a limb immobilisation study involving healthy volunteers in which Affymetrix based chip analysis was performed. Total RNA was isolated from the snap-frozen muscle using TriReagent (Ambion), and strand cDNA was then synthesised using random primers (Promega) and Superscript III (InVitrogen). Statistical analysis: Between groups comparison of muscle function was performed using one-way ANOVA, with Tukey's post-hoc test. Comparison of gene function between groups involved the right-tailed Fisher's Exact Test using Ingenuity Pathway Analysis (IPA). Significance was at all times accepted at P<0.05. Results: Isometric strength, isokinetic peak torque and work output were lower in wasted than in non-wasted COPD (P<0.01, P<0.05 and P<0.01, respectively) and control (P<0.01, P<0.01 and P<0.01;

respectively). Furthermore, isometric strength and isokinetic work output was lower in non-wasted COPD than control (P<0.01 and P<0.01, respectively). Gene expression profiling undertaken using IPA revealed differential expression signatures in wasted and non-wasted COPD patients at baseline compared to control, which were associated with a variety of biological functions and disease states. Furthermore, the magnitude of difference in functions relative to control was greater in wasted than in non-wasted COPD. Biological functions and disease states identified as being highly different from control in wasted COPD patients included skeletal and muscular system development and function, tissue morphology, endocrine system disorders, and immunological disease. The non-wasted patients showed the greatest difference in gene functions associated with carbohydrate and lipid metabolism at baseline. We also identified 4 genes common to both wasted and non-wasted COPD phenotypes whose expression (fold change) was found to be up-regulated (Myosin binding protein, 5.6 in wasted and 3.6 in non-wasted; cholinergic receptor nicotinic delta, 2.0 in wasted and 2.1 in non-wasted) or down-regulated (Fas ligand, -10.2 in wasted and -7.1 in non-wasted; C-C motif chemokine 22, -3.7 in wasted and -7.3 in non-wasted) relative to control. Resistance exercise accentuated differences from control in mRNA expression of genes for a number of biological functions, particularly in wasted COPD patients (antigen presentation, cellular movement, immune cell trafficking, inflammatory response and cardiovascular system development and function). Furthermore, the magnitude of difference between wasted and non-wasted patients for a number of biological functions was greater following exercise. Several of the biological functions identified at 24 hr were different from those deemed to be differentially expressed at baseline (e.g. antigen presentation, cellular movement, immune cell trafficking). Similar to baseline, we identified 3 genes common to both wasted and non-wasted COPD phenotypes, with mRNA expression (fold change) up- or down-regulated relative to control (Interleukin 6, 2.1 in wasted and 3.0 in non-wasted; interleukin10, -8.6 in wasted and 4.1 in non-wasted; myostatin -1.1 in wasted and -1.8 in non-wasted). Conclusions: We have identified resting muscle mRNA signatures representing known biological functions and disease states that are associated with COPD, and also that allow differentiation of wasted and non-wasted patients from control. Differences in gene function from control in non-wasted COPD patients indicates physical inactivity is a major contributor to muscle maladaptation in this patient group. However, a more profound and wide-ranging dysfunctional genomic signature was evident in wasted COPD. Acute resistance exercise accentuated differences in mRNA expression for a number of biological functions, particularly in wasted COPD patients, and may assist in target identification and validation in future intervention studies. Acknowledgements: This study was supported by the MRC/ARUK Centre for Musculoskeletal Ageing Research and Remedi UK.

**OC38- TRUNK MUSCLE COMPOSITION 2 MONTHS AFTER HIP FRACTURE: THE BALTIMORE HIP STUDIES.** G.E. Hicks[1], M. Shardell[2], R.R. Miller[3], D. Orwig[1], M. Hochberg[1], J. Magaziner[1] *(1. Newark, USA; 2. Baltimore, USA; 3. Research Triangle Park, USA)*

Introduction: Hip fracture is a major public health problem that results in significant burden to the health care system. Annually, more than 340,000 persons over age 65 fracture a hip in the United States, and this number is expected to double by 2040. Following a hip fracture, there is a sudden loss of physical function followed by a period of recovery that typically lasts for at least 12 months. Given that the duration of disability extends beyond the time required for fracture healing, there are likely other factors linked to poor recovery. Recent evidence suggests that trunk muscle attributes, including muscle composition and endurance, are linked to functional decline among older adults; but trunk muscle attributes have not been studied in older adults who have had a hip fracture. Computed tomography (CT) has been used extensively to characterize both the size and composition of skeletal muscle. The extent of radiological attenuation is generally considered to result from lipid accumulation and has been extensively used as a radiologic proxy for muscle composition characteristics, including intramuscular fat infiltration. Indeed, higher muscle attenuation on CT scan imaging correlates with lower intramuscular fat content and greater muscle strength, independent of muscle mass. The purpose of this study was to characterize trunk muscle composition (abdominals and lumbar paraspinals) in older men and women, two months following hip fracture, using data from a Baltimore Hip Studies cohort and make comparisons to existing trunk muscle composition data from the Health, Aging and Body Composition Study. We hypothesized that hip fracture patients would have smaller cross-sectional areas and greater fat infiltration in all trunk muscles as compared to healthy older adults. Methods: Participants were recruited from the Baltimore Hip Studies 7th cohort (BHS-7) a prospective cohort study designed to examine the metabolic, physiologic, neuromuscular, functional, and clinical consequences of hip fracture in equal numbers of men and women. Patients were eligible if they were >65 years and admitted to one of the study hospitals during the study period with a diagnosis of hip fracture (ICD-9 codes 820.00-820.9). As part of an ancillary study to BHS-7 (The Epidemiology of Bone Strength and Muscle Composition After Hip Fracture in Men), CT scans of the trunk were obtained at 2 months post-fracture. All participants who were enrolled in the parent study and had not died, dropped out, or been lost to follow-up by the 2-month follow-up visit were eligible for enrollment. Participants were excluded if they were unable to lie supine for the computed tomography (CT) scan or had cognitive impairment preventing them from being left alone during the CT scan. For 69 hip fracture patients, a single 10 mm axial CT scan (Philips Brilliance 64 CT scanner. Phillips Electronics N.V. Eindhoven, The Netherlands) was obtained at the L4-L5 disc space on each participant based on a lateral abdominal scout. Trunk muscle cross-sectional area (CSA) was quantified using SliceOmatic software version 3 (Tomovision, Montréal, Canada). After adipose tissue was segmented from the images, individual muscles were identified. Skeletal muscle attenuation was measured for each muscle as the mean attenuation value between 0 and 100 Hounsfield Units (HU) as a marker of skeletal muscle lipid content. Muscle CSA and muscle attenuation were quantified for all trunk muscles (rectus abdominus, lateral abdominals and paraspinal muscles). Trunk muscle composition data was acquired and analyzed in the BHS cohort based on the methodology used for the Health ABC Study. Participant data are presented as the mean and standard deviation. Paired sample t-tests were performed to compare trunk muscle composition between the hip fracture cohort and the Health ABC cohort. All analyses were performed using the statistical package SAS (SAS institute, Cary, NC). Results: Both study samples had nearly equal proportions of men and women. Compared to Health ABC participants, hip fracture patients had smaller CSA for all trunk muscles, including rectus abdominus (3.84cm2±1.80 vs. 5.45±3.81, p<.001), lateral abdominals (11.05cm2±3.99 vs. 17.40±10.56, p<.001) and paraspinals (10.07cm2±2.94 vs. 13.22±7.34, p<.001). However, the hip fracture patients had greater attenuation values (indicative of less fat infiltration) for all trunk muscles, including rectus abdominus (27.03HU±8.61 vs. 18.71±27.00, p<.001), lateral abdominals (28.32HU±5.72 vs. 25.26±5.28, p<.001) and paraspinals (35.75HU±4.41 vs. 19.32±22.30, p<.001). Conclusion: At 2 months post hip fracture, older men and women demonstrate reduced trunk muscle area globally, but there does not appear to be a replacement of muscle with adipose tissue as we have observed in analyses of the thigh musculature in this cohort, comparing the fractured to non-fractured leg. Given that trunk muscle endurance and strength are associated with balance performance in older adults, reduced trunk muscle CSA at 2 months post-fracture may be an established trait of hip fracture patients prior to fracture; on the other hand, it may also be evidence of disuse muscle atrophy in the 2 months following fracture. Future work will evaluate the role of trunk muscle composition in the functional recovery of older adults following hip fracture.

**OC39- PREVALENCE OF LOW LEAN MASS IN THE USA USING THE FNIH SARCOPENIA PROJECT CUTPOINTS: EFFECT OF AGE.** J.A. Batsis[1,2], T.A. Mackenzie[1,2], F. Lopez-Jimenez[3], S.J. Bartels[1,2] *(1. Hanover, USA; 2; Lebanon, USA; 3. Rochester, USA)*

Background: The Foundation for the NIH Sarcopenia Project (FNIH) recently published validated cutpoints for appendicular lean muscle mass (ALM) which may identify individuals with functional impairment. Such persons are believed to be at increased risk for disability, institutionalization and adverse events. We ascertained the prevalence of Sarcopenia (SP) based on individuals fulfilling these criteria in a representative population of the United States. Methods: We identified 4,984 subjects ≥60 years with body composition measures from the National Health and Nutrition Examination Surveys 1999-2004, a cross sectional survey representative of non-institutionalized persons in the United States. Sarcopenia was defined using two sex-specific definitions recently published by the FNIH Sarcopenia project: ALM (males <19.75kg; females <15.02kg), and ALM adjusted for body mass index (BMI) (males <0.789; females <0.512). Prevalence rates by sex, age category (18-59years; 60-69, 70-79, >80years) and race (non-Hispanic white, non-Hispanic black and Mexican American) were evaluated. The analysis accounted for the survey's complex, stratified design incorporating survey weights. Results: The mean age in this population was 70.3 and 71.3 years in males and females, respectively. Of the 4,984 participants ≥60years old, 2,531 (50.8%) were female. Mean BMI was 28kg/m2 in both sexes. ALM was higher in males than in females (24.2±0.05 vs. 16.3±0.05; p<0.001) but fat mass was lower (30.9±0.06 vs. 42.1±0.06;p<0.001). Prevalence rates of sarcopenia in the USA are represented in the Table. Conclusion: Using the FNIH criteria, estimated prevalence of SP varies using either the ALM:BMI or ALM definitions alone. The prevalence of SP increases with age and is lower in blacks as compared to whites. Keywords: Obesity, sarcopenia, epidemiology.

**Prevalence based on Foundation for the NIH Sarcopenia Project Cutoffs**

| | Males (n=2,453) | | Females (n=2,531) | |
|---|---|---|---|---|
| | ALM:BMI | ALM | ALM:BMI | ALM |
| | <0.789 | <19.75kg | <0.512 | <15.02kg |
| Overall >60 years | 877 (31.2) | 560 (18.4) | 729 (23.4) | 1,119 (41.9) |
| 18-59 years | 459 (7.5) | 366 (5.6) | 1316 (12.1) | 1992 (26.0) |
| 60-69-years | 279 (23.1) | 133 (11.1) | 256 (15.5) | 362 (30.6) |
| 70-79years | 330 (35.8) | 218 (21.7) | 237 (27.0) | 337 (44.5) |
| 80+ years | 268 (49.4) | 209 (37.3) | 420 (63.6) | 236 (35.5) |
| Race | | | | |
| Non-Hispanic White | 312 (17.1) | 495 (30.1) | 361 (22.8) | 667 (42.9) |
| Non-Hispanic Black | 72 (14.6) | 65 (17.1) | 57 (14.6) | 49 (12.2) |
| Mexican American | 343 (52.3) | 292 (53.4) | 166 (29.3) | 305 (41.9) |
| Other | 25 (46.3) | 25 (39.7) | 14 (23.4) | 37 (57.0) |

All prevalence rates are number of individuals (weighted percentage); ALM: Appendicular Lean Mass; BMI: Body mass index

**OC40- FRAILTY PHENOTYPE IS ASSOCIATED WITH DECLINES IN MUSCLE MASS, PERFORMANCE, QUALITY AND INTEGRITY, WITH SUGGESTION OF COMPENSATORY HYPERTROPHY.** G.A. Kuchel[1], M.S. Fragala[1,2], X. Zhou[1], Q. Wu[1], G. Polkowski[1], T. Balach[1], A.M. Kenny[1], R. Wu[1], J. Grady[1] *(1. Farmington, USA; 2. Orlando, USA)*

Background: Sarcopenia and frailty are closely linked to each other since declines in muscle mass and quality are associated with clinical vulnerability, including the development of future disability and death. Yet, in the absence of well-defined frailty phenotypes, specific mechanisms may be obscured or confounded by the presence of multiple different co-existing conditions which contribute to the frailty. The Fried frailty phenotype is characterized by unintentional weight loss, self-reported exhaustion, weak grip strength, slow walking speed and low physical activity. Once confounding diseases and co-morbidities are carefully excluded, such subjects have been shown to offer unique insights into specific frailty mechanisms. With these considerations in mind, we undertook what we believe to be the first muscle biopsy study specifically focused on individuals with a well-defined frailty phenotype. Methods: Vastus lateralis muscle biopsies were obtained in healthy young (HY; n=9; 29.7±4.1 y), healthy old (HO; n= 10; 77.8±9.0 y) and elderly with > 1 Fried frailty criteria (OF; n=9; 85.6±3.5 y). Participants with confounding comorbidity, disability or medications were excluded. Appendicular lean muscle mass (ALM) was obtained by DXA. Muscle quality (relative strength), strength and function were evaluated. Tissue sections were qualitatively rated by a neuropathologist for evidence of muscle atrophy and degeneration and quantified by image analysis for fiber diameter and shape using maximum and minimum fiber diameter length measurements and ratios of these two respective parameters. Quantitative analysis involved 9 images for each participant (3 H&E sections of 3 image regions for each). Fiber diameter measurements were performed for a total of 11,813 cells. Group differences were determined with Chi-Square and repeated measures general linear mixed modeling utilizing restricted maximum likelihood estimation with Tukey pairwise comparisons. Results: Despite similar muscle mass in HY and HO, HO had significantly lower muscle strength, power and quality than HY. In contrast, OF had significantly lower muscle mass compared to both HY and HO. OF also had lower grip strength compared to HO, as well as a trend towards decreased leg strength, leg power and muscle quality. Qualitative pathological analysis revealed normal muscle architecture in all HY and most HO subjects. Evidence of muscle fiber atrophy (70%, X2 = 13.3, p =0.001) and degeneration (50%, X2= 10.9, p =0.004) was more frequent in OF. Group differences in maximum fiber diameter (HY = 78.7±4.9m; HO = 70.3±4.7 m; OF =82.1±4.9 m) were not significant even after controlling for age and gender (p=0.11) in quantitative analysis. However, this parameter was 15.1 m larger in men compared to women (p=0.005). After controlling for age and gender, minimum fiber diameter differed by group (HY = 56.3±3.8 m; HO = 49.8±3.6 m; OF =60.3±3.8 m) where minimum fiber diameter was 11.7 m smaller in HO compared to OF (unadjusted p = 0.037, Tukey adjusted p = 0.09). Moreover, in OF there appeared to be an increased proportion of fiber diameters more than 2 SDs above the mean for HY or HO. In addition, minimum fiber diameter was 11.3 m larger in men compared to women (p=0.007). Finally, after controlling for age and gender, fiber ratio (maximum:minimum) differed by group where fiber ratio was smaller in OF (1.42±0.02) compared to HY (1.45±0.02, unadjusted p = 0.03,Tukey adjusted p = 0.07) and HO (1.48±0.02, unadjusted p = 0.01,Tukey adjusted p = 0.02). Conclusion: While aging impacts muscle quality more than quantity, the Fried frailty phenotype appears to be associated with declines in both muscle quantity and quality, together with a growing likelihood of atrophy and degeneration. Moreover, presence of degenerative changes in OF subjects appears to be accompanied by increased diameter profiles in a subset of muscle cells, suggesting potential compensatory hypertrophy indicating the unexpected presence of such plasticity even in the frail elderly. Finally, different ratios of maximum to minimum fiber diameters in frail muscle may reflect different fiber shape in comparison to healthy and young muscle. Thus, interventions aimed at muscle quality, atrophy, degeneration and compensatory hypertrophy may be required as part of an effort to improve clinical outcomes by targeting specific frailty pathways.

**OC41- NOVEL SERUM BIOMARKERS THAT PREDICT SARCOPENIA IN OLDER MALNOURISHED MEN.** S.L. Pereira[1], S.H. Gawel[2], M. Luo[1], P. Hemken[2], V. Mustad[1], N.K. Edens[1], G.J. Davis[2] *(1. Columbus, USA; 2. Chicago, USA)*

Backgrounds: Sarcopenia is characterized as the combined loss of muscle strength/functionality and muscle mass in older adults. It is associated with an increased risk of mobility-disability, poor hospitalization outcomes, and mortality. Currently, the proposed definition for diagnosis of sarcopenia involves multiple steps, and requires expensive instruments to measure muscle mass. Identifying a blood-based sarcopenia diagnostic tool could provide a practical alternative to current expensive and tedious methods. Ease of identification of susceptible populations will increase awareness of the problem, allow for timely intervention, and have a huge impact on the health economics of mobilitydisability. Methods: Non-fasted serum samples were obtained from a group of n=120 malnourished, sarcopenic (cases) (n=60) and non-sarcopenic (controls) (n=60), men and women (age 65 + years) from eight countries across Europe and North America. Malnutrition status was measured by the Subjective Global Assessment. Sarcopenia status was determined using the European Working Group Sarcopenia Older People (EWGSOP) algorithm1. Cases and controls were matched for age, gender, and site of recruitment. Biomarker measurements were carried out using multiplexed immunoassay from MyriadRBM (Human Discovery MAP-175+ v.1®), the ARCHITECT® platform, and additional markers by ELISA. A total of 190 biomarkers were measured; 60 were excluded from evaluation due to results being below detection levels in ≥30% subjects. Classification tree analysis, with a 10-fold cross validation, was performed to identify markers that may predict sarcopenia. Results: A total of 130 biomarkers were evaluated for all subjects. Using the classification tree analysis, serum levels of a set of biomarkers, Prolactin and Thyroxin Binding Globulin, were found to predict risk of sarcopenia [R2 =0.64] in male subjects with a sensitivity of 100.0% and specificity of 91.7%. The analysis did not reveal a robust set of biomarkers that could predict sarcopenia in female subjects. Conclusions: A serum biomarker algorithm that can predict sarcopenia in malnourished older males was identified. Validation of these markers in larger clinical studies is needed. Current analysis was unable to identify a robust sarcopenia diagnostic algorithm for females, suggestive of gender-specific differences. Additional analysis is needed to identify biomarker predictors of sarcopenia in older females. Reference: 1. Cruz-Jentoft A et al Age and Ageing 2010; 39: 412–423. Sponsored by Abbott Laboratories.

**OC42- INFLUENCE OF GENDER AND HIGH-FAT FEEDING ON THE DEVELOPMENT OF SARCOPENIA IN THE AGING RAT.** R. Kob[1], C. Fellner[2], T. Bertsch[1], A. Wittmann[1], C.C. Sieber[1,2], B.E. Fischer[1], C. Stroszczynski[2], L.C. Bollheimer[12] *(1. Nürnberg, Germany; 2. Regensburg, Germany)*

Background: In the past few years, obesity has been established as a risk factor for development of sarcopenia. Several molecular pathological mechanisms have been proposed that might explain this relationship. For example, elevated intramuscular levels of lipids and their derivatives might lead to elevated oxidative stress, deregulated protein synthesis and finally apoptosis. However, this intracellular lipotoxicity could only be shown in isolated myotubes while animal models revealed conflicting results. Furthermore, most studies were conducted using only male animals for a short period of time. Therefore, in this study, the gender-specific effect of long-term high-fat content feeding in Sprague-Dawley rats was examined. Methods: Beginning at 6 months of age male (n = 36) as well as female (n = 42) Sprague-Dawley rats either received standard rodent chow or a high fat diet for 15 month (HFD, 43 energy% of neutral fat, based on lard and corn oil). The quantity of carbohydrates was lowered in the HFD to gain a comparable energy density of the chow. Thus, both dietary groups obtained similar amounts of protein and all essential micronutrients. Development of the quadriceps muscle of the animals was monitored in vivo using magnetic resonance imaging. At 21 months of age the rats were sacrificed and the M. vastus lateralis was used for ex vivo analysis. Besides the anabolic Akt pathway, the amount of muscle ubiquitin ligases was monitored using Western blot. Furthermore, activation of Caspase 3 as a marker of apoptosis induction was analyzed. Regeneration processes of the myofibers were evaluated by counting the amount of centrally nucleated fibers in HE-stained sections of the muscle. Results: Surprisingly, male but not female rats revealed lower muscle cross-sectional area (CSA) at 16 months of age due to a chronic oversupply of dietary fats. This could possibly be explained by the increase of total body weight of high-fat fed female rats that was correlated with an increment of the CSA. Until 21 months of age, both genders displayed a significant decline of muscle irrespective of diet, which was about four times higher in male than in female animals (22% male vs 5% female, $p < 0.01$). This loss of muscle mass was not accompanied by de-regulation of the total amount or the phosphorylation status of the analyzed members of the Akt pathway. Degradation of muscular structure proteins also seemed not to be up-regulated since both main ubiquitin ligases, MAFbx and MuRF-1, revealed similar concentrations in control as well as the HFD group. However, a higher portion of myofibers of the high-fat fed male rats contained centrally located nuclei (4.5 % control vs 7.3 % HFD; $p < 0.05$) what points to an increased need for compensatory regeneration processes. Generally, male rats exhibited a significant higher level of cleaved Caspase 3 than the female animals. Furthermore, activation of Caspase 3 was significantly correlated with the loss of muscle CSA between 16 and 21 months of age in male rats independent of the diet ($\tau = 0.44$; $p < 0.05$). For female animals, no single factor could be correlated to the loss of muscle in advanced age. Conclusion: Male rats especially those receiving a long-term high fat diet were more prone to decline of muscle CSA during aging than female animals. This loss of muscle mass seems to be mainly driven by Caspase-3-dependent apoptosis induction in a gender-specific manner.

**OC43- GENOME-WIDE ASSOCIATION ANALYSIS OF FRAILTY MEASURES IN TWO REPRESENTATIVE COHORTS IN THE US AND THE UK.** K. Mekli[1], J. Nazroo[1], A. Marshall[1], J. Lee[2], D. Phillips[2], C. Prescott[2], N. Pendleton[3] *(1. Manchester, UK; 2. Los Angeles, USA; 3. Salford, UK)*

Background: Frailty refers a state of increased vulnerability to poor resolution of homeostasis after a stressor event, which increases the risk of adverse outcomes, including falls, delirium and disability. The mechanistic pathophysiological pathways of frailty are not known, but there is evidence in the literature for the involvement of steroid hormones and the immune system. How to best operationalize frailty has been debated, but recent international consensus includes support two approaches: the Frailty Phenotype (FP) and the Frailty Index (FI). The FP is a performance-based approach and determines the condition based on specific criteria, such as unintentional weight loss, exhaustion, low physical activity, slowness and weakness. The FI is another robust and flexible measure of frailty, which is based on the concept of deficit accumulation. Studies of genetic determinants of frailty have followed candidate gene methods limiting discovery potential. This study uses a hypothesis free genome wide association analysis of frailty status by both measures in two representative population samples of older adults in US and UK, with harmonized phenotype/genotype data. Methods: The authors propose to conduct a genome-wide association analysis in two representative cohorts using the FP and the FI as outcome measures, with sex and age as the most important covariates. The two cohorts have exactly the same genotypic and phenotypic data, presenting a unique opportunity for

a discovery and replication approach. These two cohorts are as follows: The "discovery" cohort, the Health and Retirement Study in the US (n=12,500); the "replication" cohort, the English Longitudinal Study of Ageing in the UK (n=4,700). Pathway analysis will be also conducted to highlight important mechanisms playing a role in frailty. Results: Genome-wide association and pathway analyses allow us to discover new genes and mechanisms playing a role in frailty and confirm the role of the ones previously implicated in the literature. The results of the analyses will be available at time of presentation. Conclusion: These results will demonstrate the outcome of the first adequately powered genome-wide association analysis of frailty with replication using harmonized genotypic/phenotypic data. This may permit both discovery of novel genetic loci and replication of currently supported markers.

**OC44- MUSCLE PROTEIN FRACTIONAL SYNTHESIS RATES PREDICTS MUSCLE MASS GAIN IN RESPONSE TO A SELECTIVE ANDROGEN RECEPTOR MODULATOR.** M. Shankaran[1], C. King[1], P.A. Wong[1], S. Turner[1], M. Hellerstein[1], T.W. Shearer[2], S.A. Stimpson[2], Y.X. Qian[2], R.V. Clark[2], P.S. Turnbull[2], R. Miller[2], D.C. Cooper[2], A. Russell[2], W.J. Evans[2] *(1. Emeryville, USA; 2. Research Triangle Park, USA)*

Background: Loss of muscle due to age or disease is a debilitating condition which can be potentially treated with anabolic interventions. Identification of early biomarkers of muscle anabolism would aid in development of anabolic therapies, rather than relying on indirect and relatively inaccurate measures of lean mass and functional endpoints. We hypothesized that the fractional synthesis rate (FSR) of individual muscle proteins could serve as potential biomarkers for predicting the effect of an anabolic stimulus on muscle mass. We also developed serum biomarkers for measuring muscle protein synthesis in both rodents and humans. Methods: We used a dynamic proteomics approach, involving heavy water (D2O) labeling and tandem mass spectrometry, to measure the FSR of 150-200 individual skeletal muscle proteins in three different skeletal muscles (triceps, EDL and soleus) in the ovariectomized (OVX) rat in response to treatment with a Selective Androgen Receptor Modulator (SARM). Animals were treated with SARM (0.1, 0.3 or 1 mg/kg/day) for either 10 or 28 days with D2O labeling for the last 4-7 days. All studies were conducted in accordance with the GSK Policy on the Care, Welfare and Treatment of Laboratory Animals and were reviewed by the Institutional Animal Care and Use Committee at GSK. At the end of treatment and label, muscle homogenates were digested with trypsin, and peptides were fractionated by high-pH peptide fractionation before tandem mass spectrometric analysis. Results: Treatment of OVX rats with a SARM molecule for either 10 or 28 days produced a significant and dose-dependent increase in body weight and lean body mass, as well as weights of individual triceps, but not EDL or soleus. Triceps exhibited a significant dose-dependent increase in FSR of myofibril, glycolytic, cytoplasmic, mitochondrial and extracellular matrix proteins following 10 days of SARM treatment. Comparison of the response to the highest dose across the 3 tissues revealed increased FSR for most proteins with a consistent pattern of triceps > EDL > soleus. The change in FSR for many of these proteins, including creatine kinase M-type (CK-M), carbonic anhydrase 3 (CA-3) and beta-enolase, in the triceps was strongly correlated to the 28 day lean mass and specific muscle weight gains. In addition, FSR of CK-M measured in the serum showed a 14% increase in SARM-treated rats, reflecting the average FSR response of CK-M measured in triceps (21% increase), EDL (8% increase) and soleus (12% increase) after SARM (1 mg/kg) treatment. Thus, measurements of CK-M and other muscle-derived proteins in the serum provide a 'virtual biopsy' of muscle protein synthesis. Conclusion: Muscle protein FSRs are sensitive biomarkers of the early anabolic response of skeletal muscle to SARM. Since muscle-derived proteins FSR are also measurable in serum of both animals and humans, these translational biomarkers can be used for testing efficacy of anabolic interventions.

**OC45- THE RELATIONSHIP BETWEEN INFLAMMATORY EXPOSURE OVER TEN YEARS AND SLOW GAIT IS INFLUENCED BY WHITE MATTER CHARACTERISTICS: THE HEALTH ABC STUDY.** N.K. Nadkarni[1], S.A. Studenski[4], O. Lopez[1], R. Boudreau[1], G. Liu[1], H. Aizenstein[1], S. Kritchevsky[2], K. Yaffe[3], A.B. Newman[1], C. Rosano[1], for the Health ABC Study *(1. Pittsburgh, USA; 2. Winston-Salem, USA; 3. San Francisco, USA; 4. Baltimore, USA)*

Background: Frailty can be viewed as a continuum that begins in well-functioning older adults in whom understanding the longitudinal association between inflammation, mobility and age-related changes in the brain may provide meaningful information on mechanisms underlying physical frailty. High levels of inflammation are linked to poor mobility and predict mobility disability in older adults. Slow gait speed is also related to age-related changes in the white matter (WM) of the brain such as small-vessel disease. Whether sustained exposure to high levels of inflammation or the rate of change in inflammation over time is associated with slow gait speed and whether these relationships are mediated by changes in WM in older adults remains unknown. Objectives: To examine the longitudinal relationships between inflammation and gait speed and to assess whether cerebral WM characteristics influence these relationships. Methods: In 280 well-functioning adults (mean age: 83 years, 58% female, 41% Black) cerebral WM characteristics were assessed by quantifying white matter hyperintensities (WMH), a marker of small-vessel disease (greater WMH is worse), and fractional anisotropy of normal appearing white matter (NAWM-FA), a marker of axonal integrity (lower NAWM-FA is worse), on 3-Tesla brain magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) respectively. Concurrent with time of brain imaging, gait speed was assessed on an automated walkway (Gait Mat II, E Q Inc, Chalfonte, PA) and fasting blood samples were obtained from which serum IL-6 levels were assayed using high-sensitivity Quantikine calorimetric immunoassay (R&D Systems, Minneapolis, MN). IL-6 was also assayed at regular intervals over prior 10 years from which we estimated sustained exposure to IL-6 levels and rate of change in IL-6 over this period. Separate linear regressions were used to examine the association between gait speed and the three IL-6 measures (concurrent with gait and WM measure, sustained exposure over prior years, rate of change over prior years) adjusting for relevant covariates (demographic variables, body-mass index, health-risk behaviors, cardiovascular comorbidities, general measures of cognition, grip strength and brain atrophy). The putative mediating role of WM characteristics (WMH and NAWM-FA) on these associations was tested. In addition, we conducted an exploratory analysis to assess the influence of grey matter neuronal integrity measured by mean diffusivity (GM-MD) using DTI on the IL-6-gait speed association. We also explored the relationship between IL-6 measures, gait speed and regional NAWM-FA and WMH measures in tracts most relevant to mobility in older adults (bilateral anterior thalamic radiation (ATR), corticospinal tracts (CST), superior longitudinal fasciculi (SLF) and the corpus callosum (genu and body, connecting bilateral frontal regions (CCF) and the splenium, connecting bilateral occipito-parietal regions (CCO))). Results: In this sample of older adults (Modified Mini-mental Status score = 95 and gait speed = 0.9 m/sec), high IL-6 levels at time of MRI, and sustained exposure to high IL-6 over prior 10 years were related to slower gait speed (beta= -0.16, p=0.013 and -0.26, p=<0.001), lower NAWM-FA (beta=-0.168, p=0.008 and -0.125, p=0.039) and higher WMH (beta= 0.121, p=0.05 and 0.24, p=0.001) and, these relationships withstood statistical adjustments for covariates. However, the IL-6-gait speed relationships were no longer significant when WM characteristics (NAWM-FA and WMH) were included in the model irrespective of the hierarchical level of entry. The association between sustained exposure to high IL-6 over 10 years and slow gait speed remained significant after adjusting for IL-6 level at time of brain MRI and, inclusion of GM-MD in the model showed no significant change in this association. The association between rate of change in IL-6 and gait speed (beta=0.19, p=0.002) did not withstand adjustments for covariates. We also found that sustained 10-year exposure to IL-6 and IL-6 at time of brain MRI were significantly associated with worse NAWM-FA of CCF (r=-0.142 and - 0.139, respectively, both p=0.02). Sustained 10-year exposure to IL-6 significantly correlated with WMH in CST and CCO (both r=0.11 p=0.04) while IL-6 at time of brain MRI was significantly correlated with NAWM-FA of SLF (r=-0.13, p=0.04). Slow gait speed correlated with lower NAWM-FA of the CCF (r=0.165, p=0.007) and greater WMH of CCF, CCO, ATR, CST and SLF (r= -0.14 to -.23, p= 0.01 to <0.001). Conclusion: Sustained exposure to high inflammatory burden over prior 10 years may adversely affect gait speed, potentially by influencing brain WM in well-functioning older adults. The influence of WM characteristics on the relationship between sustained IL-6 exposure and gait speed appears to relate to WM tracts important for mobility. The association between rate of change in IL-6 over time and gait slowing appears less robust. These findings provide important new information on plausible central mechanisms of inflammation linked physical frailty in older adults and suggest that a sustained reduction in inflammatory exposure over 10 years may have implications for better mobility in later life.

**OC46- CIRCULATING MYOSTATIN LEVELS IN WOMEN AND MEN USING A NOVEL MULTIPLEXED MASS SPECTOMETRY-BASED ASSAY.** H.R. Bergen, J.N. Farr, P.M. Vanderboom, T.A. White, E.J. Atkinson, S. Khosla, N.K. LeBrasseur *(Rochester, USA)*

Background: Over 50 years ago, circulating tissue-specific growth inhibitors were hypothesized to explain how tissue sizes are controlled. Since then, numerous such inhibitors have been discovered, including myostatin, a protein synthesized and secreted by skeletal muscle that negatively regulates its mass. The extent to which circulating concentrations of myostatin differ in the context of aging is unclear, largely due to methodological barriers. Methods: Thus, we developed an assay combining immunopurification and liquid chromatography with tandem mass spectrometry (LC-MS/MS) to quantify levels of myostatin and two of its inhibitory proteins, follistatin-related gene protein (FLRG) and growth and serum protein-1 (GASP-1) in a small volume of human serum. We then measured the concentrations of myostatin, FLRG and GASP-1 in a population-based sample of 80 younger (mean age ± SD: 32.6 ± 4.7 years), 80 older (age 75.4 ± 7.9 years) and 80 sarcopenic older [age 78.7 ± 7.5 years]) women and men. Results: The LC-MS/MS assay exhibited low limits of detection and quantification (0.01-0.02nM), low intra- and inter-assay variability, and high precision for all analytes. Compared to younger women, older women had 49% higher circulating concentrations of myostatin. Per unit of total body lean mass, both older and sarcopenic older women had > 30% higher myostatin levels than younger women (both $p < 0.01$). By contrast, younger men had significantly higher absolute and relative myostatin concentrations than older men with and without sarcopenia. Interestingly, younger men had 2-fold higher concentrations of myostatin than younger women, while older women and sarcopenic older women had 56% and 33% higher myostatin levels than the corresponding groups of men. In both sexes, older subjects and, particularly, sarcopenic older subjects had significantly higher concentrations of FLRG than younger subjects. No sex-differences in the circulating inhibitors of myostatin were noted between women and men. Finally, we observed that circulating concentrations of myostatin exhibit positive, but not robust, correlations with measures of muscle mass in women and men. Conclusions: Based on these data, we propose that the age-related increase in myostatin concentrations in women may contribute to their lower muscle mass and higher prevalence of sarcopenia than men. In men, it appears that myostatin acts as a homeostatic regulator of muscle mass; that is, the age-related loss in muscle is coupled with a decrease in myostatin and an increase in its inhibitors. The extent to which circulating concentrations of myostatin serve as a biomarker of muscle health, change in the context of diseases associated with muscle loss,

or help identify individuals and/or conditions that will best respond to myostatin-based therapies remain to be determined.

**OC47- EARLY DETECTION OF CHANGES IN MUSCLE MASS IN YOUNG AND OLDER ADULTS BY ULTRASOUND IMAGING.** M.V. Narici, M.V. Franchi *(Derby, United Kingdom)*

Backgrounds: Early detection of changes of muscle mass is of great importance when investigating the consequences of inactivity in clinical populations or the responses to training interventions in young and older populations. Detection of muscle mass changes has so far been based on DXA, MRI or CT. This presentation will provide evidence that ultrasound imaging enables early detection of atrophy or hypertrophy preceding or matching the changes detected by MRI or DXA. The findings of three studies are presented, 1) young adults undergoing 23-day unilateral limb suspension (ULLS) (DeBoer et al J Physiol 583, 2007), 2) young adults undergoing 35-day resistance exercise training (RET) (Seynnes et al J Appl Physiol, 102, 2007) and, 3) older adults undergoing 42-day plyometric training (PT) (Franchi et al 2014, submitted). Methods: Subjects: • Study 1: Knee extensors ULLS was performed in 8 young volunteers (mean age 19 yr) for 23 days. The non-suspended contralateral leg acted as control. • Study 2: Knee extensors RET (maximal bilateral isoinertial loading) was performed 3 times/week by 7 young volunteers (mean age 20 yr) for 35 days. • Study 3: PT was performed 3 times/wk for 42 days by 6 older males (mean age 71 yr). Measurements: • Study 1&2: Vastus lateralis muscle architecture measurements (fascicle length and pennation angle) were measured by ultrasound and muscle CSA was measured by MRI at 0, 14 and 23 days of ULLS and at 0, 10 and 35 days of RET. • Study 3: Vastus lateralis muscle architecture measurements (fascicle length, pennation angle and, muscle thickness) were measured by ultrasound and appendicular thigh muscle mass was measured by DXA at 0 and at 42 days of PT. Results: • Study 1: Increases ($p<0.005$-0.01) in fascicle length (6% and 8%) and pennation angle (3% and 8%) were detected by ultrasound after 14 and 23 days of ULLS. Size, timing and significance were comparable to those of mid-thigh CSA detected by MRI at 14 day (5%) and 23 day (10%). No changes were seen in the non-suspended control leg. • Study 2: Increases ($p<0.05$-0.01) in VL fascicle length were detected by ultrasound after 10 (2.4%), 20 (6%), and 35 days (10%) of RET, VL hypertrophy by MRI was only detectable after 20 days of RET (4.5%, $p<0.05$), increasing to 8% ($p<0.001$) after 35 days. • Study 3: Increases ($p<0.05$-0.01) in fascicle length (10.4%), pennation angle (11.1%) and muscle thickness (8%) measured by ultrasound significantly increased after 42 days of training. No changes in thigh appendicular mass were found by DXA. Conclusions: The results of these three studies demonstrate that ultrasound imaging is a sensitive technique for detecting early changes in muscle mass with training and detraining of young and older individuals. The sensitivity of detection of changes in muscle size seem comparable to that of MRI but seems superior to that obtained by DXA.

**OC48- UTILITY OF THE MID-THIGH CROSS-SECTIONAL MUSCLE AREA ON CT IN DIAGNOSING SARCOPENIA — ANALYSES OF THE ASSOCIATION WITH SKELETAL MUSCLE VOLUME MEASURED BY DXA.** Y. Matsui[1], M. Takemura[1], A. Harada[1], M. Nakamoto[1], R. Otsuka[1] F. Ando[2], H. Shimokata[3] *(1. Obu, Japan; 2. Nagakute, Japan; 3. Nisshin, Japan)*

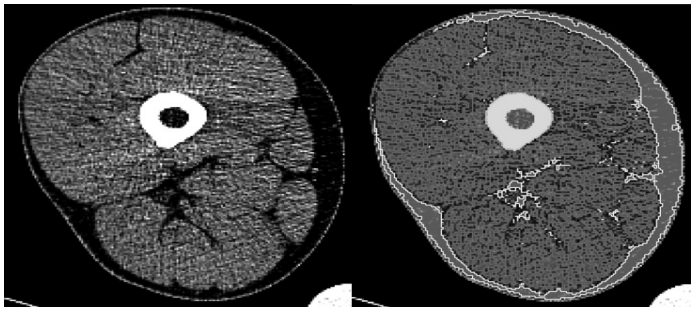
Backgrounds: In the diagnosis of sarcopenia, skeletal muscle mass (SMM) measured by DXA is utilized as the gold standard. It has been indicated that the pattern of age-related decrease in SMI (= SMM/height2) from DXA measurements is different between men and women, while muscle area measured by CT may reveal changes more accurately. The aim of this study is to examine the utility of the mid-thigh cross-sectional muscle area (CSMA) obtained by CT in diagnosing sarcopenia, (A) we compared CT-derived CSMA and DXA-derived SMM, (B) compared CSMA among normal and sarcopenic groups in Japan classified by Sanada (using DXA data only) and (C) used standards defined by the Asian Working Group of Sarcopenia (AWGS). Methods: Participants were selected from among the seventh wave examination (July 2010 to July 2012) participants of the National Institute for Longevity Sciences – Longitudinal Study of Aging (NILS-LSA). NILS-LSA is a longitudinal, dynamic cohort study that includes medical, physiological, nutritional, and psychological examinations. Participants were randomly selected from resident registrations stratified by sex and age decade. The NILS-LSA was approved by the ethics committee of the National Center for Geriatrics and Gerontology, and written informed consent was obtained from all participants. In the present study, a total of 2267 participants, 1150 men and 1117 women (age 40–89 years) were randomly selected from residents registered with the local governments of Obu City and Higashiura Town, Aichi, Japan. They underwent computed tomography examination (using Quick Grain version 5.2 software; Inotech, Hiroshima, Japan) at the right mid-thigh and skeletal muscle mass measurements by DXA (utilizing Hologic QDR4500). The association between CSMA (total and quadriceps) and SMI (= SMM/height2) obtained by excluding bone and fat volume from the whole body and right lower extremity were investigated with Pearson's correlation coefficient. CSMA (total and quadriceps) was then compared among three different SMI groups classified as normal ($> -1$ SD), class 1 sarcopenia ($-1$ SD $\geq$, $> -2$ SD), and class 2 sarcopenia ($-2$ SD $\geq$), as well as between sarcopenia and non-sarcopenia groups determined by AWGS standards (Chen, et al 2014 JAMDA), using DXA SMI, grip strength, and walking speed. Results: Correlation between CT (CSMA) and DXA (SMM): Significant strong correlations were observed between the total CSMA and SMM of the right lower extremity measure by DXA in both men and women ($r=0.75$ and $r=0.70$ respectively) as well as systemic SMM in both men and women ($r=0.75$ and $r=0.68$ respectively).Significant strong correlations were also observed between the quadriceps CSMA and SMM of the right lower extremity measured by DXA in both men and women ($r=0.75$ and $r=0.68$ respectively) as well as systemic SMM in both men and women ($r=0.70$ and $r=0.62$ respectively). Comparison of CT (CSMA) depending on DXA (SMM) and definition of sarcopenia (AWSG): In men, average CSMA of the total thigh was 166.7±19.1 cm2 in the normal group, 142.0±15.2 cm2 in the class 1 group and 121.3±15.6 cm2 in the class 2 group, revealing significant differences among the groups (all $p<0.0001$). Average CSMA of the quadriceps was 78.2±10.8 cm2 in the normal group, 66.3±9.0 cm2 in the class 1 group and 55.3±8.9 cm2 in the class 2 group, revealing significant differences among the groups (all $p<0.0001$). In women, average CSMA of the total thigh was 120.6±17.4 cm2 in the normal group, 105.4±13.3 cm2 in the class 1 group and 92.8±12.4 cm2 in the class 2 group, revealing significant differences among the groups. Average CSMA of the quadriceps was 53.7±9.2 cm2 in the normal group, 47.2±7.7 cm2 in the class 1 group and 42.0±6.7 cm2 in the class 2 group, revealing significant differences among the groups (all $p<0.0001$) Total CSMA of mid-thigh CT was significantly smaller in the sarcopenic group, defined by AWSG standards, than in the non-sarcopenic group in both men and women (both $p<0.0001$). This was also the case with quadriceps CSMA in both sexes. Conclusion: There is a strong association between mid-thigh CSMA and DXA-derived SMM. The CSMA of the total thigh and quadriceps accurately reflects the difference between the different groups classified by SMI based on DXA. The CSMA of the total thigh and quadriceps also accurately reflects the differences between sarcopenia and non-sarcopenia groups determined by AWGS standards. The mid-thigh CSMA is considered to be useful in the diagnosis of sarcopenia.

**OC49- A NOVEL 3D QCT TECHNIQUE TO QUANTIFY THE SPATIAL MUSCLE-LIPID DISTRIBUTION IN THE THIGH AND ITS ASSOCIATION WITH MUSCLE FUNCTION.** A. Mühlberg, O. Museyko, A. Friedberger, W. Kemmler, S. Von Stengel, K. Engelke *(Erlangen-Nuremberg, Germany)*

Backgrounds: The characterization of muscle morphology and function is important in sarcopenia and other muscle diseases. CT imaging has been used to quantify muscle volume and density. Here we developed a new analysis technique to also quantify the spatial muscle-lipid distribution. CT is widely available, scan times are short and in the apendicular skeleton radiation exposure is low. It was the specific aim of this study to apply this new technique to quantify the impact of different exercise interventions on changes of the muscle-lipid distribution. Methods: Baseline and 5 month follow-up QCT-datasets (120 kV, 100 mAs, slice thickness 0.6 mm, pitch 1) of 100 male subjects (42.6 ± 6.4 y) participating in the PUSH-study (27 multiple-set-resistance training (MST), 36 high-intensity training with protein supplementation (HIT), 37 control group (CG)) were analyzed for longitudinal changes. The 3D QCT analysis consists of a semiautomatic segmentation of the skin and of the fascia, which separates subcutaneous adipose tissue (SAT) and intermuscular adipose tissue (IMAT). Inside the fascia, in each voxel muscle and lipid concentrations were determined based on the CT value relative to that of SAT and that of water, which was measured in a phantom scanned with each subject. Based on this relative CT-value the voxel content was classified into high density muscle (HDM), IMAT or low density muscle (LDM). In addition to standard parameters (adipose tissue and muscle volume and density), the muscle-lipid-distribution was analyzed using structural 3D-descriptors such as texture, topology, or roughness. Both legs were analyzed separately. All descriptors were adjusted on the average cross-sectional area (CSA) of the legs, which is strongly correlated with image noise. Measurements for lean and fat mass of the right leg were also assessed by DXA (Lean_DXA, Fat_DXA). Functional tests included maximum and average force of extensors and flexors measured by a leg press ( f_(Ext,Max), f_(Flex,Max), f_(Ext,Avg), f_(flex,Avg)). Results: The figure shows the muscle-lipid segmentation results. The table lists the results for those descriptors of the right leg, which showed significant exercise effects for both legs independently after 5 months. Both exercise interventions resulted in significant improvements of muscle force (see table). DXA results were only significant for Lean_DXA in HIT group. In both exercise groups the density of the muscle (D(M)) and of the voxels within the fascia (bone excluded) (D(IF)) increased, the percentage of LDM volume relative to the volume within the fascia (%_IF (LDM))) decreased while the percentage of HDM increased (%_IF (HDM)). HDM was more homogenous distributed (Inhom(HDM)), stronger connected (connected-component-density (CCD(HDM)), its surface-to-volume ratio (StVR(HDM)) was lower and it consisted of larger grains as shown by granulometry (AvgGrain(HDM)). The decrease of the fractal dimension of the muscle (FD(M)) and within the fascia (FD(IF)) was the most significant descriptor and could indicate a change of the mosaic pattern of muscle fiber distribution. It has been shown in histology that different muscle fiber distributions can be distinguished by fractal dimension [1]. Highest correlations between %changes of functional parameters and %changes of DXA&QCT measurements were found for f_(Ext,Avg)& Lean_DXA(DXA, $R=0.20$, $p<0.05$) and f_(Ext,Avg)& CCD(HDM)(QCT, $R=0.32$, $p<0.01$). Conclusion: The QCT-descriptors showed significant treatment effect of the muscle-lipid distribution that are missed by DXA. Multiple-set-resistance training showed the largest numerical effect on muscle architecture, while high-intensity training lead to significant improvements of muscle mass (DXA) and architecture. The analysis of the spatial muscle-lipid distribution using a novel 3D QCT analysis technique may contribute to the construction of a muscle structure-function relationship for sarcopenia and other muscle diseases. This study was partly supported by the FORMOSA project (Research Consortium Muscle Wasting (Sarcopenia) and Osteoporosis – Consequences of impaired tissue regeneration in the elderly) funded by the Bavarian Research Foundation (BFS), Germany. 1. Arsos, G.A. and P.P. Dimitriu, A fractal characterization of the type II fiber distribution in the extensor digitorum longus and soleus muscles of the adult rat. Muscle & nerve, 1995. 18(9): p. 961-968.

**Figure**

Left: CT-image of the right thigh in axial view; right: Segmentation of high density muscle (magenta), IMAT (light yellow inside fascia), bone and marrow (turquois) and subcutaneous adipose tissue (yellow, outside fascia). Segmentation of LDM not shown.



| Measurement | CG (N=37) Change [%] | MST(N=27) Change [%] | TD [%] | p | HIT (N=36) Change [%] | TD [%] | p |
|---|---|---|---|---|---|---|---|
| $f_{Ext,Max}$ | 3 ± 11 | 10 ± 17 | **7 ± 4** | **<0.05** | 15 ± 17 | **12 ± 4** | **<0.001** |
| $f_{Flex,Max}$ | 11 ± 18 | 33 ± 41 | **22 ± 13** | **<0.05** | 68 ± 77 | **57 ± 12** | **<0.0001** |
| $f_{Ext,Avg}$ | 0.41 ± 15 | 16 ± 19 | **16 ± 5** | **<0.001** | 18 ± 20 | **18 ± 4** | **<0.0001** |
| $f_{Flex,Avg}$ | 48 ± 167 | 132 ± 238 | **84 ± 50** | **n.s.** | 151 ± 199 | **102 ± 46** | **n.s.** |
| $Lean_{DXA}$ | -0.2 ± 3.5 | 0.7 ± 3.3 | **0.90 ± 0.77** | **n.s.** | 2.5 ± 2.4 | **2.76 ± 0.70** | **<0.0001** |
| $Fat_{DXA}$ | -1.0 ± 9.2 | -4 ± 14 | **-2.6 ± 2.6** | **n.s.** | 0.8 ± 7.3 | **1.8 ± 2.3** | **n.s.** |
| $D(IF)$ | 0.26 ± 0.66 | 2.99 ± 0.75 | **2.74 ± 0.98** | **<0.01** | 2.16 ± 0.66 | **1.90 ± 0.92** | **<0.05** |
| $\%_{IF}(LDM)$ | 0.21 ± 0.17 | -0.45 ± 0.19 | **-0.66 ± 0.25** | **<0.01** | -0.45 ± 0.17 | **-0.66 ± 0.24** | **<0.01** |
| $\%_{IF}(HDM)$ | -0.20 ± 0.30 | 1.19 ± 0.35 | **1.38 ± 0.46** | **<0.01** | 0.79 ± 0.31 | **0.98 ± 0.43** | **<0.05** |
| $FD(IF)$ | 0.03 ± 0.04 | -0.27 ± 0.05 | **-0.29 ± 0.06** | **<0.0001** | -0.14 ± 0.04 | **-0.17 ± 0.06** | **<0.01** |
| $D(M)$ | -0.01 ± 0.06 | 2.63 ± 0.72 | **2.63 ± 0.94** | **<0.01** | 2.1 ± 0.6 | **2.11 ± 0.88** | **<0.05** |
| $FD(M)$ | 0.05 ± 0.04 | -0.25 ± 0.05 | **0.30 ± 0.07** | **<0.0001** | -0.16 ± 0.05 | **0.21 ± 0.06** | **<0.01** |
| $Inhom(HDM)$ | 0.56 ± 0.60 | -2.13 ± 0.70 | **-2.68 ± 0.91** | **<0.01** | -1.11 ± 0.61 | **-1.67 ± 0.85** | **<0.05** |
| $CCD(HDM)$ | 1.9 ± 2.9 | -8.4 ± 3.3 | **-10.30 ± 4.4** | **<0.05** | -7.9 ± 2.9 | **-9.83 ± 4.10** | **<0.05** |
| $StVR(HDM)$ | 1.4 ± 1.3 | -4.5 ± 1.5 | **-5.9 ± 2.0** | **<0.01** | -2.3 ± 1.3 | **-3.76 ± 1.83** | **<0.05** |
| $AvgGrain(HDM)$ | -0.50 ± 0.59 | 2.22 ± 0.69 | **2.72 ± 0.91** | **<0.01** | 1.27 ± 0.61 | **1.76 ± 0.84** | **<0.05** |

**OC50- DO MUSCLE STRENGTH AND FORCE DEVELOPMENT DIFFER AS A FUNCTION OF AGE?** C.H. Pion, L. Goulet, D. Éric, S. Barbat-Artigas, O. Reynaud, S. Chevalier, P. Gaudreau, G. Gouspillou, J.A. Morais, M. Aubertin-Leheudre, M. Bélanger *(Montréal, Canada)*

Backgrounds: A consequence of aging is the loss of muscle strength that is likely due to a combination of muscular and neurophysiological factors. It remains unclear at what age these factors begin to have an impact on muscle function. The amount of interaction that may exist between these factors is also unknown. The objective of this study was to determine if muscle strength and force development differ depending on age in older men. Methods: Seventy-four participants were divided in two-age groups: 30 men were 55-65 yrs (62±2yrs) and 44 were 70 yrs and older (73±4yrs). Both groups were mildly active with similar levels of physical activity (7876±3880 and 7233±3015 steps⁄day, respectively). Extensor strength of the lower limb was obtained for concentric (CKES) and isometric (rIKES) contractions. CKES was derived from a one-maximal repetition (i.e., seated leg press) while the rIKES was determined from a knee extension of the right limb pushing on a strain gauge with the knee angle fixed at 135°. Body mass index (BMI) and body composition, including lean mass of the lower limbs (LLLM) and the right thigh lean mass (rTLM), were measured in all men using Dual X-Ray Absorptiometry (DXA). Knee extensor strengths were normalized to LLLM and rTLM to yield concentric (CKES⁄LLLM) and isometric (rIKES⁄rTLM) strength indices. The functional status of each individuals was determined by the functional abilities score (FA score) derived from 6 tests (normal and fast 4-meter walk, normal and fast timed-up and go, stair and chair tests) of the Short Physical Performance Battery (SPPB). A neurophysiological profile was established from a series of measurements: the spinal excitability was derived from the Soleus Hoffmann reflex and motor response parameters (Hmax⁄Mmax ratio); motoneuron conduction velocity (CV); the completeness of muscle activation during a 2s right Quadriceps Femoris maximal voluntary isometric contraction (MVC) was determine using the twitch interpolation technique (percentage of force reserve %FR); spectral analysis (median power frequency–MPF) and mean amplitude (MA) of the EMG signal of the Vastus Lateralis (VL) during MVC. A muscular profile was also derived from a series measurements: the force ascending and descending slopes were determined for the MVC; the amplitude, the contraction (CT) and ½ relaxation (½RT) times were obtained from single VL muscle twitches; the knee joint angle (KJA) and velocity (KJV) as well as MPF and MA of the EMG were determined for a sit-tostand functional evaluation; muscle phenotypes (fiber proportion and size) were determined from biopsy samples obtained in the right VL. Difference between age-groups were assessed by parametric T-tests using the statistical package SPSS20.0 and $p<0.05$ was considered significant. Results: No difference was observed between the two age-groups for the following parameters: BMI, lower limbs and right thigh lean masses, functional status (FA score and the 6 tests), rIKES, rIKES⁄rTLM, spinal excitability (Hmax⁄Mmax), MVC force developments (ascending and descending slopes, MPF and MA of the EMG), twitch CT and ½RT, KJA and KJV during the sit-to-stand evaluation and muscle fibers proportion and size. In contrast, CKES (70+yrs: 1250±350N vs. 55-65yrs: 1561±501N) and CKES⁄LLLM index (66.7±17.7 N.kg-1 vs. 82.1±23.5N.kg-1), CV (52.4±7.3m.s-1 vs. 61.2±12.5m.s-1), %FR (1.5±2.3% vs. 4.2±5.3%) and amplitude of muscle twitch (21.4±14.3N vs. 34.3±22.7N) were all lower in the 70 yrs plus group compared with the 55-65 yrs one. Conversely when normalized to total body weight, the MPF (0.65±0.19Hz.kg-1 vs. 0.74±0.16Hz.kg-1) and MA (4±1$\mu$V.kg-1 vs. 6±2$\mu$V.kg-1) of the EMG were higher for the sit-to-stand conditions in the 70 yrs plus group. Conclusion: Despite similar functional profiles, dynamic strength and force development appear to differ with aging. Quadriceps Femoris absolute strength (amplitude of muscle twitch) appears weakened after 70 yrs. But the absence of significant differences in fiber size and type proportion, lean body mass, contraction and ½ relaxation times indicate that muscular profiles were quite similar between our 2 groups. This suggests that there would be no difference in the development of muscle strength but the muscle fiber itself would be degraded after 70 years. Dynamic strength (but not static) appears to differ with aging. The degradation appears to be due to central and peripheral neurophysiological factors like motoneuron conduction velocity, reserve percentage and median power frequency and mean amplitude of the EMG. In conclusion, the change in muscle strength during aging appears to be due to a failure of the muscle fiber, while the difficulty in developing force after 70 years seems to be more due to an alteration of some neurophysiological factors. Furthermore, the study of all these parameters in a younger population would allow us to determine whether the factors have already been affected at 55 years or, conversely, that they are stable until beyond 70 years. The former is more likely the prevailing situation since a decline in athletic performance can generally be noted from 30 years onward. Further investigations are required for this to be confirmed.

**OC51- ELECTRICAL IMPEDANCE MYOGRAPHY: ITS ASSOCIATION WITH STANDARD MEASURES IN THE ASSESSMENT AND TREATMENT OF SARCOPENIA.** J.F. Bean, S. Rutkove, L. Kurlinksi *(Boston, USA)*

Background: Some of the most important factors underlying the development of sarcopenia are age-related change in muscle composition, the associated loss of muscle force production and in corresponding mobility skills. Electrical impedance myography (EIM) may serve as a technique to monitor changes in muscle that can be easily utilized by clinicians and even has the potential for self-administration by patients. In order to evaluate the association of EIM with standard measures utilized in sarcopenia assessment, we conducted an ancillary investigation of an existing cohort study of older primary care patients at risk for mobility decline. Specifically, we aimed to evaluate the association between EIM measures of the lower extremity and measures of limb strength, limb power and measures of mobility. Methods: Quadriceps EIM was obtained in N=216 primary care patients enrolled in the Boston Rehabilitative Impairment Study of the Elderly. This study recruited primary care patients with self reported risk for mobility decline. Measures of single leg press strength, single leg press power and mobility were obtained on all participants. Results: Participants had a mean age of 78.2 +/-6.9 years, were 63% female, had a mean single leg press one repetition maximum of 2.6 +/- 0.8 N/kg and mean habitual gait speed of 0.91 m/s +/-.22. ICC test retest values for EIM were >.90. Quadriceps EIM was significantly associated with leg strength, leg power and measures of mobility, with the strongest association being observed for leg power with $r=0.80$ ($p<0.05$). Conclusions: Given its ease-of-use and strong association with standard measures of sarcopenia assessment, EIM should be further evaluated prospectively, along with DXA and grip strength as a measure of age-related muscle change.

**OC52- IS POLYPHARMACY ASSOCIATED WITH AN INCREASED RISK OF INCIDENT FRAILTY? RESULTS FROM THE ESTHER COHORT STUDY.** K.-U. Saum[1], B. Holleczek[2], K. Hauer[1], H. Brenner[1] *(1. Heidelberg, Germany; 2. Saarbrücken, Germany)*

Backgrounds: Polypharmacy, defined as taking at least five drugs, goes along with an increased risk for inappropriate drug use and adverse drug reactions (ADRs), such as falls, delirium, and hospitalization. Higher risk for ADRs in frail elderly were already reported. In addition, medication schemes are typically defined for non-frail or robust populations but might not be appropriate for frail older people. The aim of this study is to investigate the relationship between polypharmacy and incident frailty during a 3 year follow-up period in a large sample of community-dwelling older men and women. Methods: This analysis was performed on 1864 subjects of the 8-year follow-up of a large epidemiologic cohort study conducted in Germany. Frailty was assessed in the 8- and 11-year follow-up according to the frailty phenotype, described by Fried et al. Polypharmacy and Hyperpolypharmacy were defined as the concomitant use of five or more and 10 or more medications, respectively. Subjects were classified by their polypharmacy status. Group differences were tested by Chi2-test or analysis of variance. Logistic regression models were performed to assess the relationship between polypharmacy and incident frailty after 3 years of follow-up, controlling for multiple potential confounders including relevant co-morbidity (quantified by the CIRS-G scale) that may have caused polypharmacy. Results: Prevalence of polypharmacy (5≤ drugs ≤9) was 40.7% (n=759). 148 subjects (7.9%) used 10 or more medications concomitantly. Frailty at baseline was more common in subjects with polypharmacy (n=64, 8.4%) and hyperpolypharmacy (n=32, 21.6%) compared to subjects using less than 5 medications (n=37, 3.9%). Overall, 166 (9.6%) subjects became frail after 3 years. Incident frailty increased with increasing age ranging from 6.4% in ≤64 year old subjects to 17.9% in ≥75 year old subjects, and was also higher in subjects with polypharmacy (n=94, 13.5%) and hyperpolypharmacy (n=23, 19.8%) compared subjects using less than 5 medications (n=49, 5.3%). In logistic regression models, polypharmacy and hyperpolypharmacy were both statistically significantly

associated with increased risk of incident frailty even after controlling for potential confounders including multi-morbidity. Conclusion: In conclusion, polypharmacy and hyperpolypharmacy were common and showed significant associations with incident frailty. The reduction of polypharmacy might be a promising approach to decrease incidence of frailty. Funding sources: This work was supported in part by the Baden-Württemberg State Ministry of Science, Research and Arts, by the Federal Ministry of Education and Research (grant no. 01ET0717) and by the CHANCES project funded in the FP7 framework programme of DGRESEARCH in the European Commission (grant no. 242244).

**OC53- IMPORTANCE OF THE FRAILTY SYNDROME FOR THE AGED CANCER PATIENT TREATMENT.** J. Leibovici, O. Itzhaki, M. Huszar, R. Asfour, M. Michowitz, J. Sinai *(Tel-Aviv, Israel)*

Background: Cancer treatments usually include aggressive procedures to which elderly individuals may vulnerable, particularly those who are frail. Post-operative complications and adverse drug resistance are related to frailty. Therefore cancer therapy in elderly frail patients constitutes an extremely complex problem. Results: Elderly cancer patients were most often under-treated or not treated at all. These patients were often excluded from clinical trials and thus the under-treatment was not evidence-based. Contrary to this cautious attitude towards cancer treatment in the old, certain authors stressed the idea that age per se should not preclude usual cancer treatment. This should include the «fit» old patients who, it was thought, constitute the majority of the elderly population. The percentage of frail people among the elderly is indeed low in many Western countries (around 6%). But this low prevalence is observed mainly in Northern Europe and in the USA while in Southern Europe, frailty constitutes 20-30% and is even much higher in Russia. Moreover, the prevalence of pre-frail individuals is very high – around 50%-, interestingly, similar in all countries, probably due to the normal aging process. Pre-frail individuals become frail after several years. We suggest that it is this transit from pre-frail to frail which is more rapid in Southern and Eastern than in Western countries. Conclusion: We propose that the aggressive anti-cancer treatments could precipitate the pre-frail to frail transit, endangering thereby patient's life. Since the pre-frail +frail elderly people constitute 70% of the elderly population, and thus only 30% can be considered fit, only this minority among elderly people could tolerate the usual anti-cancer treatments, while the large majority of cancer patients should undergo milder treatments. Integration of frailty into clinical practice has recently begun. Indeed, treatments of the main types of cancer, adapted for the different stages of frailty, have been suggested (Vellas B., 2012).

**OC54- HOW DO MUSCLE QUALITY AND FRAILTY MEDIATE AND MODERATE PATHWAYS LEADING TO FRAGILITY FRACTURES?** A. Kin On Wong[1], C. Kennedy[2], G. Ioannidis[2], K.A. Beattie[2], C. Gordon[2], L. Pickard[2], A. Papaioannou[2], D. Goltzman[3], J. Prior[4], H. Macdonald[4], M. Ashe[4], L. Gabel[4], D. Liu[4], S. Kontulainen[5], A. Frank[5], W. Olszynski[5], K. Shawn Davison[6], L. Giangregorio[7], R. Josse[8], E. Szabo[1], M. Erlandson[5], T. Anastassiades[9], N. MacIntyre[2], J.D. Adachi[2], A.M Cheung[1] for the CaMOS Muscle Quality Study *(1. Toronto, Canada; 2. Hamilton, Canada; 3. Montreal, Canada; 4. Vancouver, Canada; 5. Saskatoon, Canada; 6. Victoria, Canada; 7. Waterloo, Canada; 8. Toronto, Canada; 9. Kingston, Canada)*

Background: Frailty is associated with an increased risk of fractures and hospitalizations. The mechanism through which this occurs has not been fully examined. Physical frailty is associated with low muscle strength, leading to fragile bones due to the lack of contraction applied to bone. Poor bone strength can predispose individuals to fragility fractures. Therefore, muscle and bone quality could be potential mediators in the pathway from frailty to a fracture. Muscle is the largest source for energy production and storage. A lack of muscle and poor muscle function may also be determinants of frailty. It is unknown how muscle relates to fractures for individuals with varying degrees of frailty. Frailty can therefore be assessed as a potential moderator of how muscle relates to fractures. Objectives: 1) OBJ1: To explore the potential mediating and serial mediating role of muscle and bone quality in the path from frailty to an incident fragility fracture; 2) OBJ2: To determine how muscle associates with fragility fractures in postmenopausal women at different levels of frailty. Methods: This was an observational cohort study with a retrospective analysis exploring the relationships among frailty, muscle, bone and fracture variables. A subset of women 60-85 years old participating in the Canadian Multicentre Osteoporosis Study (CaMos) (eligible=1825, approached=1066) completed peripheral quantitative computed tomography (pQCT) scans (20 mm/s, 38 kVp, 500 $\mu$m in-plane resolution) at 66% of the tibial length using XCT2000 or XCT3000 (at CaMos study year 16). Muscle area was segmented from bone and subcutaneous fat using a fixed threshold of 280 mg/cm3 and 40 mg/cm3, respectively, after applying a smoothing filter. Muscle mass, and areas were computed from muscle area segmentations and density was computed as the quotient of mass over area. Volumetric bone mineral density (vBMD) was determined from bone segmentations by conversion using a hydroxyapatite phantom-guided calibration curve. Comorbidities, cognition, energy level, function and mobility questions obtained at CaMos year 10 and baseline (Year 0) were used to compute the CaMos frailty index (CFI). Incident fractures from baseline to year 15 were derived from the CaMos database. To address OBJ1, Haye's mediation analysis model measured the direct, indirect and total effects from a path analysis of incident fractures regressed on frailty at baseline or at year 10, with each muscle and bone variable as independent or serial mediators. To address OBJ2, a binary logistics regression analysis measured odds ratios (OR) for fragility fractures per standard deviation difference in each of muscle density and area. The interaction of muscle outcomes and CFI was examined to explore the effect of muscle on fractures at different values of CFI. All models were adjusted for age, body mass index (BMI), lowest areal bone mineral density (aBMD) of total hip or lumbar spine and having fallen within the last 12 months. Results: Women (N=525, mean age: 71.4 ± 6.4 years; BMI: 26.90 ± 4.85 kg/m2) with one or more fragility fractures since baseline had a lower muscle density than those without a fracture (p=0.004). OBJ1: In the serial mediators' path analyses (Figure 1), the indirect effect of baseline CFI on fractures was significantly mediated through frailty's effect on muscle density and muscle density's direct effect on fragility fractures. The direct effect of baseline CFI on fractures was larger than the total indirect effects through muscle or vBMD. Year 10 CFI did not exhibit significant direct effects on fractures, but indirect effects mediated through muscle mass or area on fractures was evident. The serial mediations of frailty on muscle density, muscle density on vBMD and vBMD on fragility fractures was also significant. OBJ2: Muscle density and mass but not muscle area were associated with increased odds for fractures independently of age, BMI, aBMD and falls. Further adjustment for CFI abolished the relationship between fractures and muscle mass but not muscle density (Table 1). A plot of ORs and confidence intervals against CFI revealed that the significance of associations between muscle density and fractures was preserved only for CFI values less than 0.13. Above this value, confidence intervals overlapped 1.0 (Figure 2). For CFI ≤ 0.13, the association between CFI and each of muscle density (p=0.023) and mass were significant (p<0.001) but weak (R2 < 0.03). For CFI values above 0.13, these relationships were not present. Conclusions: OBJ1: The presence of frailty a decade ago remains linked to incident fractures years later. However, frailty experienced more recently may impact bone fragility through a clearer association with muscle, and in part muscle's relation to bone. OBJ2: Muscle properties are associated with fragility fractures for those who were less frail (CFI ≤ 0.13). For those who are frailer, muscle density and muscle mass did not associate with fractures. Longitudinal studies measuring frailty, muscle quality, bone quality and incident fragility fractures in sequence are needed to establish the direction of causality of these relationships.

**Figure 1**
Path analysis examining direct influence of frailty on fractures (Fx) and its indirect effect through muscle density and volumetric bone mineral density (vBMD). All arrows indicate association as measured by a regression coefficient

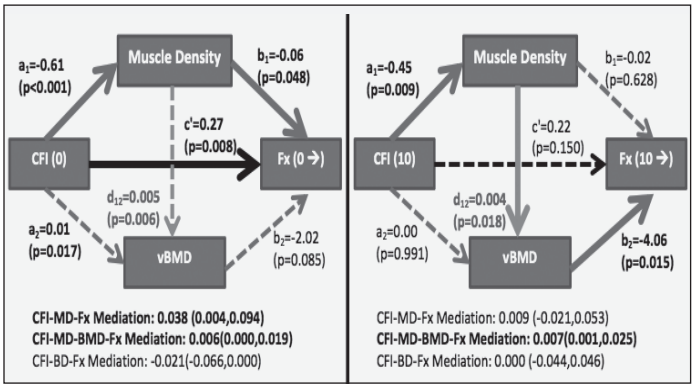



**Figure 2**
Illustration of the precision around odds ratios (OR) relating muscle density to fragility fractures for CaMOS Frailty Index (CFI) values below 0.13 and above 0.13. Note: the threshold for considering an individual to be frail = 0.25 and above

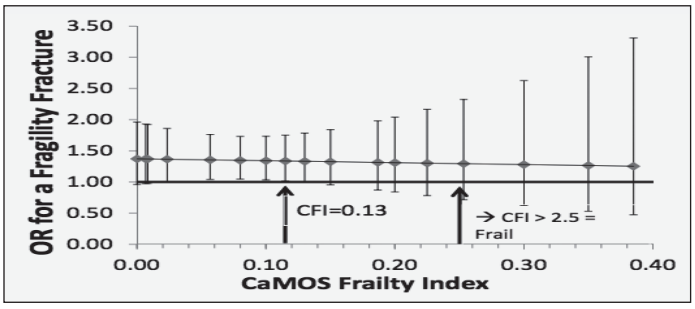



**Table 1**
Association between pQCT muscle outcomes and fractures with adjustment for covariates and the CaMos Frailty Index (CFI). * In this model, CFI was examined as an interaction with each muscle measurement.

| | Odds Ratio (OR) (95%CI) | | | |
|---|---|---|---|---|
| pQCT variables | A) Base model | B) age, BMI, aBMD | C) B + Falls | D) C + CFI* |
| Muscle density | 1.34 (1.09,1.65) | 139 (1.09,1.77) | 1.40 (1.09,1.78) | 1.35 (1.05, 1.74) |
| Muscle area | 1.04 (0.85,1.26) | 1.19 (0.94, 1.50) | 1.19 (0.94,1.50) | 1.05 (0.82,1.35) |
| Muscle mass | 1.14 (0.93,1.38) | 1.31 (1.03, 1.65) | 1.30 (1.03, 1.65) | 1.16 (0.90, 1.48) |

**OC55- SARCOPENIA PREDICTS INCIDENT DISABILITY, INSTITUTIONALISATION AND MORTALITY IN COMMUNITY DWELLING OLDER MEN: THE CONCORD HEALTH AND AGEING IN MEN PROJECT.** V. Hirani[1,2,3], V. Naganathan[1], F. Blyth[1], D. Le Couteur[1,5], D. Handelsman[4], L. Waite[1], R. Cumming[1,2,3] *(Sydney, Australia)*

Backgroupnd: Sarcopenia is the age-related loss of skeletal muscle mass and function. It is now recognised as a major clinical problem for older people. Consensus groups have previously published operational criteria for sarcopenia, incorporating lean mass with strength and/or physical performance. The aim of this study was to explore the relationship between sarcopenia and incident disability, institutionalisation and all-cause mortality among community-dwelling older men participating in the Concord Health and Ageing in men project (CHAMP), using recently developed definitions from the Foundation for the National Institutes of Health (FNIH) and the Europe Working Group on Sarcopenia in Older People (EWGSOP). Methods: Longitudinal analysis of 1,705 participants aged ≥70 years at baseline (2005-2007) living in the community in Sydney, Australia. The main outcome measures were incident disability (from baseline to 5 year follow-up), institutionalisation and mortality (median 7 year follow up). The independent variables were low appendicular lean mass (ALM), measured by dual-energy x-ray absorptiometry, using the FNIH criteria: (ALM; <19.75 kg men with gait speed: <0.8 m/s and/or grip strength <26 kg) compared with the EWGSOP definition (ALM/ht2 ≤7.23 kg/m2; gait speed: <0.8 m/s or grip strength <30 kg. Cox proportional hazard models and logistic regression models were used to assess the risk of mortality and institutionalisation, and risk in incidence of activities of daily living (ADL) disability. Results: Of the 1705 participants (mean age 77 years), a total of 191(11.3%) men were institutionalised and 535 (31%) died during follow-up (median 7 years) and 103(11.3%) had incident disability at 5 year follow up. At baseline, 14.2% had prevalent low ALM; 5.3% (FNIH definition) and 7.3% (EWGSOP definition) had sarcopenia (low ALM with weakness) and 3.7% (FNIH) and 4.4% (EWGSOP) had sarcopenia with weakness and poor gait speed (severe sarcopenia). Fully adjusted analysis (adjusted for demographic, lifestyle factors, comorbidities and health conditions), showed that both FNIH and EWGSOP defined sarcopenia indicated similar increased risk of disability (OR 3.88; 95% C.I. 1.18–12.1 and OR 4.42; 95% C.I. 1.63–12.00), institutionalisation (HR 2.28; 95% C.I. 1.15–4.52 and HR 2.06; 95% C.I. 1.06–3.98) and mortality (HR 1.38; 95% C.I. 1.02–2.33 and HR 1.44; 95% C.I. 1.06–2.01). Conclusions: This study shows that, in community-dwelling older men, both the FNIH and EWGSOP defined sarcopenia phenotype predicts similar increased risk of incident disability, institutionalisation and mortality. Early diagnosis of sarcopenia might provide prognostic information regarding the occurrence of these adverse outcomes.

**OC56- PHYSICAL CAPABILITY PREDICTS MORTALITY IN MIDDLE-AGED AS WELL AS OLDER COMMUNITY-BASED ADULTS.** V.L Keevil[1,2], R. Luben[1], S. Hayat[1], N. Dalzell[1], A.A. Sayer[3], N.J. Wareham[4], K.-T. Khaw[1] *(1. Cambridge, UK; 2. Dorset, UK; 3. Southampton, UK; 4. Cambridge, UK)*

Background: Low physical capability is a feature common to the presentation of both frailty and sarcopenia and has also been independently associated with higher future mortality. However, there are few studies exploring the relationship between physical capability and mortality which include participants younger than 70 years old and those that have predominantly examine grip strength only. Therefore, we aimed to examine associations between four frequently used measures of physical capability and mortality in community-based adults spanning a wide age range. Methods: Usual walking speed (UWS), timed chair stands speed (TCSS), grip strength and tandem standing balance (SB) were measured in 8477 men and women, aged 48-92 years old, enrolled in the European Prospective Investigation of Cancer (EPIC)-Norfolk study. Participants were followed up for a median time of 5.0 years (inter-quartile range 3.5, 6.5) and associations between physical capability and all-cause mortality were examined using Cox proportional hazards regression, with results presented as hazard ratios (95% confidence interval [CI]). For analyses, those unable versus able to hold a tandem stand for 10 seconds and those in lower versus the highest sex-specific quartiles of UWS, grip strength and TCSS were compared. Participants unable to complete the tests for health reasons were included in the lowest performance categories but those with missing physical capability data for other reasons were excluded. Age and sex adjusted associations were explored after stratification of the cohort by age group (<70 years old versus >70 years old) and interactions between physical capability and age group were formally tested using likelihood ratio tests, comparing models with and without an interaction term. Subsequently, both age groups were combined and associations in the whole cohort were examined after adjustment for the following baseline measures: age, sex, height, weight, waist circumference, presence of diabetes/ stroke/ myocardial infarction or cancer, smoking, alcohol intake, wealth, social class, TV viewing time and physical activity. Multiple imputation by chained equations was used to impute missing co-variable data. Results: The 8477 men and women included in this study (55.1% female) had a mean age of 68.7 years [standard deviation 8.1]. Participants with low physical capability were more likely to die in the follow-up period, irrespective of the physical capability measure examined. After adjustment for age and sex, similar dose-response associations were observed in both younger and older participants. For example, in participants <70 years old, hazard ratios (HR) for mortality for those in the third, second and lowest sex-specific quartiles of UWS compared to the highest were 1.09 (95% CI 0.62, 1.93), 2.13 (95% CI 1.28, 3.55) and 3.19 (95% CI 1.89, 5.37) respectively. Similarly, in participants >70 years old, HR for mortality for those in the lower quartiles of UWS were 1.35 (95% CI 0.77, 2.39), 2.37 (95% CI 1.42, 3.97) and 3.01 (95% CI 1.83, 4.96) respectively compared to those in the highest. There was no statistical evidence for effect modification by age group for any of the physical capability measures used (UWS: Pinteraction= 0.85; TCSS: Pinteraction= 0.11; Grip: Pinteraction = 0.83; SB: Pinteraction= 0.44). Considering the whole cohort together and adjusting for all co-variables, mortality was 2.28 (95% CI 1.59, 3.25), 2.54 (95% CI 1.82, 3.55) and 1.76 (95% CI 1.26, 2.47) times higher for participants in the lowest quartile of UWS, TCSS and grip strength respectively compared to those in the highest. Similarly, mortality was 1.38 (95% CI 1.12, 1.69) times higher in those unable versus able to hold a tandem stand. Results did not change after exclusion of participants who died in the first year of follow up, exclusion of participants with existing co-morbidity at baseline or exclusion of participants with missing co-variable data. Conclusions: Low physical capability is predictive of higher future mortality in middle-aged as well as older community-based adults. One explanation for the association between low physical capability and higher mortality is confounding from co-morbidity, including both clinical and sub-clinical disease. Therefore, associations in younger adults who have a lower associated disease burden should be weaker. However, our results did not support this conclusion and add to the evidence that some other mechanism explains the association. Since associations also persisted despite adjustment for a range of lifestyle and socioeconomic risk factors it is possible that low physical capability identifies those at risk of higher mortality due to the onset of conditions such as frailty and sarcopenia.

**OC57- DOES IT MATTER WHAT WE MEASURE: HOW DO THE NUMBER AND TYPE OF DEFICITS INCLUDED AFFECT THE PREDICTIVE POWER OF FRAILTY INDICES?** M.D.L. O'Connell[1], S. Scarlett[1], O. Theou[2], A.M. O'Halloran[1], B.L. King-Kallimanis[1], K. Rockwood[2], R.A. Kenny[1] *(1. Dublin, Ireland; 2. Halifax, Canada)*

Background: The concept of frailty has been developed to capture differential vulnerability to adverse outcomes among older adults of the same chronological age. One way to measure frailty is to use a simple count of health deficits summarized as a frailty index. This method has been found to robustly predict adverse outcomes across a wide range of samples and settings. However, the minimum number of deficits needed to optimize outcome prediction and the effect of using different types of deficits are not clear. Here we apply an iterative re-sampling method to explore the predictive relationships with adverse outcomes for frailty indices including different numbers and types of deficits. Methods: This analysis included 4,961 participants with a mean age of 61.9 ± 8.4, 54.2% female, from the health assessment sample of The Irish Longitudinal Study on Ageing (TILDA) and 18,097 participants with a mean age of 64 ± 10.4, 55.4% female, from the Survey of Health and Retirement in Europe (SHARE). Adverse outcomes were assessed at 2 year follow-up in TILDA, including mortality and new incidence of falls, hospitalization, Activities of Daily Living (ADL) disabilities and Instrumental Activities of Daily Living (IADL) disabilities. Mortality data was collected for 5 years follow up in SHARE. Frailty was defined using the deficit accumulation approach. Two separate 33-item frailty indices were constructed in TILDA, one using only self-reported items and one using only test-based health assessment items. These two indices were pooled to create a third 66-item combined frailty index. A single 70-item frailty index, including mainly self-reported items, was constructed in SHARE. A bootstrap-by-variables procedure was used to generate 100 random combinations of each type of deficits for frailty indices of different sizes. In TILDA, 5 item increments were used for the two 33-item frailty indices to generate indices ranging in size from 5-30 deficits. Indices ranging from 5-60 deficits in size were generated from the combined 66-item index. In SHARE frailty indices were generated ranging from 5-65 deficits in size. Area Under the Receiver Operating Characteristic Curve (ROC AUC) statistics were calculated for each iteration of each index for all outcomes in TILDA and for mortality in SHARE. The median and inter-quartile range of these estimates from the 100 iterations were compared across frailty indices of different numbers and types of deficits. Results: In the TILDA sample 52 (1.1%) participants had died (all-cause mortality) by 2 year follow up. Incidence of the other outcomes was: 2.4% developed a new ADL disability, 3.1% developed a new IADL disability, 11.1% had a new hospitalization and 5.7% experienced 2 or more falls. In SHARE 938 (5.2%) participants died over 5 years follow up. Across all outcomes in TILDA, the ROC AUCs generally increased with the number of deficits in each index up to 25-30 items, above this number of items the increase tended to reach a plateau with only modest improvements up to 60 deficits. For example, using the combined frailty index median ROC AUC for mortality for 5-item indices was 0.62; 25-75th inter-quartile range (IQR) 0.59-0.66, for 30-item indices it was 0.66; IQR 0.64-0.69 and for 60-item indices it was 0.66; IQR 0.64-0.69. For ADL disabilities median ROC AUC was 0.66; IQR 0.63-0.70 for 5-item indices, 0.75; IQR 0.73-0.76 for 30-item indices and 0.77; IQR 0.76-0.78 for 60-item indices. Similar trends were seen across the other outcomes. Replicating the mortality analysis in SHARE confirmed these findings with ROC AUCs increasing from 0.68; IQR 0.66-0.70 for indices with 5 deficits to 0.75; IQR 0.73-0.76 for indices with 30 deficits and leveling off at 0.75; IQR 0.75-0.76 for indices with 65 deficits. The relationship with mortality was generally similar for frailty indices including the same number of self-reported, test-based or combined deficits. Using 30-item indices median ROC AUC for mortality was 0.66 for all frailty indices. Self-reported or combined indices generally performed better for predicting the other outcomes than did test-based indices. For example, 30-item self-reported indices had a median ROC AUC of 0.74; IQR 0.72-0.75 for incident ADL disability, compared to 0.75; IQR 0.73-0.76 for combined indices and 0.69; IQR 0.68-0.70 for test-based indices. Conclusions: Although small improvements in ROC AUCs were seen at higher numbers of deficits for some outcomes, predictive ability generally stabilized around 25-30 deficits. Moreover for a given number of deficits we did not find a compelling advantage to using test-based or combined deficit indices over the more commonly measured self-rated items. These results are encouraging in that they suggest frailty may be adequately measured using the deficit accumulation

approach in any dataset containing at least 25 health related items. Future studies are needed to confirm these findings in older populations with higher rates of adverse outcomes over longer follow up times.

**OC58- CONFIRMING THE ASSOCIATION BETWEEN ENDOTHELIAL DYSFUNCTION AND FRAILTY. THE TOLEDO STUDY HEALTHY AGEING FRACTURES?** C. Alonso-Bouzón[1], J.A. Carnicero[1,2], M. El Assar[1], F.J. García-García[2], L. Rodríguez-Mañas[1] *(1. Madrid, Spain; 2. Toledo, Spain)*

Background: Cardiovascular disease (CVD) has been proposed as one of the mechanisms underlying frailty. The relationship between endothelial dysfunction, the earliest stage of CVD, and frailty has been poorly evaluated. Just one paper suggests there is an association between endothelial dysfunction (ED), evaluated by asymmetric dimethylarginine (ADMA) levels and frailty using L.P Fried criteria (1). As the criteria used to assessed frailty should not modify this association, we have checked if this association remains using other diagnostic criteria for frailty. Method: We used data from the Toledo Study for Healthy Aging, a prospective Spanish cohort study. Biological samples were obtained and ADMA levels were determined using an enzyme immunoassay method. Frailty was assessed by means of Frailty Trait Scores (FTS) (2) and Frailty Index (FI) (3). Gamma generalized linear regression model, where the link function was the inverse function (1/X) as a more versatile model for non-linear behavior than log-normal model, was used to assess the relationship between ADMA level and the scores of FTS and FI scales using age and gender as potential confounders. Results: 1306 community-dwelling elderly were included. Median (IQR) score for frailty scales were 42.00 (32.00-54.35) for FTS and 33.82 (28.75-41.25) for FI. After adjustment by confounders, frailty scores were associated with ADMA levels, beta=-0.0024 (p=0.001) for FTS and Beta=-0.00020 (p=0.04) for FI, indicating an exponential growth ADMA levels as frailty scores were higher. Moreover, the age also was significant, beta=-0.005 (p=0.009) for the model with FTS and beta=-0.008 (p<0.001) for the model with FI. Indicating an interrelationship between ADMA and age (the relationships between age and frailty score for the same level of ADMA, 2 FTS points =1 year and 4 FI points=1 year). Conclusions: Endothelial dysfunction, assessed by ADMA levels, is associated with frailty, disregarding the scale used for its detection. These findings strongly support the relationship between ED in the cardiovascular system and frailty, supporting the hypothesis that vascular dysfunction underlies frailty. This study was supported by grants PI11/01068, RD 06/0013 and RD12/0043 from the Instituto de Salud Carlos III (Ministerio de Economía y Competitividad), Spain, and FP7-305483-2 from the FP7-Health-2012-Innovation of the European Union. Bibliography: 1-. Alonso-Bouzón C, Carcaillon L, García-García FJ, Amor-Andrés MS, El Assar M, Rodríguez-Mañas L. Association between endothelial dysfunction and frailty: the Toledo Study for Healthy Aging. Age (Dordr). 2014;36(1):495-505. doi: 10.1007/s11357-013-9576-1; 2-. García-García FJ, Carcaillon L, Fernandez-Tresguerres J, Alfaro A, Larrion JL, Castillo C, Rodriguez-Mañas L. A new operational definition of frailty: the Frailty Trait Scale.J Am Med Dir Assoc. 2014;15(5):371.e7-371.e13. doi: 10.1016/j.jamda.2014.01.004. Epub 2014 Mar 2; 3-. Mitnitski AB, Mogilner AJ, MacKnight C, Rockwood K. The mortality rate as a function of accumulated deficits in a frailty index. Mech Ageing Dev. 2002;123(11):1457-60.

**OC59- THE RELATION OF MUSCLE STRENGTH AND GAIT SPEED WITH MUSCLE CROSS-SECTIONAL AREA DETERMINED BY MID-THIGH COMPUTED TOMOGRAPHY - COMPARISON AND SKELETAL MUSCLE MASS MEASURED BY DUAL-ENERGY X-RAY ABSORPTIOMETRY.** K. Tsukasaki, Y. Matsui, M. Takemura, A. Harada, M. Nakamoto, R. Otsuka, F. Ando, H. Shimokata *(Aichi, Japan)*

Backgrounds: Sarcopenia is characterized by age-related decline of skeletal muscle plus low muscle strength and/or physical performance. Currently, dual-energy X-ray absorptiometry (DXA) may be one of the most widely used method for muscle mass measurement in sarcopenia research. Computed tomography (CT) is also used to assess muscle cross-sectional area (CSA). Previously, we reported that muscle CSA determined by mid-thigh CT decreased with age mainly in quadriceps muscle CSA , especially in women. Separate evaluation of each muscle by CT is more accurate than that by DXA. Methods: To clarify usefulness of CT in evaluation of sarcopenia, we examined the associations of muscle strength and gait speed with muscle CSA determined by mid-thigh CT, and compared those with skeletal muscle mass index (SMI=appendicular muscle mass/height$^2$) measured by DXA in community-dwelling middle-aged and elderly Japanese. This study included 946 men and 878 women aged 40-89 years in the seventh wave survey (July 2010 to July 2012) of the National Institute for Longevity Sciences-Longitudinal Study of Aging (NILS-LSA). NILS-LSA is a longitudinal, dynamic cohort study that includes medical, physiological, nutritional, and psychological examinations. Participants were randomly selected from resident registrations stratified by sex and age-decade. The NILS-LSA was approved by the ethics committee of the National Center for Geriatrics and Gerontology, and written informed consent was obtained from all participants. We measured muscle CSA by mid-thigh CT, and SMI by DXA. The physical function examination included grip strength, knee extension strength, leg extension power and comfortable gait speed. Information on socioeconomic background and history of disease was collected using questionnaires. We examined the association of grip strength, knee extension strength, leg extension power and comfortable gait speed with muscle CSA and SMI controlled for age, smoking habit, alcohol intake, leisure time activity, energy intake, medical history of cardiovascular disease, stroke, hypertension, hyperlipidemia and diabetes. The difference in the partial correlation coefficients between CT and DXA was examined. Results: The mean values of muscle CSA, SMI, muscle strength, and gait speed were as follows. In men, muscle CSA: 147.6±23.5cm$^2$, quadriceps muscle CSA : 69.0±12.7cm$^2$, SMI: 7.5±0.8kg/m$^2$, grip strength: 38.6±7.0kg, knee extension strength: 47.8±11.6kg, leg extension power: 565.8±172.5W and gait speed: 1.4±0.2m/s, and in women, muscle CSA: 109.8±17.8cm$^2$, quadriceps muscle CSA: 49.7±8.9cm$^2$, SMI: 6.0±0.7kg/m$^2$, grip strength: 23.4±4.4kg, knee extension strength: 31.0±7.6kg, leg extension power: 325.4±101.8W and gait speed: 1.3±0.2m/s. Muscle CSA showed significant associations in both sexes with grip strength (r=0.33 in men, r=0.31 in women), knee extension strength (r=0.45 in men, r=0.45 in women) and leg extension power (r=0.34 in men, r=0.28 in women), while it showed a weak association with gait speed in men (r=0.10). Quadriceps muscle CSA showed significant associations in both sexes with grip strength (r=0.34 in men, r=0.29 in women), knee extension strength (r=0.50 in men, r=0.49 in women) and leg extension power (r=0.39 in men, r=0.30 in women), while it showed a weak association with gait speed in men (r=0.12). On the other hand, SMI showed significant associations with grip strength (r=0.35 in men, r=0.33 in women), and knee extension strength (r=0.48 in men, r=0.42 in women) and leg extension power (r=0.33 in men, r=0.24 in women) but showed no association with gait speed. The partial correlation coefficient for quadriceps muscle CSA was larger than that for SMI in leg extension power and knee extension strength ($p<0.05$ in both sexes, $p<0.05$ in women, respectively). In both sexes, there was no difference in partial correlation coefficients between muscle CSA and SMI in grip strength, knee extension strength and leg extension power. Conclusion: The present study indicated that quadriceps muscle CSA determined by mid-thigh CT showed better associations with grip strength, knee extension strength and leg extension power than SMI measured by DXA in community-dwelling middle-aged and elderly Japanese. And muscle CSA showed also associations with grip strength, knee extension strength and leg extension power, which are generally equivalent to SMI. Muscle CSA determined by mid-thigh CT is considered to be an useful method in evaluation of sarcopenia.

**OC60- FRAILTY MARKERS WERE ASSOCIATED WITH ENTRY INTO AND LESS RECOVERY FROM DISABILITY PROFILES IN HEALTHY COMMUNITY-DWELLING OLDER ADULTS. THE NUAGE STUDY.** N. Dubuc[1], M. Raîche[1], P. Gaudreau[2], B. Shatenstein[2], J.A. Morais[2], H. Payette[1] *(1. Sherbrooke, Canada; 2. Montréal, Canada)*

Backgrounds: Longitudinal associations between frailty and activities of daily living (ADL) are more frequently studied than instrumental ADL (IADL). Early onset of IADL disability and recovery to full autonomy in the NuAge study provide an opportunity to study associations with frailty markers. Methods: NuAge is a 4-year observational study of community-dwelling men and women aged 68-82 years in general good physical and mental health and functionally independent at recruitment in 2003-04 [1, 2]. A total of 1629 participants provided annual data on early stages of frailty and disability over a 3-yr period. Frailty was defined according to Fried [3], with the addition of cognition and mood, according to the tools and thresholds of Sourial [4]. Disability profiles were identified using the SMAF scale [5] classifying older adults into 14 Iso-SMAF profiles [6] according to disability status in ADL activities (7 items), mobility (6), communication (3), mental functions (5) and IADLs (8). Mean level of autonomy decreases as Iso-SMAF profile increases from 1 to 14. Participants without disability were classified into reference Profile 0 (P-0). Data were analyzed with a multi-state Markov model in continuous time. Bivariate analyses were conducted to examine associations between individual frailty markers and entry into or recovery from disability profiles. Relations between thresholds on Fried's five frailty markers (n/5) plus the two others, cognition and mood (n/7) were also examined with entry into or recovery from disability profiles. Results: At baseline, mean age of participants was 74.4 ± 4.2 years and 52.5% were women. The most prevalent single frailty marker (see Sourial [4]) was cognition (27.1%), followed by nutrition status (18.4%), energy level (16.5%), physical activity (14.3%), strength (13.4%), mood (9.8%) and mobility (4.1%). Based on Fried's phenotype [3], 51.3% were classified as nonfrail, 44.2% were prefrail, and 3.4% were frail (1.1% missing). Out of 7 frailty markers, one third had zero marker (35.2%), one (36.8%), two (18.3%) or three (5.4%) markers and only 2.9% had four to six frailty markers (1.3% missing). Initial disability profiles were distributed as follows: 0 (62.8%), 1 (24.6) or 2 (12.6%). A four-state model was used for analysis: profile 0, profiles 1 and 2 regrouped, profiles 3 to 9 pooled, and death (recorded throughout the study). This grouping was necessary because 97% of observed transitions occurred between profiles 0, 1 and 2. In single-marker analysis of frailty, mobility showed the highest significant hazard ratio (HR) for entering into disability profiles from independence (HR=1.90; 1.58-2.30), followed by energy (HR=1.80; 1.44-2.26) and physical activity (HR=1.59; 1.25-2.02). Altered cognition had the highest negative impact on recovery to independence (HR=0.53; 0.40-0.71), followed by energy (HR=0.62; 0.43-0.90), and mood (HR=0.64; 0.41-0.99). Presence of 1, 2 or 3 of the 5 Fried markers, or of the 7 frailty markers were significantly associated with more decline and less recovery to independence; high scores (>5/7) were not prevalent in the study population (2.8%). Addition of the markers mood and cognition (bringing the total to 7) provided a clearer gradient between 1 to 3 markers of frailty for the association with entry into disability profiles. However, the association with recovery to independence was less clear. Conclusion: Iso-SMAF profiles 1 and 2 characterise older adults with predominantly IADL disabilities, without ADL, mobility or cognitive disabilities. When examining entry into these profiles from independence, the profile transitions revealed that most frailty markers and all aggregated scores were associated with early onset of disabilities. Recovery showed a very similar mirror image. These results reinforced the association between the concepts of frailty and disability, and questioned the amplitude of overlap. References: 1. Gaudreau P et al: Nutrition as a determinant of successful aging: description of the Quebec longitudinal study Nuage and results from cross-sectional pilot studies. Rejuvenation Res 2007, 10(3):377-386. 2. Payette H et al: Trajectories of physical

function decline and psychological functioning: the Quebec longitudinal study on nutrition and successful aging (NuAge). J Gerontol B Psychol Sci Soc Sci 2011, 66 Suppl 1:i82-90. 3. Fried LP et al: Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001, 56(3):M146-156. 4. Sourial N et al: Contribution of frailty markers in explaining differences among individuals in five samples of older persons. J Gerontol A Biol Sci Med Sci 2012, 67(11):1197-1204. 5. Hébert R et al: The functional autonomy measurement system (SMAF): a clinical-based instrument for measuring disabilities and handicaps in older people. Geriatrics Today: J Can Geriatr Soc 2001, 4:141-147. 6. Dubuc N et al: Disability-based classification system for older people in integrated long-term care services: the Iso-SMAF profiles. Arch Gerontol Geriatr 2006, 42(2):191-206.

**OC61- SERUM LEVELS OF C-TERMINAL AGRIN FRAGMENT (CAF) ARE ASSOCIATED WITH SARCOPENIA IN OLDER PEOPLE: RESULTS FROM THE ILSIRENTE STUDY.** A.M. Martone, R. Calvani, E. Marzetti, M. Tosato, M. Lorenzi, R. Bernabei, F. Landi *(Rome, Italy)*

Background: The circulating C-terminal agrin fragment (CAF) has recently been proposed as a marker for muscle atrophy in both humans and animal models. In particular, serum concentrations of CAF, a component of the neuromuscular junction (NMJ), are elevated in older subjects with loss of lean body mass. Whether CAF may be used as a marker for muscle wasting in the presence of NMJ mechanical damage is presently unknown. The present study was undertaken to verify if serum CAF levels were associated with sarcopenia in frail older people living in community. Methods: Data are from the baseline evaluation of 332 subjects enrolled in the ilSIRENTE Study. The ilSIRENTE study is a prospective cohort study performed in the mountain community living in the Sirente geographic area [L'Aquila, Abruzzo] in Central Italy. According to the European Working Group on Sarcopenia in Older People (EWGSOP) criteria, diagnosis of sarcopenia required the documentation of low muscle mass plus the documentation of either low muscle strength or low physical performance. Serum levels of CAF were determined using a commercial ELISA kit. Analysis of covariance (ANCOVA) was used to examine the relationship between serum CAF levels and the presence of sarcopenia. Variables considered for adjustment were those showing a significant difference between sarcopenic and non-sarcopenic subjects at the univariate analysis. Results: Using the EWGSOP-suggested criteria, 101 subjects with sarcopenia (30.4%) were identified. Serum CAF levels were significantly higher in sarcopenic relative to non-sarcopenic subjects (96.9 ± 54.7 ng·mL–1 versus 76.5 ± 32.7 ng·mL–1; $p < 0.001$). After adjusting for potential confounders including age, functional and cognitive impairment, physical activity, comorbidity, congestive heart failure, COPD, depression, serum creatinine levels, the association between sarcopenia and higher levels of CAF remained significant in both genders. Conclusions. Elevated serum CAF concentrations are associated with sarcopenia in older adults living in community. The determination of serum CAF levels could therefore serve to identify a subset of frail and sarcopenic subjects at especially high risk for adverse health outcomes. Future investigations are needed to conclusively establish if CAF truly qualify as a biomarker for muscle wasting in frail older people by determining the time course of changes of CAF serum levels relative to those in muscle mass and strength as well as in response to muscle-preserving interventions. Finally, studies are needed to determine the concentration threshold of CAF that possesses the best sensitivity and specificity to be used for screening or diagnostic purposes.

**OC62- FRAIL OLDER PEOPLE IN NURSING HOMES : QUALITY OF LIFE AND CARE MODALITIES.** E. Wai-yung *(Hong Kong)*

Introduction: Because of an aging global population and enhanced longevity, the prevalence of frailty in older people is increasing worldwide. Furthermore, older people often live longer with chronic illnesses and long-term disabilities that are not reversible. Frailty is particularly prevalent to older people in residential care settings; as such settings are usually the last resort for them. Hence, care to residents with frailty in nursing homes should be focused on improving their physical and psychosocial outcomes for better quality of life (QoL), apart from increasing their longevity. Our research with the following objectives has addressed this focus. Objectives: 1. To explore the QoL of frail nursing home residents in association with various physio-psychosocial factors. 2. To investigate the psychosocial effects and QoL of frail nursing home residents given a play activities programme (PAP) and horticultural therapy. Methods: Our research adopted a cross-sectional survey and randomized control trial (RCT) design. The study sample was older people with frailty in nursing homes while the study outcomes were psychological and physical well-being. Discussion: Our research has identified anxiety, mobility, happiness, satisfactory humanistic care, and satisfactory clinical care which affect QoL of nursing home residents. Care strategies to address these factors can potentially improve their QoL. The PAP can reduce pain and enhance life satisfaction and happiness, and also decrease loneliness of frail nursing home residents while horticulture therapy pioneered a new research direction to provide better care for the frail nursing home residents. Conclusion: The factors identified in our research can inform the design of care strategies to improve QoL among nursing home residents. The PAP and horticulture therapy have good potential to be used as therapeutic modalities. We recommend nursing homes adopt these two modalities to improve the care delivered in nursing homes.

**OC64- THE EXERCISE-INDUCED MYOKINE APELIN REVERSES AGE-RELATED SKELETAL MUSCLE WEAKNESS.** C. Vinel[1], S. Deleruyelle[1], S. Legonidec[1], A. Batut[1], S. Guyonnet[1], M. Paho[2], B. Vellas[1], P. Valet[1], C. Dray[1] *(1. Toulouse, France; 2. Gainsville, USA)*

Background: Mitochondrial dysfunctions are known to be involved in many aging-associated diseases such as skeletal muscle weakness. This pathology is characterized by a reduced quality and quantity of mitochondria involved in energetic metabolism. Our team recently identified apelin, an endogen circulating peptide, as a potential booster of mitochondrial biogenesis and activity in skeletal muscle of mice. Interestingly, recent studies have shown that apelin is produced by skeletal muscle and increased in plasma after physical exercise, both in an age-independent pathophysiological context. All together, these results led us to investigate the role and the regulation of skeletal muscle apelin production during aging. Methods: Plasma (ELISA) and muscle (RT-PCR) apelin variations have been measured during mouse lifespan (3 to 24 months old) in a steady state or during acute/chronic physical exercise. Muscle specific apelin production during contraction was assessed by arteriovenous difference. Peptide role during aging was determined by performing recombinant apelin treatment (0.5$\mu$mol/kg/d, 28 days) to wild type (wt) and apelin deficient (Apl-/-) mice. At the end of the treatment, muscle mass and myofiber cross-section area were measured. Global muscle functions were assessed in vivo by evaluating strength (grip test), endurance (treadmill test) and resistance (climbing test). Muscle specific strength was measured by plantaris contractility in response to sciatic nerve stimulation. Moreover, the impact of apelin treatment on mitochondria during aging was quantified by electronic microscopy, enzymes activities and DNA quantification. To decipher cellular apelin targets, we measured protein and mRNA expression in muscles after treatment. In a translational approach, we also evaluated plasma apelin levels and muscle strength improvement in response to 6 months regular training in elderly patients (Clinical trial P-LIFE, Miami, USA). Results: Results clearly show an increase of plasma apelin during acute and chronic exercise in young mice associated with a rise of apelin mRNA expression specifically in skeletal muscle. Furthermore, arteriovenous difference experiments coupled with muscle stimulation confirm that apelin originates from muscle during contraction. In aged mice, muscle weakness is associated with a decline of basal as well as exercise-induced plasma apelin level compared to young mice. Chronic apelin treatment performed during aging improved skeletal muscle mass (0.050mg ± 0.003 vs 0.058mg ± 0.005, p value<0.0001), strength (0.074N/g ± 0.008 vs 0.087N/g ± 0.014, p value<0.05), endurance (47,5cm/sec ± 2.7 vs 55cm/sec ± 5, p value<0.01), resistance (184sec ± 90 vs 340sec ± 111, p value<0.05) and specific skeletal muscle contractility (17.28g ± 3.8 vs 23.6g ± 4.6, p value<0.01). These effects are associated with fiber hypertrophy (457$\mu$m$^2$ ± 143 vs 644$\mu$m$^2$ ± 226, p value<0.0001). Conversely, lack of apelin (Apl-/- mice) led to a dramatic acceleration of muscle weakness as demonstrated by premature skeletal muscle atrophy and altered muscle functions. This phenotype is reversed after apelin chronic supplementation. In the muscles of both aged and Apl-/- treated mice, we observed a significant increase of mitochondria quantity and quality associated with a significant rise of both citrate synthase activity and mitochondria DNA content. Analyze of protein and mRNA expression of muscles isolated from treated mice reveals that apelin could act through elevation of AMPK, Akt and PGC-1$\alpha$ proteins. Finally, in humans, physical exercise success obtained after 6 months of training and measured by Short Physical Performance Battery (SPPB) in P-LIFE cohort correlates (p value=0.03) with the capacity of aged individuals to raise their apelin plasma level. Conclusion: Our study is the first demonstrating that apelin could reverse age-related muscle frailty. Indeed, by targeting skeletal muscle mitochondria, apelin supplementation in aged mice enhanced both muscle mass and function. Furthermore, our results revealed a strong correlation between physical activity-induced muscle apelin production capacities and muscle performances after exercise in rodents and in humans. Taking together, our results strongly suggest that apelin could be considered as a biomarker for exercise efficiency and designate apelin receptor as a potential target for new pharmacological treatment of sarcopenia in elderlies.

**OC65- CIRCULATING BRANCHED CHAIN AMINO ACIDS ARE ASSOCIATED WITH BODY COMPOSITION, PHYSICAL FUNCTION AND, INFLAMMATION IN OLDER ADULTS.** M.S. Lustgarten, R.A. Fielding *(Boston, USA)*

Background: Identification of mechanisms underlying age-related alterations in body composition and decreases in physical function will be important for addressing the growing challenge of providing health care to the rapidly expanding aging population. Methods: Principal components analysis (PCA) was performed on data obtained for 182 serum mass spectrometry metabolites in combination with multivariable-adjusted linear regression to provide insight into biologic mechanisms that may underlie body composition and physical function in older adults (N=73). Results: A PCA Factor containing the branched chain amino acids (BCAA's) leucine, isoleucine and valine was negatively associated with total fat mass ($\beta \pm$ SE, -1.5 ± 0.4, p=0.001) and mobility (400 meter gait speed, 400-m; $\beta \pm$ SE, -0.0 ± 0.0, p=0.04) but was positively associated with thigh muscle cross sectional area (CSA; $\beta \pm$ SE, 6.9 ± 1.9, p=0.0004) and the fat-free mass index (total lean mass/height2; $\beta \pm$ SE, 0.6 ± 0.2, p=0.0002). A PCA factor containing the BCAA degradation products 4-methyl-2-oxopentanoate, 3-methyl-2-oxovalerate and 3-methyl-2-oxobutyrate was positively associated with muscle CSA ($\beta \pm$ SE, 6.2 ± 2.0, p=0.003). A PCA Factor containing the BCAA degradation products $\alpha$-hydroxyisovalerate, 2-hydroxy-3-methylvalerate and $\alpha$-hydroxyisocaproate was positively associated with 400-m ($\beta \pm$ SE, 0.1 ± 0.0, p=0.02) and, IL-6 ($\beta \pm$ SE, 0.2 ± 0.1, p=0.02). Conclusion: Collectively these data suggest a role for BCAA metabolism in mechanisms related to body composition, physical function and, inflammation in older adults. Future studies aimed at validation of

these results in a larger cohort, and, that test the causative role of these associations are of interest.

**OC67- ANTIHYPERTENSIVE USE AND FUNCTIONAL OUTCOME EVENTS AMONG OLDER ADULTS IN THE LIFE STUDY.** T.W. Buford[1], M.E. Miller[2], T.S. Church[3], T.M. Gill[4], R. Henderson[2], F.-C. Hsu[2], M.M. McDermott[5], N. Nadkarni[6], M. Pahor[1], R.S. Stafford[7], C.S. Carter[1], for the LIFE Study Groupta[3] *(1. Gainesville, USA; 2. Winston-Salem, USA; 3. Baton Rouge, USA; 4. New Haven, USA; 5. Chicago, USA; 6. Pittsburgh, USA; 7. Palo Alto, USA)*

Background: Antihypertensive medication use is common among older adults. Antihypertensive medications have important health impacts and are often prescribed for clinical indications beyond controlling blood pressure. Choice of antihypertensive medication may have relevance for older adults in the preservation of physical function and prevention of disability. In particular, angiotensin converting enzyme inhibitors (ACEi) have been proposed to have protective effects in preserving function. Past studies suggest that physical activity (PA) may play a role in mediating the influence of ACEi on functional outcomes. This study is a secondary analysis of the Lifestyle Intervention and Independence for Elders (LIFE) trial to evaluate the impact of ACE inhibitors on the incidence of major mobility disability (MMD) events among older adults in the LIFE study randomized to a long-term intervention of either structured PA or health education to promote successful aging (SA). Methods: LIFE is a multicenter, randomized trial that enrolled at total of 1635 participants from urban, suburban, and rural communities at eight centers throughout the United States. Participants were randomized to participate in center-based, supervised PA or SA for a median duration of 2.7 years. Study participants were sedentary men and women aged 70 to 89 years who had functional limitations, defined as a score on the Short Physical Performance Battery (SPPB) of 9 or below, but were able to walk 400 m. This analysis evaluated rates of mobility disability events among participants according to their antihypertensive medication use at randomization. Medication use was recorded via self-report and verified by evaluation of pill containers. Participants were designated as either: 1) an ACEi user, 2) a user of other antihypertensives not including ACEi, or 3) non-users of antihypertensive medications. Mobility disability events included the incidence of: 1) MMD, operationalized as the inability to walk 400 m in 15 minutes, and 2) persistent MMD (PMMD), identified by failure to walk 400 m on two consecutive assessment visits six months apart. Cumulative Hazard plots were used to obtain an unadjusted comparison of event rates by intervention group stratified by baseline antihypertensive use. Event rates were defined as the expected number of MMD events from randomization to a specific follow-up point. The interaction between baseline antihypertensive use and intervention was evaluated by Cox regression modeling, stratifying the hazard in the model by gender and clinical site. Results: For those in the PA intervention, rates of MMD (events/person year) varied from 0.15 (ACEi users) to 0.13 (other antihypertensive users) to 0.11 (non-users). In the SA intervention, these rates were 0.20 (ACEi users), 0.17 (other antihypertensive users), and 0.10 (non-users). Rates of PMMD in the PA intervention varied from 0.07 (ACEi users & other users) to 0.05 (non-users). Rates of PMMD in the SA intervention ranged from 0.13 (ACEi users) to 0.09 (other users) to 0.04 (non-users). Across both intervention arms, a significant main effect for medication use was observed for both MMD and PMMD (both p's < 0.001). However, the interaction between baseline antihypertensive use and intervention did not reach statistical significance for either MMD (p = 0.17) or PMMD (p = 0.26). For MMD, the HRs of PA relative to HE were: ACEi users: 0.74 (0.55, 0.99); other users: 0.75 (0.59, 0.97); and non-users: 1.17 (0.77, 1.79). For PMMD, the HRs of PA relative to HE were: ACEi users: 0.57 (0.39, 0.85); other users: 0.74 (0.52, 1.04); non-users: 1.07 (0.56, 2.05). Conclusion: The lack of a significant interaction between antihypertensive use and randomized treatment suggests the functional effects of long-term, structured PA by older adults may not differ by antihypertensive medication use. However, both MMD (ACEi users & other users) and PMMD (ACEi users) displayed antihypertensive classes with CI's excluding 1.0 – potentially indicating the need for further follow-up study. Future studies may warrant randomization of medications to evaluate their influence on functional outcomes in conjunction with PA.

**OC68- ASSOCIATION OF PHYSICAL IMPAIRMENTS WITH FNIH SARCOPENIA DEFINITIONS OF CLINICAL WEAKNESS: DATA FROM THE HEALTH & RETIREMENT SURVEY.** J.A. Batsis[1], C.M. Germain[2], E. Vásquez[3], S. Bartels[1] *(1. Hanover, USA; 2. Durham, USA; 3. Albany, USA)*

Background: Sarcopenia (SP) is the aging-related loss of skeletal muscle mass and function that is associated with functional decline and disability. The Foundation for the National Institutes of Health (FNIH) Sarcopenia Project have recently proposed threshold criteria for identifying individuals at risk for clinical weakness and functional decline. Using these newly established criteria, we ascertained prevalence of weakness in a representative cohort of the US population. Methods: Data from three waves of the Health & Retirement Study (HRS), 2006-2010, were used to identify adults aged ≥60 years with measures of grip strength. The sample consisted of n=5,610 men and women with physical measurements from the 2006 and 2008 waves of the Health and Retirement Survey. Physical limitations (PL) were defined in HRS as inability or difficulty in performing the following tasks: walking several blocks, walking 1 block, sitting 2 hours, getting up from chair, climbing stairs climbing one flight of stairs, stooping, reaching arms, pulling/pushing large objects, lifting weights and picking up a dime. Participants with 2 or more limitations were categorized as having PL. Measures of Activities of Daily Living (ADL) included difficulty or inability with bed transfers, eating, or dressing; Instrumental Activities of Daily Living (IADL) included meal preparation, managing money or completing household chores. The 2014 FNIH criteria for sex-specific grip strength (GS) cutoffs (men<26kg; women <16kg), and GS cutoffs adjusted for body mass index (GS:BMI) (men <1.0; women <0.56) were applied to our cohort. We determined prevalence of clinical weakness in each sex based on these definitions. Sex-specific multivariable logistic regression analyses (weighted) were performed to identify the odds of physical limitations, ADL and IADL impairment (primary outcomes) comparing the effect of FNIH-defined weakness in each sex after adjusting for age, education, race, current smoking status and number of comorbidities. Results: Mean age was 69.4 years in males and 68.6 years in females. The overall prevalence of PL and IADL limitations were 52% and 42% in both sexes, respectively. Mean GS and BMI were 29kg and 29kg/m2 in both sexes. ADL limitations were 42 and 44% in males and females, respectively. Using GS and GS:BMI criteria for weakness, in males, prevalence of PL was 42.2% and 49.8, and 7.9 and 9.5% in females. The table below outlines the unadjusted and adjusted analyses for risk of PL, ADL, and IADL impairments. Conclusions: The new FNIH Sarcopenia criteria demonstrate that a high proportion of males fulfill criteria for weakness and that these criteria strongly are associated with physical and IADL impairments in both sexes. Keywords: sarcopenia, weakness, physical limitations, disability.

**Association of Impairment (Physical, ADL, IADL) and FNIH Cutoff**

| | | Men (n=2,577) | | Women (n=3,033) | |
|---|---|---|---|---|---|
| | | **Unadjusted** | **Adjusted** | **Unadjusted** | **Adjusted** |
| PL | GS | 1.47 [1.25:1.72] | 1.34 [1.08:1.68] | 2.65 [1.98: 3.56] | 2.01 [1.36:2.97] |
| | GS:BMI | 2.16 [1.77: 2.63] | 2.05 [1.55: 2.71] | 4.06 [2.83:5.82] | 3.81 [2.32:6.23] |
| ADL | GS | .99 [.80:1.22] | .98 [.75:1.32] | 1.66 [1.30:2.28] | 1.83 [1.24:2.70] |
| | GS:BMI | 1.04 [.78:1.38] | .90 [.60:1.35] | 1.37 [.96:1.96] | 1.19 [.72:1.95] |
| IADL | GS | 1.67 [1.43:1.96] | 1.48 [1.18:1.86] | 2.85 [2.16:3.76] | 2.32 [1.55:3.46] |
| | GS:BMI | 1.66 [1.36:2.04} | 1.36 [1.02:1.81] | 2.57 [1.88:3.52] | 1.53 [.97:2.43] |

Models adjusted for age, race, number of years of school, smoking status, comorbidities, physical activity status; ADL – activities of daily living; BMI: Body mass index; GS: Grip Strength; IADL – instrumental activities of daily living; PL – physical limitations; GS cutoffs men<26kg; women <16kg; GS:BMI men <1.0; women <0.56

**OC69- LAMIN A EXPRESSION IN CIRCULATING OSTEOPROGENITORS AS A NEW BIOMARKER FOR FRAILTY: THE NEPEAN OSTEOPOROSIS AND FRAILTY (NOF) STUDY.** P. Gunawardene, S. Bermeo, P. Chung, D. Boersma, S. Fung, P. Suriyaarachchi, O. Demontiero, G. Duque *(Penrith, Australia)*

Background: Lamin A is a protein of the inner nuclear envelope. Low levels of lamin A are associated with progeria, osteoporosis and sarcopenia. Circulating osteoprogenitor (COP) cells are monocytes with strong capacity to differentiate into bone-forming cells (Pignolo and Kassem, J Bone Miner Res, 2011). In this study, we hypothesized that lower levels of lamin A expression in COP cells is associated with greater frailty in older persons. Methods: A random sample of community-dwelling individuals aged 65 and older enrolled in the Nepean Osteoporosis and Frailty (NOF) Study (mean age 82.8; N = 85; 70% female; 30 robust, 30 intermediate frail and 25 frail). Frailty was analyzed as an ordinal outcome of robust, intermediate frailty, and frail using a multinomial logistic regression model, and the base model was adjusted for age, race, vitamin D levels and comorbidities. Percentage of lamin A expressing COP cells was quantified by flow cytometry. Logistic regression models estimated the relationship between the percentage of lamin A-expressing COP cells and prevalent frailty. Results: Lower percentage of lamin A-expressing COP cells was associated with 6 times greater odds of being frail than being robust (odds ratio (OR) = 6.12, 95% confidence interval (CI) = 2.56-10.56) and 2.5 times greater odds of intermediate frailty than robust (OR = 2.58, 95% CI = 1.85-3.52). Conclusions: Lower levels of lamin A-expressing COP cells in late life are associated with prevalent frailty. Quantification of lamin A in COP cells is a reliable and easy to perform diagnostic method with high clinical potential. Further longitudinal studies are needed to understand lamin A expression in COP cells as a risk stratifier, biomarker, or therapeutic target in frail older persons.

**OC70- A FRAILTY-RELATED PHENOTYPE IN HIV+ MEN IS ASSOCIATED WITH INCREASED INFLAMMATION AND HORMONAL DYSREGULATION.** K.M. Erlandson[1], S. Reynolds[2], L.P. Jacobson[2], J. Margolick[2], A.S. Dobs[2], F. Palella[3], J.E. Lak[4], L. Kingsley[5], T.T. Brown[2] *(1. Aurora, USA; 2. Baltimore, USA; 3. Northwestern Chicago, USA; 4. Los Angeles, USA; 5. Pittsburgh, USA)*

Background: Frailty in older populations is associated with inflammation, immune senescence, and hormonal dysregulation. A mechanistic and clinical overlap between frailty and the acquired immunodeficiency syndrome (AIDS) was recognized early in the human immunodeficiency virus (HIV) era. Subsequent studies have demonstrated an early occurrence of frailty in HIV+ persons, primarily among those not treated with antiretroviral therapy (ART) or who have AIDS. In a small case-control study, we found heightened inflammation and immune activation and lower insulin-like growth factor (IGF)-1 levels among frail HIV+ men and women compared to non-frail HIV+ controls. The extent to which these disruptions in multiple systems differ from demographically similar HIV- persons without frailty remains unclear. Methods: Using a case-control study of HIV+ men without AIDS and HIV- men in the Multicenter AIDS Cohort Study (MACS),

a frailty-related phenotype (FRP) approximated the frailty phenotype and included 4 subjective measures of slowness, fatigue, exhaustion, and weight loss. Participants with 3 or 4 criteria were considered frail; 1 or 2 criteria were pre-frail; 0 criteria were non-frail. Cases were defined as persons with ≥2 frail visits; 1 frail visit and two pre-frail visits; or 1 frail visit followed by death within 2.5 years. Each frail HIV+ case was matched to both a non-frail HIV+ control and a non-frail HIV- control on age, visit number, and HIV treatment (no ART vs combination ART vs highly active ART). Biomarkers of endocrine, inflammatory, and immune dysfunction were evaluated from stored samples. Differences between cases and controls were described using Kruskall-Wallis testing. Values are reported as medians with interquartile range (IQR) or percentage. Results: Frail, HIV+ cases (n=160) were matched to non-frail HIV+ controls (n=144) and non-frail HIV- controls (n=155). The median year for the matching visit was 2005 (IQR 2001, 2008). Cases and controls were similar in age (median 48.0 years; IQR 41.0, 53.0; p=0.62) and body mass index (median 25.5 kg/m2; IQR 23.3, 28.9; p=0.37). Compared to non-frail HIV+ or HIV- controls, more of the HIV+ frail cases were black (frail 33 vs 26 vs 16%; p<0.003), current smokers (44 vs 22 vs 13%, p <0.001), and infected with hepatitis C (15 vs 5 vs 1%; p<0.001). Among HIV+ groups, frail men had a lower nadir CD4+ T cell counts than non-frail (238 cells/$\mu$L; IQR 137, 382 vs 295 cells/$\mu$L; IQR 187, 403; p <0.001) and lower current CD4+ T cell count (458 cells/$\mu$L; IQR 305, 638 vs 562 cells/$\mu$L; IQR 413, 761; p<0.001), but the percent of men on ART (61 vs 66%; p=0.48) or with HIV-1 RNA < 400 copies/mL were similar (59% vs 67%, p=0.18). The highest levels of inflammation and immune activation biomarkers were seen in the HIV+ frail (vs HIV+ non-frail and HIV- non-frail) including interleukin-6 (2.4 vs 1.4 vs 1.2 pg/mL; p<0.001), C-reactive protein (2.3 vs 1.2 vs 0.8 mg/L; p<0.001), soluble tumor necrosis factor receptor (sTNFR)-1 (1370 vs 1196 vs 1185 pg/mL; p<0.001), sTNFR-2 (4243 vs 3315 vs 2502 pg/mL; p<0.001), and T-cell activation as defined by %CD38+HLA-DR+ CD8+ T-cells (37.3 vs 35.7 vs 14.4%; p<0.001) and %CD38+HLA-DR+ CD4+ T-cells (15.3 vs 14.3 vs 5.8%; p<0.001). Markers of immune senescence (%CD4+CD28- and %CD8+CD28-) were higher among HIV+ non-frail than HIV+ frail or HIV- non-frail (CD4+: 20 vs 18 vs 12% and CD8+: 58 vs 55 vs 40%; both p<0.001).The HIV+ frail men had lower dihydroepiandrosterone-sulfate (DHEA-S, 0.8 vs 1.2 vs 1.0 ng/mL; p<0.001), IGF-1 (106 vs 115 vs 116 ng/mL; p=0.04), and free testosterone (70 vs 86 vs 86 pg/mL; p<0.001),compared to HIV+ non-frail and HIV- non-frail men, respectively. Conclusions: Among HIV+ men, the frailty-related phenotype is associated with increased markers of systemic inflammation and dysregulation of multiple hormones, including DHEA, IGF-1, and free testosterone. Interventional studies are needed to determine whether decreasing systemic inflammation or correcting hormonal deficiency can prevent or reverse frailty-related findings among HIV+ men.

**OC71- THE IMPACT OF DIFFERENT MEASURES OF FRAILTY ON RATES OF HEALTH SERVICE USE AMONG THE COMMUNITY DWELLING ELDERLY.** A.M. O'Halloran, L. Roe, R.A. Kenny, C. Normand *(Dublin, Ireland)*

Background: Skeletal muscle wasting is systemic feature of COPD, which predicts moBackground: Managing combinations of chronic conditions, functional limitations and adverse social and mental health issues, referred to in the gerontological and health sciences literature as 'complex needs', is the major challenge to healthy ageing today. However, not everyone of the same age has the same risk for poor health. One way of examining those with complex needs is through the lens of frailty - a distinctive health state related to the ageing process, exemplified by a gradual decrease in biological reserves across multiple body systems. Frail individuals are more vulnerable to stressors e.g. minor infections, surgeries or drug interactions, and ultimately to an increased risk of adverse health outcomes. It has also been shown that frail individuals are predisposed to using community, hospital and nursing home services compared to the non-frail population (Fried, Ferrucci et al. 2004). This is noteworthy given the demographic ageing predicted in most developed countries over the coming decades and the need to understand what more frail people will mean. In the Irish context, the population aged 65 years and over is estimated to treble by 2041 (Central Statistics Office Ireland, 2011). However, there is a gap in our knowledge regarding how the frail population impacts on service use across the health and social care system. The first step to understanding the likely impact of frailty on health and social care systems into the future requires a measure of frailty which will best capture service use. In this study, we investigated the relationship between health service use and three widely reported measures of frailty. We examined whether different frailty measures produce different service utilisation rates and which measure best explains services use. Methods: Data was collected from the baseline wave (2009/11) of The Irish Longitudinal Study on Ageing (TILDA), a prospective cohort study representing the community-dwelling population aged over 50 years in Ireland (Kenny 2013; Whelan and Savva 2013). Secondary analyses were performed using data from adults aged 65 years and over (n=3,422). This study operationalized the phenotype frailty syndrome (Fried et al, 2001; 2004), the FRAIL scale (Morley et al, 2011; 2012) and the deficit accumulation frailty index (Rockwood et al, 2004; 2007). For both the phenotype frailty model and the FRAIL scale, participants were classified as non-frail, prefrail and frail respectively if 0, 1-2 and ≥3 of five frailty indicators were present. The deficit frailty index (FI) was constructed from 32 age-related health deficits with each deficit coded as present (1) or absent (0). The total was then summed and divided by 32 to produced index scores between 0.0 - 1.0. Respectively, FI scores of 0.00-0.10, 0.10-0.24 and ≥0.25, indicated participants were non-frail, pre-frail and frail. Data on healthcare utilisation was self reported for hospital, primary care, allied health and home based service use in the 12 months preceding data collection. Descriptive statistics and estimated prevalence rates for service use were reported using standard population weights. Results: Using the TILDA dataset, the estimated population prevalence of people aged 65 years and over was 500,665 and the estimated prevalence of frailty was 8%, 5%, and 22%, using the phenotype, FRAIL scale and FI measures respectively. Although all three measures of frailty were significantly associated with use of hospital, primary care, allied health and home based services (p<0.05), there was variation in the rates of service use. Among the frail groups classified using the phenotype, FRAIL scale and FI models: 96-98% of frail people reported using a primary care physician/GP service with an average of 6.8-10.7 visits; while 27-39% of the frail reported overnight hospital admissions with an average length of stay at 14.9-19.3 nights. Variations in the use of allied health and home services by the frail from the three models were also observed, albeit with less intensity across sixteen services. However, this may reflect the low levels of service provision in general and does not reflect private care which was not captured in this study. In order to unpick the effect of categorical cut-offs on the frailty measures, we examined each measure as a (quasi-) continuous variable. This revealed that 0.25, the reported cut-off for the FI (Rockwood et al. 2007), mapped most accurately onto a health service utilisation. Conclusion: Our findings demonstrate that frail populations use health services intensively comparison to the non-frail, particularly primary care and hospital services. However, we must exercise caution regarding the type of frailty measure we employ to understand the impact of frailty on service use. Developing a more nuanced understanding of service utilisation patterns is crucial as we plan for service capacity and design integrated systems to deliver effective and appropriate care into the future. Future research will be required to further elucidate the factors associated with individual service use and with high and low intensity service use among the frail population.

## POSTER

**P1- IMPAIRMENT OF MUSCLE REPAIR WITH SEVERE INTRAMUSCULAR LIPID ACCUMULATION OBSERVED IN OBESE DIABETIC MICE AFTER MUSCLE INJURY.** M. Mogi, K. Kohara, H. Nakaoka, H. Kan-no, K. Tsukuda, X.-L. Wang, T. Chisaka, M. Kukida, H. Bai, B.-S. Shan, J. Iwanami, M. Horiuchi *(Ehime, Japan)*

Backgrounds: Sarcopenic obesity, a loss of muscle mass and a concomitant increase in ectopic fat, is reported to increase in life-style related diseases. Especially the prevalence of sarcopenia is greater in patients with type 2 diabetes mellitus (T2DM) than in non-diabetic subjects. Increase in intramuscular lipid accumulation enhances insulin resistance and is associated with metabolic risk factors. However, the detailed mechanism of such ectopic fat filtration in muscle of T2DM patients has not been well investigated. Here, we assessed muscle regeneration and intramuscular lipid accumulation using muscle-injured models in obese diabetic mice. Methods: Muscle in the lower limbs of 18-week-old wild-type mice (C57BL6) and T2DM mice (KKAy) was evaluated with a magnetic resonance imaging system. Male eight-week-old C57BL6 and KKAy were undergone intramuscular injection of cardiotoxin (Ctx) (100mL/10mM) into tibialis anterior (TA) muscle. After two weeks, muscle were removed and stained with hematoxylin and eosin. KKAy replaced by bone marrow prepared from GFP-transgenic mice (GFP-chimeric mice) were generated by 8 Gy whole body X-ray irradiation. Cell-differentiation was evaluated by immunofluorescent analysis. Some mice were treated with all trans-retinoic acid (ATRA) and PPARg antagonist, GW9662. Results: In 26 week-old KKAy, magnetic resonance imaging analysis showed that intramuscular fat deposition was estimated as higher intensity compared with C57BL6 mice. Treatment with Ctx showed a significant increase in honey comb structure which was stained by perilipin, a lipid droplet-associated protein. KKAy mice exhibited impaired muscle regeneration with lower mRNA expression of a myogenic marker, myoD. Muscle weight of TA was approximately a half in Ctx-injured KKAy. Such change was also observed in another diabetic mouse model, db/db, but not in streptozocin-induced diabetic mice. Fat formation was remarkably increased in aged KKAy compared with younger mice. GFP-positive fat formation was not observed in GFP-chimeric mice, indicating that fat tissue was not generated from marrow cells. Fat formation was considered to be mesenchymal origin due to immunofluorescent staining by vimentin but not by desmin. Moreover, accumulated fat was PDGFRa positive and also stained with Masson's trichrome, indicating it to be of fibro-adipocyte progenitor (FAP) origin. Immunofluorescent staining also showed that PPARg was highly expressed in fat-forming lesions in aged KKAy. Treatment with ATRA prevented the formation of intramuscular fat; however, treatment with GW9662, a PPARg antagonist, reduced ATRA-enhanced fibrotic change in intramuscular regions. On the other hand, treatment with GW9662 enhanced fat filtration. Conclusion: Obese diabetic mice showed significantly impaired muscle regeneration with replacement of fat deposition, suggesting that diabetes enhanced sarcopenic obesity possibly due to anomalous FAP cell differentiation.

**P2- HANDGRIP STRENGTH PREDICTS COGNITIVE AND PHYSICAL PERFORMANCE OF ELDERLY: NURSING HOME STUDY IN WEST JAKARTA.** Y.S. Handajani, Y. Turana *(Jakarta, Indonesia)*

Background: A number of adverse outcomes have been identified in the elderly; one of them is the hallmark of dependency and cognitive decline development. Muscle strength is a potential predictor of elderly health declining. In this study, handgrip strength was used as a proxy for muscle strength. Objective: To predict the physical performance and cognitive function by handgrip strength. Methods: One hundred and thirty-eight elderly have been staying in nursing home; there were 48.6% men and 51.4% women. Handgrip strength was measured with a handgrip strength dynamometer. Physical performance and cognitive function were assessed with Berg Balance Score and Mini Mental State Examination (MMSE). Independent Sample T-test was performed to predict balance and

cognitive decline by handgrip strength. Multivariate analyses were performed in order to identify the most affected component of balance and cognitive impairment. Results: There were 86.2% of elderly who had impaired cognitive and 57.2% had balance impairment. Elderly's right and left handgrip strengths were significantly different between men and women. Grip strengths of the right and left hands of men were six times greater than women. Low right and left handgrip strength increased the risk of balance decline (OR 2.90; 95% CI 1.61-5.18 and OR 3.45; 95%CI 1.35-5.55; p<0.05). Moreover, low right and left handgrip strength increased the risk of cognitive decline (OR 4.73; 95% CI 1.48-7.99 and OR 1.62; 95%CI 1.05-4.73; p<0.05). Multivariate analyses indicated that "recall" (component of cognitive function) and "standing with one foot in front" (component of balance performance) were the most related with low right and left handgrip strength (p<0.05). Conclusions: This study demonstrates that handgrip strength predicted physical performance especially the balance performance and cognitive decline of elderly in nursing home. "Recall" in cognitive function and "standing with one foot in front" in balance performance were the most related (p<0.05).

**P3- DOMAINS OF QUALITY OF LIFE AND ITS RELATIONSHIP WITH FRAILTY SYNDROME: CROSS SECTIONAL STUDY ON ELDERLY IN NURSING HOME, WEST JAKARTA.** Y.S. Handajani, N.T. Widjaja *(Jakarta, Indonesia)*

Backgrounds :Recently the geriatricians and gerontologists focus on Frailty in elderly people was increasing significantly. It is estimated that approximately 10-27% of the population aged ≥ 65 years of frailty and the percentage increases with age so that frailty prevalence in the population aged ≥ 85 years to reach 45% . The objective of the study was to acquire the frailty prevalence and impact on dimensions of quality of life of the elderly who live in nursing homes, West Jakarta. Methods : A total of 138 subjects aged 60 years and over were recruited from 4 nursing homes, West Jakarta. Participants underwent assessment of their frailty status according to Survey of Health, Ageing and Retirement in Europe / SHARE and Qualty of Life which was evaluated by using the WHOQOL-BREF questionnaire. One-way ANOVA and chi-squared tests were used to find the relation between frailty syndrome with Quality of Life. Results : In this study, the percentage of respondents with pre-fail status (30.4%), frail (52.2%) and non-frail/ robust (19.4%). A decline of QOL scores with frailty status was found for almost all domain of QOL (physical health, psychological health and environment domains) except for social relationships among "pre-fail" and "frail" respondents compare "non frail"/ robust respondents. Respondents who were pre-frail had quality of life score for physical health 2.10 points lower compared to who were normal (non-frail) at p = 0.01. Similarly, respondents who were frail had score 1.96 points lower compared to respondents who were non-frail at p = 0.00. The pre-frail respondents had experienced lower quality of life for psychological health domain by 1.58 points compared to those who were normal at p = 0.02. It also happened to the frail ones, they had score which 1.04 points lower compared to the normal ones at p = 0.08. The respondents who suffering from frailty had score of quality of life for the domain of the environmental 2,79 points lower than those were non-frail (normal) at p = 0.01. Subdomains which the most influenced on the domain of Physical Health was «Energy and Fatigue" , on Phychological Health domain was " Thinking, Learning, Memory and Concentration», as well as on " Environment domain was «Opportunities for Acquiring New Information and Skills». Conclusions: More than half of the elderly with frail status and one-third of elderly with pre-frail status in nursing homes and the main factor of frailty was weakness. Frailty syndrome in the elderly had a negative impact on quality of life, especially in the domain of physical health, psychological and environment. Key words : Frailty syndrome, quality of life,elderly, nursing homes.

**P4- FUNCTIONAL DISABILITY PREDICTS MORTALITY IN PATIENTS ON CHRONIC HEMODIALYSIS.** M. Bossola, A. Laudisio, M. Antocicco, L. Tazza *(Rome, Italy)*

Background/Aims: The FRAIL (fatigue, resistance, ambulation, illnesses, and loss of weight) scale can easily screen frailty status with simple 5 item questionnaire. Aim of this study is to evaluate clinical feasibility and validity of the Korean version of FRAIL (K-FRAIL) scale. Methods: Numbers of impaired items in K-FRAIL, translated from original FRAIL scale, were measured in 103 patients 65 or older who undergoing comprehensive geriatric assessment (CGA) in clinic and ward of Seoul National University Bundang Hospital. In this cross sectional study, K-FRAIL scale was compared with domains of CGA and multidimensional frailty index derived from CGA. Also, time taken to administer K-FRAIL for each patient was assessed. Results: Mean frailty index was 0.19 (SD 0.17) in participants with mean age of 76.8 years (SD 6.1) among which 55 (53.4 %) were men. Mean frailty index was 0.09 in robust, 0.18 in prefrail, and 0.34 in frail patients according to K-FRAIL scale (P for trend <0.001). Higher impairment in K-FRAIL scale was associated with worse nutritional status, poor physical performance, functional dependence, and polypharmacy. Number of items with impairment by K-FRAIL scale was positively associated with frailty index (B=3.73, P<0.001). K-FRAIL can differentiate vulnerability from robustness with sensitivity of 0.90 and specificity of 0.33, with frailty index as gold standard. Measuring K-FRAIL scale took less than 3 minutes in 75 (72.8%) patients. Conclusions: The K-FRAIL scale is correlated with frailty index by CGA, and can be used easily in clinical setting to screen frailty. Kew words: frail, geriatric assessment, aged, diagnosis.

**P5- THE KOREAN VERSION OF FRAIL SCALE: CLINICAL FEASIBILITY AND VALIDITY IN KOREAN OLDER ADULTS.** H.-W. Jung, C.-H. Kim, H.-J. Yoo, S.-Y. Park, S.-W. Kim, K.-I. Kim *(Seoul, Korea)*

Background. Unfortunately, little is known about the variables associated with functional disability and if this is predictor of outcome in patients on chronic hemodialysis. The aim of the present study was to determine if activity daily living (ADL) and/or instrumental activity daily living (IADL) were predictors of mortality in patients on chronic hemodialysis. Methods. A hundred fifteen patients affected by end-stage renal failure who had received thrice weekly hemodialysis for at least 6 months at the Hemodialysis Unit of the Catholic University, Rome, Italy, between November 2007 and January 2014 were studied. Data on six-year mortality were collected from the medical records of the dialysis center and further confirmed by comparing this information with municipal registry office data. Results. Death after six-year of follow-up occurred in 39/115 (34%) of patients. Dead participants, as compared with other participants, were significantly older, and with an higher dialytic age; also they had an higher number of depressive symptoms, and worse cognitive performance; they showed a higher Charlson comorbidity score index, lower creatinine and albumin serum levels, and higher IL-6 levels. Eventually, they showed a significant worse functional ability. According to Cox regression analysis, mortality was inversely associated with the ADLs score in the unadjusted model (RR=.69; 95% CI=.58-.82; P<.0001), after adjusting for age and sex (OR=.80; 95% CI=.66-.97; P=.027), as well as in the multivariable model (RR=.61; 95% CI=.39-.96; P=.033), adjusting for those variables which showed significant differences in univariate analyses. In addition, according to Cox regression analysis, mortality was inversely associated with the IADLs score in the unadjusted model, after adjusting for age and sex, but not in the multivariable model (RR=1.08; 95% CI=.375-1.50; P=.737), adjusting for those variables which showed significant differences in univariate analyses. Eventually, increasing worsening functional ability (expressed by an ADLs score of 5-6; 4-2; 1-0) were associated with increasing probability of death, (p for linear trend <.0001). Conclusion. We show that the mortality of patients receiving chronic hemodialysis is higher when the ADL disability is higher, independently of confounders. If this will be confirmed by other studies in the future, the ADL disability could become a potential target for intervention.

**P6- CUT-OFF VALUES FOR GAIT SPEED AND HANDGRIP STRENGTH IN MEXICAN OLDER ADULTS.** L.M. Gutiérrez-Robledo, M. T. López-Teros, E. Cruz-Arenas, L. Robles-Jiménez *(Mexico City, México)*

Background: There is an increasing awareness of the need of having population specific cut-off values of different physical performance tests. In particular, two of the test with a wide use because of their easy application and prediction of adverse outcomes (disability, mortality, institutionalization), are gait speed and handgrip strength. The aim of this work is to describe two different approaches to determine cut-off values for gait speed and handgrip strength in a representative sample of Mexican older adults. Methods: Data were taken from the 2012 Mexican Survey on Nutrition and Health (ENSANUT) for gait speed and from the Mexican Health and Aging Study (MHAS). for handgrip strength. For gait speed a total of 7,164 individuals had the measurement of gait speed in a 4-meter track at usual pace. Two trials were performed, and the best of the two was used for analysis. Subjects not able to perform were scored as the worst speed registered for the rest of the population. The first approach to generate cut-off values was that proposed in the criteria of the Fried frailty phenotype, those subjects considered abnormal belong to the lowest quintile of their respective groups (divided by sex and height). The second approach was done using also data from younger subjects. In this approach the mean of the younger population was compared with that of the individual values of the older population in order to have standard deviatons; -1 standard deviations was used as the cut-off value. Tables of the values were done stratified by age and gender. For handgrip strength a total of 1,144 individuals were analyzed. An hidraulic dynamometer (Jamar) was used to measure handgrip strength, two trials were performed, and the best result was analyzed. The same approach to define weakness in Fried frailty phenotype was used, those subjects in the lowest quintile of their group (by sex and quartiles of body mass index) were considered abnormal. The same second step as for gait speed was done. Younger subjects mean was contrasted with individual values in order to have standard deviations, and -1 standard deviation was considered abnormal. Tables of the values were done stratified by age and gender.Results: Cut-off values for gait speed are shown in table one. The reference group for gait speed consisted of 5,195 young subjects (<60-years); with a mean age of 36.29kg (SD 11.96); the mean of gait speed was 1.06m/s (SD 0.39). Subjects of 60-years and older had a mean age of 70.66 years (SD 8.07), with 54.76% of women. The mean of gait speed was of 0.85 (SD 0.37). Cut-off values for handgrip strength are shown in table two. The reference group for handgrip strength was of 942 subjects, with a mean age of 52.99 years (SD 5.07), a mean handgrip strength of 28.41kg (SD 8.81). Subjects of 60-years and older had a mean age of 70.46 years (SD 28.52), with 55.24% of women. The mean of handgrip strength was of 24.46kg (SD 8.54). Conclusion: Consistent values were obtained from both approaches and for the two physical performance tests. In general a gait speed lower tan 0.8m/s could be considered as abnormal and a handgrip strength <30kg for men could be considered as abnormal; and for women gait speed <0.6m/s and handgrip strength <18kg. The slightly lower than other values reported in other populations points to the fact that cut-off values for each different population may be needed.

**P7- RHEUMATOID POLYARTHRITIS AND PRIMARY HYPERPARATHYROIDISM: FORTUITOUS ASSOCIATION?** A.A. Zulfiqar, S. Lussato, J.L. Novella *(Reims, France)*

Backgrounds: Many inflammatory diseases, autoimmune or endocrine tropism diseases can be associated in the same person, due to a particular genetic background (HLA), hence the need for increased and long-term surveillance for detection of these diseases for these patients. However, there are associations that may be fortuitous, little or no reported in the literature, without obvious pathogenic link. Methods: We describe a unique case of an association with rheumatoid arthritis and primary hyperparathyroidism in an elderly patient of 77 years. Results: A patient of 77 years with a history of hypertension treated, a bilateral carpal tunnel surgery 2 times, a prosthetic right knee, a depressive syndrome being treated with venlafaxine was admitted for evaluation of a non-malignant hypercalcemia associated with the presence of a biological inflammatory syndrome CRP 103 mg / L, an erythrocyte sedimentation rate of 62 mm the first time, discovered during a routine checkup. Clinically, no clinical infectious signs are found. No clinical signs (no digestive or urinary problems, no psychiatric disorders) and electric electrocardiogram due to hypercalcemia are found. The patient complains only of isolated and mixed pain at his right shoulder for several months without further joint damage, and without recent and sudden visual disturbances. Biologically, hypercalcemia is found at 2.76 mmol / L, with an ionized calcium at 1.45 mmol / L, corrected calcemia to 2.88 mmol / L , hypophosphatemia at 0.85 mmol / L, with no renal failure. An investigative report is requested to label this moderate hypercalcemia in an inflammatory context. Urinary calcium is increased, with a rise of serum parathyroid hormone at 71 pg / ml serum. We do not note vitamin D deficiency. Morphological assessment is performed including a thoracco-abdominopelvic CT proving without abnormalities, and parathyroid scintigraphy finding a compatible image to a lower right parathyroid adenoma. A review of association was conducted to find a possible multiple endocrine neoplasia, proving to be negative (searching a negative pheochromocytoma by assay of urinary metanephrines / normetanephrines during 24 hours; negativity of MIBG scintigraphy and abdominal MRI). Moreover, with the negativity of infectious examinations (blood cultures, chest X-ray, Urine culture), with mixed pain at the right shoulder, a biopsy of the temporal arteries is performed proving to be negative. Autoimmune assessment is performed finding a positive antinuclear antibody at 1/400, a positive rheumatoid factor, positive anti-cyclic peptides antibodies and negativity of anti-dsDNA antibodies. Rheumatoid arthritis is diagnosed. Corticosteroid has been prescribed, then a relay with methotrexate is performed, allowing clinical and laboratory improvement. Primary hyperparathyroidism due to a lower right parathyroid adenoma is supported surgically, allowing a gradual normalization of the serum calcium. Primary hyperparathyroidism is usually part of multiple endocrine neoplasia that are MEN 2a (Sipple syndrome with association with pheochromocytoma and paresthetica notalgie) or in the MEN 1 (Wermer syndrome with an association with tumors of the endocrine pancreas and tumors of the anterior pituitary, with a very high penetrance, hereditary disease). Rheumatoid arthritis is often associated with other inflammatory or autoimmune diseases such as systemic erythematosus lupus, Sjögren syndrome or autoimmune thyoiditis and can be part of a large group that is the multiple autoimmune syndromes, which for rheumatoid arthritis is classified as type 3, (classification of Humbert). This association rheumatoid arthritis and primary hyperparathyroidism remains undescribed in the literature and this case remains outstanding, with a concomitant discovery of two diagnoses in this patient of 77 years old. Rheumatoid arthritis is a difficult disease to diagnose in the initial phase, especially in the elderly, where an inaugural stage in subjects over age 75 years is rare. The examination and clinical examination remain essential phases, and the diagnosis of rheumatoid arthritis must not be ignored, especially that early diagnosis ensures effectiveness of treatments (immunosuppressive or biotherapy second line), hence an interest in a comprehensive geriatric assessment to detect any fragility according to clinical criteria of Fried. This screening is essential to ensure optimal care of aged over 75 years, compared to young subjects. It is currently well demonstrated that the aging of the immune system, commonly named immunosenescence, contributes not only to the increasing incidence of infectious diseases and poorer response to vaccination, but also to the increasing age-related incidence of auto-immune diseases, cancers, osteoporosis, neurodegenerative diseases, diabetes and atherosclerosis. It is considered a major contributory factor to the increased frequency of morbidity and mortality among the elderly. There is a decrease in both the production of new naive lymphocytes and the functional competence of memory cell populations. This has been implicated in the increasing frequency and severity of diseases such as cancer, chronic inflammatory disorders and autoimmunity. Immunosenescence remains under investigation. Conclusion: The association rheumatoid arthritis and primary hyperparathyroidism is probably coincidental and exceptional.

**P8- HYPERVITAMINIA B12 IN THE ELDERLY: MARKER OF FRAILTY IN THE ELDERLY?** A.A. Zulfiqar[1], A. Sebaux[1], R. Mahmoud[1], E. Andres[2], J.L. Novella[1] *(1. Reims, France; 2. Strasbourg, France)*

Background: In clinical practice, measurement of total plasma cobalamin is requested widely for the biochemical assessment of cobalamin deficiency .Daily intake of 2 to 5 µg, together with efficient absorption, transportation, and transformation, are needed to maintain health. Hypervitaminia B12 is a biological anomaly which remains unknown and underestimated in clinical practice. Method: We report a case illustrating this problem in a patient of 76 years. Result: A patient of 76 years consult for asthenia. She has a medical history including a non autoimmune hypothyroidism treated and anxiety-depressive syndrome also treated. Clinical examination has no specific abnormalities. No weight loss is noted. The body mass index is at 23 kg/m2. No lymphadenopathy, no suspicious mass is found. No gynecological or gastrointestinal blood loss is found for the patient. The neurological and joint articular examination is normal. Cognitive assessment finds no abnormalities. We performe a full biological assessment which find a hypervitaminia B12 estimated at 1103 pg/ml. This endocrine marker is therefore increased (> 663pg/ml). Any deficiency or excess vitamin folate is detected. No hepatic disturbance, no renal failure, no anaemia are found. Biological markers of malnutrition such as albumin and prealbumin are normal. No lymphopenia is observed for this patient. Thyroid function is normal. No biological inflammatory syndrome (CRP, erythrocyte sedimentation rate, fibrinogen) is found. The electrophoresis of serum and a urinary protein does not find any abnormalities in favour of hemopathy. A homocysteine is prescribed in order to find a functional deficiency of vitamin B12, proving to be normal. No excess intake of vitamin B12 is found. We prescribe a thoracco-abdominopelvic scanner in order not to avoid a solid neoplasia which may explain this hypervitaminia B12. A large mass of solid shape, 86 mm in diameter, growing at the expense of the myometrium is found; this confirmed by endo-vaginal ultrasound, with intratumoral vascular, corresponding to a uterine fibroid. The ovaries are normal. Gynaecological support is recommended. The association between elevated plasma cobalamin levels and cancer risk is poorly known. A high prevalence of elevated cobalamin levels has been reported in patients with liver cancer, other solid neoplasms, and hematological malignancies. Some studies have indicated a high prevalence of cancer, both hematological and solid tumors, among patients with high cobalamin levels. Elevated plasma cobalamin levels have also been associated with several non malignant diseases, including liver diseases, alcoholism and alcoholic cirrhosis (decrease in hepatic tissue uptake and cellular vitamin B12 and complex haptocorrin-cobalamin are the main mechanisms implicated), and renal failure, autoimmune and infectious diseases. The role of the kidney in the metabolism of vitamin B12 is now clear, but not completely understood. Kidney failure is one of the reasons to search; this mainly linked by an accumulation of serum transcobalamins. Hypervitaminia B12 can be observed in case of functional deficiency with the need to dose homocysteine. Clinically, it can be sometimes paradoxically accompanied by signs of deficiency reflecting a functional deficit in relation to qualitative abnormalities related to defects in tissue uptake and action of vitamin B12. The major cancers implicated are hepatocellular carcinoma and secondary liver tumors, breast cancer, colon cancer, stomach cancer and pancreatic tumors. In liver tumors, the main mechanisms implicated in the genesis of hypervitaminia B12 are decreased hepatic clearance of complex haptocorrin-cobalamin and plasma increased by transcobalamins by excess degradation of hepatocytes . Hypervitaminia B12 is frequently observed in malignant hematological abnormalities. It is basically myeloproliferative disorders, including chronic myelomonocytic leukemia and primary hypereosinophilic syndrome, myelodysplastic syndromes and acute leukemias, including promyelocytic leukemia . This is mainly due to granulocyte production haptocorrin. Cancer is associated with high cobalamin and high haptocorrin levels. This protein originates from a variety of tissues, but its physiological function remains unknown .It is elevated in patients with some cancer types and has been suggested as a marker for disease progression. From a point of view prognostic, the correlation found in some cases between the size of certain tumors, including liver, and the degree of elevation of the vitamin B12 was suggested for hypervitaminia B12 as a possible tumor marker of poor prognosis. This could be considered as a frailty marker for elderly patients, and the geriatric assessment is undoubtedly necessary for elderly patients, in order to investigate hypervitaminia B12, and to search etiology. Conclusion: Codified approach is needed to determine the potential indications of the search for a hypervitaminemia B12 and practice what to do to pass before the discovery of a high serum level of cobalamin. Finding a high plasma concentration of vitamin B12 should lead to a systematic search for a tumor or a hepatic disease. Referent laboratory should actively advertise the numerous diseases implicated with high level of vitamin B12. A prospective study is underway in acute geriatric unit to investigate the prevalence and causes explaining hypervitaminia B12.

**P9- THE UNSUSPECTED INTRINSIC PROPERTY OF MELANIN TO DISSOCIATE THE WATER MOLECULE, IMPLICATIONS IN THE CONTEXT OF GERONTOLOGY.** A. Solís-Herrera, M. del Carmen Arias Esparza, R.I. Solís-Arias *(Aguascalientes, México)*

Background: The three worldwide main causes of blindness are the same causes since 60 years ago or more. Thereby available treatments are not working at all. Methods: Therefore, in 1990 we started an observational, descriptive study; about the morphological characteristics of the optic nerve in the living patient, which is very small in humans, measuring the equivalent to twelve human hair together (1200 microns). Our working hypothesis was to try to find morphological changes that eventually could be considered indicators of early disease, allowing us to begin early treatment. In our retina service, we began to digitize the images obtained during routine fluorangiography studies in order to magnify, trying to establish a pattern of the morphology of the vessels of the optic nerve. During the protocol, nearly 6,000 patients were reviewed over twelve years, and during its development the main variable under study was the morphological characteristics of the blood vessels of the optic nerve, about three months after we add melanin it allowed us to detect magnifications that melanin was always present in fundus examinations. Careful examination performed in numerous studies of the two main variables -melanin and blood vessels- allowed us to identify the existence of a definite interaction between melanin and blood vessels, which caught our attention, since melanin traditionally is considered as a simple built-in sunscreen. Briefly we can say that the greater the amount of melanin fewer blood vessels and vice versa. So we took on the task of trying to identify ways in which to regulate melanin seemed blood vessel. We gradually discard biological molecules for various reasons, because the effect size was very noticeable. Therefore, the putative mechanism might not be through some kind of receptor. On the other hand, then we begin

to detect elevated levels of molecular oxygen in tissues with high melanin content. On the other hand, then we begin to detect elevated levels of molecular oxygen in tissues with high melanin content, which at the time had no explanation, besides that no one had given importance. In February 2002, we could finally identify the melanin possessed the amazing ability to dissociate the water molecule. Results: The unexpected intrinsic property of melanin to dissociate the water molecule explains its effect on the vessels, and the presence of high levels of oxygen in pigmented tissues. Conclusion: The ability to dissociate the water molecule begins to decline at age 26, about 10% each decade from the 50s and then enters free fall.

**P10- PREVALENCE OF SARCOPENIA, DYNAPENIA AND SARCO-DYNAPENIA AND ASSOCIATED FACTORS IN OLDER ADULTS IN THE CITY OF SAO PAULO – SABE STUDY.** T. da Silva Alexandre[1], Y. Aparecida de Oliveira Duarte[2], J.L. Ferreira Santos[2], M.L. Lebrão[2] *(1. São Carlos, Brazil; 2. São Paulo, Brazil)*

Backgrounds: The European Working Group on Sarcopenia in Older People (EWGSOP) recommends the diagnosis of sarcopenia using the presence of low muscle mass plus low muscle strength (dynapenia) (measured by grip strength) or low physical performance (measured by gait speed). However, recent researches have suggested that both sarcopenia, according the EWGSOP, as dynapenia are good predictor of disability and mortality and that the decline in physical performance is an outcome of reduced muscle mass and strength. So the aim of the present study is to estimate the prevalence of sarcopenia, dynapenia and sarco-dynapenia and associated factors in older adults in the city of Sao Paulo, Brazil. Methods: A population-based, cross-sectional study was conducted with 1168 older adults who participated in the third wave of the Saúde, BemEstar e Envelhecimento (SABE [Health, Wellbeing and Ageing]) study in 2010. Men and women with skeletal muscle mass ≤ 8.90 kg/m2 and ≤ 6.37 kg/m2, respectively, were considered sarcopenic. Men and women with grip strength < 30 kg and < 20 kg, respectively, were considered dynapenic. Those with both conditions were considered sarco-dynapenic. Socio-demographic, behavioral, clinical, nutritional and biochemical characteristics were investigated as factors associated with each of the three conditions using multinomial logistic regression. Results: The prevalence of sarcopenia, dynapenia and sarco-dynapenia was 4.8% (95%CI: 3.6-6.3%), 30.9% (95%CI: 27.5-34.6%) and 9.0% (95%CI: 7.2-11.3%), respectively. An increase in age and malnutrition were associated with all three conditions. Cognitive impairment was associated with both dynapenia and sarco-dynapenia. Schooling, current smoking habit and not having a conjugal life were associated with sarcopenia. Osteoarthritis, schooling, being an ex-smoker and low hemoglobin were associated with dynapenia. Smoking habit and the risk of malnutrition were associated with sarco-dynapenia. Conclusion: Dynapenia is more prevalent among older adults, followed by sarco-dynapenia and sarcopenia. While different factors are associated with sarcopenia and dynapenia, these conditions have the following common associated factors: age, schooling and malnutrition. Keywords: Sarcopenia, Dynapenia, Sarco-dynapenia, Older adult, Prevalence, SABE study.

**P11- PHYSICAL ACTIVITY IN HOSPITALIZED ELDERLY MEDICAL PATIENTS; HOW ACTIVE ARE THEY, AND WHAT MOTIVATES TO PHYSICAL ACTIVITY – A PILOT STUDY.** M. Holst, H.H. Rasmussen, P. Hansen, L.A. Pedersen, S. Paulsen, C. Valentinsen, M. Køhler *(Copenhagen, Denmark)*

Background: Physical activity (PA) in elderly hospitalized patients has been found to optimize strength and appetite, and improve outcome. The aim of this study was to examine physical activity in Danish elderly hospitalized medical patients and to investigate motivating factors as well as barriers towards PA. Methods: Patients >60 years of age were recruited at two medical departments during one week. Three SenseWear armband monitors were used for monitoring PA. Semi structured interviews were used for qualitative data. Results: The study included 13 patients (female/male ratio: 5/8), mean age 73 (SD 9); BMI 19.4-32.1, mean 25.2 (SD 3.7). Only 11 of these patients completed 24-hours of SenseWear armband monitoring. Half of the participants walked less than 50 steps a day. The majority were bedridden between 9 and 15 hours a day. Measured by MET, 5/11 patients had very low activity. Four patients were moderately active for 19-38 minutes. Five patients slept less than 6,3 hours, mean 9 (SD 3.3). Lying down was recorded for a mean of 11 hours (SD 4). Motivating factors for PA were: Praise and recognition from the staff, experienced boredom, and be able to maintain Activities of Daily Living. Barriers: Disease-related, fear of falling, lack of meaningful activities, inadequate physical facilities and staff's lack of focus on patients' PA. Organisational routines such as waiting for staff, including physical examinations and rounds, were barriers for patients to get out of bed. Conclusion: Physical activity was very low in elderly hospitalized patients.. Motivating factors for physical activity experienced from the patients were to maintain ADL, boredom and lack of staff interest, but these were often hindered by organizational barriers, lack of meaningful activities and focus from the staff. Keywords: Elderly, patients, physical activity, hospitalization, ADL, bed rest, steps, MET, nurses, organization.

**P12- THE IMPACT OF FASTING DURATION AND HOSPITAL STAY ON POST-OPERATIVE SARCOPENIA FOLLOWING RADICAL CYSTECTOMY.** H. Aoki, A. Otaka, T. Ieda, F. Shimizu, S. Muto, R. Yamaguchi, S. Horie *(Tokyo, Japan)*

Introduction: Skeletal muscle atrophy in elderly people leads to sarcopenia and frailty, which are the main causes for falls and related fractures. Invasive surgery can induce secondly sarcopenia in elderly patients. In this study, we analyzed the occurrence of post-operative sarcopenia in patients who underwent radical cystectomy for invasive bladder cancer. Invasive surgery can induce secondly sarcopenia in elderly patients. In this study, we analyzed the occurrence of post-operative sarcopenia in patients who underwent radical cystectomy for invasive bladder cancer. Method: We evaluated 134 cases who underwent radical cystectomy in our institution from March 2010 to July 2014. We examined quantitatively the muscle mass at the point of femur 5 cm below pubic bone on the computed tomography (CT) scan using DICOM viewer (Fujifilm, Japan). We compared the muscle mass before and after surgery, and analyzed the relevant factors that cause muscle reduction with multivariate analysis. 37 cases of 134 cases were followed after a year from surgery. Result: Median age was 70 years (range; 63-75 years). 108 were male and 26 were female. Perioperative femur muscle mass was significantly decreased from 49.17 ± 7.89 cm2/m2 (mean±SEM) to 44.15 ± 9.40 cm2/m2 after surgery (9.11 %) at mean duration of 63 days (p< 0.0001). Multiple regression analysis for muscle mass reduction rate revealed that relevant factors were the length of fasting duration (p= 0.0094), and hospital stay after surgery (p=0.0014). After a year, femur muscle was 32.74 ± 21.34 cm2/m2. It has not been recovered in half of the cases. Conclusion: This is the first study to our knowledge that clearly demonstrates the prognostic factors for the post-operative sarcopenia after radical cystectomy. In the current study, long fasting duration and hospital stay after surgery independently induced muscle mass reduction, which potentiality leads to sarcopenia.

**P13- DETERMINANTS OF INTERMEDIATE OUTCOME FOLLOWING CLINICAL PATHWAY FOR REHABILITATION IN FRAIL ELDERLY WITH HIP FRACTURE.** H.-K. Do, G. Lee, K.-E. Kim, J.-Y. Lim *(Seoul, Korea)*

Objective: To evaluate major determinants of successful intermediate outcome following rehabilitation program based on standardized clinical pathway after hip fracture surgery in older adults. Method : This is a retrospective cohort study performed in tertiary rehabilitation facility. 186 patients who had received the unilateral hip fracture surgery were followed-up from immediate post-operation to 6 months. Clinical pathway for rehabilitation includes early individualized rehabilitation, education for activity of daily livings, review of general medical condition, and arrangement of discharge settings. Several measures were used for evaluating functional and cognitive status. One geriatric rehabilitation specialist consecutively checked ambulatory function after discharge, using 3-level grading by physical dependency. Results : 74.6% of patients achieved independent ambulatory function at 6 months after surgery. The outcome was correlated with age, mobility (premorbid, transferred to rehabilitation department and at discharge), MMSE score, time interval between injury and operation (TI), LOS, and discharge location. The logistic regression analysis was also performed with representative variables (MMSE score, age, TI, LOS). The fit of this model was good by Hosmer and Lemeshow test (p=0.878). There were 68.1% patients with cognitive impairment (MMSE<24) and higher MMSE group achieved better functional status. However, regardless of cognitive status, both groups achieved statistically significant recovery in ambulatory function. There were no differences in LOS, functional recovery amount between groups. The difference in mobility achievement was due to dissimilarity of premorbid ambulatory function. Implications/Impact on Rehabilitation: This study reveals that well-designed rehabilitation program could restore the ambulatory independency in most elderly patients after hip fracture surgery.

**P14- NUTRITIONAL STATUS AND QUALITY OF LIFE IN DIFFERENT POPULATIONS OF OLDER PEOPLE IN POLAND.** J. Kostka, E. Borowiak, T. Kostka *(Lodz, Poland)*

Background: The prevalence of overweight and obesity has been increasing during recent decades in elderly subjects. On the other hand, malnutrition concerns a great deal of subjects above the age of 65 years, especially in hospitalized and institutionalised older adults. In the general population obesity reduces the health-related quality of life (HRQL), but an exact quantification of the impact of obesity on HRQL is difficult. Although poor nutritional status is an independent predictor of mortality, it may also impair HRQL indirectly as a consequence of increased morbidity and decline in functional status. The aim of the present study was to estimate the potential association of three distinct nutritional status measures (body mass index – BMI, calf circumference (CC) and the Mini Nutritional Assessment - MNA) with HRQL in different populations of elderly people in Poland, and to assess whether this relationship persists after controlling for confounders attributable to comorbidities, functional status and cognitive function. Subjects/Methods: The study group comprised 1003 community-dwelling subjects from the urban environment, 890 subjects from the rural environment and 879 subjects from an institutional environment (nursing homes). Bivariate and multivariate associations were identified between nutritional status measures and HRQL adjusted for demographic and social variables, health status, physical function and mental status. Results: Nutrition status indices (BMI, CC MNA) were generally higher in the urban than in the rural environment and clearly worse in institutionalised elderly. In both community-dwelling groups, BMI and CC were negatively related to several Euroqol scores. In institution residents, an opposite relationships were observed: higher values of these variables were connected with less frequent reporting of problems in Euroqol. In all three groups, associations between HRQL scores and MNA were very similar: higher values of MNA were significantly connected with less frequent reporting of problems in Euroqol. Conclusions: BMI and CC as overweight/obesity measures are independent predictors of lower HRQL in urban and rural community-dwelling seniors and higher HRQL in institutionalised elderly. Poor nutritional state as measured with MNA is a similar determinant of well-being in all three environments. This different relationship of popular overweight/obesity measures to HRQL should be taken into account while designing care

for older people.

**P15- DECREASED HRQOL (SF-12) PHYSICAL SCORES ARE ASSOCIATED WITH INCREASED LEVELS OF FRAILTY IN OLDER PERSONS WITH MINOR FRACTURES UP TO SIX MONTHS POST-INJURY.** J. Lebon, M.-J. Siros, V. Fillion, V. Provencher, M. Émond *(Québec, Canada)*

Background: Fractures and minor injuries such as contusion, laceration and sprain are known as risk factors for reductions in health-related quality of life measures (HRQoL) in older people. Recently, measures of physical frailty have been found to be associated with decreased physical and mental HRQoL in older people. As most older people with such fractures present to Emergency Departments (EDs) for treatment, measuring their frailty status in EDs may help stratify their risk of reduced HRQoL post-injury. Therefore, the objective of this study is to evaluate the association between measures of physical HRQoL and frailty status among independent older men and women who suffered minor fractures. Methods: Prospective sub-study conducted within the larger CETI cohort. It includes 282 patients aged 65 or older independent in their basic activities of daily living at the time of injury, discharged home from 7 Canadian EDs after treatment of minor fractures (lower or upper limbs, head, chest, spine, etc). Their fragility status was measured using the Canadian Study of Health and Aging-Clinical Frailty Scale (CHSA-CFS) that classifies patients along 7 levels (1=very fit, 2=well, 3=well with treated comorbidities, 4=apparently vulnerable, 5=mildly frail, 6=moderately frail, 7=severely frail). Physical HRQoL was assed at 3 (T3) and 6 (T6) months after enrolment by the physical dimensions of the SF-12 Health Survey: Physical functioning (PF) physical component summary score (PCS) and Role Physique (RP). Sociodemographic and clinical data were also collected at all time points. Generalized linear mix model (GLMM were used to test for trend between frailty levels and outcomes controlling for age, sex and repeated measures over times. Results: For the PF score at T3, significant decreased ($p = 0.0003$) were observed between the "well groups" (CHSA-CFS levels $\leq 3$; mean = 75.1) and the "vulnerable and frail groups" (CHSA-CFS level $\geq 4$; mean = 56.1). At T6 patients with a CHSA-CFS levels > 3 (mean = 51.6) show significant decreased ($p = 0.005$) compared to those with a CHSA-CFS levels $\leq 3$ (mean = 76.5). For PCS scores, at T3, patients with a CHSA-CFS levels $\geq 4$ (mean = 54.2) show significant decreased ($p = 0.002$) compared to those with a CHSA-CFS levels $\leq 3$ (mean = 66.7). At T6, significant decreased ($0.0001 \leq p \leq 0.0028$) were observed between the "well groups" (CHSA-CFS levels $\leq 2$; $69.1 \leq$ mean $\leq 75.1$) and the "vulnerable and frail group" (CHSA-CFS level $\geq 4$; $19.2 \leq$ mean $\leq 69.4$). Finally, about the RP scores at T3, the "vulnerable and frail group" (CHSA-CFS levels $\geq 4$; mean = 60.1) has significant decreased ($p = 0.014$) compared to the ''well group" (CHFA-CFS $\leq 3$; mean = 72.0), while at T6, all groups of fragility levels (CHSA-CFS < 6; mean = 13.4) have a better score ($p \leq 0.032$) than people in the moderately frail group (mean = 66.5). It has to be mentioned that at both time points for all three variables that make up the physical dimension, people in the "vulnerable and frail groups" (CHSA-CFS $\geq 4$), those with a CHSA-CFS level = 4 and 5 show better scores than those in the CHSA-CFS level = 6 (moderately frail). Conclusion: The overall results show that, after controlling for sex and age, independent older men and women with a minor fractures and who were more fragile (apparently vulnerable to moderately frail states: CHSA-CFS > 3) experienced a greater reduction in their physical HRQoL scores as assessed by the SF-12 over 6 months after the ED consultation. However this reduction is greater for people within the frailest state (moderately frail: CHFA-CFS = 6). Therefore, the measure of the fragility level at ED could help identifying those at higher risk for physical decline and could offer quick and suitable attention in clinical care center for preventing physical decline post-injury.

**P16- EFFECTS OF LOW-MAGNITUDE HIGH-FREQUENCY VIBRATION ON FALL RATE AND FUNCTIONAL PERFORMANCE IN COMMUNITY ELDERLY: A 1-YEAR POST-INTERVENTION FOLLOW-UP.** C.-Y. Li, K.-S. Leung, W.-H. Cheung *(Hong Kong, China)*

Background: Sarcopenia is an age-related progressive loss of muscle mass and strength, and associated with deteriorated mobility, poor balancing ability, loss of independency and increased morbidity in elderly. Low-magnitude high-frequency vibration (LMHFV) treatment, which is a non-invasive biophysical modality to provide a whole-body mechanical stimulation, is crucial in maintaining muscle and bone quality. Our previous large scale randomized clinical trial in community elderly proved that LMHFV treatment significantly enhanced muscle performance and prevented falls. Throughout the 18-month intervention period, the vibration group subjects had improved quadriceps strength and balancing ability compared with the control. However, the long-term retention effect of LMHFV on muscle remains uncertain. The aim of this study is to investigate the post-interventional effect of LMHFV on falls and fracture risk in community elderly 1 year after the cessation of 18-month intervention. Methods: In the earlier study, females aged 60 or above, active in the community and without any osteoporosis treatment were recruited. They were recruited from twenty four community centers in Hong Kong and subjected to randomization into either control or intervention group on center-basis. The subjects in intervention group received LMHFV treatment (35Hz, 0.3g) at 20min/day and 5days/week for 18 months, while the control group remained in usual life style. One year after cessation of intervention, 50 subjects (25 Control: 25 Vibration) were randomly selected for re-assessment in this post-intervention follow-up study. Muscle strength, balancing ability and SF-36 Quality of Life questionnaire were compared at baseline, end-point (18-month) and 1 year post-intervention. The fall incidences during cessation of intervention were recorded according to report from subjects. All parameters were compared between groups in order to evaluate the effects of LMHFV in elderly by independent t-test. Human experiments approval was obtained from the Clinical Research Ethics Committee of the Chinese University of Hong Kong and written consents were obtained from all subjects. Results: During the one-year post-intervention period, one treatment and eight control subjects reported falls, and no fracture was recorded. After stopping the LMHFV for 1 year, the muscle strength of dominant and non-dominant legs in treatment group were significantly better than the baseline ($p=0.029$ and 0.002 respectively), as compared with the control. In balancing ability test, the reaction time of vibration group at post-intervention follow up is 6.6% shorter than baseline compared with 19.7% longer in the control group ($p<0.001$). Improvements of movement velocity and maximum excursion were found to remain significantly in the vibration group 1 year after cessation of treatment ($p=0.014$ and 0.007 respectively). The SF-36 physical component and mental health component of vibration group were 8.2% and 7.2% higher than baseline compared with -3.3% and 1% in the control ($p=0.162$ and 0.236). Changes of muscle strength, balancing ability and quality of life from 18-month endpoint to 1-year post-intervention had shown a decreasing trend in both groups with no significant differences between two groups. Conclusion: This study confirms the retention effects of 18-month LMHFV treatment in improving muscle performance, balancing abilities and preventing falls. The LMHFV is well tolerated by elderly and should be introduced to the community as a regular fall prevention program.

**P17- COGNITIVE FRAILTY, A NOVEL TARGET FOR THE PREVENTION OF ELDERLY DEPENDENCY.** R. Qingwei, Y. Zhuowei, B. Zhijun, L. Jin, C. Ma, H. Wei *(Shanghai, China)*

Backgrounds: Frailty is a complex and heterogeneous clinical syndrome. Cognitive frailty has been considered a subtype of frailty. Metthods: literature reviews. Results: In this study, we refine the definition of cognitive frailty based on existing reports about frailty and the latest progress in cognition research. We propose that cognitive frailty comprises subjective cognitive decline (SCD) that develops during the stage of pre-physical frailty and pre-mild cognitive impairment (pre-MCI) as well as SCD that develops during the stage of physical frailty and pre-MCI. Based on the severity of physical frailty, it is possible to determine the primary and secondary preventative measures for cognitive frailty. In addition, we obtain evidence from the literature for the role of pre-physical frailty in pathological aging. Lastly, via diagnosis with biomarkers (i.e., different combinations of amyloid-β accumulation, neurodegeneration and subtle cognitive decline), we further determine whether SCD is a component of pre-clinical AD, which is required for guiding clinical intervention. Conclusion The refined definition of cognitive frailty may be conducive to the screening and second intervention of this sydrome. Key words: Cognitive frailty; Physical frailty; Pre-physical frailty; Pre-MCI; SCD; Pre-clinical AD. Highlights: 1. The paper updates a pre-existing clinical syndrome of cognitive frailty. 2. Cognitive frailty results from physical impairment. 3. Pre-MCI SCD is proposed as cognitive alteration of cognitive frailty. 4. We outline the mechanisms of cognitive frailty due to physical impairment. 5. We detail the criteria for the screening and prevention of cognitive frailty.

**P18- WHO ARE FRAIL ELDERLY?** M. Duarte, C. Paúl, I. Martín *(Porto, Portugal)*

Backgrounds: This research work is based in one of the conceptual lines defined by Fried et al. (2001) that explains the phenotype of frailty through the presence of the following criteria: weight loss; resistance; physical activity; slowness and weakness. In this way, the authors defined 3 levels of frailty: when the subject has 3 (or more) of these criteria he is considered "frail", 1 or 2 of these indicators is considered to be in the "pre-frail" state and the ones that don't have any compromise at this level are considered 'robust' (not frail). The longitudinal studies support that this syndrome leads to inability situations, hospitalization, institutionalization and death (Fried et al., 2004). This research has the following objectives: know how phenotypic frailty behaves in the studied population and define the profile of the frail elder. Methods: A stratified random sample composed of 339 individuals residing in the community, in the region of Guimarães (north of Portugal) was constituted by 3 age groups: 50- 59 years (39,5%) 134 individuals; 60 - 69 years (31,6%) 107 individuals; 70 - 79 years (19,8%) 67 individuals and over 80 years old (9,1%) 31 individuals. From the protocol of frailty, the sociodemographic factors have been removed from the present line of investigation and the criteria of phenotypic frailty sustained in the model adjusted to the original (Fried et al., 2001). These were hetero-applied in a single moment of assessment in the domicile. Results: From the descriptive analysis of the sample it can be seen that this is composed by 181 women, with an average of 64, 4 years (dp= 9,25), in which 82% of the participants are married and 11,2% are illiterate. In what concerns the prevalence of this condition depending on the sociodemographic characteristics, it can be seen that this condition is more present in women (40, 9%), in older people (60, 4%), in the situation of widowhood or separated/divorced (46,7%) and in illiterate people (71,1%). Taking into account the socialfamilial context, frail people there's a higher prevalence of frail people in families that are constituted by a family element with some level of dependency (41,6%). This result is corroborated in the literature, because it can be seen that frailty in elders that are caregivers, when a high overload of care is present, is considered a predisposing factor for the condition of frailty (Tomomitsu et al., 2010). On the other hand, people in underprivileged economic conditions (39,5%) and inadequate housing conditions (44,9%) to their needs seem to be more frail. From the results it can be seen that these maintain more limited social networks (54,2%) and don't have any type of support at the social responses level (37,6%). Therefore, it seems clear that the profile of the frail elder is ruled by a set of characteristics of more debility at the interpersonal and social level. This is supported by literature when several studies point to an incidence of frailty associated to contexts of low socioeconomic level (Bergman et al., 2007; Topinkóva et al., 2008;

Corner, 2009; Lang et al., 2009). In the same sense, for Morley et al. (2002) deficient social conditions are aggravating of the physiopathology of the syndrome of frailty, whish reinforces the perspective of Woo (2005), that states that a social support network to the individual is a modifying factor of frailty. Conclusion: It can be concluded that the profile of the frail elder is associated to a set of characteristics that give higher vulnerability, which provides guidelines for potential areas of intervention to delay this syndrome.

**P19- STUDY OF GRONINGEN FRAILTY INDICATOR (GFI) IN THE COMMUNITY VS CLINICAL CONTEXT.** M. Duarte, C. Paúl, I. Martín *(Porto, Portugal)*

Backgrounds: The increase of human longevity brings the need to study the condition on frailty, in the sense that it is known that it generates results such as incapacity, institutionalization and death (Fried et al., 2001). From the literature review about the study of frailty in elders it seems clear that several factors explain this condition taking into account factors od physical, psychological and social nature (Markle- Reid e Browne, 2003). So, several contemporary models claim a multidimensional vision of this condition (Schuumans et al., 2004; Gobbens et al., 2010), which reinforces the need for measures to assess this condition in specific contexts. Therefore, it seems opportune to understand how this condition is related with the process of secondary ageing. According to Bergman et al. (2007), older people with pathology have a higher probability of being frail, which implicates guidelines for a differentiated intervention. This research has the following objectives: i) study the prevalence of frailty in two distinct groups of analysis: community and clinical context and ii) know the predictive value of the environment in the condition of frailty. Methods: This study contemplates a non-random sample of convenience composed of 201 individuals (100 living in the community and 101 hospitalized with the diagnosis of peripheral vascular disease (PVD) that have accepted to participate in the study. To measure frailty, the Groningen Frailty Indicator (GFI) has been used which is known for being a multidimensional nature instrument, composed of 15 items, organized in 3 dimensions, physical, psychological and social as indicators of a frail elder (Slaets, 2006). Taking into consideration the previous psychometric study of the scale, it can be concluded that 12 of the items constituted its factorial structure; therefore, the version GFI.12 is composed by functionality indicators, psychological indicators and of physical and mental health. As for the psychometric properties the instrument has demonstrated good values of internal consistency, test-retest stability, discriminating validity and criteria validity (cut-off=5 points). Results: From the sociodemographic sample analysis we can see that 53,7% are women, with an age average of 73,4 (dp= 10,5), only 9,0% of the sample are single and the rest divide between married (46,3%) and widows / separated and divorced (44,7%). In what concerns education, 25, 4% are illiterate. As for the study of prevalence of frailty, it can be seen that in the community 55, 0% are frail, in opposition to the 95,0% of frail people in clinical context. In this sense it is clear that the population with a pathology diagnosis has more characteristics of frailty that the other population being studied. It is highlighted that in the community, from the 70 women composing this sample 43 (61, 4%) are frail. In what concerns age, it is shown that in the age group that contains more advanced ages (≥75 years) frailty prevails, with 59,7% of frail people. What strengthens the association between frailty, gender and age (Collard et al., 2012). In the study in hospital context it can be seen that from the 38 women that constitute this sample 36 (94, 7%) are frail and in the distribution by age group it is also seen a significant share of frailty. This result highlights an increase in the risk of frailty and situations of pathology (Newman et al., 2001; Shlipark et al., 2004). When tested the logistic regression model adjusted to the sociodemographic variables it can be seen that people who face a secondary ageing, have 3,0 times the probability of being frail (OR=3,0, IC 95%: 1,5 - 6,0). Conclusion: It is clear that the comprehensiveness of the frailty concept to dimensions of psychosocial nature that can be compromised in the process of secondary ageing and this one in itself is a predisposing factor for the same condition. This highlights the need for constant attention to this condition so an intervention next to the frail elder can be made in an adjusted way.

**P20- IMPACT OF NUTRITION AND EXERCISE IN FRAIL OLDER PATIENTS IN A TERTIARY CARE HOSPITAL IN INDIA.** R. Kande, V. Kumar, A. Ambashtha, S. Jathar, P. Chatterjee, A. Ballave Dey *(New Dehli, India))*

Background: Frail elderly are at increased risk of recurrent hospitalisation, morbidity and mortality. Any intervention to modify the frail status of elderly people will reduce the health care burden of the individual and community. Few studies have shown benefit with nutrition and exercise. This study is one such approach to compare the two known modifiable factors of Frailty. Nutritional and exercise intervention were given for 6 months to find the best effectors. Method: This is a Randomized control trial. Consenting participants were diagnosed with Fried et al criteria. Eligible subjects randomised to group A, B and C. Group A received no intervention, Group B received only nutritional intervention in the form of dietary advice and supplemental protein and calorie and Group C received both nutritional and exercise intervention given in the form of Nordic walking. These interventions were given for a period of 6 months and followed up. Gait speed, grip strength, Frailty score, DEXA scan and other biochemical profile were monitored before and after intervention. Result: 66 subjects (41male and 25 female) were included so far in this study and were randomised into 3 groups with 22 each. The mean age was 72.3 years. Mean gait speed in group A, B and C improved from 0.33m/s to 0.39m/s (p=0.047), from 0.29m/s to 0.42m/s (p=0.024), and from 0.34m/s to 0.36m/s (p=0.450) respectively over 6 months. Mean grip strength changed from 4kg to 5kg (p=0.180), from 5.17kg to 12.17kg (p=0.027) and from 2.6kg to 2.2kg (p=0.713) in groups A, B and C respectively. Mean frailty score changed from 5.0 to 3.0 (p=0.131), from 4.67 to 2.67 (p=0.034), and from 4.4 to 4.0 (p=0.157) in groups A, B and C respectively. Conclusion: Significant improvement in gait speed, grip strength and frailty status was seen in group which received nutritional intervention. Though Nordic walking has not shown significant benefit in this study it could potentially improve functionality of frail elderly.

**P21- A SENSORY STIMULATION CARE PROGRAMME FOR NURSING HOME RESIDENTS WITH COGNITIVE FRAILTY : POSITIVE CHANGES OF RESIDENTS AND CARE STAFF.** E. Kwong, C. Lai, M. Tse, J. Liu, A. Wong *(Hong Kong)*

Background: Cognitively frail residents with moderate to severe dementia of Alzheimer type are provided care without adequate stimulation and human social interaction. Much of behavioral and psychological symptoms of dementia (BPSD), decreased awareness and responsiveness and decreased communicative interaction of nursing home residents can be attributed to such care resulting in negative impacts on residents, care staff and healthcare cost. As a sensory stimulation-oriented approach that makes no appeal to intellectual abilities is feasible for people at later stages of dementia, our research team previously designed a sensory stimulation care programme for improving the quality of care delivered to nursing home residents with later stage of dementia to address these negative impacts. Unlike session-based multisensory stimulation (MSS) or Snoezelen, our programme is integrated in residents' daily care to ensure the sensory stimulation is continuously provided for long term effect. Study aim: This study aimed at exploring positive changes of the residents and the care staff after implementation of our programme. Methods: A mixed study design including focus group interviews and pre-post experimental design was adopted. Five cognitively frail residents who suffer from moderate to severe dementia participated in this study and their primary family caregivers, as well as several care staff (a nurse in-charge, a enrolled nurse, a health worker, two personal care workers, a social worker assistant) participated in this study. The programme was carried out by the care staff for 12 months. Before and once every two week of the programme implementation, the awareness/responsiveness and behavior / mood of the programme were assessed (a total of seven times of data collection ) before, during and immediately after the sensory stimulation (SS) activities were carried. The BPSD of the residents were also assessed before and after the programme implementation. Two focus group interviews with six care staff and five family caregivers were separately conducted at the 6th and 12th week of the programme implementation to explore their observable changes of residents and their views, feedback and recommendations about the programme. Results: Both the care staff and the family caregivers found that the residents enjoyed the sensory stimulation activities through their body and verbal language, had more stable and positive emotions, had less behavioral problems (e.g. less confused speech and aggression), and more communicative interaction with the staff and their family members. The care staff observed that residents were more willing to attend other activities, (e.g. physical exercise) and were more cooperative with the staff (e.g. more willing to take medications). In addition, the care staff expressed that their workload was increased during the programme implementation but they had more topics to communicate with the residents and felt more satisfied and rewarded when they saw positive changes in the residents. Further, the family caregivers appreciated the care staff's good care to the residents which result in enhanced trust and improved relationship with the care staff. The quantitative data on awareness/responsiveness, behavior and mood and BPSD of residents were computed and the results have indicated positive changes of residents in these three variables after the programme implementation. The scores of awareness/responsiveness and behavior/mood of residents during and immediately after the implementation of the sensory stimulation activities were slightly higher than those before the activities. The scores of these two variables immediately after the activities were slightly increasing at the last four times of data collection. The scores of the residents' BPSD were slightly lower after the programme implementation. Conclusion: The results from this pilot study have indicated the contribution of the programme to the residents, the care staff and the quality of care. The programme is feasible and also accepted by the care staff and the family caregiver. The programme will be implemented with larger sample size in more nursing home residents in the further study.

**P22- PHYSICAL FRAILTY INDICATOR AS DETERMINANT AND PREDICTOR FACTORS OF DISABILITY IN OLDER PEOPLE IN NURSING HOMES IN JAKARTA, INDONESIA.** Y.S. Handajani, Y. Turana, N.T. Widjaja *(Jakarta, Indonesia)*

Backgrounds : Frailty is the most problematic expression of population ageing. Since the introduction of the concept of frailty, several instru¬ments have been developed to determine the level of frailty among elderly people. The interplay between these decreasing functions is referred to as frailty and causes an elderly people to become more vulnerable to adverse health outcomes such as disability, falls, hospitalization and death. Early identification of frailty is important to predict the development physical health. The objective of this study was to determine the greatest influence of physical frailty indicator to ADL and IADL disability Methods :We conducted a cross-sectional, observational study of 138 subjects , aged ≥ 60 years in several Nursing Homes. Subjects were interviewed with a SHARE-F1 questionnaire, Barthel Index and were surveyed on their baseline characteristics. Frailty-screening software calculated their Fl score. Handgrip strength was measured with a handgrip strength dynamometer. Independent Sample T-test were performed in order to find the relationship between physical frailty indicator and disability (ADL and IADL). There were 5 indicators of physical frailty : fatigue, loss of appetite, grip strength , functional difficulties and physical activity. Results : In this study, the percentage of subjects with ADL-disability (50.7%) and IADL- disability (66.7%). Based on the analysis of five indicators of physical frailty with disability (ADL and IADL)

showed a significant relationship fatigue, physical Activity and functional difficulties with ADL-diisability and also fatigue, loss of appetite ,functional difficulties and physical activity with IADL-disability of older people ($p < 0.05$). Fatigue and functional difficulties increased the risk of ADL-disability of older people (OR 1.1; 95% CI 1.03-2.12 and OR 1.4; 95% CI 1.08-2.08). Similarly physical activity, older peoples were low physical activity will experience ADL-disability, 1.34 times greater compared to older people who better physical activity (OR 1.34; 95% CI 1.07 -2.36). Moreover fatigue, loss of appetite and low physical activity increased the risk of IADL-disability of older people (OR 1.48; 95% CI 1.07-3.52 , OR 2.3; 95% CI 1.23-3.77and OR 2.15; 95% CI 1.76 - 3.52 ). It was meant that fatigue, functional difficulties and physical activity were determinant and predictor factors of ADL-disability and fatigue, loss of appetite and Physical Activity were determinant and predictor factors of IADL-disability of older people. Conclusions: The findings indicated that physical frailty indicators as a determinant and predictor factors of ADL-disability and IADL–disability in nursing homes. Low physical activity/ exercise seem to be the greatest determinant factor of ADL-disability and followed by functional difficulties and fatigue. Moreover it was interpreted that loss of appetite was the greatest determinant factor of IADL-disability and followed , low physical activity and fatigue. According to the result of this study, it is suggested that physical exercise for 3 times in a week have to be conducted by older peoples in nursing homes and sustainable health education could be given 2 times in a month would prevent disability of older people. Key words : Frailty indicator , determinant, predictor, disability older people, nursing homes in Jakarta, Indonesia.

**P23- FRAILTY SYNDROME, A PROGNOSTIC MARKER IN ELDERLY CANCER PATIENTS.** R. Kande, J. Banerjee, S. Thakur, G. Rajesh Desai, A.B. Dey *(New-Delhi, India)*

Background: With the global rise in the prevalence, cancer has become an inevitable reality of old age. The outcome of treatment is greatly affected by frail status in many disease conditions. We tried to observe the impact of 'frailty syndrome' in the treatment outcome of elderly cancer patients. Methods: In a cross-sectional study, cancer patients aged 65 years or more, were recruited before the start of treatment. Frailty was assessed in the patients with 'Clinical frailty scale (Rockwood et al)'. CGA, functional status and co-morbidities were evaluated as per various validated scales. The management of patients at the cancer centre and factors determining death by the end of 1 month were observed. Results: Two-third of 1450 patients (65%males) were between 60 and 75 years of age(mean:68.4 yrs). 64.25 % of them were frail (CHS clinical frailty scale score >5). The number of cancer patients abruptly declined after the age of 85. Lung cancer was the commonest (40.8%). 58% were diagnosed in stage-4 and none in stage-1. The common co-morbidities were hypertension(30%), diabetes (15%) and COPD(14%). 55% were ADL independent. 71.05% had their ECOG status score between 2-4. 59.42% of the patients died by the end of 4 weeks. Kaplan Mayer analysis revealed that frail status had significant association with mortality at 1 months of age (log rank test, P=0.004). Conclusions: Older frail patients with cancer are significantly vulnerable in many dimensions. These observations are congruent with the global cancer scenario. Greater effort is required for timely detection of frailty for better management of older cancer patients.

**P24- NUTRITIONAL ASSESSMENT IN AMBULATORY PATIENTS WITH CHRONIC PANCREATITIS.** H.H. Rasmussen, S. Schou-Olesen, M. Køhler, A.M. Drewes, M. Holst *(Aalborg, Denmark)*

Background: Chronic pancreatitis (CP) is an inflammatory disorder that results in permanent impairment of the glandular anatomy of the pancreas with or without functional abnormalities. The pathogenesis of CP is usually unclear, except in the case of alcohol-induced disease. The most common symptoms of CP are abdominal pain, diarrhea, and weight loss often requiring recurring hospitalization. Over time, pancreatic endocrine and exocrine dysfunction may develop as the disease progresses, and a variety of complications can occur. Among the possible complications are nutrient malabsorption and diabetes mellitus. Aim: The aim of this study was to investigate the nutritional risk and to describe the nutritional status in a cohort of ambulatory patients with a definite diagnosis of chronic pancreatitis. Method: A cross-sectional cohort study in patients admitted to a medical department of gastroenterology (Aalborg University Hospital). The following data were included: Demographics (sex, age, ethiology, endocrine and- exocrine function). Nutritional risk screening (NRS 2002). Nutritional assessment (BMI, handgrip strength (HGS), timed-up-and-go test (TUG), fat free mass index. (FFMi), fat mass index (FMi), phase-angel, indirect- and direct calorimetry. Biochemistry (D-vitamin, phosphate, Mg, Ca). Faecal elastase and glucose/HbA1C. Results: Overall 60 patients with CP were included (male 72%), mean age 57 Y (SD 10). In 65% the aetiology was toxic-metabolic, 33% had DM and 72% exocrine pancreatic insufficiency. Nutritional assessment: Nutritional risk was found in 28%. BMI was 22.6 (SD 3.8), FFMi 17.3 kg/m2 (SD 2.3), FMi 5.4 kg/m2 (SD 2.6) and HGS 37.6 kg (SD12.2). Table 1 shows the distribution of body composition measured by bioimpedance. Does body mass relate to strength? A positive correlation was found between HGS and TUG ($r=0.46$, $p=0.01$). Patients at nutritional risk had lower FMi ($p<0.007$) and lower FFMi ($p<0.001$) and tendency towards lower HGS ($p<0.06$). Positive correlations were found between HGS and FFM ($r=0.67$, $p<0.001$), HGS and phase-angel ($r00.59$, $p<0.001$) as well as phase-angel and FFM ($r=0.41$, $p<0.002$). Strength and function/ Metabolic: No difference was found between measured and estimated REE, however a higher REE/FFMi (30.6, SD 1.7) was found in patients with BMI<20 compared to patients with a BMI > 25 (26.2 SD 3.8). A positive correlation between FFMi and BMI was only found in patients with a BMI<20 ($r=0.71$, $p<0.005$). Other risk factors: No correlation was found between DM, alcohol, opioids, Mg, P and D-vit vs. FFMi, HGS/TUG and phaseangel. Furthermore, no correlation was found between MG and Ca vs. F-elastase. Conclusions: More than 25% of out-patients with chronic pancreatitis are at nutritional risk despite a normal BMI. Nutritional risk was furthermore associated with a lower muscle mass and muscle strength. A ver y low BMI was associated with higher resting energy expenditure. A thorough nutritional assessment is necessary to make a targeted nutrition -and rehabilitation plan.

**Table 1**
Distribution of body composition, measured by bioimpedance.

| **Distrubition of body composition in 60 ambulatory patients with chronic pancreatitis** | |
|---|---|
| **Variable** | **Mean (SD)** |
| Height | 170,7 (8,3) |
| Weight | 66,3 (13.3) |
| BMI | 22,6 (3,8) |
| Handgrip strength (HGS, kg) | 37,6 (12,2) |
| Fat free mass (FFM, kg) | 50,9 (9,4) ref 59.1 (5.4) |
| Fat free mass index (FFMi, kg/m2) | 17,3 (2,3) ref 19.4 (1.4) |
| Fat mass (FM, kg) | 15,7 (7,5) ref 15.6 (5.5) |
| Fat mass index (FMi, kg/m2) | 5,4 (2.6) ref 5.1 (1.7) |
| Phase-angel (PA) | 6,9 (0,96)* |

*Females: 0% abnormal (< 4.6); Males: 1.8% abnormal (< 5.0)

**Figure 1**
Correlations between physical strength and nutritional risk by NRS-2002

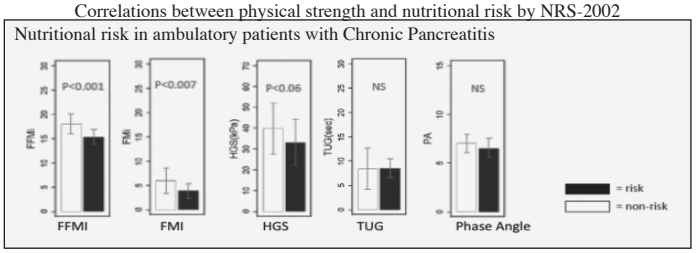



**Figure 2**
Correlations between physical strength and bodycompisition

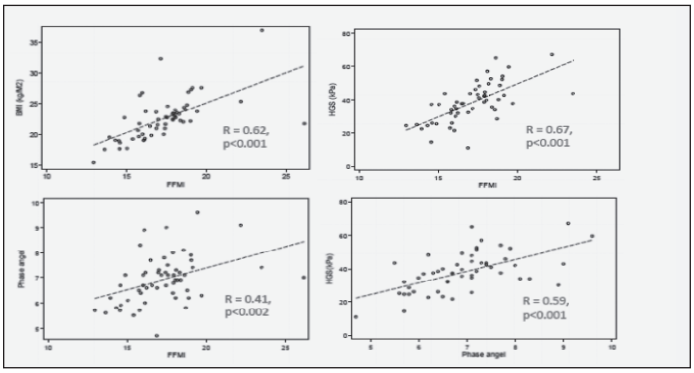



**Figure 3**
Correlation between physical strength and body composition

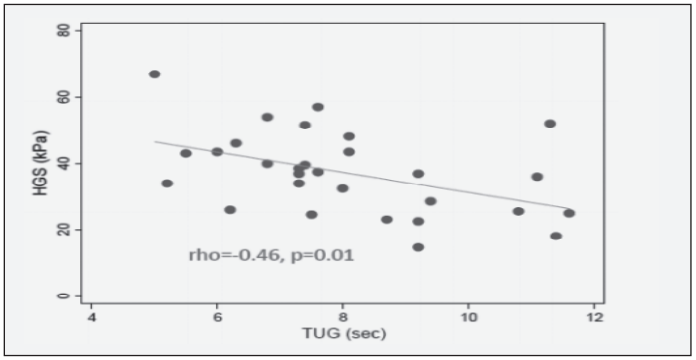
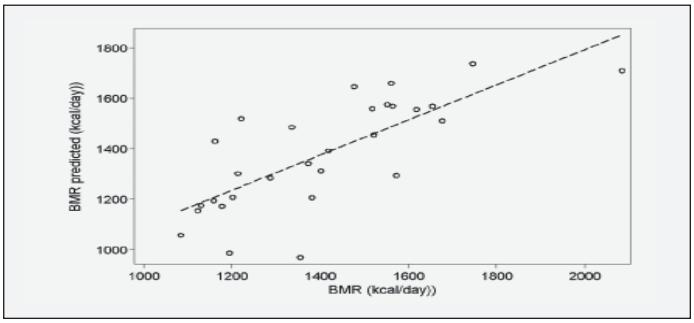


**Figure 4**
Measured resting energy expenditure vs. Harris Benedict EQ




**P26- DECREASED PSYCHOSOCIAL HEALTH SCORES ARE ASSOCIATED WITH INCREASED LEVELS OF FRAILTY IN OLDER PERSONS WITH MINOR FRACTURES UP TO SIX MONTHS POST-INJURY.** M.-J. Sirois, V. Fillion, M. Émond *(Québec, Canada)*

Introduction: Fractures, even minor, are known risk factors for reductions in health-related quality of life measures (HRQoL) in older people. In community-dwelling populations of older people, measures of frailty have recently been found to be associated with cross-sectional decreased physical and psychosocial HRQoL measures. As older people with minor fractures present to Emergency Departments (EDs) for treatment, measuring their frailty status in EDs may help stratify their post-injury risk of reduced HRQoL. Objective: To evaluate the association between frailty status of independent older men and women treated for minor fractures in EDs and psychosocial HRQoL measures three to six months post-injury. Methods: A prospective sub-study conducted within the larger Canadian Emergency Team Initiative (CETI) cohort. It includes 282 patients aged 65 or older, independent in their basic daily activities, living at home at the time of injury. They were all discharged home from 7 Canadian EDs after treatment of various minor fractures (lower or upper limbs, head, chest, spine,etc). Their frailty status was measured using the Canadian Study of Health and Aging-Clinical Frailty Scale (CSHA-CFS) that classifies patients along 7 levels (1=very fit, 2=well, 3= well with treated comorbidities, 4=apparently vulnerable, 5=mildly frail, 6=moderately frail, 7= severely frail). General and Psychosocial HRQoL was assed at 3 (T3) and 6 (T6) months after enrolment by the general and psychosocial components of the SF-12 Health Survey: general health (GH), mental health (MH), vitality (V) and mental health summary scale (MCS). Sociodemographic and clinical data were also collected at all time points. Generalized linear mix models (GLMM) were used to test for trend between frailty levels and outcomes accounting for for age, sex and repeated measures over time. Results: Due to inclusion criteria, no patient was severely frail (CSHA-CFS= 7). Overall, none of the adjusted Sf-12 general or psychosocial scores vary over time At T6, all measures significantly decreased with increasing frailty levels. According to CSHA-CFS levels, General Health means scores were 1: 73.6, 2: 67.9, 3: 65.5, 4: 63.5, 53.9, 6: 30.4 respectively (p=0.01). Along to CSHA-CFS levels, Mental Health mean scores were 1: 80.0, 2: 80.8 ± 5.1, 3: 74.2, 4: 74.8, 5: 70.8, and 6: 56.6, respectively (p=0.03). Vitality mean scores were 1: 71.6, 2: 65.3, 3: 61.3, 4: 41.1, 5: 51.7 and 6: 51.7 respectively (p=0.03). Finally, Sf-12 Mental Summary Scale means scores were 1:74.4, 2: 75.2, 3: 71.9, 4:74.1, 5: 64.2, 6:64.1 (p=0.06). It is noteworthy that overall scores tended to decrease significantly in patients with CSHA-CFS levels ≤ 4. Thus, compared to patients who were fit, well or well with treated comorbidities, patients who were apparently vulnerable, mildly or moderately frail had lower GH scores (68.8 vs 56.5, $p < 0.01$), lower MH scores (78.4 vs 71.1, p=0.05), lower V scores (66.3 vs 47.3, $p < 0.01$) and lower MCS (74.0 vs 68.3). Conclusion: Overall, while general and psychosocial HRQoL measures did not vary between 3 and 6 months within levels of frailty as measured during ED consultations, community-dwelling patients with CSHA-CFS ≥ 4 show worse general and psychosocial HRQoL measures up to 6 months after a minor fracture. As older people with such injury do not receive differential ED care, an easy to perform frailty measure such as the CSHA-CFS could help ED clinicians identify those who may need more clinical attention.

**P27- FRAILTY TRANSITIONS IN COMMUNITY-DWELLING OLDER PEOPLE IN ISRAEL.** S.A. Sternberg[1], N. Bentur[2], J. Shuldiner[2] *(1. Modiin, Israel; 2. Jerusalem, Israel)*

Background: Frailty is considered a geriatric syndrome that is characterized by increased risk for adverse outcomes such as functional decline, hospitalization, and death due to abnormalities in multiple physiological systems. Recognizing frailty states can help us identify populations at risk in order to design effective interventions to prevent adverse outcomes and increased health service utilization. Thomas Gill in an innovative study following 754 older people every 18 months over 54 months has shown that frailty is a dynamic process and that older people transition over time between non-frail and frail states. Studies have not been done in Israel on frailty and especially on frailty transitions. The objectives of are study were to examine frailty transitions and their relationship to health service utilization in a six year follow up of a national study of comprehensive geriatric assessment clinics in Maccabi Healthcare Services. Methods: 608 community dwelling older people were interviewed in 2008as part of a national survey of the effectiveness of comprehensive geriatric assessment clinics in Maccabi Healthcare Services, the second largest of four not-for- profit HMOs in Israel. 281 survivors were re-interviewed in 2014. Frailty status was determined by the Vulnerable Elders Survey (VES13) in 2008 and 2014. Those with a score of 3 and above were defined as frail. A Cox proportional hazards survival analysis was performed to determine the effect of frailty on death at 6 years. Participants were divided into four groups based on their frailty transition. Demographic, functional and health characteristics were compared between the four groups using the Kruskal-Wallis test for categorical variables and paired t-test for continuous variables. Logistic regression was performed to determine the independent association between the four frailty groups and health service utilization. Results: The mean baseline VES-13 score in 2008 for the group identified as non-frail (n=161, 26%) was 1.1 ± 0.7 and for those identified as frail (n=447, 74%) was 7.0± 2.1. The mean age of patients at baseline was 79±7 years, and two-thirds were female. Between 2008 and 2014, 24% of 608 participants were lost to follow up, 30% died, 9% were non frail, 37% were frail. The Cox proportional hazards model predicting time to death comparing frail to non frail resulted in a hazard ratio of 3.47 (CI 2.24-5.38, P<001). Frailty transitions in the 281 participants interviewed at both time points revealed that 19% stayed non frail, 22% became frail, 22% stayed frail and 37% become more frail. Becoming frail, staying frail or becoming more frail compared to staying non frail was independently associated with a greater risk of requiring help on a regular basis, having a formal caregiver, and requiring medical home care services. Conclusion: Any transition away from the non-frail state increased the use of healthcare services. Tools and interventions to target early transition to frailty should be encouraged.

**P28- SARCOPENIA IN PATIENTS WITH SHORT BOWEL SYNDROME.** H.H. Rasmussen, L. Vinter-Jensen, M. Køhler, M. Holst *(Aalborg, Denmark)*

Background: Sarcopenia is a syndrome characterised by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death. As of 2009 there is no generally accepted definition of sarcopenia in the medical literature [1]. The European Working Group on Sarcopenia in Older People (EWGSOP) developed a clinical definition and consensus diagnostic criteria for age-related sarcopenia, using the presence of both low muscle mass and low muscle function (strength or performance) [2]. Patients with short bowel syndrome (SBS) are often in high risk of malnutrition and loss of muscle mass as well as muscle function. However, the prevalence of sarcopenia in this population is not known. Moreover, identification of patients with sarcopenia is important to provide targeted nutritional therapy. Aim: The aim of this study was to identify sarcopenia in a cohort of patients with SBS. Method: In a cross-sectional study in ambulatory patients with SBS, we diagnosed patients with sarcopenia using an algorithm suggested by EWGSOP [2]. This algorithm is based on physical performance, muscle strength and muscle mass. The algorithm was modified using Timed Up-and-Go test instead of Gait Speed for mus-cle function. The following data were recorded: Demographics (age, sex); Body mass index (BMI); Handgrip strength (HGS) (hydraulic hand dynamometer NC70142, North Coast Medical, Arcata, CA, USA); *Timed Up-and-Go test (TUG); Bioelectrical impedance

**Table 1**
Demographics in 169 patients diagnosed with SBS

| | All | Female | Male | p-value* |
|---|---|---|---|---|
| Number | 169 | 106 (62.7%) | 63 (37.3%) | - |
| Age¤ | 60±14 | 61±14 | 59±15 | 0.442 |
| BMI (kg/m²)¤ | 22.3±5.4 | 22.3±5,6 | 22.2±5.2 | 0.893 |

¤mean±SD, *T-test

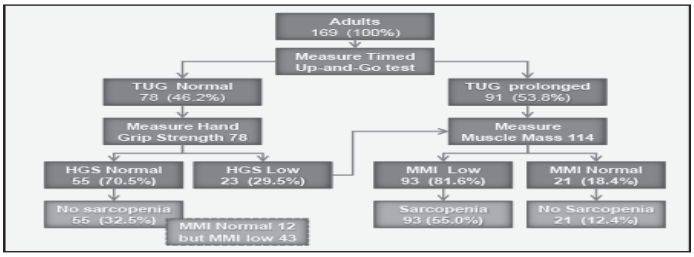
**Table 2**
Nutritional assessments in 169 patients with SBS stratified according to an algorithm for sarcopenia case finding suggested by EWGSOP

| | All | Sarcopenia | No sarcopenia | p-value |
|---|---|---|---|---|
| Number | 169 F106/M63 | 93 (55.0%) 51F/ 42M | 76 (45.0%) 55F/21M | |
| BMI (kg/m²)¤ | 22.3±5.4 | 20.1±3.7 | 25.0±6.0 | <0.001 |
| F F M I - Reduced | 79 (46.7%) | 62 (36.7%) | 17 (10.1%) | <0.001 |
| FFMI - Normal | 90 (53.3%) | 31 (18.3%) | 59 (34.9%) | |
| FMI - Reduced | 19 (11.2%) | 15 (8.9%) | 4 (2.4%) | <0.05 |
| FMI - Normal | 150 (88.8%) | 78 (46.2%) | 72 (42.6%) | |
| PA - Reduced | 21 (12.4%) | 19 (11.2%) | 4 (2.4%) | <0.01 |
| PA - Normal | 148 (87.6%) | 74 (43.7%) | 72 (42.6%) | |

¤Mean±SD, #Fishers' exact test,*T-test. Results are adjusted for sex

analysis (BioScan 920-II from Maltron, Essex, UK) measuring: Muscle Mass index (MMI in kg/m2); Fat Free Mass index (FFMI in kg/m2); Fat Mass Index (FMI in kg/m2); Phase angle (PA in degrees). *The test measures the time it takes to rise from at chair, walk 3 meters to a line, turn, return and sit down3. Statistics: Results were age and sex adjusted. Differences were tested using t-test and Fischer's test. Sig-nificance level: p<0.05. Results: Overall 169 ambulatory patients with SBS were included (age 60±14 (p=0.442), BMI 22.3±5.4 (p=0.893), female 63%) (Table 1). Sarcopenia was found in 55.0% (female/male ratio 51/42) and no sarcopenia in 45.0% (female/male ratio 55/21). The prevalence of sarcopenia was 48% (51 of 106) in females and 67% (42 of 63) in males. Patients with sarcopenia had significant lower BMI (20.1 vs. 25.0, p<0.001) and FFMI (p<0.001), as well as lower FMI (p<0.05) and PA (p<0.01) (Table 2). Further, low muscle mass was found in 43 of 55 patients diagnosed with no sarcopenia according to the algorithm (Figure 1).

**Figure 1**
EWGSOP-suggested algorithm for sarcopenia case finding - modified using Timed Up-and-Go Test for muscle performance instead of Gait Speed




Conclusion: Approximately half of the patients with SBS were identified as sarcopenic according to EWGSOP's sug-gested algorithm and with a majority of men. However some patients were diagnosed with no sarcopenia despite low muscle mass and reduced physical function. Low BMI and FFMI were associated with sarco-penia, while there was no age difference between the two groups. Perspective: The EWGSOP algorithm offers a model where you can begin with fast and easy examinations of muscle function and muscle strength, while measurement of muscle mass is only necessary in part of the patients. We measured both muscle function, strength and mass in every patient and found that 43 of 169 patients were diagnosed with no sarcopenia despite reduced muscle mass and function. This is not in agreement with the recommendation from EWSOPG (presence of both low muscle mass and low muscle function (strength or performance). Thus alternative tools to identify sarcopenia in patients with SBS seems to be relevant. References: 1. Visser M (October 2009). «Towards a definition of sarcopenia--results from epidemiologic studies». J Nutr Health Aging (Review) 13 (8): 713–6. 2. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, et al. (July 2010). «Sarcopenia: European consensus on definition and diagno-sis: Report of the European Working Group on Sarcopenia in Older People». Age Ageing 39 (4): 412–23. 3. Bohannon RW. "Reference values for the timed up and go test: a descriptive meta-analysis". J Geriat phys Ther 2006;29(2):61-8

**P29- WHICH TOOL FOR IDENTIFICATION OF SARCOPENIA IN PATIENTS WITH SHORT BOWEL SYN-DROME?** H.H. Rasmussen, M. Køhler, L. Vinter-Jensen, M. Holst *(Aalborg, Denmark)*

Background: Patients with short bowel syndrome (SBS) are often in high risk of malnutrition and loss of muscle mass as well as muscle function, thus this patient group may be in a high risk for developing sarcopenia. Identifica-tion of patients with sarcopenia is important to provide targeted nutritional therapy, and a diagnostic tool is therefore needed. Several suggestions and recommendations have been made in the last decade trying to establish a general consensus on this topic. Aim: The aim of this study was to investigate agreement between different diagnostic algorithms, to identify sar-copenia in a cohort of patients with short bowel syndrome (SBS). Method: In a cross-sectional study in ambulatory patients with SBS, we diagnosed patients with sarcopenia using 3 different algorithms: Model A: Suggested by the European Working Group on Sarcopenia in Older People (EWGSOP), based on physical performance, muscle strength and muscle mass 1. Model B: Based on EWGSOP's sarcopenia definition, using the presence of both low muscle mass and low muscle function (strength or performance) 1. Model C: Based solely on fat free mass index below reference values 2. The following data were recorded: Demographics: Age, sex and body mass index (BMI). Handgrip strength (HGS) (hydraulic hand dynamometer NC70142, North Coast Medical, Arcata, CA, USA). *Timed Up-and-Go test (TUG). Bioelectrical impedance analysis (BioScan 920-II from Maltron, Essex, UK) measuring: Muscle Mass index (MMI in kg/m2); Fat Free Mass index (FFMI in kg/m2). *The test measures the time it takes to rise from at chair, walk 3 meters to a line, turn, return and sit down3. Statistics: T-test for differences. Significance level: p<0.05. Calculation of agreement between the algo-rithms was sex and age adjusted. Results: Overall 169 ambulatory patients with SBS were included (age 60±14 (p=0.442), BMI 22.3±5.4 (p=0.893), female 63%) (Table1). TUG was prolonged in 53.8% (female/male ratio 57/34), HGS was reduced in 47.9% (female/male ratio 47/34), MMI was reduced in 80.5% (female/male ratio 74/62) and FFMI was reduced in 46.7% (female/male ratio 47/32) (Table 2). According to model A, B and C sarcopenia was diagnosed in 55.0%, 55.0% and 46.7% respectively. Over-all agreement between the 3 algorithms was 71.6%. Conclusion: Some variability was found between algorithms for diagnosing sarcopenia in patients with SBS. A clear standard on how to diagnose sarcopenia is needed, as well as the clinical implications associated with sar-copenia. The fact that the prevalence of sarcopenia is higher in the model from EWGSOP, is probably due to the inclusion of both muscle mass and muscle performance. Since there is not always a correlation be-tween muscle mass and muscle function, this provides a more sensitive tool. Perspective: A consensus definition in sarcopenia is urgently needed and should be tested in different patient groups as well as investigating clinical outcome for targeted treatment of patients with sarcopenia. References: 1. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, et al. (July 2010). "Sarcopenia: European concensus on definition and diagsosis: Report of the European Working Group on Sarcopenia in Older People". Age Ageing 39 (4): 412–23. 2. Kyle UG, Schutz Y, Dupertuis YM, Pichard C. "Body composition interpretation: Contribution of the fat-free mass index and the body fat mass index. Nutrition 19:597-604,2003. 3. Bohannon RW. "Reference values for the timed up and go test: a descriptive meta-analysis". J Geriat phys Ther 2006;29(2):61-8.

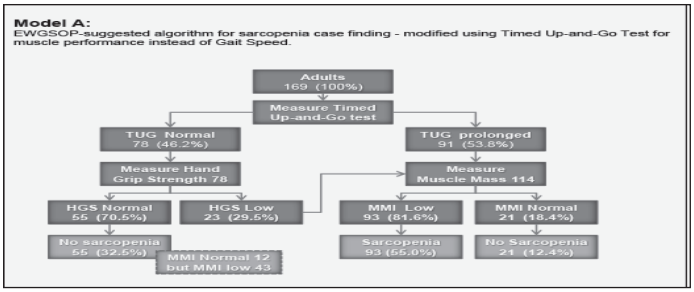
**Table 1**
Demographics in 169 patients diagnosed with SBS

| | All | Female | Male | p-value* |
|---|---|---|---|---|
| Number | 169 | 106 (63 %) | 63 (37 %) | - |
| Age¤ | 60±14 | 61±14 | 59±15 | 0.442 |
| BMI (kg/m²)¤ | 22.3±5.4 | 22.3±5.6 | 22.2±5.2 | 0.893 |

¤mean±SD, *T-test

**Table 2**
Nutritional assessments in 169 patients diagnosed with SBS stratified according to measurements outside normal range

| | All | Female/Male |
|---|---|---|
| TUG prolonged | 91 (53,8 %) | F57/M34 |
| HGS reduced | 81 (47,9 %) | F47/M34 |
| MMI reduced | 136 (80,5 %) | F74/M62 |
| FFMI reduced | 79 (46,7 %) | F47/M32 |




**Model B:**
EWGSOP conceptual stages of sarcopenia

| Stages | Muscle Mass (MMI) | Muscle Strength (HGS) | | Muscle Performance (TUG) | Total | |
|---|---|---|---|---|---|---|
| No sarcopenia | Normal | | | | 33 | No sarcopenia 76 (45.0%) |
| Presarcopenia | ↓ | | | | 43 | |
| Sarcopenia | ↓ | ↓ | or | ↓ | 44 | Sarcopenia 93 (55.0 %) |
| Severe sarcopenia | ↓ | ↓ | | ↓ | 49 | |

**Model C:**
BFMI og FFMI values from Kyle U, Nutrition 19:597-604,2003

| | FFMI (kg/m²) | Female/Male | Diagnosis |
|---|---|---|---|
| Female | ≥14.6 | 59 (55.7%) | No Sarcopenia 90 (53.3%) |
| Male | ≥16.7 | 31 (49.2%) | |
| Female | <14.6 | 47 (44.3%) | Sarcopenia 79 (46.7%) |
| Male | <16.7 | 32 (50.8%) | |

**P30- THE AGE-RELATED DIFFERENCES OF APOPTOSIS AND CALPAIN-3 IN ATROPHIED SKELETAL MUSCLES.** S.Y. Lee[1], J.-Y. Lim[2] *(Seoul, South Korea; 2. Gyeonggi-do, South Korea)*

Backgrounds: Different responses according to age in muscle atrophy have raised an issue of the etiology of sarcopenia and it has been explained by apoptotic cell death and altered sarcomeric integrity. Calpain-3 has been renowned for having a protecting role

in the sarcomeric integrity. Even though calpain-3 is a key regulator for the sarcomeric integrity in atrophic changes, changes of calpain-3 activity by aging have not been well investigated yet. The purpose of this study is to identify the age-related difference of atrophied skeletal muscles in view of apoptosis and calpain-3 activity. Methods: Eighteen young (3 month old) and the equal number of aged (22 month old) male Sprague-Dawley rats were used. Both young and aged rats were divided by three groups: partial denervation (PD), hindlimb unweighing (HU), and control. Right sciatic nerves were injured by experimental crushing for PD. Immobilization by tail suspension was designed for HU. After 2 and 4 weeks from intervention, rat gastrocnemius muscle tissues of all groups were obtained by gun biopsy technique. Four outcome parameters were measured at those periods: 1) The ratio of right gastrocnemius weight to total body weight (GW/TBW); 2) histological evaluation and morphometric analysis by cross sectional area (CSA) measurement of myocytes; 3) Apoptotic activity by terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) and Western blotting for expressions of BAX and Bcl-2; and 4) Calpain-3 activity by Western blotting. Results Young rats had significantly higher GW/TBW than aged rats in PD and HU groups (P = 0.018 and P = 0.011, respectively). Aged myocytes in PD group showed significantly smaller CSA than young ones (1074 ± 121 pixels vs. 1645 ± 263 pixels, P = 0.018) while aged myocytes had larger CSA than young ones in control group (P = 0.037). In TUNEL assay, aged rats showed higher apoptotic activity than young rats in PD group (12.0 ± 1.3 % vs. 9.5 ± 1.8 %, P = 0.028). In young HU group, BAX and BAX/Bcl-2 were significantly decreased (P = 0.046 and P = 0.028, respectively) from 2 to 4 weeks after intervention. Aged rats had significant higher BAXs at 4 weeks after intervention than those of young rats in both PD and HU groups (P = 0.009 and P = 0.004, respectively). Calpain-3 activity of young rats was higher than that of aged rats at 4 weeks after two interventions (P = 0.017 in both). Only young rats showed significant temporal increases of calpain-3 in both PD (0.810 ± 0.154 to 0.988 ± 0.166, P = 0.046) and HU (0.865 ± 0.118 to 1.097 ± 0.191, P = 0.028) groups. Conclusion: Atrophied skeletal muscles showed age-dependent different responses . Although aged muscles maintained higher level of apoptotic activity on muscular atrophic changes, calpain-3 activity of aged muscles showed diminished reactive responses rather than young ones.

**P31- ANTHROPOMETRIC CHARACTERISTICS OF POSTMENOPAUSAL WOMEN DEPENDING ON APPENDICULAR SKELETAL MASS.** V. Povoroznyuk, N. Dzerovych, R. Povoroznyuk *(Kyiv, Ukraine)*

The aim of our study was to evaluate the anthropometric characteristics of the postmenopausal women depending on their appendicular skeletal mass. Materials and methods: We've examined 8882 women aged 20-89 years (mean age – 56.7±0.14 yrs; mean height – 162.5±0.07 cm; mean weight – 73.5±0.16 kg), taken anthropometric measures of 79 examined postmenopausal women aged 40-82 yrs (mean age – 63,53±1,08 yrs, mean height – 157,54±0,79 cm, mean weight – 74,75±1,68 kg). Appendicular skeletal mass (ASM) was measured at all the four limbs with DXA. We've also calculated the appendicular skeletal mass index (ASMI) according to the formula: ASM/height (kg/m2). During the quartile analysis, depending on their ASMI parameters, the examined women were divided into the following groups: Q1 – ASMI < 6,38 kg/m2 (n=20), Q2 – ASMI = 6,38-6,83 kg/m2 (n=20), Q3 – ASMI = 6,84-7,36 kg/m2 (n=20), Q4 – ASMI > 7,36 kg/m2 (n=19). Anthropometric characteristics of the women were evaluated according to the V.V. Bunak's method (1941) modified by P.F. Shaparenko (1994). Lean and fat masses were measured with DXA using a Prodigy densitometer, GE. Statistical analysis was performed using the «Statistica 6.0» software. Results: Frequency of sarcopenia in the group of women aged 65 yrs and older was 7 %. Quartile analysis of women taking into account their ASMI revealed that the women of Q1 and Q2 groups had the following anthropometric characteristics significantly reduced: weight (Q1 – 70,90 kg, Q2 – 70,25 kg, Q3 – 74,75 kg, Q4 – 85,53 kg; F=5,24; p=0,002), neck circumference (Q1 – 350 mm, Q2 – 357 mm, Q3 – 376 mm, Q4 – 393 mm; F=5,68; p=0,001), abdomen circumference (Q1 – 846 mm, Q2 – 936 mm, Q3 – 1008 mm, Q4 – 1106 mm; F=11,52; p<0,0001), shoulder width (Q1 – 903 un., Q2 – 963 un., Q3 – 1029 un., Q4 – 1078 un.; F=2,22; p=0,09), narrow tibia circumference (Q1 – 221 mm, Q2 – 227 mm, Q3 – 244 mm, Q4 – 248 mm; F=6,44; p=0,0006). We also observed a significantly lower thorax circumference in the Q1 group (Q1 – 903 mm, Q2 –963 mm, Q3 – 1029 mm, Q4 – 1079 mm; F=3,82; p=0,01) in comparison with the women of Q4 group (Q1 – 903 mm, Q2 –963 mm, Q3 – 1029 mm, Q4 – 1079 mm; F=3,82; p=0,01). Conclusion: In women with a lower ASMI (Q1 and Q2 groups) the following anthropometric characteristics were significantly lower: weight, neck circumference, abdomen circumference, shoulder width, narrow tibia circumference. Thus, we can use the anthropometric measures for determining the groups with the relative risk of sarcopenia and its complications.

**P32- ULTRASOUND ECHOGENICITY AT THE RECTUS FEMORIS PREDICTS ATTENUATION ON COMPUTED TOMOGRAPHY IN THE EVALUATION OF THIGH TISSUE COMPOSITION.** M.O. Harris-Love[1], N.A. Avila[1,2], B. Adams[1], C. Ismail[1], S.H. Zaidi[1], C.A. Kassner[1], F. Liu[1], M.R. Blackman[1] *(Washington, USA; 2. Bethesda, USA)*

Background: Age-related changes in lower extremity skeletal muscle groups may contribute to functional limitations and compromise independent living in older adults. Previous investigators have cited diminished muscle quality, estimated via specific force or tissue composition, as an important contributor to the functional decline observed with increasing age. The purpose of this investigation was to determine the predictive value of ultrasound echogenicity of the rectus femoris to estimate thigh tissue composition based on computed tomography (CT) attenuation levels. Methods: This pilot study featured a sample of generally healthy, community-dwelling older male Veterans (n = 12, age = 63.5 ±11.5 years; BMI: 25.6 ±4.0). Ultrasound images of the dominant-limb rectus femoris were obtained using B-mode scanning with a 13-6 MHz linear array transducer. Image capture was completed using the longitudinal view with the ultrasound transducer oriented 90º to the muscle bundle. Image echogenicity was quantified via the mean values from grayscale histogram analysis of the region of interest (Adobe Photoshop, ver. 6.0). The mid-femur scanning location on the thigh was marked and identified via a radio-opaque adhesive tag immediately prior to the CT procedure. Estimates of tissue composition were obtained with CT scanning using a 10 mm axial image slice (120 kVp, 200 to 250 mA) at the mid-femur location. Intermuscular and visible intramuscular adipose tissue were segmented from subcutaneous adipose tissue during image post-processing (ImageJ software, ver. 1.48) using standard tissue attenuation threshold algorithms. The predictive value of ultrasound echogenicity for CT tissue composition estimates was determined with univariate linear regression. Results: Ultrasound echogenicity expressed as grayscale mean values was a significant predictive variable for several cross-sectional (CSA) thigh tissue composition estimates. Grayscale mean values were strong predictors for CSA total adipose tissue and lean mass ($R^2 = 0.86$, $p < .001$). Additionally, the grayscale measures exhibited significant predictive value for CSA total intramuscular adipose tissue ($R^2 = 0.76$, $p < .005$) and intramuscular adipose tissue of the rectus femoris ($R^2 = 0.80$, $p < .005$). In contrast, the association between grayscale mean values and CT tissue composition estimates was less robust for CSA subcutaneous adipose tissue ($R^2 = 0.31$, $p = .05$). Conclusions: Our preliminary findings suggest that portable, diagnostic, musculoskeletal ultrasound is a useful imaging modality to serve as a proxy for CT scanning to obtain basic CSA thigh tissue composition estimates. The ultrasound echogenicity at the recuts femoris, as expressed with grayscale histogram mean values, may have predictive validity in older men for CSA total and intramuscular adipose tissue at the mid-femur region of the thigh. Given the discordant declines in muscle mass and strength in aging adults, and the suspected role of intramuscular adipose tissue in metabolic dysfunction within this population, readily accessible measures of tissue composition, such as diagnostic ultrasound, may prove to have utility in geriatric musculoskeletal screening and assessment. (This study was funded by a Veterans Affairs VISN 5 Pilot Grant award – Station 688.)

**P33- ULTRASOUND PROXY MEASURES OF MUSCLE QUALITY ARE ASSOCIATED WITH STRENGTH AND FUNCTIONAL PERFORMANCE IN OLDER MEN.** M.O. Harris-Love, B. Adams, C. Ismail, H.J. Hernandez, V. McIntosh, J. Yang, L. Chacko, M.R. Blackman, B.S. Garra *(Washington, USA)*

Background: Diagnostic musculoskeletal ultrasound has been shown to elicit a hyperechoic response in intramuscular adipose tissue. Skeletal muscle characterized by excessive intramuscular adipose tissue is marked by diminished peak force generation in older adults. Previous study findings also suggest that poor muscle tissue quality, as estimated with ultrasound echogenicity, is associated with functional limitations in older women. In this study, the objective was to determine the association of ultrasound echogenicity with peak muscle torque and functional performance in older male Veterans. Methods: In this pilot study, we evaluated 12 older, ambulatory Veteran men (age = 63.5 ±11.5 years; BMI: 25.6 ±4.0) who were free of medical conditions associated with weakness, muscle atrophy, or edema. Strength and functional performance were assessed on separate visit days to avoid the effects of acute muscle activity on image echogenicity. Hand grip dynamometry (Jamar, Lafayette Instruments) was used for 3 trials under standardized conditions to obtain the mean peak force values. Peak knee extension torque was measured using an isokinetic dynamometer at 60º/s (Biodex System 4 Pro) following a warm-up set and a familiarization session. Participants completed the timed sit-to-stand test (5 repetitions) without external assistance per the standardized procedure. Habitual and fast gait speeds were recorded during the 6-meter timed walk test using the method validated for older adults by Tiedemann et al (2008). Diagnostic musculoskeletal ultrasound at the mid-femur region of the rectus femoris was completed using B-mode scanning with a 13-6 MHz linear array transducer. Longitudinal ultrasound scans were obtained with the transducer oriented 90º to the muscle bundle. Strength values were expressed as absolute values and also scaled to body weight to account for variations in body size. Tissue quality was measured using grayscale histogram analysis (Adobe Photoshop, ver. 6.0) to quantify the echogenicity of the region of interest. The associations of ultrasound echogenicity with peak muscle torque and functional performance were determined using Pearson correlations. Results: The sample means for strength included a peak knee extensor torque of 89.6 ±29.7 ft-lbs (scaled, .531 ±.169) and a peak grip force of 89.1 ±20.4 lbs (scaled, .524 ±.090). Habitual and fast walking speeds were 1.11 ±.31 m/s and 1.62 ±.33 m/s, respectively. The timed sit-to-stand test time for the sample was 11.15 ±5.15 s. In examining potential confounders to the data interpretation, age was found to be significantly correlated with scaled knee extensor peak torque and sit-to-stand time ($p < .05$). Therefore, statistical adjustments were made to account for age in analyses involving the affected variables. Grayscale mean values were inversely related to scaled grip force torque ($r = -.64$, $p = .03$) and scaled knee extensor torque ($r = -.61$, partial correlation adjustment for age, $r = -.18$; $p < .05$). Similar magnitude of inverse associations were observed for grayscale mean values and functional performance, including habitual gait speed ($r = -.62$, $p = .04$), fast gait speed ($r = -.71$, $p = .02$), and the sit-to-stand test ($r = .69$, partial correlation adjustment for age, $r = .30$; $p = .03$). Conclusions: Our initial results, like those of other investigators, revealed ultrasound echogenicity estimates of tissue quality to be associated with muscle strength in older adults. Moreover, the prior findings that echogenicity is related to functional performance in older women are extended by our current observations in older male Veterans, in whom we found higher mean grayscale values to be associated with lower strength values and slower functional

performance. Diminished muscle quality and increased intramuscular adipose tissue are significantly affected by increasing age. Therefore, additional analyses with a younger subset of participants may help to better understand the impact of tissue composition independently of age. Finally, our early findings suggest that the impact of body size on physical performance is also an important consideration in assessing the consequences of poor muscle quality. (This study was funded by a Veterans Affairs VISN 5 Pilot Grant award – Station 688)

**P34- SARCOPENIA AND SARCOPENIC OBESITY AND FUNCTIONAL IMPLICATIONS IN POLIOMYELITIS SURVIVORS.** J.-Y. Lim, H. Do, J.H. Lee, S.J. Han *(Seoul, Korea)*

Objectives: Sarcopenia results in a loss of muscle mass and strength. Obesity may synergistically increase their effect on physical disability. Mobility of poliomyelitis survivor is poor, which makes them prone to have both sarcopenia and obesity. The objectives of this study are to evaluate the morbidity of obesity by different criteria (body mass index and percent body fat) and to compare the SPPB score between sarcopenic obesity group and non-sarcopenic obesity group in poliomyelitis survivors. Methods: Total 67 polio survivors (Female =41, Male =26) were enrolled and completed examination at outpatient clinic of rehabilitation medicine in one university hospital. All of them had flaccid paralysis at unilateral or bilateral lower extremity and had no sphincter disturbance. They were assessed through a structured questionnaire including symptoms related to postpolio syndrome and other information. Basic anthropometric data including height, weight, circumference of chest and waist were obtained along with body composition analysis by dual X-ray absorptiometry. We evaluated body mass index, percent body fat, skeletal muscle mass index, and knee strength with isokinetic tester. Short Physical Performance Battery (SPPB) was used to evaluate their functional status. Results: Average age was 52.1 in men and 50.3 in women. According to BMI criteria, 40.4% (men 35.3%, women 42.9%) of polio survivors were classified as obese. However, 96.2% (men 100%, women 94.3%) of polio survivors were classified as obese when the percent fat criteria was applied. 61.5% (men 82.4%, women 51.4%) of polio survivors were classified as sarcopenia by ASM/ht2 criteria. 96.2% (men 100%, women 94.3%) of the survivors were classified as sarcopenia when classified by SMI. The prevalence of sarcopenic obesity was 59.6% (women 48.6%, men 82.4%) by ASM/ht2 criteria and percent body fat. When SMI criteria and percent body fat were applied. 94.2% (women 91.4%, men 100%) were classified as sarcopenic obesity. 80.8% (women 82.9%, men 76.5%) of sarcopenic obesity group had post-polio syndrome. Sarcopenic obesity group revealed low SPPB score compared to non-sarcopenic obesity group (8.62 vs 5.8), especially in walking (3.19 vs 1.93) and chair standing (2.86 vs 0.94) score. Sarcopenic obesity group had lower knee strength compared to non-sarcopenic obesity group and the differences were more prominent in uninvolved side. Conclusion: Sarcopenia and sarcopenic obesity is highly prevalent in polio survivors. BMI may be inappropriate index to assess adiposity status in disable people such as polio survivor. Sarcopenic obese polio survivors showed significantly low level of function in SPPB score. It is necessary to be concerned in the potential harmful consequences of longstanding sarcopenic obesity in polio survivor.

**P35- LOW-MAGNITUDE HIGH-FREQUENCY VIBRATION (LMHFV) IMPROVED THE SKELETAL MUSCLE QUALITY AND RETARDED THE SARCOPENIA PROGRESSION IN SAMP8 MOUSE.** A.Y. Guo, K.S. Leung, W.H. Cheung *(Hong Kong)*

Backgrounds: Sarcopenia is a systemic syndrome with progressive loss of skeletal muscle mass and muscle force combined with poor physical performance[1]. The mechanism of sarcopenia is complex, with the age-related mitochondrial dysfunction and apoptosis as the primary causes. As a major risk factor of fall-induced osteoporotic fracture, the prevalence of sarcopenia is high in the community elderly[2]. Low-magnitude high-frequency vibration (LMHFV) is a non-invasive biophysical intervention providing systemic vertical cyclic loading to the whole body[3]. It has been demonstrated that the LMHFV significantly enhanced the skeletal muscle force, balancing ability and movement velocity, hence reducing the fall incidences in the community elderly[4]. Though the benefits of LMHFV on skeletal muscle have been proved by the clinical trials, the mechanism has not been fully understood. This study is to investigate the mechanism of LMHFV on skeletal muscle in sarcopenic animal model. Material and Method: Experimentation Ethics Approval (ref: 12/012/MIS) was obtained from The Animal Experimentation Ethics Committee of The Chinese University of Hong Kong. The Senescence-accelerated mouse P8 (SAMP8) was selected with the gastrocnemius as the target muscle. The 6-month-old male SAMP8 mice were randomized into control (Ctrl) group and vibration (Vib) group. The mice in Vib group were treated with systemic vertical vibration at 0.3g, 35Hz, 20min/day, 5days/week. All the parameters were assessed at 1-, 2-, 3-, 4-month post-treatment and the two groups shared the same baseline time-point at 0-month post-treatment, with 6 mice in each time-point. Functional outcomes were measured with ex vivo muscle functional test system (800A, Aurora Scientific Inc). ATPase staining was performed for fiber cross-sectional area (FCSA) evaluation and muscle fiber typing. The investigation of satellite cell (SC) pool by immunofluorescence with Pax7 and the assessment of myostatin expression by ELISA were performed to evaluate the muscle regeneration. One–way ANOVA with Tukey post-hoc test was performed for within-group comparison among time-points; two-way ANOVA with Tukey post-hoc test was used for between-groups comparison; independent-samples T test was performed for comparison between groups at corresponding time-points. The significant level was set at $p \leq 0.05$. Results: Morphology: The peak of muscle mass (MM) appeared at month 1 (Ctrl: p=0.05; Vib: p=0.024) in both Ctrl group and Vib group and the peak of muscle cross-sectional area (MCSA) appeared at month 2 (Vib: p=0.01) in Vib group, with no significant difference between groups. The largest FCSA of fiber type IIA in Vib group appeared at month 1 (p=0.000). Generally, the FCSA of type IIA was higher than Ctrl group (p=0.000) with significant difference at corresponding time-points (month 1: p=0.000; month 2: p=0.035; month3: p=0.003.). Muscle strength: The Ctrl group showed lower specific twitch force (SF0) at month 4 (p=0.028) and higher specific tetanic force (SFt) at month 1 (p=0.008). In addition, the muscle strength in Vib group showed an increasing trend from month 0 to month 4 post-treatment. Contractibility: In general, the contraction time (CT) in Vib group was significantly shorter than the Ctrl group (p=0.000) with significant difference at month 2 (p=0.008) and month 4 (p=0.005); half-relaxation time (RT50) was lower in Vib group (p=0.000) with significant difference at month 1 (p=0.002) and month 2 (p=0.001). Fatigability: Compared with the Ctrl group, the Vib group showed significantly lower fatigue rate (FR) (p=0.01) and muscle force loss (Loss%) (p=0.01). Regeneration: SCs in Ctrl group were lower (p=0.001) with significant difference at month 3 (p=0.001) and month 4 (p=0.001). The serum myostatin expression in Ctrl group was lower at month 2 (Ctrl<Vib, p=0.031) but higher at month 4 (Ctrl>Vib, p=0.053) post-treatment than the corresponding time-points in Vib group. Conclusion: Present study revealed that the LMHFV did not alter the MM nor muscle size. However, the FCSA of fiber type IIA in gastrocnemius was significantly increased by the LMHFV. Therefore, the LMHVF improved the skeletal muscle quality through optimizing the muscle composition with increased contractile tissue and decreased connective tissue, but not increasing the muscle mass directly. Ignoring the adaption-related low muscle strength at the early phase, the long-term effect of LMHFV on sarcopenic muscle was positive. Based on the diagnostic criteria of sarcopenia proposed by EWGSOP in 2010, the delayed muscle strength decline demonstrated that LMHFV retarded the progression of sarcopenia. Besides the muscle strength, LMHFV also enhanced the muscle contractility and fatigue durability, hence improving the physical performance. Interestingly, the present study found that LMHFV could also increase total number of the SC, which acts as stem cell in skeletal muscle[5], at the late phase. Moreover, as a negative regulator of SC, the myostatin expression was also depressed by LMHFV. It demonstrated that the LMHFV benefited the skeletal muscle by promoting the muscle regeneration besides altering the muscle composition and improving muscle function. In conclusion, LMHFV could be recommended as a high cost-effective biophysical intervention for age-induced skeletal muscle loss related diseases and injuries in the community elderly. References: 1. Alfonso J, et al. Age Ageing, 2010. 2. Tanimoto Y, et al. Arch Gerontol Geriatr, 2014. 3. Rittweger J. Eur J Appl Physiol, 2010. 4. Leung KS, et al. Osteoporos Int, 2014. 5. Morgan JE and Partridge TA. Int J Biochem Cell Biol, 2003. Acknowledgment: General research Fund (Ref: 469911), Research Grant Council, Hong Kong.

**P36- SARCOPENIA IS A MEASURABLE PREOPERATIVE PREDICTOR OF SURGICAL MORBIDITY IN ADVANCED OVARIAN CANCER.** A. Kumar, M. Moynagh, W.A. Cliby, M.E. McGree, P.M. Young, J.N. Bakkum-Gamez, C.L. Langstraat, S.C. Dowdy, A. Jatoi, A. Mariani *(Rochester, USA)*

Background: Advanced ovarian cancer is primarily treated with complex surgical cytoreduction, however these surgeries are associated with high degree with morbidity and mortality. Nutritional and functional status are often compromised in women with newly diagnosed advanced epithelial ovarian cancer (EOC) which can lead to increased peri-operative morbidity and oncologic mortality. To help develop preoperative models for optimal triage of EOC patients, we investigated the role of sarcopenia in predicting surgical morbidity and overall survival in advanced EOC. Methods: Medical records of women with stage IIIC/IV EOC who underwent primary debulking surgery (PDS) with curative intent between 1/1/2006 and 12/31/2011 were reviewed. Sarcopenia was assessed by measurement of the total skeletal muscle area (SMA) at the level of L3 on preoperative axial CT. Postoperative complications within 30 days were graded according to the modified 4-point Accordion classification. Results: Of the 387 women with stage IIIC/IV, 199 women had CT scans that were evaluable. Mean SMA was 104.5 cm2 (SD:18.0 cm2) Patients ≥70 years old had lower SMA than patients <70 years old, 94.8 versus 109.0 cm2 respectively, p<0.001. In univariate analysis, grade 3-4 complications were associated with older age (p=0.049), preoperative albumin <3 (p=0.045), and decreasing SMA (p=0.015). In a multivariate model, considering sarcopenia and after adjusting for albumin, SMA still increased the risk of grade 3-4 complications by 23% per 10 cm2 decrease in SMA (p=0.058). Overall survival was inversely associated with traditional variables including age (p<0.001), stage (p=0.014), and residual disease (RD) (p=0.002), but not SMA. Conclusions: Sarcopenia, as measured by SMA on preoperative CT, may be an important, and objectively measurable, predictor of postoperative morbidity and may guide treatment counseling in women with newly diagnosed advanced stage EOC and help practioners triage patients to neoadjuvant chemotherapy.

**P37- FUNCTIONAL DECLINE AND RESIDUAL WORKING CAPACITY OF THE ELDERLY PEOPLE.** O. Tomarevska, O. Poliakov *(Kiev, Ukraine)*

Backgrounds: Increased average life expectancy of people leads to aging of population. This creates a problem of working disability and independence of older people. Methods: We have studied anthropometric characteristics, parameters of respiration, physical performance, psychomotor activity, sensory skills and mental activities. In addition, the rate of functional aging studied in 120 persons aged 60 - 89 years and 43 men aged 20 - 30 years. We have also analyzed the professional history, social status, and factual nutrition of the surveyed older people. Results: We have described the relationship of physical, cognitive, psycho-physiological functions and breathing parameters in persons over 60 years. The observed decline in cognitive function in the surveyed men and women after

75 years did not depend on the type of professional activity, in particular from intellectual or physical nature of labor. The study of cognitive functioning showed better effect for previous intellectual professional activity on the results of the Mini Mental State Examination (MMSE) for persons older than 60 years ($p < 0.05$) than for those who was involved in previous physical labor, but this pattern is screwed by the educational level ($p < 0.001$). In elderly and senile persons it was established that typological features increased the time of visual-motor reaction and it was twice higher than for the young individuals. The volume of daily self-sufficiency per Barthel Index was found positively correlated with lower expression (or absence) of cognitive impairment as per MMSE ($r = 0.567$, $p < 0.001$), as well as indicators of hand grip strength, the ability to perform functional «Sit-to-Stand» tests, longer time of static balancing on the left leg. The best indicators of the hand grip strength of the elderly were associated with the lower severity of labor in the last professional activity in women and men ($p < 0.05$). According to the study, a decrease in muscle strength was observed in elderly men by 55% and 27% in older men compared with young adults. Muscle strength of older women was 69%, and the elderly - 48% of the performance of young women. Analysis of the results of the study group as a whole at the age of 60 - 89 years showed a decrease in the density of connection of the muscular endurance compared with the muscle strength, with the parameters of external respiration. The parameters of muscle strength showed significant correlation ($p < 0.01$ - 0.001) with the body fat percentage in the human over 60 years. One of the criteria for assessing of the residual working capacity is the velocity and duration of information processing in testing of the intellectual activity. Based on these studies we have developed a method of quantitative evaluation for the "residual working capacity" in persons of retirement age. According to our research results, we have developed a percentage scale for rating of the residual working performance in persons older than 60 years, and recommendations for improving the effectiveness of human activity. Determination of residual working capacity made it possible to estimate the working potential of the persons of the retirement age having in mind developing labor regulations for the retired. A quantitative share of the factors affecting the residual working capacity was attributed to the following factors: professional activities of 17.04%, household and family of 15.31%, health of 12.74%, physical activity of 12.73%, nutrition of 10.53%. Cluster analysis by age groups revealed differences in patterns among persons in the age group of 75 - 89 years, where the calendar age forms a separate branch of the hierarchy, in contrast to the group of 60 - 74 years, where the calendar age forms related cluster of residual work performance, seniority and the number of years of learning this trend is stronger and remains even in the analysis of the age group of 60 - 89 years. Correlation between percentage of body fat and indices of cognitive functions has gender characteristics. In the analysis of residual overall working capacity and the influence of the factors of previous professional working capacity we have defined credible contribution of the positive impact of the received education at 9.82%, continuing professional activity of the person at the time of the study at 32.41%, age at the year of the retirement at 11.93%. We have observed an expressed acceleration of the rate of functional aging in the senile than in the elderly group, regardless of the prevalence of intellectual or physical labor. Conclusion. Due to the accelerated rate of aging the decreased performance occurs. As a result, the residual capacity of people aged 60 - 89 years, an average of 47.54% with respect to young people. Thus, 57% of the elderly and 96.7% of the senile people are in need of ergonomic innovation at work and at home.

**P38- FRAILTY AMONG COMMUNITY DWELLING OLDER ADULTS IN THE MALAYSIAN FALLS ASSESSMENT INTERVENTION TRIAL (MYFAIT).** S.B. Kamaruzzaman, H.M. Khor, M.P. Tan *(Kuala Lumpur, Malaysia)*

Background: The population of older adults in Malaysia is increasing exponentially. It is estimated that 15% of overall population size will be aged 60 years and over in 2035. Frailty in the elderly is an important risk factor for falls, institutionalization and mortality. However, there is limited information on frailty in a multicultural and multi-ethnic society such as Malaysia. The aim of the study is to validate frailty using two different measures and explore factors that are associated with frailty in community dwelling elderly Malaysians. Methods: Study participants included 318 community dwelling elderly aged 65 years and above from the Malaysian Falls Assessment and Intervention Trial (MyFAIT) study (Tan et al BMC Geriatrics 2014). Fallers were recruited from outpatient clinics and the emergency department while non-fallers were recruited through community health screening and word-of-mouth advertising. Assessment for frailty was performed using a multidimensional frailty index (MFI) based on the deficit accumulation FI and the Fried's phenotype criteria. FI was developed using 42 variables, which include comorbidities, self- reported health symptoms, sensory impairments, psychosocial and functional status (Barthel index), anthropometric measurements (body mass index & grip strength), physical performance (timed up and go [TUG] test & functional reach) and medication history. An assessment was made of the distribution of scores, which were then divided into quartiles, the first to fourth quartiles reflecting the lowest to highest levels of frailty. Each ascending quartile was labelled as 'not frail/ low, mild, moderate and severe frailty. The 5 components measured as part of the Fried's criteria were self-reported exhaustion, low physical activity and unintentional weight loss (10lbs in past year), weakness (grip strength) and slow walking speed (TUG). The presence of 3 or more indicators represents frailty. Correlations between both frailty assessments were examined. Results: The mean age of the participants was 73.9 years (standard deviation (SD) = 6.6 years) and 67.9% women. There was a strong degree of correlation between MFI and Fried's phenotype score ($r=0.71$, $p<0.01$). The MFI estimated that 106/318 (33.3%) were frail with a mean score of 0.33 (SD 0.06). From the Fried phenotype criteria, 85(26.7%) were non-frail, 163 (51.3%) were pre-frail and 70 (22%) were physically frail. It is shown to increase notably with age (<65year=1/13 [7.7%]; 65-74year= 33/175[18.9%]; 75-85year= 52/103 [50.5%]; >85 year= 20/25 [80%]; $p<0.01$). Ethnic Indians (odds ratio, OR [95% confidence interval, CI]= 1.91[1.0-3.67]; $p=0.049$) were significantly more frail compared to those of Chinese and Malay ethnic groups. Aside from gender,, being widowed, having a previous history of falls, ≥3 co-morbidities, visual and hearing impairment, self-report poor memory, exhaustion and weight loss, disability in ADL function and poor physical and balance performance (TUG, grip strength, functional reach) were significantly associated with frailty using both measures. Conclusion: Both MFI and Fried's criteria significantly identified frailty in this population. As we had evaluated the frailty indices among fallers as well as community dwelling controls we have pre-selected for a frailer population which explains why more of our sample are considered frail compared to published data from previous papers. Having more frail individuals in our sample has allowed us to evaluate reliably the factors associated with frailty in our population. We have found significant ethnic variations in frailty levels which have not previously been reported in literature.

**P39- CARE GIVER BURDEN OF FRAIL ELDERS IN AN URBAN SETTING IN MALAYSIA.** J. Sathasivam, S.N. Che Mat Din, S.B. Kamaruzzaman, F.M. Hairi, N.C. Wan, K. Chinna *(Kuala Lumpur, Malaysia)*

Background: Feminization of the workforce, declining fertility rates and waning of the 'filial-piety' philosophy among Asian communities have a large impact on one's ability to care for the increasing elderly population in Malaysia. This study was done to explore the care giver burden of carers of community dwelling frail elders in an urban setting in Malaysia to allow targeted policies to be planned for these elders and their caregivers. Methods: Operational definitions: The definition that was established in this study to define a caregiver was 'a caregiver is one who provides physical, emotional and financial support to the recipient to ensure their well-being'. This does not necessarily limit to those providing direct care but also being responsible for the indirect care that was delivered. All domestic helpers were not included in the study as they were defined as paid helper. Study design and sample: This was a cross sectional study of frail elders with caregivers conducted in an urban district in Malaysia. 789 elderly in an urban district in Malaysia was recruited as part of the study using a complex multistage random sampling method and their caregivers were interviewed. Only 279 caregivers were available for the interview. Study Instruments: The frailty status was assessed using a multidimensional frailty assessment tool following the Frail Index construct. There was a total of 41 items in the tool and the total score was calculated and divided into 5 categories; robust, pre-frail, mildly frail, moderately frail and severely frail. Care giving burden was perceived from 3 dimensions; concern for the dependent, subjective burden and objective burden using the 22- item Zarit Burden Interview. The final scores were divided into 4 categories; no to mild burden, mild to moderate burden, moderate to severe burden and severe burden. Ordinal regression was performed to identify the correlates of care giving burden of these frail elders. All results were weighted prior to analysis. Results: The response rate for the study was 35.4% as most of the houses approached had the grandparents caring for their under-aged grandchildren. Most of the caregivers were males, who were either the spouse or child of the dependent elders. They were also predominantly married with an education level between primary schooling to Form 5 (upper secondary). Caregivers below the age of 60 experienced higher burdens as compared to those more than age 60. Most of the caregivers lived in their own properties and were dependent on a private source of income or income from their children. 3.2% of those caring for frail elders suffered from moderate to severe burden whilst 32.2% suffered from a mild to moderate burden. Declining cognitive status among the elderly was found to have a significant association with increasing levels of burden ($p<0.001$). Most caregivers had been involved in long duration of care >5 years, however duration of care was not predictive of care giver burden ($p=0.801$). Frailty status was found to be an important correlate for increasing levels of caregiver burden among the caregivers of this urban community dwelling elders ($p<0.001$) however only moderate to severe burden remained significant for the frail group after controlling for socio-demographic profiles of the recipient, duration of care and moderate to severe cognitive declined elderly ($p<0.005$). When the results were controlled for the socio-demographic profiles of the caregiver, duration of care and their cognitive status, there was no association found between level of burden and frailty status. Conclusion: This study suggests that interventions targeted to reduce frailty in an elderly person could reduce the burden of their caregivers. These interventions should focus on creating a group of older people who are self- reliant and independent. Identification of vulnerable caregivers is important so that an alternative support system is provided for their elders. Cultural and potential barriers within caregivers to seeking alternative aid from a day-care or community centre require further analysis in this community. Keywords: Caregiver burden, community dwelling, caregiving burden, frail elderly, frail older people.

**P40- THE ASSOCIATION BETWEEN SINGLE HOUSEHOLD FAMILY STRUCTURES AND FRAILTY IN A RURAL JAPANESE PUPULATION: THE NAGASAKI ISLANDS STUDY.** H. Yamanashi, Y. Shimizu, J. Koyamatsu, M. Nagayoshi, K. Ariyoshi, T. Maeda *(Nagasaki, Japan)*

Backgrounds: Growing burden of medical care costs and long-term care costs of frail elderly has been already national issue in Japan. Previous study reported that the community dwelling elderly population with frailty is associated with adverse events of falls, worsening morbidity or ADL disability, hospitalization and death. Because the population aging rate is reported to be much higher in remote county and isolated islands than that of urban city, the matte of frail elderly should became serious problem in remote county and isolated islands. On the other hand, the demographic changes during half century results in elevated the number of the elderly with one-person households, strongly. And family structure pattern may be influence on health problems. However, epidemiological study that reported about family structure patterns and their special health

problems is scare. Furthermore, one study in Mexico reported the influence of the family structure of one-person households on frail elderly, but the result were contradictious between pre-frail and frail population. We hypothesized that single households is independent risk factor for elderly frail. We conducted a cross-sectional study of 1,618 Japanese lives in isolated islands. Methods: The survey population comprised 1,618 participants (564 men and 1,054 women) aged 29 to 94 years, all residents of the western rural community of the remote islands in Nagasaki, who participated in this study when they visited national heath check-up in May and June, 2014. A total of 420 individuals (162 men and 258 women) aged below 60 years old or those with missing data were excluded, leaving 1,198 participants (402 men and 796 women) for enrolment in this study. The mean age of the study population was 71.8 years (±7.2 SD; range 60 - 94) for men and 71.9 years (±7.3 SD; range 60 - 92) for women. Trained interviewers obtained information on familiy structure, Frailty Index for Japanese elderly (FI-J), smoking status, drinking status, medical history, use of antihypertensive agents, use of medication, and for diabetes mellitus, mental illness (Kessler-6). Patterns of Family structures were defined based on the information about number of household members and relationship among them; 1) Single household, 2) Non-single household. Frailty was measured by 15-items questionnair (FI-J), which validity had been already established in Japanese population in Kusatsu. Cut-off point of frailty was FI-J 3/4 points, and we categorised participants with 0 to 3 points as non-frail and those with 4 to 15 as frail. Body weight, height and grip strength were measured with normal procedures. We obtained metabolic profiles by blood samples at the time of the examination. We stratified participants by sex. Then, difference in mean values or prevalence of potential confounding factors by frailty were analyzed by using covariance or general linear models, and logistic regression models were used for calculating odds ratios (ORs) and 95% confidence intervals (CIs) for the association of Family Class. Three different approaches were used for making adjustments for confounding factors. First, the data were adjusted only for age (Model.1). Second, we adjusted further for body weight, height, body mass index, antihypertensive medication use, antihypergycemic medication use, antilipidemic medication use, history of stroke, history of ischemic heart disease, chronic kidney disease, smoking, alcohol intake, and reumatoid arthritis (Model.2). Third, we adjusted further for the score of Kessler six (Model. 3). Results: Of the 402 men and 796 women, 43 men and 241 women classed as single household, 359 men and 555 women as non-single household. For men, basically participants of single household have higher serum triglycelides than that of non-single household. Sex-specific age adjusted odds rations (and 95% CIs) of frailty in relation to single household structure patterns were 3.50 (95%CI 1.74-7.02) in men, and 0.91 (0.60-1.38) in women (Model. 1). This associations in men remained statistically significant 4.11 (95%CI 1.91-8.83) after further multi-adjustment (Model. 3). We found significat difference of daily activity between participants of single household and non-single household only in men (41.9% vs 21.5%, p=0.003). It suggests that sedentary life style in men of single household may be possible explanation of the result. Those analyses are mid-term analyses, so it may change after final analyses. Conclusion: In the population in rural Nagasaki, single household family structures in men compared with non-single household family structures had high risk of affecting frailty.

**P41- IS TRUNK POSTURE IN WALKING A BETTER MARKER THAN GAIT SPEED IN PREDICTING DECLINE IN FUNCTION AND SUBSEQUENT FRAILTY?** A. Merchant Reshma, S. Banerji, G. Singh, E. Chew, C.L. Poh, Y.R. Guo, Y.W. Pang, M. Sharma, R. Kambadur, S.K. Tay *(Singapore)*

Background: Gait speed is a strong predictor of a wide range of outcomes in older adults including falls and fractures, hospitalization, cognitive decline and mortality. Recently, many guidelines and consensus definitions of sarcopenia have been based on gait speed, but without addressing posture adaptation adopted to maintain the speed in the face of weakness or joint stiffness. With aging, older adults compensate for general decline through environmental modification and posture adaptation. The objective of this prospective study was to identify early adaptations in posture during walking that may precede actual decline in gait speed among healthy community-dwelling Chinese men. Methods: The study team recruited community-dwelling older Chinese adults 60 – 80 years (n=90) with BMI in the normal range. Their function was evaluated using handgrip strength testing, 6 minute walk, timed up-and-go (TUG), and motion analysis for gait characteristics. Parameter cut-offs were established using data from published literature for Chinese subjects and verified by data obtained from this study. Low function was characterized by slow walking speed (<1 metre/sec) and/or slow timed up-and-go (>10 sec) while low strength was determined by hand grip dynamometer testing (<26 kg). The degree of frailty was classified using the Canadian Scale for Healthy Ageing (CSHA) to differentiate between healthy and vulnerable older adults. For the purpose of this analysis, CSHA 1 and 2 were considered as healthy subjects and were analyzed as a single group. Gait speed (derived from the 6 minute walk), trunk rotation, strength and functional parameters were compared in 3 groups: Group 1 healthy (CSHA1 and 2), Group 2 intermediate risk (CSHA 3) and Group 3 vulnerable (CSHA4) older adults. Trunk posture adaptation was measured as the mean offset in the positions of left and right shoulder markers in the direction of motion (positive X-axis) as recorded during heel strikes of both lower limbs. Results: The degree of trunk rotation as seen in the shoulder offset varied with increasing predisposition to frailty: Group 1 mean 9.03mm (SD 10.07mm) to Group 2 mean 15.11mm (SD 15.74mm) to Group 3 mean 24.30mm (SD 8.31mm). The trunk was rotated towards the left side which was the preferred stabilizing lower limb in 70.7% of Group 1, 87.9% of Group 2 and 94.0% of Group 3 subjects. The posture was deemed to be significantly altered in Groups 1 and 2 if the shoulder offset was equal to or more than the mean value for Group 3 (24.30 mm), which was the clinically vulnerable group and showed maximum adaptation. In Group 1, 95.12% subjects maintained gait speed of >1 m/s and 24.39% had a significantly altered trunk posture during walking. In Group 2, 93.93% subjects maintained gait speed of >1 m/s while 39.39% subjects showed significant trunk adaptation. In the vulnerable Group 3, 62.50% subjects maintained a walking speed of >1 m/s, of whom 67% displayed posture adaptation during walking. Trunk posture adaptation correlated with deficits of strength, function and walking speed. Conclusion: In general, the vulnerable older adults had lower functional performance and strength compared to the healthy older adults group. Although many maintained normal gait speed, a significant number demonstrated posture adaptations in walking. Hence, while gait speed may be a useful parameter for screening older adults for sarcopenia and frailty, our data suggests that it is useful to track trunk posture adaptation to identify the at-risk older adults earlier even before gait speed declines. Further prospective studies are needed to see if healthy older adults with trunk posture adaptation and normal gait speed develop impaired gait speed earlier than those without such adaptation and if this can be prevented with posture correction and range of motion exercises.

**P42- THE BENZODIAZEPINE WITHDRAWAL SYNDROME IN THE ELDERLY: A DIFFICULT DIAGNOSIS TO BE ISSUED IN FRAIL ELDERLY.** A. Martin-Kleisch, N. Henry, J.L. Novella, A.A. Zulfiqar *(Reims, France)*

Background: Benzodiazepine withdrawal syndrome is difficult to diagnose because of its rich and unspecific symptoms. Benzodiazepines are commonly used in geriatric medicine. However, there is a misuse of these drugs and a pharmacology link modified with numerous predisposing factors (poly medication, co-morbidities ...), which can be problematic in the frail elderly. Methods: We illustrate this problem with this clinical case. Results: Mrs. C, aged 92, was addressed to emergencies by her medical doctor in a context of poor general condition. The patient was suffering from hypertension treated, acute coronary syndrome that required the establishment of a stent, a treated dyslipidemia, moderate chronic renal insufficiency, insulin dependent diabetes treated, a minor depressive syndrome, cholecystectomy, and the establishment of a total prosthetic left hip. Known treatments included antihypertensive, insulin, an anti-depressant, analgesic (paracetamol) and a diuretic. The patient stated that she consulted her doctor recently for a fall with a hip injury. Paracetamol treatment has been achieved. Physical examination, in emergency, showed a calm patient in bed, Glasgow 15, with strictly stable hemodynamic constants. Clinical examination, on the heart, pulmonary, gastrointestinal and neurological levels, remains normal. The rheumatologic examination revealed pain in the right hip by mobilization. The patient was then transferred to acute geriatric unit. However, at the second day of hospitalization, the patient presented two episodes of tonic-clonic seizures generalized in two-hour intervals, in the absence of fever, requiring the administration of Clonazepam 1 mg intravenously. A post-critical confusion was observed. Faced with this crisis, a new biological assessment was performed: an absence of electrolytes disturbances, chronic kidney disease stage 3, normal liver and inflammatory function, and normal level of lactic acid. An initial CT scan showed only a cortico-subcortical atrophy without abnormalities. An Electro-encephalogram did not reveal any epileptic ectopic focus. Levetiracetam was also introduced. The patient has amnesia of the episode, no tongue bite was found. In the absence of frank etiology of this crisis, we contacted her medical doctor to see if epilepsy medical history had been forgotten or if other treatments have been recently introduced. The medical prescription faxed by her doctor showed two treatments, which were unknown to us, Alprazolam 0.25mg 3 times a day associated with a hypnotic treatment at bedtime. Especially at the interrogation of the family, taking drugs recently became chaotic, with much greater intake of medicines, without following the usual dosage. Faced with this information, an assessment complement was asked in pharmacology. We asked the quantitative determination of antidepressants and benzodiazepines. These assays came back negative. A diagnosis of secondary generalized tonic-clonic seizures due to benzodiazepine withdrawal syndrome was made. In fact, the medical prescription of benzodiazepines was recent, and not known in Emergency, which was then stopped abruptly; this combined with an uncontrolled taking medication from the patient. In the case of the patient, taking these two drugs associated with probable misuse, as described by the family environment, can suspect a rapid accumulation of active metabolites of these drugs. Conclusion: Elderly patients often have several treatments, causing drug interactions. These patients are often poorly adherent; this is sometimes a source of adverse effects. In addition, benzodiazepines have a special place in the elderly because very often prescribed. Their misuse leads to many significant clinical adverse events, and no specific, like the withdrawal syndrome. We must therefore focus on short-term benzodiazepines, and better knowledge of their indications and uses, in the elderly, mostly in frail elderly. The diagnosis of drug withdrawal syndrome is clinically difficult to confirm, and joint work is to be performed with toxicologists to better understand their diagnostic and therapeutic care in emergency. Moreover, the absence of medical prescription available on arrival of the patient in an unit must always call the medical doctor to avoid complications with abrupt withdrawal of a drug that should be done gradually.

**P43- COMPARE THE PREVALENCE OF SARCOPENIA BY DIFFERENT CRITERIA AMONG COMMUNITY DWELLING ELDERLY MEN IN BEIJING.** Y. Hu[1], H. Dong[1], Y. Zhang[1], L. Fan[1], M. Zhang[1], J. Sun[1], X. Han[1], L.-K. Chen[2] *(1. Beijing, China; 2. Taipei, Taiwan)*

Backgrounds: An ideal diagnostic approaches and cutoff values of sarcopenia covering different ethnic backgrounds is still lacking. This study was conducted to compare different measurement for prevalence of sarcopenia in a cohort of healthy community-dwelling elderly men in Beijing area, in order to evaluate applicable diagnostic criteria of sarcopenia for local community. Methods: We prospectively evaluated 169 age 60

years and older in the community and 85 young volunteer by cross-sectional study. A comprehensive geriatric assessment and determined anthropometric data was performed. Measurement of appendicular skeletal muscle mass was achieved by Dual Energy X-ray Absorptiometry, which used to calculated relative appendicular skeletal muscle mass (RASM). We also measure 6 min walking speed and grip strength. We compared clinical characteristics of sarcopenia defined by European Working Group on Sarcopenia in Older People (EWGSOP) criteria and the International Working Group on Sarcopenia (IWGS). Results: 1. The cut-off points obtained were 6.53 Kg/m2 for Beijing, below to those observed in Europe and USA. 2. Use Single skeletal muscle content as diagnostic criteria for sarcopenia. Based on Baumgartner standard of diagnosis, the prevalence of sarcopenia observed was 36% for elderly male, higher than Taiwan, Korean, USA, Spain and France. 3. Use skeletal muscle content and muscle function as diagnostic criteria for sarcopenia. Based on EWGSOP, the prevalence of sarcopenia for Presarcopenia, Sarcopenia and Severe sarcopenia are 9.1%,18.2%,15.1%, respectively, and the prevanlence of Sarcopenia and Severe sarcopenia is 33.3%. Based on IWGS, however, the prevalence of sarcopenia for Beijing area elderly male are 67.9%. The agreement of sarcopenia diagnosed by EWGSOP and IWGS criteria was only fair by using RASM (kappa 0.404 , p=0.000). Conclusion: Proper selections for cutoff values of RASM, handgrip strength and walking speed with full considerations of gender and ethnic differences were of critical importance to reach the universal diagnostic criteria for sarcopenia internationally. We should establish and unity the applicable diagnostic criteria for sarcopenia based on the characteristic of Chinese senior citizen.

**P44- THE IMPACT OF PREOPERATIVE ASSESSMENT OF PHYSICAL FRAILTY FOR GASTROINTESTINAL SURGERY IN THE ELDERLY.** K. Sugimoto, Y. Maekawa, C. Nakama, C.-C. Wang, Y. Yasunobe, Y. Takeya, K. Yamamoto, H. Rakugi *(Osaka, Japan)*

Background: The safety of surgical operations has improved considerably due to dramatic breakthroughs in medicine, which has led to an increase in the number of surgical operations among elderly patients. When assessing the operability of an elderly patient, it is necessary to consider not only the patient's age and type of illness, but also physical activity, degree of surgical stress, and the patient's will, in order to make a comprehensive assessment. The most commonly used method for assessing the operability of a patient is performance status (PS), however, there have been many reports that PS alone is not insufficient for making the assessment of operability especially in the elderly. Indeed, we have examined the usefulness of comprehensive geriatric assessment (CGA) in the prediction of postoperative complications in the elderly and have reported its usefulness. On the other hand, physical frailty has attracted attention as an indicator of predicting disability especially in the old-old, however, the influence of preoperative assessment for physical frailty on postoperative complications has not been clarified yet. Therefore, we examined whether measuring physical function before operations would be useful in preventing the development of postoperative complications. Methods: 286 patients aged 70 and over, who underwent the measurements of physical functions and CGA before radical surgery for gastrointestinal cancer during the period since 2010 at Osaka University Hospital. The measurements of grip and leg muscle strength, CGA (Barthel index and instrumental ADL (IADL), Vitality index, Mini-Mental State Examination (MMSE) and Geriatric Depression Scale (GDS)) and hearing of exercise habit and PS were performed. Assessment of postoperative complications including postoperative delirium was extracted from reference to hospital medical records. Delirium was diagnosed according to the Confusion Assessment Method (CAM) algorithm and evaluated by two different doctors. We examined the association between preoperative measurement of physical functions and postoperative complications. Results: The average of age of all the subjects was 79.2 years old. Postoperative complications and delirium were observed in 28.3% (81 cases) and 23.4% (67 cases) of these subjects, respectively. The degree of postoperative complications was associated with leg muscle strength and all the CGA components and as well as PS before surgery, and delirium was associated with led muscle strength and CGA components (Barthel index, IADL, MMSE and GDS) as well as PS. Leg muscle strength as well as Barthel index and IADL were extracted as independent factors associated with postoperative complications including delirium after adjusted for traditional risk factors for postoperative complications. Conclusion: Performing the measurement of physical function and CGA prior to gastrointestinal surgery can be useful tools for predicting the development of postoperative complications including delirium.

**P45- BETA-HYDROXY-BETA-METHYLBUTYRATE AND VITAMIN D COORDINATELY PREVENT SKELETAL MUSCLE ATROPHY IN VIVO.** S. Ogawa, M. Yakabe, S. Ogawa, M. Akishita *(Tokyo, Japan)*

Introduction: Sarcopenia is a debilitating condition that occurs with senescence. Whereas many factors are suggested to be involved in developing the symptom or prevention of sarcopenia, the underlying mechanisms as well as its therapeutic approaches are not elucidated. Two atrogenes, MuRF1 and atrogin-1/MAFbx, are ubiquitin ligases that were identified as molecular mediators of muscle atrophy. In clinical trials, it has been suggested that vitamin D and β-hydroxy-β-methylbutyrate (HMB) increased skeletal muscle mass or muscle force. Objectives: In this study, we investigated anti-atrophic effects of vitamin D and HMB on muscles of tail-suspended mice mediated by changes in expression of atrogenes. Discussion: C57BL/6 mice were divided into four groups; control, tail-suspension, tail-suspension +vitamin D, tail-suspension+HMB. After subjected to tail-suspension, they were sacrificed, then soleus muscles were collected and weighed. Cross-sectional areas (CSAs) of the soleus muscles were also calculated. Atrogenes expression in soleus muscles and serum interleukin-6 (IL-6) concentration in tail-suspended mice were also investigated. As a result, soleus muscle weight and CSAs decreased during tail-suspension period, and vitamin D or HMB inhibited the decrease significantly ($p<0.01$). Atrogene expression was also inhibited significantly by vitamin D or HMB. In addition, vitamin D and HMB coordinately inhibited serum IL-6 expression induced by tail-suspension.Conclusion: Vitamin D and HMB ameliorated tail-suspension-induced muscle atrophy possibly mediated by inhibiting IL-6 expression and by modulating atrogene expression, further suggesting therapeutic effects of vitamin D and HMB on sarcopenia.

**P46- SELF-REPORTED PHYSICAL FUNCTION IS REDUCED IN PERSONS WITH DYNAPENIA AND OBESITY: DATA FROM THE LONGITUDINAL OSTEOARTHRITIS INITIATIVE.** J.A. Batsis[1,2], A.J. Zbehlik[1,2], D. Pidgeon[2], S.J. Bartels[1,2] *(1. Hanover, USA; 2. Lebanon, USA)*

Background: Muscle strength (dynapenia) declines with age placing individuals at risk for mobility impairments. Obesity is also associated with functional and mobility impairment, increasing one's risk for falls leading to institutionalization. Co-occurring obesity and dynapenia places individuals at great risk for adverse events, and increases the potential negative impact on self-reported health. We identified the impact of both dynapenia and obesity on self-reported health status in a cohort at risk for developing osteoarthritis. Methods: We identified older adults aged ≥60years from the longitudinal Osteoarthritis Initiative. We identified tertiles of knee extensor strength (KES) in each sex, and classified subjects as having dynapenia if their KES was in the low tertile (males<365.8N; females <235.3N). Obesity was defined using the standard body mass index (BMI) category of ≥30kg/m2. Four categories based on these combinations were created: dynapenia with obesity (DynO); dynapenia without obesity (DynWO); obesity without dynapenia (OWDyn); and subjects without either dynapenia or obesity (WDynWO). We ascertained longitudinal Physical (PCS) and Mental Component (MCS) scores of the SF-12 at baseline, one, 2, 3, and 4 years. We performed a longitudinal data analysis using linear mixed models with random effects, adjusting for age, sex, Charlson co-morbidity index, race, education, smoking status, physical activity and study-specific cohort type (incident, progression, control). We included a time x cohort interaction to determine rate of change longitudinally in each grouping. Results: Our cohort consisted on 2,252 subjects, ranging in age from 66.3 to 70.5years, with 1,269 (56.3%) female. Subjects with dynapenia (with and without obesity) and those without dynapenia, had KES in males (302 vs. 483 N;$p<0.001$) and females (185 vs. 321 N;$p<0.001$), respectively at baseline. Prevalence of Dynapenia with obesity was 9.0% each in both males and females. Unadjusted PCS scores decreased in all groups and in both sexes between baseline and follow-up. However, there were no changes in the difference in PCS scores across the four groups in either sex (males: $p=0.38$; females: $p=0.20$). There were no significant changes in MCS scores within groups in either sex. Multivariable analyses and time x group interactions are represented below: Conclusion: Dynapenic Obesity is associated longitudinally with markedly reduced physical measures of self-reported health and not mental health on the SF-12 in both males and females. While overall rates decline with time, individual rates of change for those with DynO in a 4-year time period likely occurred prior to study onset, suggesting the importance of targeting individuals early on clinically, who present with risk factors for osteoarthritis.

| | **Males** | | | | **Females** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Physical** | | **Mental** | | **Physical** | | **Mental** | |
| | **β± s.e.** | **P** | **β± s.e.** | **P** | **β± s.e.** | **P** | **β± s.e.** | **P** |
| Intercept | 52.6±3.9 | <0.001 | 54.1±3.49 | <0.001 | 51.5±3.47 | <0.001 | 44.2±3.29 | <0.001 |
| DynO | -6.12±0.89 | <0.001 | 0.186±0.79 | 0.81 | -5.15±0.79 | <0.001 | -0.621±0.75 | 0.42 |
| DynWO | -1.15±0.61 | 0.06 | -0.101±0.54 | 0.85 | -1.90±0.52 | <0.001 | -0.590±0.50 | 0.24 |
| OWDyn | -2.40±0.61 | <0.001 | -0.931±0.54 | 0.09 | -2.42±0.55 | <0.001 | -0.275±0.52 | 0.60 |
| WDyn WO | Referent | --- | Referent | --- | Referent | --- | Referent | --- |
| Time | -0.44±0.10 | <0.001 | -0.097±0.09 | 0.29 | -0.38±0.08 | <0.001 | -0.109±0.077 | 0.15 |
| T x DynO | -0.05±0.24 | 0.84 | 0.033±0.22 | 0.88 | 0.07±0.19 | 0.71 | 0.234±0.19 | 0.22 |
| T x DynWO | -0.35±0.16 | 0.03 | 0.165±0.15 | 0.27 | -0.05±0.13 | 0.70 | -0.086±0.13 | 0.51 |
| T x OWDyn | -0.06±0.16 | 0.70 | -0.077±0.15 | 0.61 | -0.32±0.13 | 0.01 | 0.126±0.13 | 0.13 |
| T x WDyn WO | referent | --- | Referent | --- | Referent | --- | Referent | --- |

Scores represent the Physical and Mental Component Scales of the Short-Form 12 Questionnaire. Time x Group interaction is reflected in the lower pane of the table; Abbreviations: DynO – Dynapenia with Obesity; DynWO – Dynapenia without Obesity; OWDyn – Obesity without Dynapenia; WDynWO – Without Dynapenia without Obesity; T - Time

**P47- PRE-SARCOPENIA (LOW MUSCLE MASS) DIFFERENTIATES WOMEN WITH LOW BONE MASS (BM) AND OSTEOPOROTIC FRACTURES FROM THOSE WITH LOW BM AND NO FRACTURES.** C. Mautalen, S. Mastaglia, A. Bagur, B. Oliveri *(Buenos Aires, Argentina)*

Background: Sarcopenia and Bone fractures: According with several studies ~ 64% of women and 95% of men with hip fractures had sarcopenia (1,2). Also 23% of patients with

one vertebral and 44% of those with two or more vertebral fractures had sarcopenia (3). Hypothesis: Do patients with osteopenia/osteoporosis (by BMD T-score) are at a higher risk to suffer an osteoporotic fracture if there muscular mass (MM) is low or are in the pre-sarcopenia status? Herewith we present a retrospective study suggesting that a low MM might be an important risk factor to suffer bone fractures on women with osteopenia /osteoporosis of the total skeleton. Study Design: Retrospective study: (Revision of bone mineral density studies of the total skeleton) of patients coming for a possible bone disease during the last 2 years. Total number of studies reviewed (n=41). Bone mineral density (BMD) of skeleton <-1DS (n=38). No Fractures (n=27), *Fractures (n=11). *Vertebral (n=6); no vertebral (n=4) and both (n=1). Variables analyzed: BMD of total skeleton, Total Fat mass, Total Lean mass. Index assessed: Arms lean mass /height2, Legs lean mass / height2. Appendicular lean mass (arms+legs) /height2, Muscle strength or performances were not assessed. Results: The results of the whole group were: Age 75 ± 8 years old, body mass index (BMI) 25.4 ± 4.0 kg/m², fat mass (kg) 24.1 ± 6.9, lean mass (kg) 34.1 ± 3.4 and total skeleton T-score -2.03 ± 0.82. Appendicular Muscle Mass (aMM) (kg/m²) 5.99 ± 0.72. Arms MM (arMM) (kg/m²) 1.44 ± 0.21 and legs MM (lMM) (kg/m²) 4.55 ± 0.6. The T-score of the aMM was -1.16±1.03.aMM had a significant correlation with lean mass (r= 0.63; p< 0.001 ) but a weak correlation with fat mass (r= 0 .42;p<0.01). arMM and lMM had the same correlation with lean mass (r= 0.63; p<0.001) and somewhat reduced correlation among them (r= 0.57; p<0.001). Nine patients (25%) had an aMM below 2 SD of young reference woman (Presarcopenia) and 12 (31%) patients had a T- score between -1 and -2 SD (low aMM). The group of patients with osteoporotic fractures (Fx) (n=11) was compared with the group without fractures (NoFx)(n=27) Although the former had greater age, lower BMI, lower fat mass, and lower BMD T-score the differences on this items were not significant. In contrast, statistically significant differences were observed on aMM (5.49 ± 0.57 vs. 6.16 ± 0.68 < p 0.005) aMM T-score (0.86 ± 0.96 vs. 1.87 ± 0.81 p < 0.005), arms MM (1.24 ± 0.18 vs. 1.51 ± 0.15; p< 0.001), legs MM 4.25 ± 0.4 vs 4.7 ± 0.6; p < 0.03) and total lean mass (32.3 ± 25 vs. 35.2 ± 37.0; p < 0.02). Five out of 11 (45%) of Fx patients had Presarcopenia and 5/11 (45%) had low aMM. One obese patient of this group had a normal aMM. In contrast only 15% of NoFx patients had Presarcopenia, and 27% low aMM. Conclusions: In this retrospective study of patients with osteopenia, those with bone fractures had a significant diminution of their appendicular muscle mass (aMM) compared to non-fractured patients. The diminution was more pronounced at the arms level compared to the legs. These results emphasize the need to assess aMM on patients with osteopenia with or without osteoporotic fractures to detect a risk factor for bone and general health. The study should also include evaluation of muscle strength and performance. References: 1- Di Monaco M, Castiglioni C, Vallero F et al. Sarcopenia is more prevalent in men than in women after hip fracture: a cross-sectional study of 591 inpatients. Arch Gerontol Geriatric, (2012) 55: 48-52. 2- Fiatarone Singh MA, Singh NA, Hansen RD, et al. Methodology and baseline characteristics for the Sarcopenia and Hip Fracture study: a 5-year prospective study. J.Gerontol A Biol Sci Med Sci, (2009) 64: 568-74. 3- Iolascon G, Giamattei MT, Moretti A, et al. Sarcopenia in women with vertebral fragility fractures. Aging Clin Exp Res (2013) Supl 1, S 129-131.

**P48- ELDERLY HAND AS A NEW GERIATRIC SYNDROME IN CARDIOLOGICAL PRACTICE.** E.I. Korshun, A.N. Ilnitski *(Saint-Petersburg, Russia)*

Backgrounds: Senile patients are the major part of all cardiological patients. They can be characterized as the patients with multimorbidity pathology with the many geriatric syndromes that affect to the complications and prognosis of cardiac diseases including different types of arrhythmia. Usually such patients are frail because of many reasons, including the low adherence to the medication. The reasons of such phenomenon are mutual, but one of them is a new geriatric syndrome - elderly hand. We studied the impact of the elderly hand syndrome to the decreasing of adherence to treatment and affecting of frailty in senile patients with arrhythmia. Methods. Prospective study to assess the status of arteries, veins, skin condition and mobility of hands in geriatric cardiology patients with arrhythmia, to study communication pathogenetic mechanisms of development of this syndrome (trophic disorders, disorders of vascularization, disorders of innervation, bone and joint disorders, infectious lesions, the deficiency of hygienic care, occupational pathology) with the development of low adherence to treatment of senile patients with arrhythmia. Results. We observed that elderly hand in senile patients with arrhythmia is characterized by trophic disorders, disorders of vascularization, disorders of innervation, bone and joint disorders, infectious lesions, the deficiency of hygienic care, occupational pathology in cardiac patients; we determined the prevalence of major syndromes (lesions of the skin and its appendages, lesions of bones and joints, the damage of the muscle tissue, neurological lesions of the central genesis, neurological disorders of the peripheral dysfunction, vascular lesions). The main problem of such local status is decreasing of functional capacity of the hand and the low level of slim motor movement. That's why senile patients had the problems with consumering of pills, including antiarrhythmic, antihypertensive, anticoagulative, antiischemic and other drugs of cardiac group. It causes the low adherence to such treatment, which leads to decreasing of health status and vulnerability of cardiac pathology that leads to development constant forms of arrhythmia. We developed complex approaches to therapy of cardiac patients with arrhythmia, including elderly hand, which leads to the decreasing of geriatrics syndromes and frailty due to the increasing of adherence to specific cardiological treatment. Conclusion. The results of the study gave the opportunity to include the syndrome «elderly hand» in a comprehensive evaluation of cardiac patients with arrhythmia, to develop and improve treatment of senile patients with cardiac diseases and different degree of development of this syndrome.

**P49- FRAILTY IN ELDERLY- A NUTRITIONAL EVALUATION.** M. Shaheen, S. Puri *(New Delhi, India)*

Background: The present investigation was an exploratory study to assess frailty in elderly above 70 years of age and determine the influence of nutritional and lifestyle factors on frailty among them. Methods: Assessment of frailty was done using tests for physical parameters which included tests for functional ability (Activities of Daily Living and Instrumental Activities of Daily Living), gait agility and balance (Timed-Up and Go test), lower extremity test (Sit-to-Stand Test), dynamic balance and skeletal muscle soundness (Functional reach Test and Hand Grip Strength Test). Assessment of psychological and mental health was based on using tests for confidence (Activity-specific Balance Confidence Scale) and Mini Mental State Examination to assess the cognitive ability of the elderly subjects. Nutritional risk was assessed using the Mini Nutritional Assessment and one day 24 hour dietary recall. Anthropometric evaluation of the subjects included measurement of height, weight, waist and hip circumference and Mid-Upper Arm Circumference. Body Mass Index and Waist Hip Ratio were also determined. Results: Majority of the subjects (60 %) belonged to the age group 70 to 75 years of age, were males (68.6 %), married (77.1%) had three to four children (60 %), were graduates (9 %), more so in the younger age group, working in government service (50 %) and now retired (72.9 %), living in nuclear families (61 %) in their own dwelling. Assessment of frailty among the subjects revealed that 18.6 percent of the subjects were frail and the rest (81.4 %) were categorised as non-frail. Frailty was higher in the older age group (≥ 81 years) and more in males. In terms of their functional ability, no significant differences were found between frail and non-frail groups. Only 7.7 percent of the frail individuals required assistance in performing their activities of daily living. The data on IADL revealed that only one frail subject was totally dependent on others while the same number was for total independency. A significantly higher percentage of frail elderly perceived their health to be poor (93.7 %) as compared to non frail (4.3 %) elderly (p<0.05). The morbidity data indicated that 58.5 percent of the subjects reported joint pains while 17 percent reported breathlessness. Vertigo (30.8 % vs. 5.3 %) and hearing problems (30.8 % vs. 7 %) were significantly higher in frail subjects as compared to non-frail subjects (p<0.05). Over 52 percent of the subjects reported hypertension and 21 percent diabetes. Significantly higher number of frail subjects (30.7 %) were taking more than three prescription drugs. Distribution of subjects according to the physical activity undertaken revealed that majority of both the non-frail and frail subjects had a sedentary lifestyle. Over half of the frail subjects (53.8 %) rarely engaged in any type of exercise while 68.4 percent of the non-frail subjects undertook some form of exercise on a regular basis. Majority of the subjects was not cognitively impaired and no significant differences were seen in both the groups. Majority of the elderly subjects (78.6 %) had complete confidence in performing selected activities as given in the ABC scale. Frail subjects had a lower mean weight (57 kgs) as compared to non-frail subjects (64.71 kgs). Significantly higher percentage of frail subjects (38.5 %) experienced weight loss of more than 3 kgs in the past three months. Almost 30 percent of the frail elderly had BMI less than 18.5 kg/m2 (WHO, 2004). Mean waist circumference of frail subjects were lower (97.38 cms) as compared to the non-frail subjects (103.85 cms), although no significant difference was noted between the two groups. All the frail subjects (men and women) had the mean WHR greater than the recommended cut-off and had MUAC more than 21 cms. According to the total MNA score, a significantly higher number of most frail elderly (69.23 %) were at risk of malnutrition as compared to non-frail elderly (37 %). Nutrient intake analysis did not reveal any significant differences in intakes between the two groups. When compared to RDA, the mean intakes of both frail and non-frail group was higher than the RDA for calcium, thiamin, vitamins A and C and it was lower than the RDA for energy, protein, iron, riboflavin and niacin. Pearson's correlation was used to study the association of frailty with certain variables like age, health, nutrition and lifestyle factors. Frailty had a significant positive correlation with poor self-health perception (p<0.05), vertigo (p=0.001), low physical activity (p=0.001), intake of more than 3 prescription drugs per day (p<0.05), total MNA score (p=0.005) and negative correlation with energy and protein intake (p>0.05) and ADL scores (p>0.05). Conclusion: Early identification of frailty, through its predictors and determinants is vital in ensuring good functional ability in advancing years. Adopting prevention strategies like nutrition and exercise interventions will help in delaying frailty and improving the overall health and quality of life of the elderly

**P50- RELIABILITY OF EIGHT MUSCLE STRENGTH MEASURES OBTAINED WITH A HAND-HELD DYNAMOMETER IN AN ELDERLY POPULATION.** F. Buckinx, J.-L. Croisier, J.-Y. Reginster, N. Dardenne, C. Beaudart, J. Slomian, O. Bruyère *(Liège, Belgium)*

Background: Decreased muscle strength is common among older people, especially in nursing home, which represents a risk factor for various adverse events such as falls, hospitalizations and deaths. A reliable muscle performance measurement is of primary importance and could be reached with highly specialized instruments (e.g. isokinetic device). However, these equipments are not hand-held making assessment of muscle function more difficult in specific conditions (e.g. in nursing home). The goal of this study was to assess the reliability of a hand-held dynamometer for isometric strength measurements among nursing home residents. Methods: The isometric muscle strength of the nursing home residents was assessed for 8 different muscle groups (knee extensors and flexors, hip abductors and extensors, ankle flexors and extensors, elbow flexors and extensors), using a wireless digital hand-held dynamometer, the MICROFET2 device (Hogan Health Industries, Inc. 8020 South 1300 West, West Jordan, USA). Strength measurements were performed at T0, after 4 days (T4) by the same operator and after 8

days (T8) by a second operator. Three maximal contractions for each muscle group were performed with 30 seconds intervals between contractions. The highest performance was considered for analysis. IntraClass Coefficient (ICC) was computed to assess the reliability of the test-retest of the MicroFET2 performed by the same operator or by two different ones. The closer coefficient to 1, the higher the reliability. We considered an ICC over 0.90 as very high, between 0.70 and 0.89 as high and between 0.50 and 0.69 as moderate. Results: A total of 30 elderly subjects (75.0±11.2 years, 50% of women) were enrolled in this study. ICC used to characterize the reliability of the test-retest performed by the same operator, ranged from 0.60 (0.37-0.83) for the ankle extensors to 0.85 (0.74-0.95) for the elbow flexors. When considering the test-retest performed by two different operators, the ICC values ranged from 0.62 (0.41-0.84) for the ankle extensors to 0.87 (0.79-0.96) for the elbow extensors. ICC values higher than 0.70, indicating a high reliability, were observed for all muscle groups, except for the ankle extensors (intra- and inter- observer) and for dorsi-flexor ankle (intra-observer). Conclusion: Muscle strength measures obtained with a hand-held needed a standardized protocol but also standardized instructions to patients. Under these conditions, the measure of muscle strength by the MicroFET2 is reliable for many muscle groups when performed either by the same operator or by two different ones.

**P51- PREVALENCE OF FRAILTY IN NURSING HOME RESIDENTS ACCORDING TO VARIOUS DIAGNOSTIC TOOLS.** F. Buckinx, J.Y. Reginster, N. Dardenne, C. Beaudart, J. Slomian, S. Gillain, J. Petermans, C. Ricour, E. Goffart, O. Bruyère *(Liège, Belgium)*

Introduction: Recent studies highlighted the large discrepancies regarding the prevalence of frailty. It could be explained, at least partly, by the large number of operational definitions of frailty that currently exists. However, the exact consequence of the use of different diagnostic tools on the prevalence of frailty has been rarely investigated in the same population. Even if it should be acknowledged that there is no specific definition of frailty validated for nursing home residents, there are very few data assessing the impact of various currently used definitions of frailty on its prevalence in the specific context of nursing home. Methods: Patients resident in nursing home were defined as frail or not according to ten diagnostic tools: Clinical Frailty Scale, Groningen Frailty Indicator, Edmonton Frail Scale, Frail Scale Status, Frailty Index, Fried definition, Sega Grid, Share Frailty Index, Strawbridge Questionnaire and Tilburg Frailty Indicator. The percentage of pre-frail subjects was also evaluated by 3 of these 10 tools: Frail Scale status, Fried definition and Share Frailty Instrument. The percentage of frail and/or pre-frail subjects for each tool was calculated and the agreement between the different tools was measured using the kappa Cohen's coefficient and its 95% confidence interval. The association between the different diagnostic tools and subjects characteristics was assessed by multiple regression or logistic regression. Results: A total of 200 volunteers institutionalized subjects (mean age: 83.4 ± 9.27 years, 75% of women) were enrolled in this study. Prevalence of frailty varies from 1.99% (Frailty index) to 79.9% (Groningen Frailty Indicator) depending on the diagnostic tool used. The percentage of pre-frail subjects varies from 12.7% (Clinical Frailty Scale) to 59% (Fried definition). The agreement (i.e. assessed with the Kappa coefficient) between the different definition, was very low, ranging from -0.0088 (-0.043-0.025), observed between Frailty Index and Strawbridge questionnaire, to 0.36 (0.20-0.51), observed between Sega Grid and Groningen Frailty Indicator. According to the tools, it seems that significant differences are observed regarding the age of patients, their sex, their walking support, the energy expenditure, their nutritional status, their quality of life (EQ-5D and SF-36) and their functional abilities (Tinetti score, SSPB score, Timed Up and Go). Conclusion: Prevalence of frailty is highly dependent on the diagnostic tool used. It is necessary to reach a consensus on the diagnostic tools, as well as on the parameters to be measured, in order to make data obtained in epidemiological studies comparable.

**P52- CORRELATION BETWEEN MUSCLE MASS AND MUSCLE STRENGTH AND THEIR ASSOCIATION WITH PHYSICAL PERFORMANCE AND GAIT SPEED.** C. Beaudart, J.-Y. Reginster, J.-L. Croisier, J. Slomian, F. Buckinx, M. Locquet, A. Quabron, O. Bruyère *(Liège, Belgium)*

Background: The loss of muscle mass and muscle strength is a consequence of the aging process. Few data have assessed the relationship between muscle mass and muscle strength but also between these muscle parameters and functional capacities. The purpose of this study was not only to determine the cross-sectional relationship between muscle mass and muscle strength but also to assess their association with physical performance and gait speed. Methods: Participants were voluntary community-dwelling subjects aged 65 years and older enrolled in the SarcoPhAge study, a 5-year prospective Belgian study. Lean mass was measured by Dual-Energy X-Ray Absorptiometry (DXA). Handgrip strength was measured by a hydraulic dynamometer. Physical performance was measured by the Short Physical Performance Battery test and gait speed was measured on a 4-meter distance. The lowest sex-specific quartile of muscle mass (i.e. lowest quartile of muscle mass for women and lowest quartile of muscle mass for men) and of muscle strength (i.e. lowest quartile of muscle strength for women and lowest quartile of muscle strength for men) were calculated. Results: Among the 534 subjects recruited in the SarcoPhAge study, 322 (60.5 %) were women. The population mean age was 73.5 ± 6.16 years. Total muscle mass was strongly correlated with muscle strength (r=0.71, p<0.001). Both lower and upper limbs muscle mass were significantly associated with muscle strength (r=0.76, p<0.001 for upper limbs muscle mass versus r=0.70, p<0.001 for lower limbs muscle mass). Subjects who presented the lowest sex-specific quartile of muscle mass presented a significant reduced gait speed compared to others (respectively 0.91±0.29m/second versus 0.99±0.28m/second, p=0.003) but also a lower score at the SPPB test compared to others (respectively 8.92±2.48 points versus 9.47±2.33 points, p=0.02). Compared to the higher quartiles, subjects that presented the lowest sex-specific quartile of muscle strength also presented a significant reduced gait speed (respectively 1.05±0.27m/second versus 0.82±0.26m/second, p<0.001) and a lower score at the SPPB test (respectively 9.98±1.92 points versus, 7.83±2.66 points, p<0.001). Discussion: Total muscle mass and appendicular muscle mass were significantly associated with muscle strength. Based on these results, therapeutic strategies against sarcopenia focused on both aspects of muscle (i.e. muscle mass and muscle strength) should be investigated. Moreover, interestingly, measuring the muscle strength in the upper limbs is linked to the measures of lower limbs muscle performance such as gait speed or the Short Physical Performance Battery test. Prospective studies are still needed to confirm these data.

**P53- IS THERE A SPECIFIC PATTERN OF LEAN / FAT MASS RATIO IN SARCOPENIC SUBJECTS?** C. Beaudart, J.-Y. Reginster, J.-L. Croisier, J. Slomian, F. Buckinx, M. Locquet, A. Quabron, O. Bruyère *(Liège, Belgium)*

Background: Body composition changes with aging. Cross-sectional and longitudinal data have shown that aging is associated with a decrease in lean mass and increase in fat mass. Sarcopenia is characterized by a decrease in lean mass but the distribution of fat mass in this population is still poorly investigated. Methods: Sarcopenia was diagnosed by the definition of the European Working Group on Sarcopenia in Older People (EWGSOP). Total lean mass and total fat mass was measured by Dual-Energy X-Ray Absorptiometry (Hologic Discovery A, USA). Results: 534 subjects aged 73.5±6.16 years were recruited for this study: 322 subjects were women and 212 were men. Among these subjects, 73 were diagnosed sarcopenic. The sarcopenic subjects presented a mean of 37.8±7.58 kg of lean mass versus 46.1±10.9 kg for non-sarcopenic (p<0.001). Regarding fat mass, a total of 21.1±6.69 kg of fat mass was distributed in sarcopenic subjects which was significantly lower than non-sarcopenic subjects (26.3±8.38kg, p<0.001). However, the percentage of lean mass of the total body weight does not differ significantly between groups. Indeed, the amount of lean mass in sarcopenic subjects represented 63.8±8.69% of the total body mass versus 63.2±7.51% for non-sarcopenic (p=0.48). Consequently, the percentage of fat mass of the total body weight do not differ either between sarcopenic and non-sarcopenic subjects (p=0.41). No sex-effect was observed for these results. Discussion: Even if sarcopenic subjects presented a significant reduced amount of lean mass and fat mass in terms of kg, the percentage of lean mass and fat mass was identical in sarcopenic subjects compared to the non-sarcopenic subjects. Consequently, the ratio lean mass / fat mass does not seem to differ between sarcopenic and non-sarcopenic subjects.

**P54- HEALTH RELATED QUALITY OF LIFE IN SARCOPENIA** C. Beaudart, J.-Y. Reginster, J. Slomian, F. Buckinx, M. Locquet, A. Quabron, O. Bruyère *(Liège, Belgium)*

Background: Health related quality of life (HRQoL) has been poorly investigated in subjects with sarcopenia. The aim of this cross-sectional study was to compare the quality of life of subjects suffering from sarcopenia and severe sarcopenia with non-sarcopenic subjects. Methods: Participants were community dwelling subjects aged 65 years or older. To diagnose sarcopenia, we applied the definition of the European Working Group on Sarcopenia in Older People (Cruz-Jentoft et al. 2010, Age & Ageing). Muscle mass was measured by Dual-Energy X-Ray Absorptiometry, muscle strength by a hydraulic dynamometer and physical performance by the Short Physical Performance Battery test. Sarcopenia was defined by a loss of muscle mass associated with a loss of muscle strength or physical performance. Sarcopenia was characterized as severe when all three criteria of the definition were met. HRQoL was assessed by the SF-36, the EQ-5D and the EQ-VAS scales. Results: 534 subjects were recruited for this study (60.5 % of women, mean age of 73.5 ± 6.16 years). Prevalence of sarcopenia was 13.7% and prevalence of severe sarcopenia was 5.99%. Sarcopenic subjects presented a significant worse HRQoL, assessed with the SF-36, in the domains of physical function (51.9 ± 29.2 % for sarcopenic subjects versus 65.2±25.2% for others, p<0.001) and general health (53.6 ± 20.2 % for sarcopenic subjects versus 58.4 ± 17.9 % for others, p=0.04). No difference was observed for the other domains of the SF-36 (role limitation due to physical problems, bodily pain, vitality, social functioning, role limitation due to emotional problem, and mental health). Severe sarcopenia was associated with reduced quality of life in 5 of the 8 domains of the SF-36: physical functioning (p<0.001), social functioning (p=0.002), role limitation due to physical problems (p=0.047), vitality (p=0.009) and general health (p=0.002). With the EQ-5D, no difference was found between sarcopenic subjects and non-sarcopenic ones. However, severe sarcopenic subjects presented a significant worse quality of life based on the EQ-5D (0.65 ± 0.24 points, for severe sarcopenia vs 0.53 ± 0.26 points for others, p=0.008). With the EQ-VAS, no difference was observed for either sarcopenia or severe sarcopenia. Discussion: Severe sarcopenic subjects present a reduced HRQoL. When all sarcopenic subjects are taken into account, the association is less obvious and only specific domains, such as mobility or physical function, are more affected by sarcopenia. However, subtle effects of sarcopenia on HRQoL could have been missed by the generic non-specific instruments used in this study. Therefore, a specific tool could be necessary to assess the real impact of sarcopenia on health related quality of life.

**P55- MUSCLE FATIGUE RESISTANCE AND SELF-PERCEIVED FATIGUE IN RELATION WITH SARCOPENIA AND QUALITY OF LIFE.** C. Beaudart, J.Y. Reginster, I. Bautmans, J.-L. Croisier, J. Slomian, F. Buckinx, M. Locquet, A. Quabron, O. Bruyère *(Liège, Belgium)*

Introduction: Reduced grip strength is a clinical component of sarcopenia that seems to be associated with a lower quality of life. Contrary to grip strength, the grip fatigue

resistance and the self-perceived fatigue are poorly investigated in populations of elderly subjects. In this study, we aimed to measure the relationship between these fatigability features, sarcopenia and quality of life. Methods: The SarcoPhAge study is an ongoing longitudinal study following 534 community-dwelling elderly subjects aged 73.5 ± 6.16 years. Sarcopenia was defined by the algorithm suggested and developed by the European Working Group on Sarcopenia in Older People for this study. Quality of life was assessed with the SF-36 questionnaire. Grip fatigue resistance, or grip work, was measured with a hydraulic handgrip dynamometer and was recorded as the total effort produced during the test. The following formula was used: Grip Work = (Grip Strength (kg) × 0.75) × Fatigue Resistance, where fatigue resistance is the time (in seconds) taken for the grip strength to drop to 50% of its maximum (Bautmans et al. 2005. Clinical and Experimental Research). Self-perceived fatigue following daily-life activities was estimated using the Mobility-Tiredness scale. The lowest quartile of grip work and the highest quartile of self-perceived fatigue were then calculated and four groups of subjects were herewith defined: A) a group with low grip strength and high self-perceived fatigue, B) a group with low grip work and low self-perceived fatigue, C) a group with high grip work and high self-perceived fatigue and finally, D) a group with high grip work and low self-perceived fatigue. Results: Among subjects enrolled in the SarcoPhAge study, 97.9% get measurements of grip work and self-resistance fatigue and were consequently included in the present study. The prevalence of sarcopenia was significantly higher in group A with low grip work and high fatigue (30.5%) compared to group B (18.9%), group C (13.5%) and group D (10.3%) (p=0.002). Quality of life was dependant of the grip work performance and more importantly of the self-perceived fatigue. Indeed the lowest quality of life was observed in subjects from group A, followed by subjects from group C, subjects from group B and finally, subjects from group D (p<0.001 for all domains of the SF-36 questionnaire) (Table 1). Moreover, correlations observed between self-perceived fatigue and all domains of quality of life were systematically higher than correlations observed between grip work and quality of life (e.g. r=0.67 vs r=0.27 for physical function ; r=0.56 vs r=0.15 for general health ; r= 0.40 vs r=.18 for mental health). Discussion: Reduced muscle resistance and high perceived-fatigue seem both in relationship with sarcopenia and reduced quality of life. Sarcopenia should be assessed in elderly subjects complaining from fatigue or poor muscle resistance.

**Table 1**
Clinical characteristics of subjects of group A, group B, group C and group D

| | Low grip work, high self-perceived fatigue – Group A (n=36) | Low grip work, low self-perceived fatigue – Group B (n=95) | High grip work, high self-perceived fatigue – Group C (n=52) | High grip work, low self-perceived fatigue – Group D (n=340) | p-value |
|---|---|---|---|---|---|
| Age (years) | 76.8 ± 6.7 | 74.5 ± 6.5 | 74.5 ± 5.54 | 72.7 ± 5.93 | <0.001 |
| Sex | | | | | |
| Women n (%) | 35 (97.2) | 83 (87.4) | 27 (51.9) | 169 (49.7) | <0.001 |
| BMI (km/m²) | 27.1 ± 6.3 | 25.9 ± 4.35 | 28.3 ± 5.32 | 26.5 ± 4.61 | 0.03 |
| Muscle mass (kg) | 37.5 ± 6.87 | 39.0 ± 6.74 | 46.9 ± 8.54 | 47.2 ± 11.7 | <0.001 |
| Muscle strength (kg) | 17.6 ± 9.48 | 20.2 ± 7.32 | 28.1 ± 7.85 | 32.2 ± 11.1 | |
| Sarcopenia n (%) | 11 (30.5) | 18 (18.9) | 7 (13.5) | 35 (10.3) | 0.002 |
| Quality of life | 29.2 ± 26.0 | 63.3 ± 22.2 | 31.3 ± 21.7 | 71.9 ± 21.6 | <0.001 |
| SF-36 PF (%) | 47.2 ± 25.4 | 68.4 ± 24.2 | 51.4 ± 25.8 | 74.8 ± 20.9 | <0.001 |
| SF-36 SF (%) | 16.7 ± 31.1 | 53.7 ± 40.9 | 18.7 ± 30.5 | 65.6 ± 37.9 | <0.001 |
| SF-36 RP (%) | 21.3 ± 36.6 | 58.6 ± 42.0 | 32.7 ± 36.4 | 67.5 ± 37.9 | <0.001 |
| SF-36 RE (%) | 43.4 ± 17.8 | 61.1 ± 19.4 | 47.2 ± 17.6 | 64.4 ± 17.9 | <0.001 |
| SF-36 MH (%) | 29.3 ± 16.9 | 52.4 ± 16.5 | 34.4 ± 16.6 | 54.9 ± 16.2 | <0.001 |
| SF-36 VT (%) | 31.6 ± 23.0 | 55.7 ± 27.1 | 35.8 ± 21.9 | 61.4 ± 22.8 | <0.001 |
| SF-36 BP (%) | 35.6 ± 18.5 | 60.0 ± 17.1 | 39.3 ± 17.0 | 62.2 ± 15.2 | <0.001 |

PF= physical functioning, SF = social functioning, RP = role limitation due to physical problems, RE = role limitation due to emotional problem, MH = mental health, VT = vitality, BP = bodily pain.

**P56- EXPLORATION OF TRUNK MUSCLE COMPOSITION AND SELECT PHYSICAL PERFORMANCE MEASURES: A PRELIMINARY ANALYSIS AMONG OLDER ADULTS WITH AND WITHOUT CHRONIC LOW BACK PAIN.** J.M. Sions[1], P. Coyle[1], T. Velasco[1], J.M. Elliott[2], G.E. Hicks[1] *(1. Newark, USA; 2. Chicago, USA)*

Background: Among older adults, larger magnitudes of intramuscular fat in trunk muscles have been associated with and predictive of poorer physical performance on the Health ABC Physical Performance Battery, which includes repeated chair rise, balance tasks, the 6 meter walk test, and the narrow 6 meter walk test; low back pain (LBP) has been shown to moderate this relationship (Hicks et al 2005). However, among older adults, the relationship between intramuscular fat and other physical performance measures remains relatively unexplored. Magnetic resonance imaging (MRI) affords a gold-standard measure for accurately delineating fat from muscle and can be used to quantify muscle-fat infiltration indices (MFIs) as well as relative muscle cross-sectional area (rmCSA), i.e. total CSA minus intramuscular fat CSA (Elliott et al 2013, 2014). The purpose of this cross-sectional analysis was to determine if MFI and rmCSA were associated with select physical performance measures in older adults with and without chronic LBP. We hypothesized that multifidi and erector spinae MFI, but not rmCSA, would be associated with the following tests among older adults: 8 foot walk test, Timed Up and Go, and fast stair performance and that MFI associations with physical performance measures would be stronger among older adults with chronic LBP. Methods: This is a preliminary analysis of 20 community-dwelling adults, ages 60-85 years, with (n=10) and without (n=10) chronic LBP who are part of a total sample of 102 participants (50% with chronic LBP). Participants with chronic LBP, i.e. defined as ≥ 3 months duration of LBP, had to have pain ≥ 3/10 on the pain thermometer. Individuals were excluded if they had a history of low back surgery, had received services for LBP within the past 6 months, had experienced a recent traumatic event, or if he/she had a neurological disorder or terminal illness. Participants underwent a standardized clinical examination including physical performance testing as well as lumbar spine T1-weighted MRI on a 1.5 Tesla scanner (Siemens MAGNETOM Erlangen, Germany). Right and left relative cross-sectional area (rCSA), i.e. muscle plus intramuscular fat, measurements were taken for the L4 multifidi and erector spinae (longissimus + iliocostalis) by tracing just inside the muscle borders on axial MRI slices using Image J software (National Institutes of Health, Bethesda, MD). Using the Image J histogram function, pixel intensity summaries were obtained for each rCSA and an area of extramusclar fat lateral to the erector spinae to allow computation of MFIs, i.e. mean rCSA pixel intensity/mean extramuscular fat pixel intensity. rmCSA was computed as (1-MFI)*rCSA, effectively removing the T1-weighted fat from the rCSA. Right and left sides were averaged. Using IBM SPSS Statistics 22 (SPSS, Inc., Chicago, IL), linear regression was used to assess the percentage of the variance in multifidi and erector spinae MFI that explained physical performance among older adults with and without chronic LBP, while controlling for age, sex, and pain intensity (p< .05). Results: Mean age of the sample was 70.9±7.7 years (55% female). After controlling for age, sex, and average pain over the past 24 hours, among older adults with chronic LBP, the addition of multifidi MFI (mean±SD=.51±.08) explained an additional 50% of the variance in Timed Up and Go (mean±SD=8.29±2.77 sec; p=.012), 51% of the variance in fast stair ascent (mean±SD=5.37±2.38 sec; p=.018), and 46% of the variance in fast stair descent (mean±SD=6.56±2.28 sec; p=.017). Among older adults with chronic LBP, the addition of erector spinae MFI (mean±SD=.45±.06) explained an additional 41% of the variance in 8 feet walk test (mean±SD=2.90±.87 sec; p=.018); 41% of the variance in Timed Up and Go (p=.035), 55% of the variance in fast stair ascent (p=.012), and 45% of variance in fast stair descent (p=.019). Among older adults without LBP, the addition of erector spinae MFI (mean±SD=.50±.13) explained an additional 34% of the variance in fast stair ascent (mean±SD=4.17±1.18 sec; p=.020). Multifidi (mean±SD=4.06±1.26cm2) and erector spinae rmCSA (mean±SD=6.96±1.66cm2) did not explain any additional variance in physical performance measures for either group (p>.05). Conclusion: These preliminary results seem to indicate that trunk muscle MFI, but not muscle size, is significantly correlated to not only the 8 feet walk test, which assesses gait speed, but Timed Up and Go and stair performance among older adults with chronic LBP. Correlations of trunk muscle MFIs with gait speed, Timed Up and Go, and stair performance appear to be present and/or stronger among older adults with chronic LBP when compared to those without LBP. Further participant analysis may confirm these preliminary findings and provide the foundation for future studies evaluating predictive relationships among trunk muscle MFI and physical performance among older adults with chronic LBP.

**P57- THE INDEPENDENT ROLE OF INFLAMMATION IN PHYSICAL FRAILTY AMONG OLDER ADULTS WITH MILD COGNITIVE IMPAIRMENT AND MILD-TO-MODERATE ALZHEIMER'S.** L. Tay, W.S. Lim, M. Chan, R. Ye, M.S. Chong *(Singapore)*

Background: Emerging evidence supports physical frailty as a distinct entity contributing to the heterogeneity of clinical presentation and disease progression amongst persons with Alzheimer's dementia (AD). Chronic systemic inflammation and hormonal deficits have been separately implicated in both physical frailty and cognitive impairment. The objectives of this study were to examine the independent and combined effects of systemic inflammation [interleukin-6 (IL-6) and tumour necrosis factor-α (TNF-α)] and alterations in distinctly regulated hormonal axes [insulin-like growth factor-1 (IGF-1) and dehydroepiandrosterone sulphate (DHEAS)] on (i) baseline frailty status and (ii) progressive physical frailty at one year, among community dwelling older adults with early cognitive impairment [mild cognitive impairment (MCI) and mild-to-moderate AD]. Methods: This is a prospective cohort study of older adults with MCI and mild-

moderate AD attending a tertiary Memory Clinic. We recruited 99 subjects between December 2012 and November 2013, of whom 78 subjects have completed 1-year follow-up. Physical frailty status was assessed as per the Buchmann criteria at baseline and 1-year, with progressive physical frailty being defined by the accumulation of frailty components at follow-up relative to baseline. Blood biomarkers of systemic inflammation (IL-6 and TNF-α) and anabolic hormones (IGF-1 and DHEAS) were measured at baseline and examined in relation to physical frailty status at baseline and progression at 1-year. Each subject was categorized as (i) neither pro-inflammatory nor hormonal deficient, (ii) pro-inflammatory (IL-6 or TNF-α, or both, being in highest quartile) but not hormonal deficient, (iii) hormonal deficient (IGF-1 or DHEAS, or both, being in lowest quartile) but not pro-inflammatory and (iv) both pro-inflammatory and hormonal deficient. Multiple logistic regression was performed to examine the independent role of inflammatory-hormonal deficient state on the outcome variable of physical frailty at baseline, adjusting for a priori-defined co-variates of age and gender, in addition to any significant variable in the measures of co-morbidity, nutritional status and ApoE genotype on univariate analyses. Among the 78 subjects who had completed 1-year follow-up, we performed multiple logistic regression analysis for the dependent variable of frailty progression, including inflammatory-hormonal state and the above mentioned a priori-defined and significant co-variates. Results: The mean age of the study cohort was 76.6 + 6.7 years - 16 (16.2%) subjects had MCI, 68 (68.7%) had mild AD and 15 (15.2%) had moderate AD. At baseline, 20 (20.2%) subjects fulfilled criteria for physical frailty, and they were significantly older than their non-frail counterparts (79.6 + 5.2 vs 75.8 + 6.8, p=0.022), exhibited significantly poorer physical performance (mean SPPB: 7.6 + 2.5 vs 9.0 + 2.2, p=0.016), but similar in baseline severity of cognitive impairment. Among the individual blood biomarkers, only TNF-α was significantly different, being higher in subjects who were physically frail at baseline (median TNF-α: 1.30 (0.60-1.40) vs 0.60 (0.50-1.30) pg/mL, p=0.035). When the pro-inflammatory and endocrine deficient states were examined in combination, subjects who were physically frail at baseline were significantly more likely than their non-frail counterparts to exhibit a pro-inflammatory state, either in isolation or in combination with endocrine deficiency (70% vs 36.7%, p=0.033). In the multiple logistic regression model, an isolated pro-inflammatory state was associated with significantly higher odds for physical frailty at baseline (OR 4.99, 95% C.I 1.25-19.88, p=0.023), with trend for increased odds in subjects having concurrent pro-inflammatory and endocrine deficient states (OR 3.38, 95% CI 0.67-17.01, p=0.139), referent to subjects who were neither pro-inflammatory nor hormonal deficient. Among the 78 subjects who completed 1-year follow-up, 18 (23.1%) met criteria for progressive physical frailty. An isolated pro-inflammatory state exhibited increased odds for progressive frailty at 1-year (OR 3.49, 95% C.I. 0.84-14.58, p=0.086), although not achieving statistical significance. Conclusion: Our findings provide important initial contribution toward understanding how dysregulations in inflammatory and endocrine systems impact on the adverse state of physical frailty in cognitively impaired older adults. In particular, we evidenced the significant impact of an elevated inflammatory state on frailty status at baseline. While requiring future replication before conclusive recommendations can be drawn, our preliminary findings may suggest a role for the screening of inflammatory status in selecting persons with cognitive impairment most likely to benefit from immuno-modulating therapies. This study was funded by National Healthcare Group Clinician Scientist Career Scheme CSCS/12002 and National Healthcare Group Clinician Scientist Career Scheme CSCS/13001

**P58- MOLECULAR ADAPTATION OF SARCOPLASMIC RETICULUM TO FUNCTIONAL ELECTRICAL STIMULATION AND LEG-PRESS TRAINING IN AGING.** S. Mosole[1], S. Zampieri[1,2], B. Ravara[1], S. Furlan[1], H. Fruhmann[2], S. Löfler[2], M. Vogelauer[2] , H. Kern[1,2], U. Carraro[1], Pompeo Volpe[1], A. Nori [1,2] *(1. Padova, Italy; 2. Vienna, Austria)*

Background: Physical activity plays an important role in preventing chronic diseases and muscle degeneration in adults and elderly people. Voluntary physical exercise is not always feasible and it becomes fundamental to identify protocols for alternative therapies such as Functional Electrical Stimulation (FES). Recently we found that FES has a positive impact on functional decline of muscle in seniors. Functional counteraction of muscle decline by FES has also been associated to muscle structural adaptations (1) probably ignited by changes of intracellular Calcium (Ca2+). This study investigates the effects of physical training (Leg Press) and FES on the Ca2+ sensor NFATc1 and on expression of Calsequestrin (CASQ), Sarcalumenin, Ca2+ATPase (SERCA1, 2) and Ryanodine Receptor (RYR1), i.e., key proteins involved in Ca2+ storage, uptake and release of sarcoplasmic reticulum in human skeletal muscles. Methods: Vastus Lateralis (VL) biopsies were performed before and after nine weeks of FES treatment or LP training on a group of volunteers (n= 17), mean age of 71, mean age of 72 (n= 9), respectively. NFATc1 localization was studied by immunofluoresence staining on 8$\mu$m muscle sections. Total muscle homogenates were obtained from ten 20 $\mu$m sections by shredding in 3% SDS, 5mM EDTA pH 8. 0. Comparison of CASQ, SERCA and Sarcalumenin expression was performed by densitometric scanning of Western Blots by Scion image software. Total RNA was obtained from a dozen of 20um sections using trizol extraction method. qPCR was performed using Sybr green chemistry; specific primers were designed using Primer3 software; Cyclophilin A (CypA), 60S ribosomal protein L32 (RPL32) and Beta-2 microglobulin (B2M) were tested as reference genes, being the latter the most stable. Normalization was performed by deltaCT method. Statistics: Shapiro-Wilk test was applied for Normal distribution, non parametric matched Wilcoxon test and Student' T test were performed where appropriated; significance was set at $p<0.05$). Results: Nuclear localization of NFATc1 was higher in sections obtained after FES and LP (positive nuclei pre treatments 2.85% n=7, after FES 59,42% n=6 after LP 67,00% n=2). Following the FES protocol, increase of Sarcalumenin and SERCA2 content was observed in total homogenates whereas the skeletal isoform of CASQ decreased. RYR1 RNA did not change statistically. Leg Press training did not produce any change in protein content. Conclusion. NFATC1 is a transcription factor which induces Fast to Slow conversion of fibers (2). NFATc1 translocation upon muscle overload, aerobic training and electrical activity has been demonstrated in mouse and humans (3). Our data show a significant myonuclear trans location of NFATc1 which in turn indicates activation of the Calcineurin-NFAT pathway by FES. Moreover these results show that FES potentiates Ca2+ uptake in skeletal muscle via up-regulation of SERCA2 and Sarcalumenin suggesting that FES simulates a slow-type firing pattern. References. 1) Electrical stimulation counteracts muscle decline in seniors. Kern H, Barberi L, Löfler S, Sbardella S, Burggraf S, Fruhmann H, Carraro U, Mosole S, Sarabon N, Vogelauer M, Mayr W, Kern H , Cvecka J, Romanello V, Pietrangelo L, Protasi F, Sandri M, Zampieri S, Musaro A. Front Aging Neurosci. 2014 Jul 24;6:189. 2014. (2) Schiaffino S, Sandri M and Murgia M Activity-Dependent Signaling Pathways Controlling Muscle Diversity and Plasticity Physiology 22:269-278, 2007 (3) Gundersen K Excitation-transcription coupling in skeletal muscle: the molecular pathways of exercise. Biol Rev Camb Philos Soc. 2011 Aug;86(3):564-600.

**P59- DIFFERENCES IN FRAILTY IN OLDER NURSING HOME RESIDENTS ACROSS EUROPEAN COUNTRIES: RESULTS FROM THE SHELTER PROJECT.** A. Ballokova[1], R.E. Hubbard[2], N.M. Peel[2], D. Fialova[1], G. Onder[3] *(1. Prague, Czech Republic; 2. Brisbane, Australia; 3. Rome, Italy)*

Background: Frailty is term used to describe and capture differences between older people with complex co-morbidities, dependency and disability. Nursing home residents are sometimes considered a homogenous group with a high burden of frailty. These patients are characterised mainly by numerous chronic diseases; clinical, functional and cognitive decline; accompanied by high prevalence of polypharmacy including use of potentially inappropriate medications. However, due to varying admission criteria, health care systems and prescribing practices, residents may differ across institutions and, particularly, across countries. Here, we aimed to determine the frailty status of nursing home (NH) populations across countries by using a Frailty Index (FI) measurement that conceptualises frailty as a multidimensional state capturing quantity rather than the nature of health problems.Methods: This cross-sectional study conducted in 2009-2011 in 7 European countries and Israel included 4,156 nursing home patients aged ≥65 years assessed at baseline for the EU SHELTER project. Data were collected using the interRAI Long-Term Care Facilities assessment tool. This settingspecific instrument has been standardized, revised and validated. The instrument encompasses a large number of clinical items across numerous domains, including activities of daily living, cognitive functions, communication, mood and behaviour, continence, nutrition, falls, skin condition, medical diagnosis as well as medication data. Across these multiple domains including medication records, variables indicating health deficits were selected. These health deficits needed to meet specific criteria such as being associated with health status; comprising number of different systems; increasing in prevalence with age and not saturating. Dichotomous data were coded as symptom absent = 0 deficit, present = 1 deficit. Ordinal scales were recoded as 0, 0.5 or 1 deficit based on face validity and the distribution of data. Each individual's deficit points were summed and divided by the total number of deficits considered (in this case 58) to yield a FI with theoretical range 0 – 1. Higher values indicated a greater number of problems and hence greater frailty. Individual FI scores were then stratified by countries and compared. Results: Out of 4,156 patients, 133 were excluded due to missing medications records. The mean age ± standard deviation (SD) of the sample was 83.5±9.4 years and a majority (73.2%, n=2,945) were women. The mean number of medications ± SD used was 7±3.6 with nearly one quarter of patients using more than 10 medications (24.3%). The mean FI±SD of the sample was 0.39±0.15 (interquartile range 0.274–0.500). Almost half of the residents (48.2%) were in the category of FI >0.40, a score previously associated with the clinical descriptor "severely frail". Statistically significant differences were found in means of FI across the participating countries ($p<0.001$). Residents in Germany (0.33±0.14) and The Netherlands (0.35±0.16) were the least frail. Intermediate values were seen in England (0.37±0.12), Italy (0.38±0.16) and Finland (0.38±0.12). The highest FI±SD scores were calculated for France, Czech Republic, and Israel (0.42±0.17, 0.42±0.16, 0.44±0.15; respectively). Conclusions: Using the comprehensive interRAI Long-Term Care Facilities assessment tool facilitates derivation of an FI without any additional data collection. The integral character of this tool and FI measurement results in possibility to compare outcomes within and across different countries and settings. The results of our study showed significant differences in frailty in NH settings across countries, clustering them into three groups of low, intermediate and high FI scores. As frailty is multifactorial in character, further analyses should be conducted to identify factors influencing the value of FI score in particular countries; including socio-economic and cultural parameters and health policy variances. The incorporation of FI measurement and understanding of factors associated with differences between FI scores may help to optimise and individualise health care as well as medication prescription in this vulnerable group of patients. Funding: The SHELTER study was funded by the Seventh Framework Programme of the European Union.

**P60- BONE AND MUSCLE PARAMETERS IN THE PREDICTION OF HIP FRACTURE RISK FROM THE PROSPECTIVE EUROPEAN STUDY OF FRACTURES OF THE FEMUR (COHORT EFFECT):AN IN-VIVO STUDY.** P. Pottecher, A. Muhlberg, O. Museyko, V. Bousson, K. Engelke, J.D. Laredo *(Paris, France)*

Objective: To determine, by a dedicated three dimensional quantitative computed tomography (3D QCT) analysis, the hip muscles composition changes occurring with aging and to study the combination with bone parameters in differentiating fractured and unfractured hip subjects. Material and methods: By a case control in-vivo study, ninety five women from EFFECT cohort were recruited, 37 women with low-energy hip fractures and 58 female non hip-fracture control subjects. The dedicated 3D QCT analysis tool [Medical Image Analysis Framework-Soft Tissue option (MIAF-SoftTissue)] consisted of a double semi-automatic segmentation of the body surface and superficial fascia delimitating deep muscles. Subcutaneous adipose tissue (SAT) and intermuscular adipose tissue (IMAT) could therefore be segmented. Within the anatomical compartment deep to the fascia, structural descriptors such as texture, topology, or roughness reflecting muscle and lipid distribution were analyzed in each voxel. This method was applied in QCT-data sets (120kV, 170mAs, slice thickness 1 or 1,25mm, pitch 1). The left hip was analyzed in controls and the hip contralateral to the fracture in patients. The most discriminant bone parameters were already identify in a previous study (*). An univariate analysis was carried out (t-test, linear regression) to identify the soft-tissue parameters discriminating hip fractures ($p<0,05$) and best subset models were computed with determination of the area under the receiver characteristic operating curve (AUC). Afterwards, these parameters were combined with bone variables. Results: Among the 56 soft tissue parameters, 13 composition (muscle-lipid distribution) or textural parameters differed significantly. Fifteen parameters were discriminant for hip fractures in the linear regression analysis adjusted on age and body mass index (BMI). An AUC of 0,86 was obtained in the multivariate analysis. When muscle and bone parameters were combined, an AUC of 0,93 was reached, versus 0,75 with bone parameters only. Conclusion: The QCT soft-tissue parameters based on muscle-lipid distribution are discriminating for hip fracture and combination with bone parameters may improve bone fracture prediction. (*) Bousson VD, Adams J, Engelke K, Aout M, Cohen-Solal M, Bergot C et al. In vivo discrimination of hip fracture with quantitative computed tomography: results from the prospective European Femur Fracture Study (EFFECT) J Bone Miner Res. 2011; 26: 881- 93.

**P61- PREVALENCE OF SARCOPENIA IN PARKINSON'S DISEASE.** D. Liborio Vetrano, M. Stella Pisciotta, A. Laudisio, M. Guglielmo, D. La Carpia, V. Brandi, B. Di Capua, D. Ricciardi, M. Rita Lo Monaco, G. Onder, R. Bernabei, G. Zuccalà *(Rome, Italy)*

Background: Several typical characteristics of Parkinson's disease (PD) represent potential risk factors for the development of sarcopenia, among which motor symptoms, drugs, malnutrition and disability. At the same time, detrimental effects of sarcopenia potentially increase the risk of some negative outcomes, already highly prevalent in this population, as falls, fractures, dependency, hospitalization and mortality. Notwithstanding, data on prevalence of sarcopenia in individuals affected by PD are currently missing. The aim of the present study was to assess the prevalence of sarcopenia in a sample of PD outpatients. Methods: Data on 126 PD outpatients have been analysed. Assessment of skeletal muscle mass has been done by DXA (Dual X-Ray Absorbimetry), muscle strength has been evaluated by hand grip and physical performance with the 4-meter walking speed test. Either EWGSOP (European Working Group on Sarcopenia in Older People) and FNIH (Foundation for the National Institutes of Health) Sarcopenia Project criteria have been used to define sarcopenia. Results: Within our sample (mean age 73 years; 33% women), sarcopenia was present in 13 (10%) subjects according to the EWGSOP criteria and in 25 (20%) according to the FNIH ones (16% and 20% among those older than 75 years). Three (2.4%) subjects have been contemporary defined sarcopenic applying both criteria and 91 (72%) contemporary non-sarcopenic. Women resulted more frequently sarcopenic according to EWGSOP criteria (12%) and men according to the FNIH ones (21%). Conclusion: Sarcopenia is a relatively common finding in subjects affected by PD, being present in 10 to 20% of them, with a low concordance of used criteria. Further studies should investigate which criteria result more reliable to predict negative outcomes in such population.

**P62- COMPARISON AMONG FUNCTIONALITY, COGNITION AND MOOD OF ELDERLY USERS FROM A PUBLIC HEALTH SERVICE IN THE INTERIOR OF SÃO PAULO (BRAZIL).** A.C. Martins Gratão[1], B. Rodrigues de Souza Melo[1], K.H. Neri[1], M.A. Andreotti Diniz[1], C. Nunes Scherma[1], L. Correa Figueiredo[1], V.J. Haas[2] *(1. São Carlos, Brazil; 2. Uberaba, Brazil)*

Background: The changes observed in the morbidity and mortality profile, characterized by the greater occurrence of chronic illnesses and possible functional and cognitive losses due to aging, produce specific demands for health care. The objective of this study was to assess and compare the health conditions, functionality, cognition and mood of elderly patients at three public health institutions with different care profiles (hospitalization, outpatient and long-term). Method: observational, cross-sectional, comparative study with quantitative approach, approved by the Research Ethics Committee. The instruments applied were the Mini-Mental State Examination (MMSE), Scale of Basic Activities of Daily Living (KATZ) and Instrumental Activities of Daily Living (Lawton). Results: The sample consisted of 140 elderly persons, with 37 people from a Long-Term Care Institution for the Elderly (LTCIE), 53 users from a teaching hospital and 50 from the Teaching Health Service (USE), located in an interior city in the State of São Paulo, Brazil. Among the elderly assessed at the LTCIE, 54.1% were male, with a mean age of 74.4 years, the majority totally dependent, for BADLs (51.4%) as well as IADLs (62.2%) and 100% of the elderly assessed presented cognitive decline (mean 6.6 points). At the Teaching Hospital, 50.1%, male, mean age 70.8 years, 58.5% independent for BADLs, 43.4% for IADLs and 62.3% of the elderly assessed presented cognitive decline (mean 17.3 points). At the USE, 68%, female, mean age 75.1 years, 59% independent for BADLs, 40% for IADLs and 48% of the elderly presented cognitive decline (mean 19 points). As regards the presence of depressive symptoms, the incidence rates at the three institutions corresponded to 29.7%, 41.5% and 36%, respectively. The test of multiple comparisons with Bonferroni's adjustment revealed the existence of statistically significant differences in functional ability (BADLs and IADLs) between the LTCIE and the Hospital and between the LTCIE and the outpatient clinic ($p<0.001$). The multiple logistic regression analysis indicates that only age predicted cognitive decline and that the prevalence rates of cognitive decline in hospitalized elderly and elderly monitored at the outpatient service increase 8.7% for each additional year of life. The prevalence rates for the LTCIE could not be calculated as all elderly presented cognitive decline. Conclusions: The functional and cognitive disabilities were identified in the distinct contexts, the latter of which was mainly related to advanced age. The results indicate the importance of appropriate care for the cognitive and functional performance of the elderly with a view to preventing their decline, which is that frequent in public health services in Brazil. Key words: Elderly; Daily Activities; Cognition.

**P63- FRAILTY IN JAPANESE ELDER PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A TWO-YEAR OBSERVATION AT OUTPATIENT CLINIC FOR COMPREHENSIVE PULMONARY REHABILITATION.** K. Senda, S. Satake, I. Kondo, M. Nishikawa, H. Tokuda, H. Miura, H. Endo *(Obu, Japan)*

Backgrounds: Chronic obstructive pulmonary disease (COPD) is a highly prevalent, however preventable and treatable chronic systemic inflammatory disease. COPD is often associated with sarcopenia leading to frailty. Sarcopenia in COPD patients has been studied as the treatable target of exercise training in pulmonary rehabilitation (PR). However, few reports are available to describe the importance of frailty in COPD patients and the information on frailty and sarcopenia in Japanese senior patients with COPD is especially scarce. This study aimed to investigate frailty of Japanese elder COPD patients at the outpatient clinic for comprehensive PR using the Fried's Frailty Criteria in the Cardiovascular Health Study (CHS). Methods: Clinically stable 25 outpatients with COPD at the PR clinic of the National Center for Geriatrics and Gerontology, Obu, Japan, underwent a comprehensive geriatric assessment (CGA) including interview and anthropometry by a registered nurse, body composition with dual-energy X-ray absorptiometry, Charlson Co-morbidity Index (CCI), nutritional status with Mini Nutritional Assessment (MNA), Total Activity score of self-administered Modified Baecke Questionnaire, health-related quality of life (HRQOL) with St. George's Respiratory Questionnaire (SGRQ), self-rated health status with COPD Assessment Test (CAT) and pulmonary function. The cohort consisted of 23 male and 2 female; age: 76.2 +/- 5.8 (65-86) years; the Global Initiative for Chronic Obstructive Lung Disease (GOLD) stage I: 6, stage II: 13, stage III: 5, Stage IV: 1; the BODE index: integrated body mass Index (BMI), air flow obstruction, dyspnea and exercise capacity; 2.3 +/- 1.9 (0-7) /10) and followed for two years with repeated annual CGA. We adopted the cutoff value for Japanese senior people in Obu Study of Health Promotion for the Elderly (Shimada, et al. JAMDA 2013; 14: 518-24), which were low walking speed <1.0m/s, low grip strength <26kg for male or <17kg for female and 5% body weight loss in the last 2years. Results: At the introduction of PR, mean number of positive frailty CHS criteria (Number of frailty) was 1.0 +/- 0.84 (0-3 /5) and 2 were classified as frail, 17 as pre-frail, and 6 as robust. One patient showed reduced walking speed, 6 reduced weights, 6 showed low grip strength, 8 had fatigue, 5 showed low activities. During 2-year observation at outpatient PR clinic, a frail patient died of suffocation with aspiration pneumonia and frail other became pre-frail. Total of 3 pre-frail patients died of respiratory failure (with weight loss and fatigue, preserved-muscle mass, GOLD stage I and BODE index: 5/10 at the initial evaluation), heart failure and cancer of bile duct, respectively. A pre-frail patient became frail, two became robust and eleven remained pre-frail. A robust patient died of heart failure, three became pre-frail and two remained robust. Mean appendicular skeletal muscle mass index (ASMI) was 6.50 +/- 0.61 (4.99-7.76)kg/m2. While 23 patients were diagnosed as sarcopenia and six as sarcopenic-obesity by Baumgartner Criteria, seven patients were diagnosed as sarcopenia by the European Working Group on Sarcopenia in Older People (EWGSOP) algorithm and one was severe-sarcopenia. Both of two frail patients were diagnosed as sarcopenia with EWGSOP algorithm. Remaining four sarcopenic patients with EWGSOP algorithm were classified as pre-frail. Mean BMI was 21.5 +/- 2.9 (17.9-28.4)kg/m2. Mean MNA score was 24.6 +/- 3.3 (17-29.5), seven were at risk of malnutrition and none was diagnosed as malnutrition. Mean Geriatric Depression Scale (GDS) was 3.4 +/- 3.3 (0-14 /15). Mean CCI was 1.9 +/- 1.4 (1-5). Mean CAT score was 11.7+/- 5.5 (3-23 /40). Mean Medical Research Council dyspnea grade (MRC) was 1.3 +/- 1.0 (0-3 /4). Number of frailty was positively correlated with CAT (r= 0.49, p= 0.01), MRC (r= 0.51, p= 0.01), 3-meter timed Up and Go test (r=0.57, < 0.01), GDS (r= 0.59, P< 0.01) and HbA1c (r= 0.49, p= 0.01). Number of frailty was negatively correlated with waking speed (r= -0.46, p= 0.02), functional reach (r= -0.44, p= 0.03), MNA score (r= -0.41, p= 0.04) and the Total Activity score (R= -0.40, P= 0.05). No significant correlations were observed between Number of frailty and age, CCI, BMI, ASMI, forced expiratory volume in one second and serum makers of systemic inflammation (hs-CRP, IL-6 and IL-1ra). Conclusion: Japanese elder COPD patients seem to have the constellation of sarcopenia leading to frailty, disability

and co-morbidity (including COPD itself) which impacts on health status and mortality. Sarcopenia was highly prevalent condition and might play an etiological role in the frailty in COPD patients. At the PR clinic for senior COPD patients, measurement of walking speed and health status with CAT are proposed for the efficient initial predictors for frailty. Further research in frailty of COPD patients is needed to establish the effective regimen of PR for preservation and improvement of HRQOL with comprehensive and inter-disciplinary approach to prevent and treat sarcopenia leading to frailty.

**P64- VARIATION IN THE PREVALENCE OF SARCOPENIA IN MANIZALES, COLOMBIA, ACCORDING TO 2 REFERENCE VALUES OF SKELETAL MUSCLE MASS INDEX.** A.M. Lopez-Salazar, D.R. Gonzalez-Gonzalez, C.H. Gonzalez-Correa *(Caldas, Colombia)*

Background: Sarcopenia refers to the age–dependent loss of skeletal muscle mass. The determinants of sarcopenia include well–recognized life course influences on muscle mass and strength include age, gender, heritability, adult body size, physical activity, nutrition and comorbid disease. According to the current global trend, Colombia is also experiencing an increase in life expectancy and increased prevalence of related conditions which impose health challenges to a nation with limited resources, such as the Colombian. At present, there are no studies evaluating the prevalence of sarcopenia in this population, nor the reference values of clinical and anthropometric parameters of the local population are known, so extrapolation of data from different populations in the world are used as reference in the Colombians. In 2010 the European Working Group on Sarcopenia in Older People (EWGSOP) defined the condition by an algorithm diagnosis, as the loss of muscle mass plus low muscle strength or low physical performance, associated with age. Within the existing diagnostic methods for the evaluation of muscle mass in low-resource settings, it has been proposed the use of bioelectrical bioimpedance as a cost-effective technique. The method has been validated with reference techniques such as MRI. The aim of this study was to evaluate the prevalence of sarcopenia in a group of elderly under the EWGSOP criteria and using 2 reference values for the assessment of muscle mass parameter. Methods: This was an analytical cross-sectional descriptive study conducted in Manizales, Colombia. 209 people between 65 and 75 years living in the urban area of the city were evaluated. The sample size was calculated based on data from the population census at the time of the study design. The following interventions were conducted: revision of personal history as self-report, anthropometric parameters (body mass index, BMI), assessment of skeletal muscle mass by bioelectrical impedance using reference values from two studies: NHANES III (1996) and Chien et al study (2008), realization of the Short Physical Performance Battery (SPPB) and hand grip strength by manual dynamometry. Results: 124 females and 85 males with mean age 69.6 ± 3.0 years (69.6 ± 3.1 females and 69.5 ± 2.9 males): were evaluated. Overall BMI (kg / m2) was 25.4 ± 3.6. The mean hand dynamometry value was 27.1 ± 9.11 (kg / force) (21.4 ± 5.4 females and 35.4 ± 6.7 males). The mean score of SPPB Battery was 9.9 ± 1.7; (9.5 ± 1.7 females and 10.3 ± 1.6 males). Mean value of skeletal muscle mass was 8.4 ± 1.8; and 7.3 ± 0.9 females and 9.9 ± 1.0 males). The overall prevalence of sarcopenia including all conditions within the spectrum (presarcopenia, sarcopenia and severe sarcopenia) with reference values NHANES III was 52.7% and with the Chien et al, values was 16.8%. Conclusions: Evaluating the muscle is the main parameter for the diagnosis of sarcopenia. When extrapolated reference values from other populations are used, the sarcopenia frequency varies substantially. Thus, the data presented should be interpreted with caution and it is desirable to obtain national reference values to have reliable results. This will require additional studies.

**P65- COMPARATIVE STUDY BETWEEN FORMAL AND INFORMAL CAREGIVERS OF ELDERLY USERS FROM THE PUBLIC HEALTH SERVICE IN THE INTERIOR OF THE STATE OF SÃO PAULO (BRAZIL).** A.C. Martins Gratão[1], M.A. Andreotti Diniz[1], K. Helena Neri[1], C. Nunes Scherma[1], B. Rodrigues de Souza Melo[1], L.F. da Silva Talmelli-Ruy[2] *(1. São Carlos, Brazil; 2. Ribeirão Preto, Brazil)*

Background: Caregivers are identified as people who watch over the wellbeing, health, eating, personal hygiene, education, culture, recreation and leisure of the people they take care of. Often, the dimension of the care demand, associated with the responsibility of their work, mainly enhance the appearance of symptoms of burden and exhaustion. Promoting measures to assess the health and mental suffering of caregivers is necessary to maintain this population's health. This study was aimed at assessing and comparing the health conditions and burden of formal and informal caregivers for elderly users of a public health service. Method: Observational, cross-sectional and comparative study with a quantitative approach, which received approval from a Research Ethics Committee. The data were collected through interviews in the first semester of 2014, using an identification instrument, the sociodemographic and health profile and the final question of the Zarit Burden Scale and SRQ (Self Reporting Questionnaire), which assesses the emotional stress of the general population. The population consisted of formal caregivers from a Long-Term Care Institution for the Elderly and informal caregivers of elderly attended at a Teaching Hospital and a Teaching Health Service located in the interior of São Paulo/Brazil. For the data analysis, the statistical software SPSS 20.0 was used. The mean coefficients of the categorical variables were analyzed using Student's t-test, of the quantitative variables using Pearson's correlation and, for the analysis of multiple comparisons, Mann-Whitney was applied to the pairs. Results: The sample included 50 caregivers, being 15 formal and 35 informal. Among the formal caregivers, women were predominant (86.7%), with a mean age of 36.7, 13.7 years of education, and a mean workload of 7.5 hours of work per day. Among the caregivers' health-related aspects, the self-referred illnesses Systemic Arterial Hypertension (40%) and back problems (20%) were mentioned. The emotional stress was assessed using the SRQ 20, showing in data that the aspect "sleeping badly" was the most mentioned (53.3%), followed by "feeling tense, nervous or concerned" (40%) and "feeling tired" (40%), revealing that 26.7% were diagnosed with emotional stress. After the application of the final question from the Zarit Scale, the interviewed caregivers most frequently mentioned feeling "somewhat overburdened" (40%) and "moderately overburdened" (26.7%). Concerning the 35 informal caregivers assessed, it was revealed that 77.1% of them lived with the elderly. Women were predominant (85.7%), 42.9% were the elderly's children, with a mean age of 55.2 years (minimum 19 and maximum 83 years), 7.1 years of education, length of care 6.5 years and an average 19.8h per day taking care of the elderly. The most prevalent illnesses were Systemic Arterial Hypertension (40%), Diabetes Mellitus (28.6%) and back problems (28.6%). After assessing the burden, 31.4% mentioned feeling "somewhat" overburdened and 25.7% "highly" overburdened, revealing that 17 (48.6%) presented a mild burden. As to the emotional stress, the most reported aspects were "feeling tense, nervous or concerned" (80%), "feeling sad lately" (62.9%) and "sleeping badly" (60%), revealing that 16 (45.7%) presented emotional stress. Only the sex and length of care in hours per day showed a significant correlation with the burden ($p<0.05$) in this study. Conclusions: In the study sample, higher levels of burden and emotional stress were found in informal caregivers, with feelings of sadness for informal and feelings of fatigue for formal caregivers as the main difference. These results reveal the need to look at this population's needs in the different contexts more closely, planning interventions to improve these people's health and work conditions. Key words: Psychological Stress; Caregivers; Family Caregivers; Elderly.

**P66- ESTIMATION OF TOTAL ENERGY EXPENDITURE OF PATIENTS WITH SHORT BOWEL SYNDROME BY A PHYSICAL ACTIVITY MONITOR: A COMPARISON WITH THE DOUBLY LABELED WATER METHOD.** P. Giacomo Fassini, E. Ferriolli, F. Pinheiro Amador dos Santos Pessanha, K. Pfrimer, J.S. Marchini *(Sao Paulo, Brazil)*

Backgrounds: The Short Bowel Syndrome (SBS) is a set of signs and symptoms resulting from nutritional and metabolic alterations due to extensive resection of the small bowel and represent one of the most severe states of malabsorption. Weight loss and malnutrition are the main features of this syndrome and approximately two-thirds of patients with SBS are sarcopenic. Knowledge of the energy requirement is important to aid the management of nutrition therapy in these individuals. The aim of this study was to compare the total energy expenditure (TEE) of SBS patients estimated by an activity monitor with TEE measured by the doubly labeled water (DLW) method. Methods: Eleven volunteers with SBS (six women) receiving treatment at the Metabolic Unit of the Clinics Hospital, Ribeirao Preto Medical School, Sao Paulo, Brazil were evaluated. The project was approved by the local Human Research Ethics Committee. The control group (CG) was composed by volunteers without SBS with similar characteristics (gender, age, ethnicity, body mass index (BMI) and chronic diseases). Body composition was determined by bioelectrical impedance. Total energy expenditure was estimated by an activity monitor (ActivPAL®, Glasgow, UK) for 14 days and compared with TEE measured by the doubly labeled water multi-point method. The metabolic equivalents (MET) calculated by the monitor software were multiplied by the resting energy expenditure measured by indirect calorimetry and a 10% estimated thermic effect of food of was added to the result. The Kolmogorov-Smirnov test was used to assess normality and T-Test for comparison between groups. The Pearson´s correlation test was used to verify association between the two TEE assessment methods ($p<0.05$). Results: Mean age was 53 ± 8 years for both groups. Anthropometric variables, body composition and resting energy expenditure were not significantly different ($p>0.05$). The average weight was 55.7 ± 8.7kg and 57.6 ± 6.6 kg for the SBS and CG groups, respectively. BMI was 21.5 ± 3.4kcal.m-2 and 22.3 ± 2.5 kcal.m-2, respectively. Lean mass was 42.3 ± 6.6kg and 43.5 ± 5.6kg. Body fat was 13.4 ± 3.9kg and 14.2 ± 4.2kg. Resting energy expenditure was 1347± 193kcal and 1369 ±196kcal. Total energy expenditure measured by doubly labeled water (DLW) was 1874±275kcal and 2395±448kcal ($p< 0.01$), and these values differed from those estimated by the monitor with values 2058±301kcal and 2199±340kcal ($p>0.05$). There was a moderate positive correlation between TEE measured by DLW and TEE estimated by the monitor in both groups ($r = 0.771$ and $p = 0.005$ in the SBS group and $r = 0.726$ and $p = 0.01$ in the CG). Conclusions: Resting energy expenditure did not differ between groups, suggesting an adaptation of the SBS patients, as the time since resection was longer than three years. On the other hand, total energy expenditure differed between groups when analyzed by the DLW method. The activity monitor overestimated TEE as compared with the DLW method by 9.8% in the SBS group, and underestimated TEE by 8.2% in the control group. Despite these results, activity monitoring may be considered a good method for the determination of total energy expenditure of SBS patients, once error was below 10% and there was a good correlation with the values recorded by the DLW method. Funding: FAPESP (2011/50768-7, 2012/22543-3 and 2012/22542-7) and FAEPA (450-2013 e 452-2013).

**P67- FUNCTIONAL DISABILITY IN THE ELDERLY: A CONCEPT ANALYSIS.** L.F. Talmelli-Ruy[1], A.C. Martins Gratão[2], R. Aparecida Partezani Rodrigues[1] *(1. Ribeirão Preto, Brazil; 2. São Carlos, Brazil)*

Background: The national setting points to a greater proportion of elderly individuals and a consequent increase in the population's life expectancy, thus, the objective of the healthcare of the elderly stands on the maintenance of their functionality, autonomy and independence for as long as it is possible. In this context, a concern emerges regarding the development of studies to assess the functionality of this population. The aim of this

study was to analyze the concept of functional disability in elderly individuals using the Hybrid Model of Concept Development. Method: Hybrid Model of Concept Development is comprised of three phases, namely the Theoretical Phase, the Field Phase and the Final Analytical Phase. The Theoretical Phase was developed by means of a literature integrative review, in which the search for primary studies took place in the LILACS, MEDLINE and CINAHL databases with the use of controlled and non-controlled descriptors that were limited according to the specificity of each database. A total of 1,113 studies were preselected, however only 58 were found eligible after the application of the inclusion criteria. The Field Phase took place in two steps. The first step consisted of a semi-structured interview in the house of the elderly individuals for identification of those who were eligible for the second step; the focus group technique was used in this moment. Four groups were performed, with two groups including elderly individuals between 60 at 79 years of age and two groups including elderly individuals over 80 years of age. During the groups, the researchers approached the antecedents, attributes and consequences of the concept of functional disability, and the groups were analyzed by means of the thematic content analysis. In the Final Analytical Phase, the data collected in the Theoretical and Field Phases were identified and their similarities, divergences and differences were analyzed. Results: These data showed that functional disability in the elderly is multidimensional. It is related to physical, social, personal, environmental and emotional aspects, not restricted only to the presence of pathologies or the incapability of performing daily living activities independently, but also in the damage of the maintenance of the autonomy and wellbeing of the elderly. Functional disability occurs in different contexts, being related to the old age, the presence of chronic conditions, accumulative results of life habits, damage in the performance of social roles and unfavorable environmental conditions. The results of functional disability are damaging and bring harm both to the individuals and to their families, being related to reduced expectancy and quality of life, loss of independence and autonomy, increased costs, environmental adjustments and, especially, to emotional damage. Conclusions: The study of the concept of functional disability in the elderly with the use of the Hybrid Model methodology has allowed to reinforce its understanding and consequent use in the practice with the elderly. Keywords: Elderly. Functional disability. Concept analysis. Geriatric nursing. Integrative review.

**P68- TOTAL ENERGY EXPENDITURE AND PHYSICAL ACTIVITY IN FRAIL AND NON-FRAIL OLDER PEOPLE: A STUDY USING DOUBLY LABELED WATER AND ACTIVITY MONITORING.** E. Ferriolli[1], J.A.O. Carneiro[2], F. Pinheiro Amador dos Santos Pessanha[1], K. Pfrimer[1], P.G. Fassini[1], J.C. Lemos de Souza Marchesi[1], A.F. Junqueira dos Santos[1], J.C. Moriguti[1], N. Kilza da Costa Lima[1] *(1. São Paulo, Brazil; 2. Bahia, Brazil)*

Backgrounds: The clinical phenotype of frailty is characterized by low physical activity, global weakness, exhaustion, low walking speed and weight loss. Impaired energy metabolism seems to play a central role in muscle weakness and energy imbalance may be related to many features of this syndrome. The aim of this study was to compare the total energy expenditure, body composition and physical activity in frail and non-frail community-living older people using doubly labeled water and activity monitoring. Methods: Twenty-one independent and community-living volunteers aged ≥65 years participated in this study. Thirteen of them were classified as frail (F) according to the Fried et al. criteria and eight as non-frail (NF). Total energy expenditure and body composition were measured by the doubly labeled water multi-point method (DLW). The number of steps and physical activity behavior were measured by activity monitoring (activPAL®, Glasgow, UK) used for 14 uninterrupted days during sample collection for the DLW study. The Kolmogorov-Smirnov test was used to assess normality and T-Test for comparison between groups. The level of significance adopted was α=5%. Results: Seventy-one percent of the volunteers were women. Mean age was 78.9±5.2 and 72.5±6.8 years (F and NF group, respectively, p= 0.5). Mean weight was 72.1±16.2kg and 65.3±9.6kg and mean BMI was 29.3 ± 6.4kg.m-2 and 28.2 ± 5.1kg.m-2, respectively (p>0.05). No significant difference was observed in TEE (2206.0±487.4Kcal and 2196.8±468.3Kcal, respectively, p=0.7), even when corrected for body weight (30.6±7.6kcal.kg-1 and 33.7±9.4kcal.kg-1, respectively, p=0.8). No significant differences were found in total body water (26.1±4.5L and 29.8±6.0L), lean body mass (35.6±6.2kg and 41.1±8.5kg), and fat mass (28.6±10.6kg and 29.9±11.6kg). The number of steps taken per day by the frail volunteers, however, was lower (3907 ± 3010 and 8420 ± 2888 steps/day, p<0.01). Conclusions: Frail volunteers, despite having body composition and energy expenditure not significantly different from non-frail volunteers, had a significantly lower physical activity as measured by the number of steps taken per day. This finding suggests that frail older persons may have lower energy efficiency as compared to non-frail persons. Funding: PRONEX-FAPESP process number 2011/50768-7.

**P69- HEALTH PROFILE OF ELDERLY AND CAREGIVERS AT A LONG-TERM CARE INSTITUTION FOR THE ELDERLY IN THE INTERIOR OF THE STATE OF SÃO PAULO (BRAZIL).** B. Rodrigues de Souza Melo[1], A.C. Costa[2], M.A. Andreotti Diniz[2], K. Helena Neri[2], L.Correa Figueiredo[1], V.J. Haas[3], A. C. Martins Gratão[1] *(1. São Carlos, Brazil; 2. SãoPaulo, Brazil; 3. Triângulo Mineiro, Brazil)*

Background: The increased life expectancy, the economic and psychosocial difficulties families face to take care of elderly people, mainly for those with reduced functional ability, justify the greater demand for hospitalizations, leading to a 5 to 10% increase in the incidence rate of elderly hospitalization in LTCIEs in Brazil. The objective in this study was to assess the health conditions of elderly people and formal caregivers at a Long-Term Care Institution for the Elderly (LTCIE) in an interior city in the State of São Paulo, Brazil. Method: observational and cross-sectional study with a quantitative approach, undertaken in the second semester of 2013 with approval from a Research Ethics Committee. The elderly's personal, functional, emotional, cognitive and health aspects were assessed. The cognitive performance was assessed using the Mini-Mental State Examination (MMSE), the functional performance using the assessment of the elderly's Activities of Daily Living (ADLs), so as to objectively quantify the need for help or dependence on care, using Katz and Lawton's Scales. Emotional aspects were assessed using the Geriatric Depression Scale and health aspects using physical assessment, presence of illnesses and life habits. The caregivers were assessed in terms of demographic aspects and the presence of burden, emotional discomfort using a question from Zarit's Burden Scale and the SRQ (Self Reporting Questionnaire). For the data analysis, the statistical software SPSS 20.0 was used. The mean coefficients of the categorical variables were analyzed using Student's t-test and, for the quantitative variables, Pearson's correlation was used. Results: The mean age was 74.4 years (+9.8), with a higher mean age for women than men (78.1 years against 71.2 years), the majority was single (67.6%), showing 80% of the men and 52.9% of the women. The incidence of diseases showed SAH as the main disease (32.4%), followed by psychiatric disorders and sequelae of CVA (21.6%), Diabetes Mellitus (18.9%) and Alzheimer's Disease (16.2%). Concerning the performance of the activities of daily living, most of the elderly showed to be completely dependent, for BADLs (62.2%) as well as IADLs (51.4%). In addition, 100% of the assessed elderly showed cognitive decline, with a mean 6.6 points on the MMSE, with a worse performance for women (6.0) when compared to men (7.2). Concerning the 15 formal caregivers assessed, corresponding to the nursing team, one physiotherapist and one social worker, 13 (86.7%) were female with a mean age of 36.7 (±8.5). In the assessment of the burden, they most frequently reported feeling "somewhat" (40%) and "moderately" overburdened (26.7%). In addition, the data revealed that the aspects "sleeping badly" (53.3%), "feeling tense, nervous or concerned" (40%) and "feeling tired" (40%) were emphasized. Conclusions: This study offers important contributions that can help to discuss the institution's profile, to promote improvements for dwellers and employees. Knowledge is needed through information obtained by means of validated instruments in order to implement and assess actions that guarantee better care to these elderly and caregivers, considering that they deserve special attention in terms of emotional and psychological aspects, contributing to public policy proposal to achieve longevity with quality of life.

**P70- FRAGILITY IN THE ELDERLY WITH CHRONIC RENAL HEMODIALYSIS: APPLICATION OF PHENOTYPE OF FRAILTY FRIED.** B. Rodrigues de Souza Melo, G. Dutra Gesualdo, J. Gomes Duarte, A.C. Martins Gratão, F. de Souza Orlandi *(São Paulo, Brazil)*

Background: Population aging isa global realitythat demandsever moreefficientin elderly care. Chronic diseasessuchas hypertensionanddiabetesmellitusbecome moreprevalent, these are the maincauses ofChronic Kidney Disease(CKD) in such a waythat theyare understandablein recent yearsa greater demand forrenal replacementtherapy forelderly patients. TheCKD patienton hemodialysisfeelsthreatened, insecure, which causesdisorganizationintheir sense ofidentity and in thebody imageby organicchanges resulting fromdisease, thesefactorscan interfere in yourquality of lifeand canbecomea fragilepatient.Theobjective was to evaluatethe fragilityofthe elderly with chronicrenalhemodialysistreatmentwithapplication ofPhenotypeof FrailtyFried. Methods: It is about a descriptive study of cross-sectional developed in a Renal Replacement Therapy Unit of a city in the state of São Paulo, Brazil. The sampleansweredthe followinginclusion criteria: Be60 yearsor more; having been diagnosed withChronic Kidney Disease; be inhemodialysis treatmentand agree toparticipate in the researchwith the signingof the Instrument ofFree and Informed Consent.47 seniors were assessed through the Instrument for Characterization of Participants and Phenotype of Frailty Fried whose classification is given by: 0 robust individuals, 1-2 pre fragile and 3, 4 or 5 individuals indicating fragility. Results: Of the 47 assessed patients 78.7% were male and 21.3% female, with ages was 60-83 years with a mean of 68.1 (± 6.0) years, with the majority of Caucasian (78.7%). The meanduration of hemodialysiswas41.0(± 44.1) months, the majority61.7% (n =29) presentedhypertension as abase disease. With regardto nutritional evaluations, 27.6% were underweight. With respect tofragility,65.9% (n = 31)presented fragility, 29.8% (n = 14)werepre fragileand 4.3% (n = 2)wererobust. Conclusion: Given the abovecan observe theimportance of assessingfrailtyin elderly people withchronickidney diseasein an advanced stage, since thisisdifficult toconfront andundertakesphysical, psychological, social andeven familyissues.It is noteworthy that65.9% of participants showedfragility, and 29.8% were shownpre fragile .Facing this, we intend topursue thisstudyby identifying thefactorsthat are contributing tothe syndrome, withthe futureaimto minimize thesefactorsandconsequentlythe conditionsof fragility.

**P71- AN ALGORITHM OF MEDICATION REVIEW IN RESIDENTIAL AGED CARE FACILITIES: FOCUS ON MINIMIZING USE OF HIGH RISK MEDICATIONS.** A. Poudel[1], A. Ballokova[2], R.E Hubbard[1], L.C. Gray[1], C. Mitchell[1], L.M. Nissen[1], I. A. Scott[1] *(1. Brisbane, Australia; 2. Prague, Czech Republic)*

Backgrounds: While many older people remain robust and independent, others become frail, suffer chronic diseases, receive multiple medications, and are susceptible to adverse drug events (ADEs). Frail older people are more likely to be institutionalized in residential aged care facilities (RACFs) with approximately 40% of people aged greater than 75 years requiring long-term residential care: this proportion is predicted to increase further as family and work patterns change. The higher risks of ADEs result from medication errors, adverse drug reactions and drug-drug and drug-disease interactions. Risk factors for medication-related harm include polypharmacy (defined as 5 or more regularly prescribed drugs) and use of high-risk drugs such as selective serotonin reuptake inhibitors

(SSRIs), hypnotics, antipsychotics, analgesics (opiates) and anxiolytics which are regularly prescribed to 25% to 30% of patients in RACFs. Optimizing prescribing and avoiding use of high risk medications might prevent adverse events such as falls, delirium and other geriatric syndromes prevalent in such patients. We aimed to develop a pragmatic, easily applied algorithm for medication review for frail older people in RACFs. Methods: The literature was searched for evidence of association of adverse effects related to potentially inappropriate medications (PIMs) in older patients. High risk medications were identified as those having robust evidence of cause and effect. Prior research into the cessation of PIMs in older patients in different settings were synthesised into a 4-step algorithm for incorporation into clinical assessment protocols for patients in RACFs. Results: The algorithm comprises several steps leading to individualised prescribing recommendations: 1) identify a high risk medication; 2) ascertain the current indications for the medication and assess their validity; 3) assess if the drug is providing ongoing symptomatic benefit; 4) consider withdrawing, altering, or continuing medications according to the findings in steps 2 and 3. Any decision regarding stopping, altering or starting medicines must be tailored to individual patient circumstances and take into account patients' life expectancy, their values and preferences, and the likely positive or negative impact of the drug on their quality of life. Decision support resources were developed to complement the algorithm in ensuring a systematic and patient-centred approach to medication discontinuation. These include a comprehensive list of high-risk medications and the criteria of inappropriateness, lists of alternative treatments, and suggested medication withdrawal regimens. Conclusion: The algorithm captures a range of different clinical scenarios in relation to PIMs and offers an evidence-based approach to identifying and, if appropriate, discontinuing such medications. Studies are required to evaluate prescriber perspectives on enablers and barriers to use of the algorithm in everyday practice, and determining algorithm effects on prescribing decisions and patient outcomes.

**P72- AN ANTHROPOMETRIC PREDICTION EQUATION FOR APPENDICULAR SKELETAL MUSCLE MASS IN COMBINATION WITH A MEASURE OF MUSCLE FUNCTION TO SCREEN FOR SARCOPENIA IN PRIMARY AND AGED CARE.** S. Yu, S. Appleton, I. Chapman, R. Adams, G. Wittert, T. Visvanathan, R. Visvanathan *(Adelaide, Australia)*

Background: Sarcopenia is the presence of low muscle mass and poor physical performance. A screening tool is required. The aim was to compare the accuracy of our newly developed anthropometric prediction equation (PE) to dual absorptiometry x-ray (DXA) in predicting low muscle mass (LMM) and sarcopenia. Methods: Gender-specific LMM cut-offs for the PE method were identified using the lowest 20% of the skeletal muscle index by applying the PE to a community cohort of older (>65) men (n=611) and women (n=375). The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of PE derived LMM were compared to DXA derived LMM. The cohort was randomized into a development and validation group to identify various cut-offs for LMM via the PE method and test it's performance against the DXA method in predicting LMM and sarcopenia. Results: The PE cut-off for LMM was<8.05 Kg/m2 in men and <5.35 Kg/m2 in women. On validation of various cut-offs with improving sensitivity values from 70 to 97%, specificity increased from 45.5% to 85.7%, PPV increased from 31.3% to 56.9% and NPV increased from 93.0% to 98.6% in men. In women, specificity improved from 42% to 72%, PPV reduced from 56.9% to 31.3% and NPV improved from 93.0% to 98.6%. When the PE method was combined with a measure of muscle performance such as grip strength, a similar pattern of performance was observed. Conclusion: The PE when combined with a measure of muscle performance as part of a novel screening tool performs as a 'rule out' test with high sensitivity and NPV values.

**P73- AN ETHNIC-SPECIFIC CUT-POINT FOR SARCOPENIA FOR BLACK SOUTH AFRICAN WOMEN.** H.S. Kruger[1], L.K. Micklesfield[1,3], H.H. Wright[1,4], L. Havemann-Nel[1], J.H. Goedecke[3,5] *(1. Potchefstroom, South Africa; 2. Johannesburg, South Africa; 3. Cape Town, South Africa; 4. Queensland, Australia; 5. Tygerberg, South Africa)*

Background: Various cut-points for appendicular skeletal muscle mass (ASM) and ASM index (ASMI, ASM divided by height squared), together with measures of muscle strength and physical performance have been proposed to identify sarcopenia, resulting in a high degree of variability in the prevalence of sarcopenia depending on the criteria used. Height, muscle mass and adiposity differ among populations, suggesting that standard criteria for sarcopenia may not be appropriate globally. Cut-points to classify sarcopenia have not been determined in black Africans, which is relevant as the body composition of Africans differs considerably from whites. The aim of this study was therefore to develop an appropriate cut-point for sarcopenia for black South African (SA) women, with adjustment for differences in body size, and to assess the ability of the newly derived cut-point, in comparison to established cut-points, to categorize older women according to functional ability, the other important component of sarcopenia. Methods: DXA data from two reference groups of black SA women aged 18-40 years from Cape Town (n=238) and Soweto (n=371), were used for the determination of a sarcopenia cut-point. The body composition of the SA reference groups was compared with the reference group of 122 non-Hispanic white women (18-40y) in the Rosetta Study, used to derive the first widely adopted ASMI-based sarcopenia cut-point of <5.5 kg/m2 in women. The ability of the derived cut-points to predict physical performance and strength was examined in a random sample of 221 black SA women, aged 45-84 years. Grip strength was measured for the dominant hand using a dynamometer. Time to complete a 6 metre walk test was recorded to calculate gait speed. Body composition (fat mass, FM; fat-free soft tissue mass, FFSTM; body fat percentage, %BF, ASM) was measured using DXA. ASMI and ASMBMI (ASM divided by BMI) were calculated. A cut-point for sarcopenia was calculated as the ASMI two SDs below the mean of the reference group. In addition, the residual method was used to define a cut-point for ASM, adjusting for height (m) and FM (kg). The proportion of the sarcopenic women in the older group was calculated using five methods: i) the Foundation for the National Institutes of Health (FNIH) criteria for sarcopenia of ASMBMI <0.512 (FNIH ASMBMI), and ii) ASM <15.02 kg (FNIH ASM) iii) the European Working Group on Sarcopenia in Older People ASMI cut-point (5.5 kg/m2) (EWGSOP ASMI), iv) the residual method cut-point (RM), and v) the new cut-point calculated from the SA reference groups (SA ASMI). Ethics Committees approved the studies and informed consent was obtained from participants. The proportion of sarcopenic women according to each of the five cut-points, who also had gait speed <0.8 m/s and handgrip strength <16 kg, was determined by cross-tabulation. Receiver operating characteristic (ROC) curves were created for the ASM, ASMBMI, ASMI and residuals, against low gait speed and low grip strength as standards for low functional ability. The area under the curve (AUC) and the sensitivity and specificity were determined for each method to discriminate between sarcopenic women who had low vs. normal functional ability. Results: The SA reference groups had a higher %BF than the international reference group, but ASMI was not different between groups. The mean sarcopenia cut-point for the two SA groups was 4.94 kg/m2. The residual method yielded a mean sarcopenia cut-point of -1.49. FNIH ASM defined the largest proportion of the older women as sarcopenic (38.7%), with the SA cut-point (4.94 kg/m2) classifying the smallest proportion (9.1%). The two cut-points that included adjustment for adiposity yielded similar results, 21.4% and 20.8%, respectively. The cut-points had relatively low sensitivity to identify sarcopenic women with low gait speed (23.1-30.8%) or low grip strength (19.1-27.7%). Specificity was high for all cut-points for identifying non-sarcopenic women with normal gait speed and grip strength (66.9 to 93.1%). The FNIH ASM cut-point had the best sensitivity and specificity, followed by the SA ASMI. The AUCs derived from the ROC curves showed that ASM and ASMI had good ability to discriminate between those with a low vs. normal gait speed (AUC=0.76 and 0.74, respectively), as well as low vs. normal handgrip strength (AUC=0.67 and 0.64, respectively). The corresponding AUCs for the residual method and ASMBMI to discriminate between those with a low vs. normal gait speed, and for low vs. normal handgrip strength, reflect insufficient discriminative power. Conclusion: The new SA cut-point reflects the unique body composition of black SA women and had similar or greater odds of predicting reduced functional ability in older SA women when compared to other internationally accepted cut-points. These results could lead to the early identification of sarcopenia among black women in sub-Saharan Africa, with the view for targeted early intervention in this high-risk and understudied population.

**P74- THE ASSOCIATION OF FALL HISTORY WITH HOSPITALIZATION, SKILLED NURSING FACILITY STAYS, AND NURSING HOME PLACEMENT IN OLDER, COMMUNITY DWELLING WOMEN.** P.M. Cawthon[1], L. Lui[1], M.J. Schoenfeld[2], S. Cummings[1], C. McCulloch[1], J. Cauley[3], L. Marshall[4], D. Kado[5], M.L. Paudel[6], B. Taylor[6,7], J. Schousboe[6,8], K.E. Ensrud[6,7] *(1. San Francisco, USA; 2. Indianapolis USA; 3. Pittsburg, USA; 4. Portland, USA; 5. San Diego, USA; 6. Minesota, USA; 7. Minneapolis, USA; 8. St Mios Park, USA)*

Background: Previous studies have quantified health care utilization and costs related to acute fall events. However, in community-dwelling adults, the extent to which hospitalization, skilled nursing facility stays and nursing home placement may vary by fall history is not known. Therefore, using data from women in the Study of Osteoporotic Fractures (SOF) linked to Medicare Claims, we tested the hypothesis that women who reported a history of recurrent falls would go on to have greater likelihood of hospitalization, greater rate of inpatient hospital days once hospitalized, and greater likelihood of skilled nursing facility stays and long term nursing home placement than those without a history of recurrent falls. Methods: Using data from SOF Visit 6 (1997-8, mean age 80.8 years), fall history was classified from self-reported cohort questionnaire data as recurrent fall history (2+ falls in the past 12 months) versus no history of recurrent falls (vs 0-1 falls). Days of hospitalization were derived for participants enrolled in Medicare Fee-For-Service (FFS) using their MEDPAR inpatient claims. For women at the SOF Portland site, who were enrolled in Kaiser for Medicare Part C, we used Kaiser encounter data to determine days of hospitalization. Additionally, for the Medicare FFS women we were able to determine short-term skilled nursing facility (SNF) stays and long-term nursing home placement within three years of the clinic visit. Short-term SNF stays are defined as the Medicare Part A covered benefit that follows an inpatient stay which is designed for rehabilitation. We defined long-term nursing home placement as permanent residence that occurs outside of the covered Part A benefit (often called custodial care using the Yun algorithm (Yun H et al., Health Services and Outcomes Research Methodology 2010). We used two-part Hurdle models with bootstrapping to estimate the likelihood of hospitalization and the rate ratio of inpatient hospital days amongst those hospitalized, for those with and without recurrent fall history. We used logistic regression to estimate the odds ratios of short term SNF stays and long term nursing home residence associated with recurrent fall history. Models were adjusted for age. Multivariate models were additionally adjusted for covariates assessed from cohort data including: walking for exercise, antidepressant use, benzodiazepine use, cognitive function, anticonvulsant use, number of comorbid conditions, walking speed over 6 meters and ability to rise from a chair. Results: Data for hospitalizations were available for 4269 women. Of these, 610 (14.3%) reported a history of recurrent falls in the past 12 months and 2200 (51.4%) women were hospitalized at least once in the three years after the SOF study visit. Data for short SNF stay were available for 3008 women, 603 (20.0%) had short term SNF stays over three years. Data for long term nursing home placement were available for 2832

women; 259 (9.1%) had long term nursing home placement over three years. Women with a history of recurrent falls, in age-adjusted models, were more likely to be hospitalized (OR: 1.33, 95% CI: 1.12, 1.59) and had a greater rate of inpatient days once hospitalized (RR: 1.25, 95CI: 1.09, 1.43) than women without a recurrent fall history. After multivariate adjustment the association of recurrent falls with hospitalization (OR: 1.32, 95%CI: 1.05, 1.67) persisted but recurrent falls were no longer significantly associated with a higher rate of inpatient days. In age-adjusted models, women with a history of recurrent falls were also more likely to have short-term SNF stay (OR: 1.63, 95% CI: 1.28, 2.08) and long-term nursing home placement (OR:2.59, 95% CI: 1.88, 3.55). After multivariate adjustment, results were similar for short-term SNF stays (OR:1.44, 95%CI: 1.03, 2.01), but the association between recurrent fall history and long-term nursing home placement was attenuated and no longer significant. Conclusion: A history of recurrent falls is associated with increased health care utilization in older women. In general, this association is not explained by potential confounding factors including medication use, comorbid conditions and physical performance. A limitation of our study was that we could not quantify health care use or costs associated with incident fall events. Future studies of fall interventions should consider whether the intervention reduces health care utilization amongst women with a fall history.

**P75- PREVALENCE OF SARCOPENIA AND ITS ASSOCIATIONS WITH FRAILTY, COMORBIDITIES AND FUNCTIONAL CAPACITY: FIBRA NETWORK STUDY IN BELO HORIZONTE.** J. Ude Viana, J.M. Domingues Dias, L. Paccini Lustosa, P. Parreira Batista , R. Corrêa Dias, S. Lanziotti de Azevedo Silva *(Minas Gerais, Brazil)*

Background: sarcopenia and frailty are both considered geriatric syndromes because of their high prevalence, uncertainty diagnosis, multifactorial onset and complex interrelations leading to adverse outcomes such as disabilities, comorbidities, falls, hospitalization, institutionalization and even death. Frailty is supported by a cycle which is based on a tripod composed by neuroendocrine dysregulation, immunological disfunction and sarcopenia. Sarcopenia was first described in 1989 by Rosenberg as the loss of muscle mass related to aging. Today it is characterized as the association between muscle mass, strength and performance loss. Some studies have described a relationship between frailty and sarcopenia, but it is not known or well established in literature which of them lead to the other or what is the trigger for their development. Their prevalence vary ac-cording to the definitions and instruments used to assess them. Thus, the objective of this study was to determine the prevalence of sarcopenia and frailty and their associations with functional capacity and comorbidities in community-dwelling elderly from a region in Brazil. Methods: Fibra Network (Studies of Frailty in Brazilian Elderly) is an epidemiological cross-sectional, multidisciplinar and multycentric study. Sarcopenia was characterized as proposed by The European Working Group on Sarcopenia using handgrip strength assessed by Jamar dynamometer to measure muscle strength (positive if values were lower than 20Kgf for women and 30 Kgf for men), gait speed in a 4 ,6 meters course to assess muscle performance (positive if speed was equal or lower than 0.8m/s) and the lowest percentile of apendicular skeletal muscle mass assessed by the Lee equation ad-justed by height square{(0.244 * body weight) + (7.8 * height) + (6.6 * gender) – (0.098 * age) + (race – 3.3)}(positive if lower than 6.47 for women and 8.76 for men). Frailty was described using Fried et al (2001) criterion composed by 5 itens (weight loss, weakness, slowness, poor endurance and energy and low physical activity level). If positive in 1 or 2 of these itens the elderly was considered pre frail, 3 or more frail and none of them robust. To assess funcional capacity the Katz scale for Basic Activities of Daily Living (BADL), the Lawton scale for Instrumental Activities of daily Living (IADL) and a semi-structured questionnaire for Advanced Activities of Daily Liv-ing(AADL) were considered. The comorbidities where those related as diagnosed by a doctor on the last year (heart diseases, hypertension, VEA, Diabetes mellitus, cancer, arthritis, lung diseases, depression and osteoporosis). The association between sarcope-nia, frailty, functional capacity and comorbidities were verified by Spearmans's correla-tion. Results: The sample was composed of 562 elderly aged 65 or more, mean age 74.15 (±6.43) without cognitive deficits and able to walk independently. 65,5% were women and 13,5% of the total sample was partially dependent for Activities of Daily Living. 20,1% were classified as sarcopenic using the algorithm proposed by the European Consensus (5.5% pre-sarcopenia, 10.5% sarcopenia and 4.4% severe sarcopenia), 44.3% were pre frail and 8.5% frail. Sarcopenia and frailty showed a significative but weak correlation (r=0.108 and p= 0.01). In relation to functional capacity, sarcopenia only correlated to IADL (r=0.081 and p= 0.05). A negative significant correlation was found between sarcopenia and the number of comorbidities (r= -0,103 and p= 0.014). Conclusion: Sarcopenia and frailty showed a weak correlation which must be explained by their silent onset, result that can also explain the negative correlation between sarco-penia and comorbidities. Maybe because of the sample profile of community-dwelling elderly which are usually more active and less dependent, these syndromes are still not installed causing adverse outcomes. However it is important to notice that sarcopenia and frailty relations must be studied more assertively for their better understanding to avoid impact on elderly's functional status and quality of life.

**P76- ASSOCIATION BETWEEN FRAILTY AND FUNCIONAL CAPACITY IN COMMUNITY-DWELLING ELDERLY FROM BELO HORIZONTE, BARUERI AND SANTA CRUZ: FIBRA NETWORK STUDY.** J. Ude Viana[1], C. Freire Jardim[1], M. Rodrigues Perracini[2], R. Oliveira Guerra[3], S. Lanziotti de Azevedo Silva[1], R. Correa Dia[1] *(1. Minas Gerais, Brazil; 2. São Paulo, Brazil; 3. Rio Grande do Norte, Brazil)*

Background: Decline in funcional capacity is an adverse outcome of ageing and frailty influenced by environmental and personal factors. Frailty cycle is theoreti-cally based on a tripod of alterations in the physiological systems among them sar-copenia, neuroendrine dysregulation and immunological disfunction which corre-late in a complex way leading to instability in homeostasis, fractures, immobilizati-on and undernutrition (FRIED et al., 2001). This way the objective of this study was to investigante the association between frailty, clinical conditions and physical capacity in elderly from three cities in different regions of Brazil. Methods: Fibra Network (Studies of Frailty in Brazilian Elderly) is an epidemiologi-cal cross-sectional, multidisciplinar and multycentric study. Sociodemographic vari-ables selected for this analysis were: marital status, age, gender, scholarship and inco-me. Clinical variables were: comorbidities, falls, hospitalization, medications in use and weight alterations. To assess funcional capacity Basic (BADL), Instrumental (IADL) and Advanced (AADL) activities of daily living were considered. The associa-tion between frailty and city was verified by multinomial logistic regression. Results: The sample was composed of 1308 elderly aged 65 or more, mean age 73.33 (±6.35) without cognitive deficits and able to walk independently. The three analyzed cities (Belo Horizonte, Barueri e Santa Cruz) showed significant differences when com-pared in relation to functional capacity (p=0.000). Santa Cruz was the city which most presented dependent (IADL p=0.000) and partially dependent (AADL p= 0.000) elder-ly. The study showed a direct relationship between frailty and increasing in the difficul-ty on performing activities of daily living. Frailty also influenced more functional ca-pacity than the city, being Santa Cruz the one with the worst result. The most frail elder-ly showed higher reduction in functional capacity for AADL (p=0.000) and IADL (p=0.000). In relation to AADL (p=0.003), the general sample was considered depen-dent, but non frail elderly were the most partially dependent for these activities. Conclusion: Functional capacity was influenced by the residence of the elderly, frailty and socioeconomic factors. This way our results can contribute to extend knowledge about this subject and help on the planning of prevention strategies at public health le-vel, besides promoting new discussions of the national politics for the elderly people from Brazil.

**P77- ASSOCIATION BETWEEN FRAILTY AND FUNCIONAL CAPACITY IN COMMUNITY-DWELLING ELDERLY FROM BELO HORIZONTE, BARUERI AND SANTA CRUZ: FIBRA NETWORK STUDY.** M. Consuelo Velazquez Alva, M.E. Irigoyen Camacho, I. Lazarevich, J. Delgadillo Velazquez, P. Acosta Dominguez, M. Zepeda *(Mexico City, Mexico)*

Backgrounds: Sarcopenia is a condition affecting the quality of life among the elderly. The loss of muscle mass has an impact on their activities of daily living. A low-quality diet is associated with the development of sarcopenia, among other factors. Food consumption is affected by oral health conditions, as people with fewer teeth and inadequate dentures consume lower quantities of fiber and vitamins and their consumption of protein could be affected. Energy intake recommended in European countries and by the World Health Organization guidelines change for older adults, with decreasing energy requirements along with increasing age, due to a less active lifestyle and changes in body composition. There is little information about the possible association between sarcopenia and oral health, conditions such as the number of teeth in the mouth, use of dentures, and ability to chew food. Objective: The purpose of this study was to identify the association between sarcopenia and chewing ability in a group of elderly people living independently in a southern area of Mexico City. Method: The study group was selected from a regional government geriatric clinic located in a southern area of Mexico City. The inclusion criteria were patients 65 years old and older, females and males, without severe cognitive limitations. The exclusion criteria included patients with physical impairments to performing the anthropometric evaluation, amputation of pelvic members, and those who did not completed the questionnaires and physical examination. Anthropometry was carried out following a standardized protocol by two trained dietitians. Body composition was assessed using a bioelectrical impedance analyzer (RJL Systems' Quantum™ I V). The European Working Group on Sarcopenia in Older People (EWGSOP) algorithm was applied to diagnose Sarcopenia. Muscle mass was calculated using the following BIA equation used by Janssen et al: skeletal muscle mass (kg) = ([height2/ BIA (resistance) x 0.401] + [gender x 3.825] + [age x -0.071]) + 5.102. Height = centimeters, resistance = ohms, sex: women = zero, age = years. Low muscle mass was classified as the skeletal muscle index less than 6.42 kg/m2. The World Health Organization criteria were used for tooth loss assessment, and a questionnaire was used regarding oral habits and chewing ability. Oral examinations were carried out by a standardized dentist. Linear logistic regression models were constructed using sarcopenia as the dependent variable and oral conditions as the independent variables, adjusted by age. The odds ratios (OR) and 95% confidence intervals (95% CI) were obtained from the models. The study protocol was approved by the Metropolitan Autonomous University, and ethical aspects were considered. Results: A total of 472 elderly people participated in the study, and their mean age was 74.2 (± 6.4) years old, (min 65, max 94), and the majority of the participants were women (71.7%). Their mean body mass index was 26.6 kg/m2 (± 4.4). The prevalence of sarcopenia was 35.6%, and no differences by sex were observed in the prevalence of sarcopenia, (P=0.529). Regarding oral health, the mean number of lost teeth was 16.6 (±4.8), and 31.2% of the participants had chewing problems, and the remaining 68.8% did not. More women than men had chewing limitations, 33.9% and 24.3%, respectively, (P=0.0377). In the elderly group with sarcopenia, 44.7% had chewing problems, and in the group without sarcopenia, 31.4% had these type of problems (P=0.005). The results of the logistic regression model indicated that sarcopenia was associated with chewing problems (OR= 1.55, (95%CI 1.01, 2.37), P=0.045), age was associated with sarcopenia (P<0.001), and sex was not statistically significant in the model (P=0.265). More than one-third of the patients had sarcopenia. This prevalence is of concern, taking into account the negative consequences on mobility and the ability to perform activities of daily living resulting from the decrease in skeletal muscle mass experienced in the elderly with sarcopenia. Treatment

and preventive programs for sarcopenia should be implemented in the population studied. Additionally, the oral examinations revealed that approximately half of the teeth had been lost by the participants, and more than 30% of the study group had chewing problems. Conclusion: The results suggest that oral health could have an impact on sarcopenia. The elderly with sarcopenia were more likely to have chewing problems. Oral health is frequently neglected among the elderly people and the physical limitations imposed by sarcopenia make it more difficult to maintain good oral health. Poor oral conditions also had an impact in the selection of food and could be associated with protein- and micronutrient-deficient diets. These findings are important for the development of geriatric care protocols for the elderly and suggest the need for an interdisciplinary approach.

**P78- EFFECTS OF SYNBIOTIC SUPPLEMENTATION ON SYSTEMIC INFLAMMATION OF ELDERLY SUBJECTS.** J.V. Neto, S.M. Lima Ribeiro *(São Paulo, Brazil)*

Background: Ageing is associated to a reduction in the capacity to cope with stressors, which is the main concept of frailty. A number of changes in body composition and function are related to the development of frailty, such as: visceral deposition of fat (highly associated with systemic inflammation) and reduction in the subcutaneous fat. A remarkable change is related to a systemic and low level rise in inflammatory markers in the blood, which has been associated to a broader process called inflammaging. Our work highlights the hypothesis that this low-level inflammation is associated to an imbalance in gut microbiota and changes in intestinal permeability, which in turn justifies the use of synbiotic substances. Aims: to evaluate the effect of a 6-month supplementation of a synbiotic substance on the systemic inflammation in elderly in risk of frailty. Methods: we studied 49 individuals, 65-90 years old, fulfilling from one to two frailty criteria proposed by Fried et al (2001). A double-blind randomized clinical trial was performed, in which the participants were allocated in one of the following groups: SYN (symbiotic treatment) - intake of a synbiotic substance (Frutooligossacarideos 6 g, Lactobacillus paracasei 109 to 108 CFU, Lactobacillus rhamnosus 109 to 108 CFU, Lactobacillus acidophilus 109 to 108 CFU and Bifidobacterium lactis 109 to 108 CFU); or PLA (placebo, control)- maltodextrin in the same doses as the SYN group. Both groups were instructed to consume the substances twice a day, for the period of 6 months. Before and after the supplementation the subjects were evaluated for: plasma inflammatory markers (IL-6, IL-10 and TNF-α); blood cells count; anthropometric measures, gut function (Bristol Scale and Roma criteria). Data were analyzed by repeated measures ANOVA (inflammatory markers), with appropriated pos-hoc test, student's t Test (blood cells), as well as odds ratio and risk reduction analysis. The Intention to treat principle was adopted. Significance was considered as p<0.05. Results: The PLA group was composed by 24 subjects with mean age of 76.2±8.4 years, and the PLA group was formed by 24 subjects with mean age 75.6±8.1 years. The gut function was improved in 5.3% of SYN. In turn, PLA group presented 20% of negative symptoms of gut function. The OR of improvement of SYN according to ROMA III was 0.76 (CI= 0.09-6.17), indicating a benefit of the synbiotic supplementation. The inflammatory markers were analyzed in two different ways: the whole group and considering the age as co-variable. When compared the whole groups, some differences were found by the time between both groups for IL-10 at baseline (b) and after supplementation (a) (PLAb=3,9±5,4; PLAa=1,4±1,7; and SYNb1,9±3,2; SYNa=1,5±1,3) and IL6 values at baseline (PLAb=3,9±5,4; PLAa=2,4±1,6 and SYNb=3,0±1,9; SYNa=2,5±1,1). Taken the three age ranges groups (1, 2, 3) and comparing for the supplementation group and time, there was no significant difference, but considering only time, differences were found between PLA and SIN groups at baseline (b) and after supplementation (a), for IL-10 (PLA1b=4,07±;4,23; PLA1a=2,41±0,61; PLA2b=2,33±1,06; PLA2a=1,59±0352; PLA3b=5,56±8,37; PLA3a=3,32±2,40; SYN1b=2,71±2,01; SYN1a=2,83±1,48; SYN2b=3,29±2,39; ; SYN2a=2,41±1,19; SYN3b=2,85±1,22; SYN3a=2,60±1,11). Differences were also found for IL-6 when comparing the age groups considering only the time (PLA1b=4,07±; PLA1a=1,29±0,48; PLA2b=2,33±1,06; PLA2a=0,89±0,25; PLA3b=5,56±8,37; PLA3a=1,75±1,54; SYN1b=2,71±2,01; SYN1a=0,80±0,01; SYN2b=3,29±2,39; SYN2a=2,59±4,29; SYN3b=2,85±1,22; SYN3a=1,43±1,08). The blood cells count revealed higher numbers of basophiles (SYN=32,05±39,85; PLA=4,22±17,91) and monocytes (PLA=14,58±8,60; SYN=11,00±7,36) on the SIM group compared to the PLA group. Conclusion: Taking altogether, it's possible to conclude that the synbiotic supplementation seemed to be efficient for the elderly considered in risk of frailty, but it remains necessary to perform more studies, including larger populations and with analysis of gut permeability. Key words: frailty, inflammation, microbiota, synbiotic.

**P79- SARCOPENIA IN ELDERLY INPATIENTS: HOW TO IDENTIFY?** R. de Cássia de Aquino, N. de Oliveira, M. Marques de Sousa Mirkis *(São Paulo, Brazil)*

Backgrounds: Sarcopenia is characterized by the combination of the decrease in mass, strength and function of skeletal muscle, and illustrates the fragility associated with aging of the organism. Despite frequent in elderly hospitalized and cause significant harm, few studies in Brazil evaluates sarcopenia in hospital environment and the assessment is not yet well established. The purpose this study was to evaluate the prevalence of sarcopenia and the association of sarcopenia with status anthropometric nutritional in older patients admitted in hospitals. Methods: Cross-sectional, quantitative study conducted in older patients hospitalized in two hospitals. The presence and classification of sarcopenia was obtained by the proposed method by Lee et al. (2000) and associated with anthropometric measurements (arm circumference, arm muscle circumference and calf circumference), nutritional risk (Nutritional Risk Screening - NRS 2002) and grip strength. The findings were considered significant at a significance level of 5%. Results: The study included the participation of 150 elderly patients with a mean age of 69.4 years (SD 11.3 years), with the majority being Caucasian (75.3%), male (66.6%) and 35.8% had nutritional status of eutrophic. Elderly males had a higher frequency of sarcopenia ($p < 0.05$) compared to women. Nutritional risk was more common among elderly people with sarcopenia ($p < 0.05$), however, with regard to race, no statistically significant difference was observed. Regarding sarcopenia and anthropometric measurements was observed that the decreased with the increase of the degree of sarcopenia ($p < 0.05$). All measurements were correlated with negative sarcopenia and the higher the degree of sarcopenia, lower anthropometric measurements. There was a decrease of palmar pressure with increasing age and on the right hand there was a statistically significant correlation ($p < 0.05$). Conclusion: Data from this study indicate that sarcopenia in elderly patients is associated with male gender, the presence of nutritional risk and reduction of anthropometric measures, besides the decrease of palmar pressure. In this sense it is important to identify the risk of sarcopenia in elderly hospitalized patients, including nutritional risk screening (NRS 2002) and assessment to complete and forward a nutritional therapy and multidisciplinary in order to maintain or restore the nutritional status.

**P80- DYNAPENIA AND SARCOPENIA AS A RISK FACTOR FOR DISABILITY IN ELDERLY.** A.-M. Benjumea[1], C.-L. Curcio[1], G. Duque[2], F. Gomez[1] *(1. Manizales, Colombia; 2. Sydney, Australia)*

Background: The term sarcopenia refer to the loss of muscle mass and muscle strength related to ageing. Differences between definitions, measurements and mechanisms of sarcopenia have been observed. Furthermore, loss of muscle mass can be attributed to the combination of muscular and neural factors and not only to a decrease in muscle mass. It is known also that decrease in muscle strength is a good predictor of disability. The aim of this this study is to compare the association of sarcopenia defined by the European Working Group on Sarcopenia in Older People (EWGSOP) and dynapenia with physical disability. Methods: Design: Retrospective cohort study. Setting: Falls & Fractures Clinic, University of Caldas (Manizales, Andes Mountains, Colombia, South America). Participants: 534 subjects (mean age= 74, 75% female) assessed between January 2002-2014. Measurements: Sarcopenia was measured according to the EWGSOP: muscle mass by calculating the index of skeletal mass, muscle strength with manual dynamometry and physical activity with the gait speed, cut-point < 0.8 Mt/sec. Sarcopenia is defined as low muscle mass plus decrease in muscle strength or decrease in physical activity. Dynapenia was defined as the handgrip force ≤30 kg for men and ≤20 kg for women. Outcomes: physical disability (ADL), instrumental disability (IADL), disability mobility, instrumental or mobility disabilities and instrumental and physical disabilities. Results: Dynapenia and sarcopenia were present in the 84.6% and 71.2% respectively. Sarcopenia and dynapenia were higher in older subjects and in women than men. While sarcopenia was associated with BMC and hypertension, dynapenia was associated with hypothyroidism and vision impairment. After controlling for all covariates, sarcopenia was associated with IADL and mobility disability. Dynapenia was associated with ADL, IADL and mobility disability. Conclusion: Reduced relative skeletal muscle mass is a common occurrence that is significantly and independently associated with functional impairment and disability, particularly in older women. However, loss of strength is a more consistent risk for disability than is loss of muscle mass.

**P81- LEG MUSCLE QUALITY AND PERFORMANCE IN DIABESITY INDUCED SARCOPENIC PHYSICAL FRAILTY.** D.C. Bittel[1], A.J. Bittel[1], L.J. Tuttle[2], D.R. Sinacore[1] *(1. Saint Louis, USA; 2. San Diego, USA)*

Background: Sarcopenia is an age-related loss of skeletal muscle mass – often diagnosed by measuring muscle mass (DXA, BIA), grip strength, and gait speed, with a common diagnostic criterion age of 65 years or older. Sarcopenia increases frailty and leads to difficulty with fundamental functional tasks. It has been argued, however, that loss of muscle mass alone is inadequate to define sarcopenic decline, and that muscle power (dynapenia) may be the key defining aspect. Declines in muscle power may stem from reductions in muscle quality, which is an important etiological factor in the sarcopenic process. Diabesity, a specific form of type 2 diabetes mellitus (T2DM) which typically develops with age and which is associated with obesity, is associated with reductions in muscle quality (eg. intermuscular adipose tissue accumulation) and accelerated sarcopenia. Indeed, previous research from out lab has shown that individuals with T2DM and peripheral neuropathy (T2DMPN), a more progressed/severe diabetic state, exhibit signs of sarcopenia well before the common criterion age of 65, most notably in muscle of the leg. This finding is significant, as leg (calf) muscle function is more closely associated with physical function than thigh or upper extremity musculature. The relationship between sarcopenia and frailty in this population has yet to be elucidated. Thus, the purpose of this study is to examine the relationship between diabesity and underlying sarcopenic factors in the leg (muscle quality, muscle performance), and how this may confer physical frailty. Methods: 43 subjects were included- 12 with T2DM only, 21 with T2DMPN, and 10age-, sex-, and BMI-matched controls. Leg compartmental intermuscular adipose tissue (IMAT – a measure of muscle quality) and muscle volumes were quantified using T1-weighted MRI. Plantarflexor (PF) torque and power were measured at 120°/s (Biodex System 3 Isokinetic Dynamometer). A 9-item physical performance test (PPT) was administered to classify physical frailty (defined as a PPT score <29). Sarcopenic indices were calculated via dual-x-ray-absorptiometry (DXA) and the Skeletal Muscle Index equation shown below.

$$SMI = \frac{Total\ body\ skeletal\ muscle\ mass(kg)}{Total\ body\ mass\ (kg)}$$

$$Total\ body\ skeletal\ muscle\ mass = \left[(1.13 \times ALM) \times (.02 \times Age\ in\ yrs)\right] + (.61 \times sex\{0 = f, 1 = m\}) + .97$$

Chi-square analysis was used to determine group differences in frequency of frailty classification. Group differences in compartment volumes, and muscle performance, were assessed using one-way ANOVAs. Pearson correlation coefficients quantified relationships across variables. Finally, a multiple regression predicting PPT score from group status, leg %IMAT, and PF power, was used to determine the relative weights of these factors in classifying frailty. Results: 80% of those within the two diabetic groups were classified as sarcopenic, while only 60% of matched controls were sarcopenic. The T2DMPN group was significantly more likely than controls or T2DM to be classified as frail (X2 =6.9, p=.033). Those classified as frail had higher %IMAT volume, and lower leg muscle power than non-frail participants (p=.016, p=.009 respectively). T2DMPN also had higher %IMAT in the calf muscles than controls and T2DM (p=.013). T2DMPN had lower ankle PF power than controls and T2DM (p=.027). Total calf %IMAT was inversely correlated with PF power and PPT score (p=.03, p<.001 respectively). Multiple regression indicated that T2DMPN is associated with a more precipitous decline in PPT score (more frailty) than T2DM or controls (p=.01), and for every 1 point increase in %IMAT volume of the leg muscles, there is an accompanying .1 point reduction in PPT score (p=.004). Conclusion: Obese individuals with T2DM are more likely to be sarcopenic than their matched non-diabetic counterparts. As the diabetic state progresses to impart neuropathic symptoms, these individuals may become more frail, and exhibit poor muscle quality (via excess IMAT accumulation) and power, especially in the extrinsic muscles of the ankle. These diabese individuals are particularly susceptible to the acceleration of sarcopenia due to the coincident pathophysiology of these conditions – sarcopenia and diabesity are both associated with mitochondrial dysfunction, low-grade systemic inflammation, insulin resistance, growth factor and hormonal decrements, and immobility/reduced physical capacity in the form of frailty. A common mechanistic contributor to early sarcopenic status and physical frailty in diabesity may be leg IMAT deposition, which is hypothesized to accumulate in response to diabesity-related reduction in muscle oxidative capacity, and is highest in those with progressed disease (i.e T2DMPN). This IMAT accumulation may release pro-inflammatory cytokines, impart lipotoxic effects, disrupt muscle architectural arrangement (fascicle structure and pennation angle), and lead to myocyte apoptosis, thus contributing to loss of muscle mass and dynapenia. This process, when over-active in the muscles of the leg in those with diabetic peripheral neuropathy, may more potently hamper physical mobility, and thus contribute to the higher incidence of physical frailty in this group. Interventions designed to restore leg muscle volume, reduce IMAT, and possibly enhance leg muscle oxidative capacity should be central components in the management of diabetes-related sarcopenic frailty. Funded by: NICH T32 HD007434-19 & NICHD K12 HD055931.

**P83- VALIDATION OF A FRAILTY INDEX FROM THE INTERRAI ACUTE CARE INSTRUMENT.** R.E. Hubbard[1], N.M. Peel[1], M. Samanta[1], A. Mitnitski[2], K. Rockwood[2], L.C. Gray[1] *(1. Brisbane, Australia; 2. Nova Scotia, Canada)*

Background: Decisions for complex older inpatients are often undertaken without the benefit of a strong evidence base. This results in frustration and feelings of inadequacy for the treating doctor. More importantly, it can result in incorrect care. Some older people are subject to futile and distressing treatment at the end of their lives; others are denied potentially beneficial interventions on the basis of their chronological age alone. A measurement of frailty could stratify the risk status of older inpatients and help target their care more appropriately. This study is one of a series designed to explore the efficacy of a Frailty index derived from the interRAI Acute Care instrument (the FI-AC). Here, we address the diagnostic accuracy of the index, asking the research question: do higher FI-AC scores identify older inpatients with poorer health status and at greater risk of adverse outcomes? Methods: Our sample comprised 1418 patients aged 70 and older admitted to 11 acute care hospitals in Queensland and Victoria, Australia. The sites ranged from small secondary care centres (with 120 – 160 beds, n = 2), through rural hospitals (250 – 280 beds, n = 2) to metropolitan teaching facilities (300 – 450 beds, n = 4) and major tertiary referral centres (>650 beds; n = 3). All patients were assessed at admission and discharge by trained nurse assessors using the interRAI AC. The instrument surveys a large number of domains, including cognition, communication, mood and behaviour, activities of daily living, continence, nutrition, skin condition, falls, and medical diagnosis. Based on admission data, variables across these multiple domains were selected as health deficits. Dichotomous data were coded as symptom absent = 0 deficit, present = 1 deficit. Ordinal scales were recoded as 0, 0.5 or 1 deficit based on face validity and the distribution of data. Deficits were summed and divided by the total number considered (here, 56) to yield an FI-AC with theoretical range 0-1. Higher values indicated greater frailty. Outcomes included discharge destination (measured as change to a higher level of care from admission to discharge), length of stay, and adverse events in hospital including falls, functional decline and incidence of pressure ulcer. Adverse events were collected prospectively by daily chart review and ward visit by research nurses during the acute care episode. Results: Mean age of patients was 81.0 (± 6.8). The median (interquartile range) length of stay in acute care was 6 (4-11) days and the majority (87.2%) were admitted to hospital from the community. Mean FI-AC at admission was 0.32 (± 0.14). Patients discharged to the community (n=919) were the least frail (0.28 ± 0.12), while those discharged to other inpatient care (n=234), residential aged care (n=207) or who died (n=57) were progressively frailer (0.39 ± 0.13; 0.41 ± 0.13; 0.47 ± 0.16 respectively). In logistic regression models, adjusting for age and gender, each increase of 0.1 in FI was significantly associated with increased likelihood of adverse outcomes, including discharge to a higher level of care (OR: 1.47 [1.33-1.63]), length of stay >28 days (OR: 1.32 [1.13-1.55]), in hospital falls (OR: 1.29 [1.11-1.51]), functional decline (OR: 1.24 [1.07-1.43]), and incidence of pressure ulcer (OR: 1.52 [1.24-1.88]). Conclusions: The best opportunity to calculate a hospital based FI is to use data already collected for other purposes. The interRAI AC provides this opportunity. The FI-AC does identify patients at greater risk of adverse outcomes. This may enable us to move forward with the next step, of whether knowing such information with precision can aid the clinical judgment now employed daily to proceed with usual care, or to modify it based on the vulnerability of the person to whom it is aimed. Randomised controlled trials of care pathways are now recognised as inadequate when used in people with multiple problems. Tailoring interventions to each patient's individual frailty status may yield results with greater clinical utility. This is currently the focus of further enquiries by our group.

**P84- PRELIMINARY FINDINGS ON THE PSYCHOMETRIC PROPERTIES OF THE CHINESE VERSION VERBAL AND NON-VERBAL INTERACTION SCALE (C-VNVIS).** L.J. Yat Wa *(Hong Kong)*

Background: Communication between caregivers and care recipients is crucial in providing quality nursing care. However, older people with severe cognitive impairment have difficulties in verbal communication due to deterioration in their ability to express themselves verbally. The Chinese version Verbal and Non-verbal Interaction Scale (C-VNVIS-CR) was developed to assess behavioural responses in an all-round approach that captures both the sociable (such as calm, relaxed) and unsociable (such as argumentative, shouting) versus the verbal and non-verbal behavioural responses that may be observed in cognitively impaired older people. Methods: A validation study was used to evaluate the psychometric properties of the C-VNVIS Results: The preliminary results show that it has satisfactory levels of interrater and test-retest reliability as well as internal consistency, but only modest levels of correlation with another observational scale for assessing cognitively impaired people emotional changes. Thus, further validation studies of this scale are necessary. However, the most important point of this study is that it sheds new light on how cognitively impaired older people's responses can be assessed in a reliable and systematic manner. Conclusions: This is an important first step to evaluate and monitor the quality of care provided to them based on their behavioural responses via the consistent use of C-VNVIS-CR – an observation-based instrument.

**P85- RISKS AND PREVENTION OF FRAILTY IN SOCIAL HEALTH EFFECTS OF AGING.** M. Noguès, J. Touchon, J. Bousquet, V. Bruguière, D. Paccard, A.-L. Coupet, M. Marc, J.-C. Reuzeau *(Montpellier, France)*

Background: Frailty increases with age and frequency is a medical, social and societal major problem. It must be detected early and treatment to prevent or delay the loss of independence. Upstream of frailty, risk identification can provide a more focused view of the population likely to receive support tailored to the somatic field and the social sphere. The combination of data from information systems Social Security (Health and Retirement) shows in situations of seniors seeking care, isolation, insecurity that predict progression to frailty. An early awareness of these factors allows to implement plans actions within the broader social health prevention (work Observatories fragile situations, CNAMTS 2013). Method: Identifying risk of frailty: the Regional Institute on Aging (IRV) in Languedoc Roussillon, Living Lab MACVIA LR. The IRV is animated by the Retirement and Occupational Health Insurance Agency (Carsat). It unites and brings together in a single unit, various activities provided by services Carsat for the coordination and the creation of caring for frail seniors. The creation of the IRV resulted in various exchanges with other social security schemes and key partners, including ARS and Councils. To pursue a policy of proximity focused on the prevention of the effects of aging, Carsat-LR has implemented an Observatory on fragile situations expanded to Interrégime (MSA - RSI). It aims to identify the risk of frailty insured to promote prevention and early actions tailored to the needs of the people to maintain their independence and identification of priority intervention areas. The information is available on the website of the Carsat-LR and can be accessed via a Geographic Information System (GIS). The dynamic assessment of individuals identified at risk of frailty. This evaluation approach in the context of a reflection on the evolution of the support of fragile seniors to come home joined the work of the Carsat for social action. The challenge is to assess over time the risk of frailty in 4 axes determined by somatic, psychosocial, nutritional and cognitive. The objective is to identify the components of frailty and its multidimensional character for each subject and direct support based on risk(s) of frailty identified. The score is used to draw the «star of loss of autonomy» for each subject and direct, ultimately, to workshops or activities most appropriate prevention. The conceptual model of prevention (primary, secondary, tertiary) is very useful, but the use of these levels can lead to segmentation that make it difficult to have a comprehensive approach especially when seniors are at risk of frailty. For preventing the effects of aging, it's necessary to review the methods of communication and therefore to have an approach this population for develop tailored responses. It therefore seems preferable to revisit the concept of prevention through a paradigm, this shift would be to review the preventive approaches based on the differentiation between the areas affected by frailty, namely: - Health and disease as defined by WHO; - Social health based on the representation that the person of his personal activity; - Socio-economic environment that takes into account the person in a broader environment that is in fact his social autonomy. Results: The IRV incorporates a «concerted counter» recommended by the National Plan Proximity Autonomy (Circular CNAMTS/CNAV of 09/20/2014). He brings to insured retirees or retirees at risk of frailty,

advice and guidance in the domain of access to rights, but also on the domain of health. The «concerted counter» uses the existing skills: case manager, technicians Social Security ... It identifies people at risk of frailty as may be reported by the Observatory but also by the various social security organizations to provide advice and facilitate their orientation. Links in this area are made with prevention centers. Individuals have a regular monitoring and evaluation presented above. Following the launch of this experimental offering, 50 people were followed by the «concerted counter.» 75% of policyholders have expressed a specific need and, often, financial difficulties, and / or related to housing, health care, loneliness or the acquisition of complementary health. The needs expressed do not reflect always the real needs. The case manager makes an accurate assessment of the situation of each senior from an interview guide. This allows to identify unmet needs identified by the insured. 9% report being dissatisfied with their housing [insecurity, noise, decay, distance from health professionals]. Medically, 67% are regularly monitored by their doctor. However, few are the visually or aurally, 15% admit to having difficulty seeing or hearing. In addition, 15% had to give up dental or optical care with regard to the costs of these, unsupported by health insurance or complementary. Conclusion: The device thus established from the risk of frailty clearly shows the interest to locate the preventive approach as far upstream as possible. The effects of aging involve the implementation of appropriate procedures and especially a comprehensive approach to subjects in their environment.

**P86- KEY INFLAMMATORY PATHWAY GENES ARE ASSOCIATED WITH FRAILTY IN THE ENGLISH LONGITUDINAL STUDY OF AGEING A CANDIDATE GENE ASSOCIATION STUDY.** K. Mekli[1], J. Nazroo[1], A. Marshall[1], M. Kumari[3], N. Pendleton[2] *(1. Manchester, UK; 2. Salford, UK; 3. Essex, UK)*

Background: The term frailty refers to a reduced functional reserve and consequent decrease in adaptation (resilience) to any sort of stressors and sometimes even in the absence of extrinsic stressors in elderly individuals with disability and death as a consequence. The underlying pathophysiological pathways of frailty are not known, but the hypothalamic-pituitary-adrenal (HPA) axis and heightened chronic systemic inflammation appear to be major contributors. Methods: We used the English Longitudinal Study of Ageing (ELSA) dataset of 3160 individuals over the age of 50 and assessed their frailty status according to two widely accepted frailty measures: the Frailty Phenotype (FP) and the Frailty Index (FI). We selected 620 single nucleotide polymorphisms (SNPs) in genes involved in the steroid hormone or inflammatory pathways and performed linear association analysis adjusted for covariates age and sex. To support the biological plausibility of any genetic associations, we selected biomarker levels (high-sensitivity C-reactive protein (CRP), high-density lipoprotein (HDL), cholesterol and dehydroepiandrosterone sulphate (DHEAS)) for further analyses to act as potential endophenotypes of our chosen genetic loci. Results: The strongest association with FP was observed in the Tumor Necrosis Factor (TNF) (rs1800629, uncorrected P=0.001198, β=0.0894) and the Protein Tyrosine Phosphatase, Receptor type, J (PTPRJ) (rs1566729, uncorrected P=0.001372, β=0.09397) genes. Rs1800629 was significantly associated with decreased levels of HDL (uncorrected P=0.00949) and cholesterol levels (uncorrected P=0.00315) whereas rs1566729 was associated with increased levels of HDL (uncorrected P=0.01943). For the FI, the strongest signal was detected in the pro-inflammatory interleukin-18 gene (IL-18) (rs360722, P=0.0021, β=-0.015). Further significant signals were observed in the Interleukin-12 (IL-12) (rs4679868, P=0.0062, β=-0.008 and rs9852519, P=0.0077, β=-0.008), Low Density Lipoprotein Receptor-Related Protein 1 (LRP1) (rs1799986, P=0.0065, β=0.011) and Selectin-P (SELP) (rs6131, P=0.0097, β=-0.01) genes. None of these SNPs were significantly associated with biomarker levels.After correcting for multiple testing (Bonferroni correction) attenuation left the associations non-significant. Conclusions: We provide evidence for the involvement of a key inflammatory pathway gene (TNF) in the frailty phenotype. Although the association was only nominally significant, it is supported by the endophenotype biomarker results. We also show associations between genetic variants of four genes (IL-18, IL-12, LRP1 and SELP) and the frailty index. These genes are involved in the inflammatory pathway and cholesterol transport and, as such, our results provide further support for the involvement of the immunological processes in frailty of the elderly.

**P88- MEASURING FRAILTY: A COMPARISON OF FRIED'S FRAILTY PHENOTYPE AND ROCKWOOD'S FRAILTY INDEX USING THE ENGLISH LONGITUDINAL STUDY OF AGEING.** A. Marshall, K. Mekli, J. Nazroo *(Manchester, UK)*

Background: Frailty is a state of vulnerability to poor resolution of homeostasis after a stressor event and is a consequence of cumulative decline in many physiological systems during a lifetime. In the literature two approaches have received wide-spread attention in terms of how to measure frailty: the Frailty Phenotype (FP) and the Frailty Index (FI). The former is a performance-based approach and determines the condition based on 5 specific criteria, such as unintentional weight loss, exhaustion, low physical activity, slowness and weakness. Individuals are frail if they are positive for 3-5 items, pre-frail if for 1-2 items and robust if for none. Another robust and flexible measure of frailty is based on the concept of deficit accumulation quantified as a frailty index. Deficits can be symptoms, signs, or functional impairments that accumulate with age, such as problems carrying out daily activities or chronic illnesses. FI counts these deficits and often expresses it as a ratio of deficits present to the total number of deficits considered. Method: This paper addresses the uncertainty around how frailty should be measured by comparing the Fried and Rockwood frailty assessment measures using data from the English Longitudinal Study of Ageing (ELSA). We evaluate the success of each frailty measure in predicting death and moves to a care home, using Cox Hazard models and Receiver Operating Curves. Results The results of our survival analysis suggest a comparable performance of the Fried and Rockwood measures of frailty in terms of predicting mortality. As might be expected we observed significantly increased risk of mortality with increasing frailty according to each frailty measure. Harrells C statistic an indicator of model fit was comparable for the continuous frailty index (Harrells C=0.79), the discrete version of the frailty index (Harrells C=0.78) and the fried frailty measures (Harrells C=0.79). Interestingly we observed a similar model fit using measures of wealth and self-reported health as opposed to measures of frailty. Conclusions: In conclusion, prediction of mortality over an 8 year period for older people (60+) living in the community is comparable whether the frailty phenotype or index is used. The choice of measure might then reflect the particular setting. The frailty phenotype is advantageous in clinical setting, whilst the Frailty index is useful in community environments where the collection of clinical information within the frailty phenotype is challenging.

**P89- SWALLOWING FUNCTION AND NUTRITIONAL STATUS IN COMMUNITY-DWELLING ELDERS AND INPATIENTS OF OLD AGE.** J. Beom[1], S.J. Jee[1], M. Choi[1], D.J. Park[2], K.H. Cho[1] *(1. Daejeon, Republic of Korea; 2. Gyeonggi-do, Republic of Korea)*

Backgrounds: Swallowing function can be impaired due to various etiologies in elders, which commonly causes malnutrition and frailty. We evaluated swallowing function and nutritional status in community-dwelling elders (CDE) and inpatients of old age with impaired general medical condition (IIGMC). Methods: A total of 18 CDE volunteered, in which videofluoroscopic swallowing study (VFSS) with rice gruel, yoplait, rice, 2.5ml and 5ml water, fiberoptic endoscopic evaluation of swallowing (FEES) and blood test were conducted. Videofluoroscopic dysphagia scale (VDS), modified penetration-aspiration scale (mPAS), the number of mastication, albumin level and total lymphocyte count (TLC) were measured. The values were compared to those of 23 inpatients of old age without definite dysphagia, any brain or oropharyngeal structural lesion except medical diseases such as pneumonia. The Charlson comorbidity index (CCI) and Swallowing Quality of Life (SWAL-QOL) questionnaire were checked in CDE. Results: Mean age was 72.7±5.9 years in CDE and 78.9±7.1 years in IIGMC. The IIGMC group revealed significantly longer oral transit time (1.4 vs. 0.5 second), larger mPAS with 2.5ml (1.7 vs. 1.0) and 5ml (1.7 vs. 1.0) water, larger total VDS score (15.7 vs. 8.0), and lower albumin level (3.24 vs. 4.17), and TLC (1,166 vs. 2,385) than CDE group. The mPAS with rice gruel, yoplait and rice, pharyngeal delay time, pharyngeal transit time, and the number of mastication were comparable between CDE and IGMC groups. The CCI was 0.57±0.98, and SWAL-QOL score was 193.8±20.9 in CDE. Among 18 CDE, five individuals showed supraglottic penetration, decreased swallowing reflex, or vocal cord palsy. Conclusion: Inpatients with impaired general medical condition had higher possibility to develop dysphagia and malnutrition than community-dwelling elders, which is probably due to deconditioning. Future studies with larger sample size and electromyographic evaluation of masseter and suprahyoid muscles will be needed to investigate mechanism of swallowing dysfunction.

**P90- HYPERTROPHIC RESPONSES TO RESISTANCE EXERCISE TRAINING ARE ATTENUATED WITH AGEING, DESPITE SUBJECTS BEING WELL MATCHED FOR BASELINE BODY COMPOSITION AND METABOLIC HEALTH INDICES.** B.E. Phillips, P.L. Greenhaff, J.P. Williams, K. Smith, P.J. Atherton *(Nottingham, United Kingdom)*

Background: Resistance exercise training (RET) induced muscle hypertrophy is not only a pursuit of body builders and recreational exerciser's. Indeed, despite recent development of novel pharmaceuticals (e.g. SARMS, myostatin antagonists) and promising neutraceuticals (e.g. leucine, β-hydroxy-β-methylbutyrate (HMB)), RET arguably remains the most safe and effective way of mitigating/ recovering muscle loss associated with ageing (sarcopenia) and other "wasting" conditions (e.g. cancer cachexia, respiratory diseases, organ failure, disuse). Nonetheless, whether RET remains as effective at yielding hypertrophy in older, compared to younger individuals remains contentious, since some studies report blunted acute muscle protein synthesis responses to RE, and blunted RET-induced hypertrophy in older individuals, while others report similar responses. It is feasible that one explanation for these apparent contrasting results could relate to inherent variations in physiological characteristics associated with aged cohorts (e.g. age-related adiposity blunting anabolic responses to RET), rather than being a facet of chronological age, per se. Instead, we hypothesized that blunted hypertrophic responses to RET are a pervasive feature of ageing, rather than being driven by age-related physiological changes i.e. increased adiposity or reduced muscle mass. Methods: To test our hypothesis, we recruited 3 age-cohorts consisting of 14 young (25±4 y; body mass index (BMI) 24±2 kg·m-2), 20 middle-aged (50±4 y; BMI 27±3 kg·m-2) and 17 older (70±3 y; BMI 27±2 kg·m-2) males and females (~50:50) that were well matched for body composition (lean body mass, young: 49.2±2.7; middle-aged: 49.8±2.3; old: 49.2±2.9 kg; body fat mass, young: 27.2±3.2; middle-aged: 31±2; old: 32±2%) and indices of metabolic status (fasting glucose, young: 5.1±0.2; middle-aged: 5.5±0.2; old: 5.5±0.2 mM; fasting insulin, young: 4.4±0.5; middle-aged: 4.4±0.5; old: 4.9±0.5 mM). All subjects were screened, with exclusions for overt muscle wasting, metabolic, respiratory or cardiovascular disorders or other signs and symptoms of ill health. All subjects performed habitual activities of daily living and recreation but did not routinely participate in moderate or high intensity aerobic exercise and had not participated in RET in the last 2 y. Before and after RET we performed dual-energy X-ray absorptiometry (DXA; Lunar Prodigy II, GE Medical Systems) scans to quantify subjects' body composition and took a blood sample for measures of fasting glucose (ILAB 300 Plus Clinical Chemistry

System) and insulin (ELISA; (Immunodiagnostic Systems Ltd). The RET programme consisted of 20-wks fully supervised whole-body RET designed to increase both muscle hypertrophy and strength, based on published recommendations. Subjects trained three times per week for 20-wks with each RET session lasting ~60 min. Intensity was set at 70% 1-RM, with multiple sets of 12 repetitions and two minutes rest between sets; intermittent 1-RM assessments were made every 4-wks to ensure intensity of training was constant and progressive. Non-compliance led to study exclusion. Values are presented as means±SEM with data analyzed by one-way ANOVA (independent age groups) or Spearman's correlations (across age) with a $P<0.05$ of considered significant. Results: Before RET there were no significant differences in whole-body lean mass between the age groups. There were significant increases in whole body lean mass after RET in young (+5±1%, $P<0.001$) and middle-aged (+2±1%, $P<0.05$), but not older subjects (+1±1%, NS). Despite this divergence in hypertrophic responses, all 3 age groups exhibited significant, and similar increases in muscle strength after RET (1-RM, young: 5729±405 vs. 7609±377 N (+36%); middle-aged: 4921±387 vs. 6535±460 N (+35%); old: 4082±282 vs. 5630±374 N (+39%), all $P<0.01$). The 39% strength increase in the older group restored strength to a value not significantly different to that of the young before RET. On analyzing the cohorts together, we identified a significant negative correlation between ageing and RET-induced hypertrophy ($R2=0.184$; $P<0.05$). In contrast, there were no correlations between baseline body fat mass, lean body mass or metabolic indices and ensuing hypertrophic responses. Conclusions: While our programme of 20-wks RET was effective at improving muscle strength to a similar extent in young, middle-aged and older individuals, muscle hypertrophy was only achieved in young and middle-aged subjects, with chronological age being the only divergent characteristic; at least of the parameters we measured. Indeed, there were no significant baseline differences between age groups in body fat, whole-body/lean-leg mass, abdominal fat, BMI, skeletal mass index, appendicular lean mass index or android: gynoid ratios. Neither were there differences in metabolic health-based parameters i.e. fasting blood glucose, insulin or cholesterol. These data support the notion that blunted hypertrophic responses to RET in older age are a facet of ageing per se, and not associated physiological changes i.e. increased adiposity or altered metabolic health facets. Moreover, our study reveals that the preservation of RET induced increases in muscle 'quality' (i.e. using 1-RM as a measure of strength related performance) in older age, are driven by means beyond muscle hypertrophy, in fitting with the notion that losses in muscle function exceed those of muscle mass in older age.

**P91- EVALUATION OF A DIETARY INTERVENTION IN MIDDLE AGE OBESE SARCOPENIC FEMALES.** R. Sammarco, M. Marra, M. Di Guglielmo, M. Naccarato, C. Pagano, F. Contaldo, F. Pasanisi *(Naples, Italy)*

Backgrounds: Sarcopenic Obesity (SO) was defined for the first time in 1996 by Heber et al. as the combination of reduced fat free mass evaluated by bioimpedance analysis (BIA) and fat mass excess, expressed as body weight percentage ; since then, many authors have described this clinical condition. There are a limited number of studies mainly in the elderly on sarcopenic obesity and its treatment; available data derived from not obese elderly population, demonstrated how the reduced intake of protein in the diet is associated with both a greater amount of body fat and the reduction of physical performance. Aim of this study was to evaluate the efficacy of a nutritional rehabilitation program, characterized by a different modulation of individual nutrients and proteins, in adult patients with sarcopenic obesity on: body composition, resting energy expenditure, muscle strength and quality of life. Methods: We studied 18 women aged 41-74 years (mean age 55.0 ±9.6 years; weight 103±12 kg; height 158±4 cm; BMI 41± 5 kg/m$^2$), selected among patients attending the Obesity Unit. Sarcopenia was evaluated using Janssen's muscle mass indexes: percentage of skeletal muscle mass (SMP), calculated as SM (kg)/body mass (kg) ×100. All subjects were followed for 4 months and randomly assigned to different nutritional interventions: 1. Hypocaloric diet (group A); 2. Hypocaloric high-protein diet (1.2-1.4 g / kg body weight reference / day with the addition of 15 g / day of protein supplement (group B). At entry and after four months we have evaluated the nutritional status: anthropometric measurements, body composition, Resting Energy Expenditure (REE) by indirect calorimetry, and the functional assessment by Handgrip test and Short Physical Performance Battery (SPPB). Quality of life was assessed with SF-36 questionnaire. Results: The anthropometric measurements and body composition of the two groups A and B, at entry, showed not significant differences between two groups for age (A vs B: 53 ± 8.9 vs 58 ± 10 years),weight (A vs B: 99 ± 12, 7 vs 108 ± 10.2 kg), BMI (A vs B: 39.2 ± 5.48 vs 43.6 ± 4.39 kg/m$^2$), fat free mass (A vs B: 47.7± 2.45 vs 47.5 ±3.34 kg) and fat mass (A vs B: 59.9± 9.35 vs 51.4 ±10.9 kg). In both groups, weight decreased 4 kg ($p<0.05$) after 4 months of dietary treatment. REE did not change in both experimental groups (group A vs B = -43 vs - 65 kcal /die). This result is similar even after correction for the fat free mass (group A vs B = +1.0 vs + 0.4 kcal / kg). Women with high protein-low-calorie diet preserved lean body mass better compared to low-calorie diet (A vs B = -1.3 vs -0.5 kg, $p<0.05$). The phase angle, that is the expression of the intracellular water, did not change significantly in both groups. Muscle strength measured by dynamometry improved significantly in the group with protein supplementation (group A = unchanged, group B = 1.6 kg, $p<0.05$); the score of the test SPPB did not change significantly in both groups. The scores of the SF-36 test showed that the only significant change after 4 months is the score of general health in the group A (baseline vs 4 months: 54 vs 63, $p = 0.028$); all the other categories (physical activity, physical role limitations, physical pain, vitality, social activities, emotional role limitations, mental health) did not change significantly. Conclusion: In our study, obese patients with high-protein diet showed an improvement in muscle strength after 4 months of protein enriched diet. This result has, in our opinion, important clinical implications because the assessment of muscle strength is a non-invasive and low cost method. Furthermore, dietary protein enrichment may represent a protection from the risk of sarcopenia following an hypocaloric diet. The limits of our study are the short period of observation and the limited population sample of women in middle age with uncomplicated obesity. Further studies are required in a larger population in order to determine the association between dietary protein intake and changes in lean body mass, which could have important implications for developing strategies for weight loss in these subjects and for the prevention of one of the possible causes of physical disability associated with aging related sarcopenic obesity.

**P92- UNIT FOR DIAGNOSIS AND PREVENTION OF SARCOPENIA (UDPS) PRELIMINARY EXPERIENCE.** C. Fernández, D. Gómez Glorioso, E. Sarnacki, C. Mautalen *(Buenos Aires, Argentina)*

Background: Patients with osteoporotic fractures are also frequently sarcopenic (see also other communication in this conference). In our Center, that has been taking care of patients with Metabolic Bone Disease during the last 4 decades, the methods for the diagnosis of Sarcopenia has been installed. Our preliminary experience is herewith presented. Patients: During the last two months 31 women have been examined at the UDPS. The reasons for undergoing the studies have been: Weakness:13, osteoporotic fractures:12, falls: 3 , newspapers news 2 and fractures and fall :1. Muscle Mass and Function Assessment. • BMD and whole body composition measurements were performed and appendicular lean mass (ALM) was calculated by DXA. • Grip strength was measured using a dynamometer (Camry). • Self- selected gait speed was measured during a 5 meter walk. Results: Average age was 70.0 ± 8.1 (range 54 to 84), weight 59.7 ± 10.1 kg , height 158 ± 6cm, BMI: 23.9 ± 3.6 (range15.8 to 30.0 kg/m$^2$). Appendicular lean mass (ALM): 5.67 ± 0.85 kg/m$^2$ (range 4.38 to 7.78) Walking speed: 0.93 ± 0.24 m/s. Hand grip: 17.8 ±5.4 kg and sit-up time 14.3 ± 3.6 seconds). The following significant correlations were observed: ALM and handgrip +0.58 $p< 0.01$ and hand grip and sit up test -0.51 $p <0.01$. Taking the results of the appendicular lean mass as a main standard we observed the following results: Below -2 SD from young normal: 47% of the patients, between -1SD and -2SD below young normal: 46% of the patients. Above – 1 SD: 7% of the patients. For the population with ALM below 2 SD of normal young (5.67 kg /m$^2$) we tried three different definitions of Sarcopenia: • International Working Group (low ALM plus gait speed < 1.0 m/s) 38% of our patients were classified as sarcopenics. • Foundation of the NIH (low ALM plus hand grip below 16 kg) 36% of the women in the study were sarcopenic. • European Working Groups (low ALM plus gait speed ≤ 0.8 m/s and hand grip below 20kg) only disclosed that 8% of the patients met the criteria for sarcopenia. The marked difference was due to the fact that very few patients had a walking speed ≤ 0.8m/s.Using other approach, patients with a low ALM and a sit-up test above 12.5 seconds, the percentage rose to 47%, since all patients with an ALM below -2 SD failed to have a normal sit-up test score. In our routine clinical practice, without the sophisticated end points using in research, the walking speed test seems to be less reliable than sit-up test. Clinical decision: Independently of the different criteria advocated, all patients in the sarcopenic range according to the IWG or Foundation NIH have been given a suitable exercise program, a diet with at least 1g of protein for kg/weight and sufficient vitamin D3 to keep 25HO D serum levels above 30 mg/ml. The same advices were given to patients with AMM between -1.0 and –2.0 SD below young normal who failed on the hand grip, walking speed, or sit-up test. Conclusion: We present herewith our preliminary experience –hopefully to be expanded by the time of the Conference- translating into a customary clinical practice, the research findings and improved knowledge gathered during the last years about Sarcopenia and Frailty.

**P93- PHASE ANGLE MEASUREMENT USING BIOELECTRICAL IMPEDANCE OLDER ADULTS WHO DANCE REGULARLY COMPARED TO NON-DANCERS.** M. Gonzalez-Lara, P. Tella Vega, L. Robles Jimenez, M. Ulises Perez Zepeda *(Mexico City, México)*

Backgroung: In Mexico there is a popular kind of Latin ballroom enjoyed by middle – aged and older adults called danzón (Guzmán-García, 2011). It has been suggested that the participation in physical activities is part of an important factor that contributes to prevent chronic diseases, as well as mortality, functional limitations and disability (Mavrovouniotis et al., 2008). Age-related loss of muscle mass and strength defines "sarcopenia", which is the reponsible for the increase in morbidity in the elderly (Baumgartner et al., 1988). There are some techniques for the assessment of sarcopenia, for example, bioelectrical impedance analysis (BIA). BIA is based on the notion that tissues rich in water and electrolytes are less resistant to the electrical passage than adipose tissue (Cesari et al., 2012). Phase angle (PhA), a value calculated from BIA measurements, tends to decline with age, relates the distribution of intracelular and extracellular fluid, and varies with the lipid content of cell membranes. PhA could reflect the overall integrity or validity of living tissue (Wilhem-Leen, 2013). It has also been considered highly predictive of impaired clinical outcome and mortality in several diseases. At muscular level, phase angle correlates with grip and with knee extensión strength (Basile C, et al, 2014). The aim of this study is to know the association of phase angle using BIA in older adults who dance compared to those who do not dance. Methods: A cross-sectional study was done in the functional laboratory of the Instituto Nacional de Geriatria. Subjects were recruited from academies of dancing all over Mexico City. The comparison group was a group of non-dancers that had the characteristic of gathering frequently and have social activities. A multi-dimensional evaluation was done to both groups, that included sociodemographic, health variables, physical and body composition tests. Sarcopenia was defined with the European Working Group on Sarcopenia. All subjects signed informed consent. Phase angle was determined by bio impedance, and was compared between groups. Non-parametric statistics were used. Results: A total of 104 subjects were assessed, half dancers and half non-dancers; from

which 62.1% were women and mean age was of 70.1 (6.14). Phase angle mean was of 4.6 for non-dancers and 6.8 for dancers, a significant difference (p=.003). When comparing phase angle between sarcopenic and non-sarcopenic individuals irrespectively of their dancing status, there was no difference. Even when dividing groups by dance status, phase angle was not different by sarcopenia groups. Conclusions: Phase angle is a promising biomarker of muscle waste in older adults, and has discriminative value for different groups of physical activity levels.

**P94- PERILIPINS AND P53 EXPRESSION DURING HUMAN MUSCLE AGING.** M. Conte[1], A. Armani[2], E. Bertaggia[2], F. Vasuri[1], A. D'Errico-Grigioni[1], M. Franchi[3], M.V. Narici[3], M. Sandri[2], C. Franceschi[1], S. Salvioli[1] *(1. Bologna, Italy; 2. Padua, Italy; 3. Nottingham, UK)*

Backgroung: Sarcopenia, the progressive loss of muscle mass and strength, is a phenomenon characterizing human aging whose etiology is still not clear. A sedentary lifestyle contributes to this process and acts synergistically with age to determine a loss of muscle mass and strength. Both conditions are marked by increased adiposity, which can lead to ectopic fat deposition in skeletal muscle. Lipid accumulate in skeletal muscle as intra-muscular triglycerides (IMTG) stored within lipid droplets (LDs). LDs are characterized by the presence on their membrane of proteins known as Perilipins (Plins). In skeletal muscle the most abundant are Plin2 and Plin5. The exact role of Plin2 and Plin5 is currently unknown. We were also interested in investigating the expression and activation in skeletal muscle of tumor suppressor p53 protein. p53 is best known for its activity on cell cycle regulation and apoptosis, but also for the regulation of glucose metabolism. Few data are available on the role of this factor in muscle metabolism and aging. Methods: For human samples we analysed Vastus lateralis (VL) muscle biopsies from young and old healthy donors and patients with lower limb mobility impairment. To confirm the results on human samples, an animal model of muscle atrophy was used, i.e. unilateral denervation of lower limb in adult mice. The analyses were performed by Real time RT-PCR and Western blotting. In humans, correlation analyses between molecular biology data and morphological and functional data were performed. Results: In human skeletal muscle the expression of Plin2 resulted higher in old subjects when compared to young ones, while that of Plin5 remained very similar in the two age groups. In particular, Plin2 expression reached the highest expression in patients with limited physical activity/ chronic immobility, suggesting a synergistic effect of aging and inactivity leading to muscle atrophy. Accordingly, in these patients the expression of Plin2 was negatively associated with decreased muscle strength and positively associated with markers of muscle atrophy, such as MuRF-1 and Atrogin. The association of Plin2, but not of Plin5, with muscle atrophy was also confirmed in an animal model with skeletal muscle atrophy induced by denervation. In denervated mice, the expression of Plin2 resulted higher with respect to the contralateral non-denervated one. The amount of the active form of p53 (ser20P-p53) resulted positively correlated with the expression of Plin2. More interestingly ser20P-p53 level resulted negatively correlated with VL muscle thickness, suggesting a possible role in muscle atrophy. This was further confirmed by a positive correlation between ser20P-p53 and atrogin expression. Conclusion: Our findings suggest a possible relationship between accumulation of Plin2-associated IMTG, the activation of p53 and muscle atrophy. The molecular mechanisms linking Plin2 to p53 are still unclear, however, it can be hypothesised that aging and physical inactivity can cause an increased deposition of IMTG, mirrored by increased Plin2 expression leading to lipotoxicity and increased expression and activation of p53. This latter could be a cause of muscle degeneration and hence p53 can possibly be considered as a new marker of age-associated muscle atrophy.

**P95- MALNUTRITION ASSOCIATION WITH QUALITY OF LIFE AMONG PEOPLE AGED 60+ IN SWEDEN: RESULTS OF THE SNAC-B STUDY.** M. Naseer[1], C. Fagerström[2] *(1. Malmö, Sweden; 2. Karlskrona, Sweden)*

Background: Risk of malnutrition increases with the advancement of age, and increasing share of elderly population suggests that it will become a major public health problem in future. Inadequate nutrition often results in poor health outcomes and decline in functional ability, which in turn influences on quality of life (QoL). Previous studies on the association of nutrition status and QoL focused more on the physical and mental construct of QoL. Knowledge on the impact of nutrition on the psychological well-being (life satisfaction) is scarce. The aim of this study was to investigate the prevalence of malnutrition in the elderly people of age 60 and above and to assess the association of malnutrition with health related quality of life and life satisfaction controlling for demographics, functional ability, and comorbidity. Methods: A cross-sectional study design was used, and data of Swedish National study of Aging and Care-Blekinge (SNAC-B) was used for testing the hypotheses. The criterion used for nutrition assessment was the occurrence of at least one anthropometric measure, i.e., BMI, MAC, CC, below the cut-off, in addition to have problem in one of the subjective measure, i.e., decline in food intake, weight loss, and eating ability. The scales SF-12, LSI, and ADL were used for the assessment of HRQoL, life satisfaction, and functional ability respectively. Results: The prevalence of malnutrition was 8.5%, and under nourished subjects were significantly older, females, unmarried/widowed/divorced, residing in special housing, and functionally impaired. The risk of malnutrition was significantly associated with poor HRQoL, both in physical (OR 2.31, 95% CI 1.18-4.52), and mental (OR 2.34, 95% CI 1.22-4.47) dimension. However, no significant association was observed between the malnutrition and life satisfaction (OR 1.30, 95% CI 0.70-2.40). Conclusion: Malnutrition status has detrimental effect of poor physical and mental health related quality of life. These findings emphasize to identify the risk factors of malnutrition and modify them, both for the prevention of malnutrition, and promotion of health related quality of life.

**P97- ENERGY EXPENDITURE AND PHYSICAL ACTIVITY IN END-STAGE RENAL DISEASE (ESRD): CROSS-SECTIONAL AND LONGITUDINAL OBSERVATIONS.** N.J.H. Broers, T. Cornelis, N.M.P. Diederen, F.M. van der Sande, K.M.L. Leunissen, J.P. Kooman *(Maastricht, The Netherlands)*

Background: Physical inactivity in dialysis patients is associated with increased mortality and may have a negative association with body composition (BC), muscle strength and quality of life (QOL). It is uncertain whether physical activity (PA) is affected by the start of dialysis treatment, or an inherent characteristic of end-stage renal disease (ESRD). This study firstly aimed to compare PA and energy expenditure (EE) between healthy controls, pre-dialysis and prevalent dialysis patients, secondly to assess the effect of starting dialysis on PA and EE and thirdly, to study the association between PA, BC, muscle strength and QOL domains in ESRD patients. Methods: This study consisted of a cross-sectional part and a longitudinal part. For the cross-sectional part 30 pre-dialysis patients (mean age; 60.5 years, 14 hemodialysis (HD) and 16 peritoneal dialysis (PD) patients), 29 prevalent dialysis patients (mean age; 58.2 years, 21 HD and 8 PD patients) (dialysis vintage ≥ 1 year) and 18 healthy age matched controls were included (mean age; 61.4 years,). All participants wore a SenseWearTM pro 3 armband to measure different PA parameters (total energy expenditure (TEE), activity related energy expenditure (AEE), number of steps and Metabolic Equivalent Task (MET)) for 24 hours on a non-dialysis day. Next to that, BC was determined by the Body Composition Monitor (BCM®, Fresenius Medical Care, Bad Homburg, Germany), handgrip strength (HGS) was determined by a hand held dynamometer and a four-meter walking test was conducted to determine walking speed (km/h). Lastly, Short Form-36 (SF-36) questionnaires were filled out to measure physical component summary (PCS) scores for the physical domains of QOL. For the longitudinal part changes in PA and BC parameters, HGS, walking speed and PCS scores were measured in 30 pre-dialysis patients before the start of renal replacement therapy (RRT) (within one month before start) and five to six months after starting RRT by the same methods as for the cross-sectional part. Results: For the cross-sectional part: EE (TEE: 2182.83±398.42 vs. 2617.33±576.48, P=0.003) and PA parameters ((AEE: 203.50±264.67 vs. 739.72±366.62, P<0.001), (number of steps: 5164.33±2377.81 vs. 11.568±4619.75, P<0.001) and (MET's: 1.21±0.23 vs. 1.46±0.18, P<0.001)) were significantly lower in incident dialysis patients as compared with healthy controls, but not as compared with prevalent dialysis patients. No differences in PA parameters were found between HD and PD patients. Lean tissue index (LTI) (kg/m2) tended to be higher in incident patients as compared with prevalent patients, (14.22±2.49 vs. 12.75±3.24 kg/m2, P=0.06), but no significant differences were found between incident patients and healthy controls (14.22±2.49 vs. 14.32±1.72 kg/m2). HGS was not significantly different between incident and prevalent patients as well as for healthy controls. For the longitudinal part: no changes over time in the first six months after starting RRT were found for PA and BC parameters as well as for HGS, walking speed and PCS scores in the incident group. Also no differences were found between HD and PD. Furthermore, in the whole patient group (incident and prevalent patients) strong associations were found between LTI and TEE (r=0.386; P=0.003), LTI and number of steps (r=0.383; P=0.003), LTI and MET's (r=0.260; P=0.05) and LTI and PCS (r=0.284; P<0.05). HGS and TEE (r=0.455; P<0.001). Walking speed and TEE (r=0.428; P=0.002), AEE (r=0.366; P<0.05), number of steps (r=0.445; P=0.001) and MET's (r=0.485; P≤0.001) were also significantly related. Also associations were found for PCS score and number of steps (r=0.367; P<0.05), and PCS scores and MET's (r=0.352; P<0.05). Conclusions: EE and PA parameters are already decreased in the (late) pre-dialysis phase, consistent with a sedentary lifestyle, despite the fact that LTI was not reduced as compared with healthy controls. In prevalent dialysis patients PA is reduced. PA on non-dialysis days was not significantly affected by the start of dialysis treatment. PA was positively associated with LTI and QOL. The effects of uremia itself and/or co-morbidity may be related to a decline in PA in the earlier stages of chronic kidney disease (CKD). Therefore, future research in CKD 1-4 patients is necessary to unravel the pathways involved in changes in PA.

**P98- ENHANCED EXPANSION OF MITOCHONDRIAL DNA MUTATIONS IN AN IN VITRO MODEL OF HIV-ASSOCIATED SKELETAL MUSCLE AGING.** B.A. Payne, K. Gardner, P.F. Chinnery *(Newcastle-upon-Tyne, UK)*

Background: Mitochondrial DNA (mtDNA) mutations are a key feature of human skeletal muscle aging. Over time these clonally expand within individual skeletal muscle fibers, causing functional defects of energy production within affected cells. Ultimately this process is thought to contribute to physiological muscle aging. Long-term anti-retroviral treated HIV-infected persons may show increased frailty and muscle weakness. Recent data suggest that certain nucleoside analog (NRTI) anti-retroviral drugs may lead to the accelerated accumulation of mtDNA mutations in skeletal muscle, but the mechanisms are unknown. Specifically it is unclear whether these drugs enhance mtDNA mutagenesis, or whether they increase the clonal expansion of mtDNA mutations within cells. Methods: We used a transmitochondrial cybrid cell line containing a single 7.5kb mtDNA deletion mutation, and fibroblasts from elderly individuals containing the m.414T>G point mutation. Cells were exposed to various NRTIs (known to show differing potential to inhibit the mtDNA polymerase, pol γ) for 32 days, followed by return to normal culture medium. MtDNA content was determined by multiplex real-time PCR. MtDNA large-scale deletion mutations were analysed by multiplex real-time PCR and long-range PCR. Point mutations were analysed by pyrosequencing (Qiagen) and massively parallel resequencing (Illumina MiSeq). Results: In cybrids exposed to normal culture medium, the proportional (heteroplasmy) level of the deletion mutation remained stable throughout the experiment. In cybrids exposed to didanosine (ddI, a strong

inhibitor of pol γ), heteroplasmy level increased from 75% to 96% (SD 1.6%, p<0.01). This was due to selective depletion of wild-type mtDNA content (to 14% of baseline, SD 3%, p<0.001) but preservation of mutant (deleted) mtDNA. Cybrids treated with physiological doses of stavudine (d4T), zidovudine (AZT) or tenofovir (TDF) showed no significant changes in deletion heteroplasmy, however 10x physiological dose d4T did increase heteroplasmy to 86% (SD 4%). On long-range PCR analysis, there was no evidence of new deletion mutation formation with any NRTI at normal or 10x dosing. In aged fibroblasts there was no significant overall change in the heteroplasmy level (~50%) of the m.414T>G point mutation with any of the NRTI exposures. However deep resequencing of cybrids and fibroblasts revealed the presence of multiple additional low-level (<5% heteroplasmy) point mutations. When subjected to mtDNA depletion (due to ddI), followed by repopulation of mtDNA content (i.e. a molecular bottleneck), significant shifts in low-level mutations were seen (ddI, mean shift 6.3%, SD 2.8%; untreated, mean 2.7%, SD 1.2%; p=0.01). This effect was accentuated with 10x physiological dose ddI exposure. No significant heteroplasmy shifts were seen with d4T, AZT or TDF. There was no new point mutation formation detected by deep resequencing. Conclusion: Despite prolonged and high-dose exposure to NRTIs, there is no mutagenesis in mtDNA. However, we observed: 1) a selective advantage to the replication of deleted mtDNA in the presence of partial inhibition of mtDNA pol γ (ddI and high-dose d4T); and 2) the enhanced segregation of mtDNA point mutations through a molecular bottleneck mechanism (ddI). Both phenomena will in vivo lead to the accelerated clonal expansion of pre-existing (age-associated) mtDNA mutations within individual cells. These data provide a plausible mechanism for the increased mtDNA mutations observed in muscle fibers of NRTI-treated HIV-infected patients. Such mutations may lead to accelerated physiological decline of skeletal muscle during aging. These data also fit with the current notion that clonal expansion rather than mutagenesis is probably the key factor driving the accumulation of mtDNA mutations in skeletal muscle during normal human aging, and as such, our experimental methods provide an approach for manipulating this process in vitro.

**P99- HANDGRIP STRENGTH AND DEPRESSION AMONG THE VERY OLD.** J.M. Jacobs, J. Stessman *(Jerusalem, Israel)*

Background: Handgrip strength (HGS) is a simple clinical bedside measure of muscle strength, which may contribute to comprehensive geriatric assessment. We examine its association with depression among the very old. Methods: The Jerusalem Longitudinal Cohort follows a representative cohort, born 1920-1921. In 1998, 2005, and 2010 respectively, subjects aged 78, 85 and 90 underwent repeated comprehensive assessment for numerous social, functional and health parameters. The sample was augmented with new recruits from the same birth cohort at subsequent stages in order to maintain sample size. Hand grip strength was measured using a hand held dynamometer, and low grip strength was defined as the lowest quartile. Depression was determined using the Brief Symptom Inventory. Logistic regression models controlled for the confounders of body mass index, fatigue, physical activity level, chronic pain, hypertension, ischemic heart disease, and chronic renal failure. Results: At ages 78, 85 and 90 a total of 246, 1086, and 354 subjects were assessed. Among subjects with low versus normal grip strength the prevalence of depression was 42.5% vs 24.3% (p<0.05), 52.6% versus 31.4% (p<0.001), and 45.6% vs. 17.7% (p<0.001) at ages 78, 85 and 90 respectively. The adjusted Odds Ratios (OR's) for depression among subjects with low grip strength at ages 78, 85, and 90 were 2.31 (95% CI: 1.14-4.7), 2.42 (95% CI: 1.82-3.22), and 3.89 (95% CI: 2.30-6.5), respectively. We examined the likelihood of depression at follow-up according to grip strength at baseline for non-depressed subjects. Among subjects with low versus normal grip strength, new depression at follow-up was observed from age 78-85 among 23.1% vs. 24.8% (n=122, p=ns), with an adjusted OR of 0.65 (95%CI: 0.09-4.81). In contrast, between the ages 85-90, among subjects with low versus normal grip strength, new depression was observed among 37.9% vs. 18.6% (n=321, p<0.05), with an adjusted Odds Ratio of 3.07 (95%CI: 1.28-7.34). Conclusions: Our findings describe the significant association between depression and low grip strength, observed throughout follow up from age 78 to 90. Not only were older subjects with low grip strength more likely to suffer from depression throughout follow-up, we observed that among the oldest old a low grip strength is a significant predictor of subsequent depression.

**P100- THE EFFECTS OF A NATURAL MYOSTATIN INHIBITOR DERIVED FROM FERTILIZED EGG YOLK ON SERUM MYOSTATIN LEVEL AND LEAN MUSCLE THICKNESS AND MASS: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL.** R. Ashton[1], J.M. Wilson[2], R. Lowery[2], N.D. Padliya[1], M. Dariani[1], R.J. Hariri[1] *(1. Cedar Knolls, USA; 2. Tampa, USA)*

Background: The loss of skeletal muscle associated with the aging process may result in weakness, reduced mobility, frailty, increased risk of falls and fractures potentially leading to disability and an overall poor quality of life. Exercise, coupled with nutritional supplementation, is an important approach to preserving muscle mass, particularly in the later years of life. We report on the results of a randomized, double-blind, placebo-controlled trial evaluating the effects of a natural nutritional supplement, Fortetropin™, on serum myostatin level and lean muscle thickness and lean body mass. Fortetropin™ is a bioactive proteo-lipid complex derived from fertilized egg yolk. While the study population included healthy adult males, the results of this study may have implications for the treatment of sarcopenia. Methods: The efficacy of Fortetropin™ was evaluated in 45 recreationally resistance trained human males (18-30 years of age) in a double-blind, placebo-controlled clinical trial carried out over the course of 12 weeks. Subjects were placed into three groups: placebo, 6.6 gram and 19.8 gram daily dose of Fortetropin™. All subjects performed resistance training twice a week. The primary endpoints were changes over time in muscle thickness. Secondary endpoints were changes over time in lean body mass and tertiary endpoints were changes over time in strength and power measurements. Exclusion criteria were: history of inflammatory diseases, cardiovascular diseases, drug or alcohol abuse, egg allergy and/or obesity. All subjects were supervised by a dietician to ensure that the total number of calories and macronutrients consumed by subjects in each of the treatment groups were similar (50% carbohydrates, 25% fat, and 25% protein). Lean body mass and fat mass were measured using dual emissions x-ray absorptiometry (DEXA) and direct ultrasound was used to measure muscle thickness. Blood samples were taken from each subject at the onset and completion of the study for comprehensive safety and lipid panels, and serum myostatin levels. Results: Serum myostatin levels decreased significantly after 3 months relative to baseline in the 6.6 gram group (-20.7%, p=0.02) and 19.8 gram group (-17.8%, p=0.006). Serum myostatin levels were not significantly affected in the placebo group (-10.4%, p>0.46). Consistent with the drop in serum myostatin levels, there was a statistically significant increase (p< 0.05) in muscle thickness in both arms receiving Fortetropin relative to the placebo arm (placebo: 1.2% + 0.53, 6.6 gram group: 5.5% + 1.41, 19.8 g Arm: 4.1% + 1.20). Results also demonstrated a statistically significant increase (p< 0.05) in lean body mass in both active arms in comparison to the placebo group (placebo: 1.1% + 0.48, 6.6 gram group: 3.1% + 0.71, 19.8 gram group: 3.5% + 0.76). There were no statistically significant changes in cholesterol, HDL, LDL and triglycerides after 3 months relative to baseline in any of the three study groups. There were no study related adverse events were reported during the study. Conclusions: It has been demonstrated that daily consumption of Fortetropin™ is effective in reducing serum myostatin levels and increasing muscle thickness and lean body mass in healthy, adult males undergoing moderate resistance training. Further, no statistically significant changes were observed in the lipid profile of subjects consuming Fortetropin™ on a daily basis. While sarcopenia is a multi-factorial process, studies have reported an increase in myostatin levels with aging. Based on the mechanism of action of Fortetropin™ and the clinical results of this study, there are opportunities for a safe, oral supplement to address loss of muscle during the aging process. Future studies will focus on evaluating Fortetropin™ in a population of older men and women suffering from sarcopenia.

**P101- A POSSIBILITY OF HEAT STRESS AS A COUNTERMEASURE FOR AGE-ASSOCIATED DECREASED OF MUSCLE MASS.** K. Goto[1], Y. Ohno[1], T. Sugiura[2], Y. Ohira[3], T. Yoshioka[4] *(1. Toyohashi, Japan; 2. Yamaguchi, Japan; 3. Kyotabane, Japan; 3. Hirosaki, Japan)*

Backgrounds: Aging-associated muscle atrophy, so-called sarcopenia, exhibits the reduction of muscle strength, the impairment of physical function, resulting that a significant reduction in quality of life. Even though skeletal muscle mass depends on the net protein balance, which is attributed to a dynamic equilibrium between muscle protein synthesis and breakdown, there are little or no differences in basal muscle protein synthesis rates between the young and old animals. Recently, we have shown that heat stress is one of anabolic stimuli on skeletal muscle in young animals and humans. It is well known that heat stress up-regulates heat shock proteins (HSPs) via stress response in not only skeletal muscle cells but also other cells. It has been confirmed that heat stress stimulates p70 S6 kinase (p70S6K), which is one of downstreams of Akt/mammalian target of rapamycin intracellular signaling pathway in skeletal muscle, and increases in muscle protein. However, there is no report regarding the effect of heat stress on skeletal muscle in aged animals. In addition, it is suggested that HSP25 and HSP72 may play an important role in the regulation of skeletal muscle. The other hand, cathepsin L, a lysosomal proteinase, is considered to play a major role in the terminal degradation of proteins delivered to lysosomes by endocytosis or autophagy, and is up-regulated during skeletal muscle atrophy induced by various causes. Recent evidences show there is no difference in the basal rate of protein breakdown in aging-associated atrophied skeletal muscle. However, there are no reports regarding the effects of aging and/or heat stress on the expression level of cathepsin L in skeletal muscle. Therefore, in the present study, we investigated that the muscle protein content and the expressions of HSP25, HSP72 and cathepsin L in response to heat stress in young and aged skeletal muscles of mice. Methods: All experimental procedures were carried out in accordance with the Guide for the Care and Use of Laboratory Animals as adopted and promulgated by the National Institutes of Health (Bethesda, MD) and were approved by the Animal Use Committee of Toyohashi SOZO University. Young (7 weeks, n=12) and aged (106 weeks, n=12) male C57BL/6J mice were used. The mice of both ages were randomly assigned to untreated control and heat-stressed groups (n=6 in each group). Mice in heat-stressed group were exposed to heat stress (41°C for 60 min) in an incubator without anesthesia. Heating protocol in the present study caused an increase in colonic temperature up to 41°C and induced the up-regulation of heat shock proteins in mammalian skeletal muscle. Seven days after the exposure, soleus muscles were dissected from both hindlimbs. Results: Protein content in aged soleus were lower than those in young muscle. In aged soleus, higher baseline expression levels of HSP25, HSP72 and cathepsin L were observed compared with those in young muscle (p<0.05). However, there were no significant differences in the expression levels of phosphorylated p70SK, calpain 1, and calpain 2 of soleus muscle between two age-groups. A significant increase in muscle mass of both age-groups was observed 7 days after the application of heat stress (p<0.05). Heat stress also up-regulated the expressions of HSP25, HSP72, and phosphorylated p70S6K in both aged animals (p<0.05). On the other hand, a significant decrease in cathepsin L expression in aged soleus muscle was observed 7 days after heat stress (p<0.05), but not in young muscle. There was no significant change in the protein expression level of calpains in both age-groups following heat stress. Conclusion: Protein synthesis in skeletal muscle of aged as well as young animals may be stimulated by the application of heat stress. Heat stress may be a hypertrophic stimulus to facilitate muscle protein synthesis in not only growing but also aged animals. This study was supported, in part, by Grants-in-Aid for

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**P102- EFFECTS OF INTERMITTENT SLOW-JOGGING TRAINING ON FITNESS AND SKELETAL MUSCLE MASS IN OLDER JAPANESE: A RANDOMIZED CONTROLLED TRIAL.** M. Ikenaga[1], H. Tanaka[1], Y. Yamada[2], Y. Kose[1], K. Morimura[1], Y. Higaki[1], A. Kiyonaga[1], Nakagawa Study Group *(1. Fukuoka, Japan; 2. Tokyo, Japan)*

Background: The muscles most readily affected by sarcopenia are the main agonist muscles used while running. Running and jogging exercises are generally difficult to prescribe for older individuals because such exercises are of higher intensity than other aerobic exercises such as walking. We hypothesized that running exercise at a speed equal to or slower than the usual walking speed safely and effectively improves fitness and helps to prevent sarcopenia in older patients. Therefore, the purpose of this randomized controlled trial was to examine the influence of slow-jogging (SJ) training on fitness and skeletal muscle mass in older patients. Methods: Eighty-one community-dwelling older people (women, 54.7%; age, 71.1 ± 4.0 years) were sex and age-matched and randomly assigned to the SJ group (n = 40) or control group (n = 40). Seventy-five participants (SJ, n = 37; control, n = 38) completed the 12-week intervention. The SJ program involved both walking and minute-by-minute jogging at the anaerobic threshold (AT) intensity as determined by the double product breakpoint of the first heart sound and heart rate. We evaluated the aerobic capacity at the AT, leg power, and skeletal muscle mass before and after SJ training. The sit-to-stand (STS) performance was analyzed to determine the leg power. The segmental intracellular water (ICW) as measured by segmental multifrequency bioelectrical impedance analysis was used as an index of skeletal muscle mass in the upper leg. Results: The AT and STS performance were higher after training in both the SJ and control groups, and both parameters improved to a significantly greater degree in the SJ group than in the control group (AT: 15.7 vs 4.9%, $P < 0.01$; STS: 12.9 vs 4.5%, $P < 0.05$). The ICW in the upper leg was higher after training in the SJ group only and was significantly greater in the SJ group than in the control group (9.7 vs 3.4%, $P < 0.05$). Conclusion: The present study has demonstrated that intermittent SJ exercise may contribute not only to increased aerobic capacity, but also to increased leg power and upper leg muscle mass in the older population.

**P103- EFFECTS OF SYNBIOTIC SUPPLEMENTATION ON SYSTEMIC INFLAMMATION OF ELDERLY SUBJECTS.** J. Valentini Neto, S.M. Lima Ribeiro *(São Paulo, Brazil)*

Background: Ageing is associated to a reduction in the capacity to cope with stressors, which is the main concept of frailty. A number of changes in body composition and function are related to the development of frailty, such as: visceral deposition of fat (highly associated with systemic inflammation) and reduction in the subcutaneous fat. A remarkable change is related to a systemic and low level rise in inflammatory markers in the blood, which has been associated to a broader process called inflammaging. Our work highlights the hypothesis that this low-level inflammation is associated to an imbalance in gut microbiota and changes in intestinal permeability, which in turn justifies the use of synbiotic substances. Aims: to evaluate the effect of a 6-month supplementation of a synbiotic substance on the systemic inflammation in elderly in risk of frailty. Methods: we studied 49 individuals, 65-90 years old, fulfilling from one to two frailty criteria proposed by Fried et al (2001). A double-blind randomized clinical trial was performed, in which the participants were allocated in one of the following groups: SYN (symbiotic treatment) - intake of a synbiotic substance (Frutooligossacarideos 6 g, Lactobacillus paracasei 109 to 108 CFU, Lactobacillus rhamnosus 109 to 108 CFU, Lactobacillus acidophilus 109 to 108 CFU and Bifidobacterium lactis 109 to 108 CFU); or PLA (placebo, control)- maltodextrin in the same doses as the SYN group. Both groups were instructed to consume the substances twice a day, for the period of 6 months. Before and after the supplementation the subjects were evaluated for: plasma inflammatory markers (IL-6, IL-10 and TNF-α); blood cells count; anthropometric measures, gut function (Bristol Scale and Roma criteria). Data were analyzed by repeated measures ANOVA (inflammatory markers), with appropriated pos-hoc test, student's t Test (blood cells), as well as odds ratio and risk reduction analysis. The Intention to treat principle was adopted. Significance was considered as $p<0.05$. Results: The PLA group was composed by 24 subjects with mean age of 76.2±8.4 years, and the PLA group was formed by 24 subjects with mean age 75.6±8.1 years. The gut function was improved in 5.3% of SYN. In turn, PLA group presented 20% of negative symptoms of gut function. The OR of improvement of SYN according to ROMA III was 0.76 (CI= 0.09-6.17), indicating a benefit of the synbiotic supplementation. The inflammatory markers were analyzed in two different ways: the whole group and considering the age as co-variable. When compared the whole groups, some differences were found by the time between both groups for IL-10 at baseline (b) and after supplementation (a) (PLAb=3,9±5,4; PLAa=1,4±1,7; and SYNb1,9±3,2; SYNa=1,5±1,3) and IL6 values at baseline (PLAb=3,9±5,4; PLAa=2,4±1,6 and SYNb=3,0±1,9; SYNa=2,5±1,1). Taken the three age ranges groups (1, 2, 3) and comparing for the supplementation group and time, there was no significant difference, but considering only time, differences were found between PLA and SIN groups at baseline (b) and after supplementation (a), for IL-10 (PLA1b=4,07±;4,23; PLA1a=2,41±0,61; PLA2b=2,33±1,06; PLA2a=1,59±0352; PLA3b=5,56±8,37; PLA3a=3,32±2,40; SYN1b=2,71±2,01; SYN1a=2,83±1,48; SYN2b=3,29±2,39; ; SYN2a=2,41±1,19; SYN3b=2,85±1,22; SYN3a=2,60±1,11). Differences were also found for IL-6 when comparing the age groups considering only the time (PLA1b=4,07±; PLA1a=1,29±0,48; PLA2b=2,33±1,06; PLA2a=0,89±0,25; PLA3b=5,56±8,37; PLA3a=1,75±1,54; SYN1b=2,71±2,01; SYN1a=0,80±0,01; SYN2b=3,29±2,39; SYN2a=2,59±4,29; SYN3b=2,85±1,22; SYN3a=1,43±1,08). The blood cells count revealed higher numbers of basophiles (SYN=32,05±39,85; PLA=4,22±17,91) and monocytes (PLA=14,58±8,60; SYN=11,00±7,36) on the SIM group compared to the PLA group. Conclusion: Taking altogether, it's possible to conclude that the synbiotic supplementation seemed to be efficient for the elderly considered in risk of frailty, but it remains necessary to perform more studies, including larger populations and with analysis of gut permeability. Key words: frailty, inflammation, microbiota, synbiotic.

**P104- THE TRANSITION OF SENIOR LEARNING IN SOUTH OF TAIWAN: THE NEW-AGED ERA IS COMING.** H.-L. Chin[1], Y.-T. Hung[2] *(1. Chiayi County, Taiwan; 2. Keelung City, Taiwan)*

Backgrounds: With the trend of aging society in Taiwan, learning programs for the elderly has become more and more popular in Taiwan including "Senior Citizens Learning Camp" and "Senior Citizens Learning Center". There are 101 Senior Citizens Learning Camp, and 306 Senior Citizens Learning Center till July 2014. The investigation is about the transition of Senior Citizens Learning Camp. Methods: The present study is about the attendance analysis of 183 members (62 male and 121 female) of Senior Citizens Learning Camp in Keelung City and Chiayi County during 2011-2014. The data collection includes observational recording about their attendance, participation and feedback in each course. Results: The characteristics of these new-aged has changed a lot during these years including: (1)The percentage of male members is getting higher gradually. Most of all, male trainees are tend not to attend the handicraft courses; however, once they become the leader, the attendance goes up at once. (2)The average age of the attendees is getting younger, more than 80% of attendees are younger than 65 in 2013, and more than 90% of them are younger than 65 in 2014. As a matter of fact, the observational recording in the emotional course indicate that the younger group (51-60 year-old) can follow the instruction from the tutor and get into the relaxing brainwave more effectively than the elder group. (3)The educational level of attendees is getting higher, less than 10% of the attendees had graduated from college before 2010, but more than 55% of them got the bachelor degree in their young age in 2014. Conclusion: All the senior can reduce the degradation of cognitive function through learning; however, the study calls upon the differentiation between Senior Citizens Learning Camp and Center, and appeals to pay attention to younger elderly in Senior Citizens Learning Camp and elder man as well who could become the tutors of Senior Citizens Learning Center which will encourage them to learn more enthusiastically and promote their self-efficiency. And we have to figure out the characteristics of the elder man on learning group. Keywords: Learning Programs for Elderly; New Aged; Senior Citizens Learning Camp; Senior Citizens Learning Center.

**P105- ANALYSIS OF FUNCTIONAL ABILITY, AEROBIC CAPACITY AND LEVEL OF PHYSICAL ACTIVITY BETWEEN 'NON SARCOPENIC' ELDERLY AND ELDERLY 'AT RISK OF SARCOPENIA'.** L. Paccini Lustosa[1], D. Aparecida Gomes Pereira[1], P. Parreira Batista[1], T. de Oliveira Ennes[1], A. Netto Parentoni[2], L. Souza Máximo Pereira[1] *(1. Belo Horizonte, Brazil; 2. Diamantina, Brazil)*

Background: Sarcopenia presents association with various adverse health outcomes, such as the frailty syndrome, postural instability, falls, neuroendocrine and immune alterations. It is assumed that elderly with sarcopenia present greater risks of functional limitations, poorer levels of physical activity, in addition to being more likely to develop health complications. On the other hand, identify sarcopenia has been object of study by several researchers, in which all agree on the difficulty to clinically diagnose this phenomenon. Current propositions to identify sarcopenia, are the algorithms proposed by the European Working Group on Sarcopenia in Older People (EWGSOP) and International Working Group on Sarcopenia (IWGS), in which underscore the importance of including functional capacity as one of parameters for diagnosis. And yet, some authors have pointed to the interrelationship between functional ability, aerobic capacity and physical activity in the elderly, but showing no evidence in specific situations such as sarcopenia. Thus, the objective of this study was to compare functional ability, aerobic capacity and level of physical activity between 'non sarcopenic' elders and with those at 'risk of sarcopenia', classified according to the algorithm of EWGSOP. Methods: This is an observational, cross-sectional study. Participated 53 women living in the community with age equal or higher than 65 years, regardless of race and/or social condition, able to walk independently (with or without use of assistive devices for walking). Exclusion criteria were neurological disease and/or musculoskeletal acute diseases, which could prevent the performance of the tests, cognitive alterations detected by the Mini-Mental State Examination, according to schooling. The participants were submitted to the walking speed test (4m) and grip strength (Jamar dynamometer) for inclusion in the groups: non sarcopenics elderly (INS) and elderly at risk of sarcopenia (IRS), according to the algorithm and cutoffs of EWGSOP. Further, all were assessed for body mass index (BMI - kg/m²), physical activity level (Minnesota Leisure Time Activities Questionnaire), aerobic capacity (Shuttle Walking Test - SWT) and functional capacity (Short Physical Performance Battery - SPPB). The data were presented as measures of central tendency and dispersion. It was used the Shapiro-Wilk test to analyze the data distribution. For comparison between groups it was used the t-test independent for parametric variables and the Mann-Whitney U test for nonparametric ones. It was considered significant alpha of 5%. Results: Twenty elders were classified as INS (67.84 ± 3.69 years) and 33 as IRS (73.33 ± 7.33 years). When comparing the two groups, there was a significant difference regarding age ($p = 0.005$), to IMC (INS = 33.29 ± 1.40 Kg/m2 ; IRS = 28.36 ± 0.99 Kg/m2 ; $p= 0.011$), functional ability INS = median = 10.50; IRS = median = 9.00; $p= 0.007$) and level of physical activity (INS

= median = 3790.50 Kcal/week; IRS = median = 1268.75 kcal/week; p= 0.001). There was no significant difference regarding aerobic capacity (INS = 279.29 ± 26.70 m; IRS = 227.08 ± 16.21 m; p= 0.317). Discussion and Conclusion: The results showed that elderly classified at 'risk of sarcopenia', despite being eutrophic, had worse rates of functional capacity, low level of physical activity and were older, confirming the literature. However, these differences were not enough to impact on the aerobic capacity of the elderly women evaluated. In this case, one can consider the possibility of maintaining aerobic capacity because they are eutrophic, with lesser fat rate. Moreover, points to the importance of better investigate the role of body mass index in sarcopenia, because, as well as in other diseases, obesity may be a risk factor and aggravation, and should be considered in the presence of sarcopenia. Also, future studies should be encouraged to check if the variables that showed differences between the groups can really predict sarcopenia earlier.

**P106- SARCOPENIA AND WEIGHT CYCLING IN OBESE ADULTS FROM SOUTHERN ITALY.** R. Sammarco, M. Marra, C. Finelli, C. De Caprio, M.L. Di Guglielmo, E. De Rosa, M. Onufrio, V. Amato, F. Contaldo, F. Pasanisi *(Naples, Italy)*

Backgrounds: Sarcopenia is a clinical condition characterized by a progressive and generalised loss of skeletal muscle mass and function, usually associated with aging, it often implies a poor quality of life and a higher risk of physical disability and death. Sarcopenia can also be observed in obese adults. The combination of fat mass excess and muscle mass depletion is defined "sarcopenic obesity". The aim of study was to evaluate the prevalence of sarcopenia in a group of obese adults from Southern Italy by using skeletal muscle mass indices. Methods: Seven hundred and forty eight obese (BMI ≥ 30 kg/m2) adults of both sexes, aging 18 – 65 years have been consecutively evaluated at the Obesity Outpatient Clinic of Federico II University in Naples. Body composition was evaluated by bioimpedance analysis (BIA). Skeletal muscle mass (SM) was calculated using the following equation: SM = [(height2 /BIA-resistance × 0.401) + (gender × 3.825) - (age × 0.071)] + 5.102. In order to evaluate the prevalence of moderate and severe sarcopenia, sex-specific cut-off points of percentage skeletal muscle index (SMP= SM/ body mass × 100), have been used according to Jannsen et al 2002. We have also evaluated the presence of weight cycling, defined as repeated reductions in body weight larger than 10% following hypocaloric dietary intervention with or without use of drugs. Results: The prevalence of sarcopenia has been evalutated in the whole sample divided by gender : Females (18- 65 years n. 458; age 33.9±10.9 years; weight 122.7±21.5 kg; IMC 46.7±7.6 kg/m; FAT 50.6±5.0%) and Males (18-65 years; n. 290; age 33.9 ±10.9 years; weight 139.9±24.8 kg; IMC 46.1±7.6 kg/m$^2$; FAT 44.3±6.1%). Using the SMP cut-off points, the prevalence of moderate sarcopenia was 49.8% (228/458) while the prevalence of severe sarcopenia was 47.2% (216/458) in females; in males 14.5% (42/290) presented moderate sarcopenia and 85.2% (247/290) had severe sarcopenia. The effect of weight cycling was evaluated in all sample of males and females divided in two age groups: Group A 18-30 years (123 M; 180 F) and Goup B 30-65 years (167 M; 278 F). In females, weight cycling was present in 90.5% of younger women with severe sarcopenia (67/74) and in the 95.8 % of the older group with severe sarcopenia (136/142). In males, weight cycling was present in 76.5% of younger men with severe sarcopenia (81/106) and in the 83,0% of the older group with severe sarcopenia (117/141). Multiple regression analysis was used to evaluate other possible predictors of the presence of severe sarcopenia, as well as body weight. In males, the results showed that weight cycling was the most important predictor, even with respect to age (p=0.041; R=0.320).

**P107- ASSOCIATION BETWEEN SERUM BIOMARKERS AND FRAILTY LEVEL IN OLDER MEN AND WOMEN WITH MINOR INJURIES. PRELIMINARY RESULTS FROM THE CETI PROJECT.** J. Lebon[1], M.-J. Siros[1], M. Aubertin Leheudre[2], M. Émond[1] *(1. Québec, Canada; 2. Montréal, Canada)*

Introduction: Normal aging is associated with disabilities such as mobility decline or physical impairment. Moreover, it has recently been shown that these disabilities are associated to frailty in elderly adults. Therefore it has been suggested that serum biomarkers could be used as potential diagnostic tools for these various disabilities (mobility decline and physical impairment) in clinical studies. However, to our knowledge, there are very few studies that have looked for the association between serum biomarkers and the frailty status in a population of elderly adults with minor injuries. In addition among these scares studies, there are no consensuses about the predictive capacity of serum biomarkers to diagnose frailty. Objectives: The aim of the present study is to explore, the association between several serum biomarkers (Ferritin, Creatinine, Vitamin D, Albumin, Glucose, Estradiol, Testosterone, Thyroid Stimulating Hormone (TSH), Insulin-Growth Factor (IGF-1) C-reactive protein (CRP)) and frailty level in a population of older men and women presenting to the emergency department (ED) with minor injuries. Methods: Observational cross-sectional study conducted with a sub-group of 77 well-functioning independent elderly adults (48 men and 32 women) from the larger CETI cohort, aged 65 years and over at the time of injury, discharged home from 4 Canadian EDs after treatment of minor fractures (lower or upper limbs, head, chest, spine, etc). Their frailty status was measured using the Canadian Study of Health and Aging-Clinical Frailty Scale (CSHA-CFS) that classifies patients along 7 levels (1 = very fit, 2 = well, 3 = well with treated co-morbidities, 4 = apparently vulnerable, 5 = mildly frail, 6 = moderately frail, 7 = severely frail). Biomarkers were obtained from blood samples measured from each 4 Canadian ED. Sociodemographic and clinical data were also collected during the ED visit. Pearson's correlations (r) were performed to examine the relation between serum biomarkers and frailty levels at baseline. Partial correlation controlled for age and sex, were also performed. Results: Due to inclusion criteria, no patient was severely frail (CSHA-CFS = 7). Overall, these preliminary analyses seem to indicate that very fit and well patients (CSHA-CFS = 1 or 2) tended to have lower Glucose and Vitamin D levels ($-0.264 \leq r \leq -0.230$; $p < 0.05$) and higher Estradiol ($r = 0{,}230$; $p < 0.05$). While patients with treated co-morbidities, apparently vulnerable, mildly or moderately frail (CSHA-CFS ≥ 3) tended to have higher Glucose and Vitamin D levels ($0{,}235 \leq r \leq 0{,}238$; $p < 0.05$) and lower Estradiol levels ($r = -0{,}235$; $p < 0.05$). Testosterone levels tended to be higher in fit and well patients (CSHA-CFS = 1 or 2) ($r = 0{,}295$; $p < 0.05$) and Ferritin tended to be more elevated in patients with CSHA-CFS level = 5. However, due to the small number of patients (lack of power), no other association has been observed and attempts to control for confounders such as age and sex, lead to non-significant results of the association between most serum biomarkers levels and increased frailty. Conclusion: Overall, these preliminary results showed, that there may be some possible associations between some serum biomarkers such as Glucose, Vitamin D, Ferritin and sexual hormones (Estradiol and Testosterone) and the level of frailty in a population of older men and women presenting to the emergency department with minor injuries. However due to the small number of subject, it was not fully possible to explain these associations and the predictive capacity of biomarkers and these results need to be considered as preliminary. Therefore more studies with a larger number of subjects are needed in order to elucidate which biomarkers could be more useful to predict frailty level and to control for potential confounders in this specific population.

**P108- OLDER ADULTS EXHIBIT REDUCED STRETCH REFLEXES RELATIVE TO YOUNG ADULTS.** L.A. Clark, D.W. Russ, T.D. Law, B.C. Clark *(Athens, USA)*

Background: It is becoming increasingly recognized that age-related neurodegenerative changes are associated with both frailty and sarcopenia. Little research has examined the effects of advancing age on the amplitude of the stretch reflex (a.k.a., myotatic reflex) (PMID: 9783117), which is surprising considering the critical importance of stretch reflexes on motor function. Accordingly, the purpose of this study was to compare the short-latency stretch reflex amplitude of young adults to those of older adults. Methods: Twenty-three young adults (14 women and 9 men, 20.8±3.2 years) and 32 older adults (19 women and 13 men, 70.5±5.5 years) participated in this study. Electromyographic (EMG) activity was recorded from the flexor carpi radialis muscle and we quantified the short-latency stretch reflex amplitude in response to a standardized mechanical tap to the distal portion of the muscle along with the maximum Hoffman reflex (H-reflex) amplitude in response to electrical stimulation of the median nerve. Both the stretch and H-reflexes were normalized to maximal compound muscle fiber action potential (CMAP or Mmax) to control for extraneous influences on the signals (e.g., differences in subcutaneous adipose tissue, muscle cell membrane excitability, etc.). Unpaired t-tests were used to compare young adults to older adults for the respective outcomes. Results: Older adults exhibited significant smaller normalized stretch reflex amplitudes in comparison to young adults (4.01±6.4% of Mmax vs. 35.2±19.6% of Mmax, p<0.01). No differences were observed between older adults and young adults for the normalized H-reflex amplitude (13.4±10.5% of Mmax vs. 11.9±19.5% of Mmax, p=0.70). Conclusions: The reduction of stretch reflex amplitude in older adults, together with no differences in H-reflex amplitude, suggests that older adults have an attenuated spinally-mediated stretch reflex response that most likely arises due to reductions in muscle spindle sensitivity. Acknowledgements: This work was funded in part by grants from the National Institutes of Health (R01AG044424, R01AT006978, R15HD065552).

**P109- COPENHAGEN SARCOPENIA STUDY. IS SARCOPENIA THE NEXT CLINICAL TARGET AFTER OSTEOPOROSIS?** T.E. Noerst, H. Ludvig, O.M. Hansen, N.F. Folkmann, E. Prescott, H. Elkjaer Larsen, C. Suetta *(Copenhagen, Denmark)*

Background: Sarcopenia refers to the loss of skeletal muscle observed with aging and is a major cause of the loss of mobility, independence, and frailty in older adults. The magnitude of the public health problem posed by sarcopenia is, however, not well established and a recognized impediment to studies of sarcopenia is the lack of data from large healthy cohorts to estimate the prevalence and incidence in elderly populations. Moreover, it is of major importance to develop sensitive cellular markers involved in skeletal muscle atrophy/wasting and bone-turnover, in order to find patients at risk of development of frailty and sarcopenia. The aim of the present study is therefore to establish a danish reference material on muscle mass and body composition in combination with measurements of muscle strength and functional parameters. Furthermore, blood samples from this healthy cohort will be used to isolate new promising markers of muscle wasting and bone deformation in order to find sensitive predictors of sarcopenia and osteoporosis. Methods: 1500 subjects with an age-span of 20-90 years, from the Copenhagen City Heart Study, where participants have been examined repeatedly since 1976, are included. • Body composition, total and regional muscle and fat mass is calculated from a whole body DEXA-scanning (Dual-Energy X-ray Absorptiometry, Core scan); • Bone mineral density (BMD) is measured locally at both the lumbar spine region and hip regions by DEXA-scanning; • Muscle function is evaluated by a Sit to stand test during 30 seconds and 10 m maximal walking speed; • Maximal muscle strength is measured as the maximal hand grip power with a hand dynamometer and Leg extension power with the Nottingham Power Rig; • Blood tests: Blood will be examined for CRP, TNF-alfa and vitamin-D status as well as newly developed markers of muscle loss (P6NP and C6M) and bone formation and resorption (osteocalcin and ALP). Results: The study was initiated in November 2013 and will proceed till November 2015. Preliminary data on body composition, muscle mass, bone mineral density, and muscle function in 1000 persons will be presented. Conclusion: With the establishment of a Danish reference material for muscle mass, bone mineral

density, muscle strength and muscle function we hope in the future to combine routine investigations of regional BMD with body composition in order to identify patients at risk of development of sarcopenia and frailty.

**P110- MYOFIBRILLAR PROTEIN SYNTHESIS IS ELEVATED FOR 2 DAYS FOLLOWING ACUTE RESISTANCE EXERCISE AND HIGH-INTENSITY INTERVAL EXERCISE IN OLDER MEN.** K.E. Bell, C. Séguin, G. Parise, S. Baker, S.M. Phillips *(Hamilton, Canada)*

Background: The importance of healthy aging is a requirement due to the ever-growing proportion of seniors in Canada and around the world. The age-associated decline in muscle mass (sarcopenia) begins in the 5th decade of life and is associated with reductions in strength and an increased risk of disability in older adults. Importantly, sarcopenia is also associated with increased risk of falls and fractures and a higher incidence of metabolic diseases, such as type 2 diabetes. Resistance exercise (RE) can result in hypertrophy and increases strength, and is prescribed for older adults to counter sarcopenia. Recommendations to retain and improve cardiovascular fitness and insulin sensitivity include aerobic exercise (AE); however, AE is not effective in promoting strength and muscle mass gains. High intensity interval training (HIIT) is a potent stimulus for aerobic fitness, oxidative capacity, and insulin sensitivity, but is relatively unstudied in aging persons. A direct comparison of the acute muscle protein synthetic (MPS) response between RE, AE, and HIIT has not been made in older individuals but would be relevant in determining the potential long-term phenotypic changes expected with these various modes of exercise. Traditionally, tracer infusions have been used to measure MPS, but these trials are limited in that participants are confined to a laboratory bed for the duration of the study, and acute measurements are typically only made for ~5h post-exercise. Thus the objective of this study was to determine how a single bout of RE, AE, or HIIT would affect longer-term (2d) MPS in older men. We used a novel deuterated water-based tracer method to capture an integrated longer-term (2d) acute response to exercise in a free-living situation, which we proposed would more accurately reflect the potential for lasting phenotypic change. We hypothesized that the different modes of exercise would stimulate MPS in different muscle protein sub-fractions. Specifically, we hypothesized that RE and HIIT would increase myofibrillar MPS, whereas AE and HIIT would increase sarcoplasmic MPS. Methods: Healthy sedentary men (n=22; 67 ± 4 years [mean ± SD]; BMI: 27.0 ± 2.6 kg/m2) who were free from metabolic disease, were randomly assigned to complete RE (n=7), HIIT (n=8) or AE (n=7). Approximately 1 wk following VO2peak and strength testing, participants began daily oral consumption of a stable isotope tracer (deuterated water; D2O) for 9 days. Daily saliva samples were taken to measure tracer incorporation in total body water. Muscle biopsies were obtained on days 5-9 of D2O consumption to measure tracer incorporation into muscle at rest, and at 24h and 48h post-exercise. Immediately following their biopsy on day 6, participants completed a single session of RE (3 x 10 repetitions: leg extensor and press, 95% 10RM), HIIT (10 x 1 min, 90% maximal heart rate [HRmax]) or AE (30 min continuous cycling, 55-60% HRmax). Muscle samples were separated into myofibrillar and sarcoplasmic fractions and purified. Tracer incorporation into these fractions was measured and fractional synthetic rate (FSR) was calculated. Participants consumed a weight-maintenance diet (15% protein, 30% fat, 55% carbohydrate) during the study to control protein intake and carbohydrate availability during exercise. Results: Baseline myofibrillar and sarcoplasmic FSR was similar for all groups. Myofibrillar FSR was significantly elevated relative to baseline 24h and 48h following acute RE and HIIT. However, the increase in myofibrillar FSR was greater following RE vs. HIIT and AE at both time-points. RE stimulated an increase in myofibrillar FSR of ~80% and ~50% 24h and 48h post-exercise, respectively. Following HIIT, myofibrillar FSR was increased ~50% 24h post-exercise, and ~25% 48h post-exercise. Interestingly, HIIT was the only mode of exercise to stimulate an increase in sarcoplasmic FSR 24h post-exercise compared to baseline (2.30 ± 0.34 vs. 1.84 ± 0.21 %d-1). Other studies in younger persons have observed increases in sarcoplasmic FSR following AE. Therefore, it is possible that the 30 min AE protocol we used in this study was not rigorous enough to stimulate an increase in sarcoplasmic FSR, or that older persons simply do not respond in a manner similar to younger persons. Conclusion: This study is the first to describe a longer-term MPS response to acute exercise using D2O. Here, we report that HIIT is able to stimulate an increase in both sarcoplasmic and myofibrillar MPS in older men. Considering that HIIT is also a potent stimulator of oxidative metabolism and insulin sensitivity, it may be beneficial to incorporate HIIT into exercise prescription for older adults. As hypothesized, RE was the most robust stimulus for myofibrillar MPS. Since MPS was measured over the course of several days with participants in their natural, free-living environment, we propose that these data reflect a more accurate MPS response to acute exercise. Future research should examine the effect of a training program combining HIIT and RE on changes in muscle mass as well as metabolic and functional improvements.

**P111- LONG TERM MEASUREMENT TOOL AND QUANTITATIVE OUTCOME ASSESSMENT OF ELDERLY PHYSICAL PERFORMANCE.** S. Sun, M. Daumer *(München, Germany)*

Backgrounds: Physical activity in daily life plays a critical role in the prevention and treatment of sarcopenia. Studies have suggested positive correlation between continual exercise intervention and clinical parameters (muscle strength and physical performance). However, despite the wide variety of short-term measurement instrument for physical performance, tools to robustly monitor long term physical activity are still lacking, especially targeted for elderly population and can be easily implemented in different settings. Though self-report was traditionally used to gather related information, it can be subjective and influenced by many factors. Thus an objective, easy-to-use, activity-based measurement tool has been proposed, not only to be used in clinical practice, but also in free-living environment. Besides the tool itself, a series of validated quantitative parameters were provided as outcome assessment of elderly physical function. Methods: Ten elderly subjects were monthly monitored using the actibelt® (Trium Analysis Online, Munich, Germany), a unobtrusive device integrated in a belt buckle measuring tri-axial acceleration near center of body mass with 100 Hz sampling rate. The following parameters were extracted from the raw accelerometry data collected on each day: adherence (i.e. amount of time during which the device was worn), total number of walking and running steps, gait speed, step frequency, activity temperature (i.e. a measure for overall physical activity), and further parameters deduced from walking speed, i.e. the total distance travelled, the longest non-stop distance travelled and step length. Finally, the tool were evaluated on three aspects: (1) appropriateness to target population (2) practical aspects of test administration (3) psychometric properties. Results: An individual profile of physical performance over a month-long period of time is automatically generated by validated algorithms. Parameters consisting the profile can objectively reflect important aspects of physical activities conducted by elderly subjects. Parameters such as gait speed and step frequency corresponds to that of general elderly population. The evaluation shows that as an outcome assessment, the tool exhibits good psychometric properties, including good discrimination between individuals, expected outcome, and sensitivity to change with time. Conclusion: The proposed assessment tool continuously gathers tri-axial acceleration data from which meaningful quantitative parameters can be generated. With integration within a belt buckle, it has high user acceptability, requires minimal equipment or skills and will not be limited for use in either clinical setting or free-living environment only. The metrics derived from raw data provides precise, sensitive, and comprehensive evaluation of daily physical activities. Furthermore, some parameters are in accordance with commonly used outcome measures. The collection of data contributes to better understanding of the relation between daily physical activities and development of sarcopenia in elderly population. The tool can also be used in clinical practice to facilitate a more objective examination of impact of clinical intervention on sarcopenia in a long term.

**P112- IDENTIFICATION OF FRAIL INDIVIDUALS IN PRIMARY CARE SETTINGS: PROPOSAL OF A NEW MODEL.** I. Vergara[1], A. Bueno[1,2], J. Nuñez[1,2], M. Machón[1], K. Vrotsou[1], I. Martín-Lesende[3], A. Díez[1,2] *(1. San Sebastian-Donostia, Spain; 2. Renteria, Spain; 3. Bilbao, Spain)*

Background: Frailty is one of the most relevant clinical expressions of ageing and a powerful indicator of the health status of older populations. One key element is the application of an effective tool that can easily identify frail individuals in primary care at an early stage of decline. Although simple rapid screening tests have previously been developed and validated, there is still a need to explore detection tools adequate to primary care settings. This study has been developed with the objective to define a model for the identification of frail community dwelling adults suitable for its regular use in primary care settings. Method: this is a two years follow up open cohort study of community dwelling elder adults, aged 75 or more at the moment of recruitment, and autonomous regarding basic daily living activities (Barthel =>90). The study was developed in primary care health centres pertaining to Osakidetza, the public health care provider at the Basque Country. Patients were assessed at the moment of inclusion and every six months. At every interview, physical performance tests (Gait Speed and Timed Up and Go) were performed, and comorbidities, polipharmacy and social support, among others were also assessed. As main outcome, the occurrence of death and the loss of autonomy (Barthel <90 or decrease of a 10% from the previous value) were considered. Uni and multivariate regression logistic models were derived in order to explain the occurrence of the aforementioned adverse events. The study was approved by the Gipuzkoa Health Region Ethics Committee. Written informed consent was obtained from all participants. Results: 215 subjets were included. 169 fulfilled the two years follow up period. 50 of them presented the defined adverse events. Of these, 84% presented loss of autonomy and 16% died. Age, TUG, and the presence of polipharmacy showed to be statistically associated ($p<0.05$) with the occurrence of the defined adverse events in the proposed multivariate model. This model shows an AUC=0.876 and for an estimate probability of p=0.20, sensitivity and specificity are 83% and 685 respectively. Conclusions: The proposed model could be useful for the identification of frail individuals in primary care setting given its good metric capacities and its easy and intuitive application. Further research is needed in order to validate the model and to assess its application in a daily practice basis.

**P113- CONCORDANCE BETWEEN TOOLS FOR THE DETECTION OF COMMUNITY DWELLING FRAIL ADULTS.** I. Vergara[1], M. Machón[1], K. Vrotsou[1], N. Egües[1], A. Bueno[1,2], J. Nuñez[1,2], I. Martín-Lesende[3], A. Martín[3], E. Carrasco[1], A. Díez[1,2] *(1. San Sebastian-Donostia, Spain; 2. Renteria, Spain; 3. Bilbao, Spain)*

Background: Frailty is one of the most relevant clinical expressions of ageing and a powerful indicator of the health status of older populations. Tools to identify frailty can be classified into three groups: those based on rules, like the Tilburg Frailty Indicator (TFI); those based on functional performance, such as Gait Speed (GS) and Timed Up and Go (TUG) tests; and those based on biomarkers (e.g., IL6 expression). More advanced research is needed to assess the ability of existing tools to identify frail individuals in primary care settings. With this overall aim, this study explores the concordance between two functional performance tests (GS and TUG), transcriptomic studies and TFI scores. Method: the proposed research is a nested case-control study of community-dwelling adults, aged 75 years or older, from a prospective cohort study with two years of follow-up (the KoS-frail study). All surviving individuals from the original cohort will be invited

to participate. Those willing to participate will receive a comprehensive assessment including questionnaires, function performance tests and blood tests. Then, a nested case control will be set up considering individuals' frail or robust status as measured by TFI. Those with a score equal or higher than 5 will be considered frail, and treated as cases. Assessment will consist in a personal interview (sociodemographic characteristics and social and health status dimensions), detection of biomarkers (Primeview Affymetrix microarrays) and physical performance tests (GS and TUG). The study has been approved by the Gipuzkoa Health Region Ethics Committee. Written informed consent will be obtained from all participants. Results: at this time, 68 from 129 surviving patients have been recruited. All proposed questionnaires and functional performance tests have been performed and blood samples have been obtained from them. Data are being processed and blood samples have been collected at the biobank of reference. Recruited patients have a mean age of 82 years (SD 81-83) and 60% of them are women. Regarding frailty status, at this time TFI has been assessed and according to it, 25% of the studied population could be considered frail. Further analysis will allow us to assess the concordance of these results with the values of the functional performance test (GS and TUG). On the other hand, microarrays studies has been done in 57 samples after QC filter. Groups are based on TFI indicator, and the results analysis are ongoing Conclusions: Frailty is a highly prevalent condition among community dwelling older adults. Understanding the frailty process is essential to prevent decline towards disability. One key element is the application of an effective tool that can easily identify frail individuals in primary care at an early stage of decline. Although simple rapid screening tests have previously been developed and validated, there is still a need to explore detection tools adequate to primary care settings. Complete data regarding the concordance assessment between existing tools for identifying frail individuals will be presented at the meeting, as well as new insights of novel biomarkers according to the degree of frailty.

**P114- TACKLING FRAILTY AT PRIMARY CARE SETTINGS: VALIDATION AND COMPARISON OF THREE IDENTIFICATION TOOLS AND USE OF HEALTH CARE SERVICES: STUDY PROTOCOL.** I. Vergara[1], F. Rivas[1], T. Téllez Santana[1], M. Machón[1], E. Contreras Fernández[2], K. Vrotsou[1], A. Bueno[1,3], J. Nuñez[1,3], I. Martín-Lesende[4], E. Carrasco[1], A. Díez[1,3], G. Abellan van Kan[5] *(1. San Sebastian-Donostia, Spain; 2. Málaga, Spain; 3. Renteria, Spain; 4. Bilbao, Spain; 5. Toulouse, France)*

Background: Frailty is one of the most relevant clinical expressions of ageing and a powerful indicator of the health status of older populations. Tools to identify frailty can be classified into three groups: those based on rules, like the Tilburg Frailty Indicator (TFI); those based on functional performance, such as Gait Speed (GS) and Timed Up and Go (TUG) tests; and those based on genetic biomarkers (e.g., SOX2 expression). More advanced research is needed to assess the ability of existing tools to identify frail individuals in primary care settings. The aim of the project is to provide insight information about the capacity of different tools to detect the presence of frailty in primary care settings and to improve the knowledge of the profile of health services used by this type of patients. Method: This aim will be specified in these two objectives: 1. To assess the capacity to detect frail individuals of four tools, based on their predictive capacity over the occurrence of dependence and death. Assessed tools are: the Tilburg frailty Indicator TFI (based on rules and self-administrated); koS-model (to be validated and based on rules and functional performance measurement); Gerontopole Frailty Screening Tool GFST (based on clinical judgement) and two genetic biomarkers (SOX2 and p16Ink4a). 2. To assess the patterns of health care services utilization of these individuals. To do so, a multicentric (two regions of Spain: Basque Country and Andalucia) prospective cohort study of 1.250 individuals will be set up based on community dwelling autonomous individuals aged 70 or more at the moment of inclusion. A two year follow up period is proposed. At the inclusion time, a basal assessment will be performed using the proposed tools. The follow up period will allow to, by means of personal interviews and the review of clinical databases, collect data regarding the occurrence of loss of autonomy, death as well as the overall use of clinical services during this period. The study has been financially supported by the Spanish Institute of Health Carlos III (, grant nº PI14/01905) and submitted for evaluation to the corresponding Ethics Committee. Written informed consent will be obtained from all participants. Conclusions: The application of effective tools that can easily identify frail individuals in primary care settings is a key element in order to provide an appropriate and tailored care to elderly populations. Although simple rapid screening tests have previously been developed and validated, there is still a need to explore case-finding tools adequate to primary care settings. This study protocol would be detailed at the conference, will provide a basis for the study of frailty from a health services research perspective, focused in primary care settings and with the robust methodological approach that a cohort study may ensure.

**P115- OLDER ADULTS WITH CHRONIC LOW BACK PAIN: A CLINICAL POPULATION VULNERABLE TO FRAILTY?** P. Coyle, J.M. Sions, T.O. Velasco, G.E. Hicks *(Newark, USA)*

Background: Low back pain (LBP) is one of the most commonly reported conditions among older adults (Goel et al, 1996). Although researchers have identified numerous functional limitations linked to LBP in older adults, it is unknown if frailty is more prevalent in this population. Chronic pain conditions may hasten the path to frailty due to a decrease in physical activity. Frailty syndrome is defined by the following clinical signs and symptoms: 1) muscle weakness, 2) exhaustion, 3) slowness, 4) sedentary behavior, and 5) unintentional weight loss (Fried et al, 2001, 2004). The purpose of this analysis was two-fold: first, to compare the proportions of clinical signs and symptoms of frailty in older adults with and without low back pain, specifically muscle weakness, exhaustion, and slowness; second, to explore the influence of pain-related characteristics on frailty. Methods: This was a cross-sectional, comparative analysis of older adults, ages 60-85, with (n=66) and without (n=57) chronic LBP (CLBP). CLBP was defined as pain of ≥3 months duration; participants had to have ≥3/10 pain intensity for inclusion. Individuals were excluded if he/she was acutely ill, had a progressive neurological condition, had signs/symptoms of nonmechanical LBP, or were extremely mobility-limited. Given the limitations of the dataset, we were only able to evaluate the following frailty criteria: weakness, exhaustion, and slowness. Repeated chair rise performance was used to evaluate weakness criteria (Lord et al 2002). For chair rise performance, scores falling below the median cut-points set by Guralnik et al, 1994 were used. Responses of "a little of the time" and "none of the time" on item 9e of the ShortForm (SF-36) ("In the past four weeks, how much of the time have you felt full of energy?") were used to classify exhaustion. Gait speed over an 8-foot walkway was used to classify slowness. Gait speeds falling below cut-points established by Fried et al, 2001, were classified as having slowness. If a participant met 1 of 3 criteria they were classified as "intermediate frail"; if they met all 3 criteria they were classified as having "frail syndrome" (Fried et al, 2001). SPSS 22 (SPSS IBM, Inc., Chicago, IL) was used for all statistical analyses ($\alpha = 05$). Chi-Square tests were used to assess for differences between those with and without LBP, in the proportions of the 3 individual criterion of frailty, being intermediate frail (i.e. meeting at least 1 of the 3 criteria), and frailty syndrome (i.e. meeting all 3 criteria). Using binary logistic regression, the influence of pain-related characteristics, beyond demographics, on each individual frailty criteria and intermediate frailty-status was determined. Demographic variables included age, sex, education level, race, and body mass index (BMI). Pain-related characteristics included pain location (i.e. low back, buttock, or thigh), pain with walking, and worst rated (0-10) pain intensity in the past 24 hours.

**P116- THE BAYSTATE FRAILTY STUDY – PREVALENCE OF FRAILTY IN A COHORT OF HOSPITALIZED ELDERLY PATIENTS.** M. Stefan[1], N. Schreiber[1], V. Rastegar[1], J. Budrow[2], P. Manikantan[3], K. Spencer[4], H. Pokharel[1], P. Lindenauer[1] *(1. Springfield, USA; 2. Boston, USA; 3. New York, USA; 4. Middletown, USA)*

Background: Elderly patients have limited physiological reserves and decreased ability to compensate for stress, resulting in a delayed return to baseline function and an increased vulnerability to in-hospital and post-discharge complications. Current outcome risk assessment models do not account for frailty and, consequently, the estimates of mortality and morbidity are frequently inaccurate in the elderly. The objectives of this study are to assess the prevalence of frailty and its association with in-hospital and post-discharge outcomes in hospitalized elderly patients (phase I) and to implement a coordinated care team approach to improve the outcomes of frail elderly patients (phase II). Methods: This is a prospective study which includes patients older than 65 years who are admitted for urgent surgeries (e.g. hip fractures, small bowel obstruction, acute cholecystitis), trauma, elective orthopedic surgeries and 3 frequent medical diagnoses (heart failure, COPD, pneumonia). In the first phase, we collected measures of frailty at admission using Edmonton Frailty Scale which has been validated in other studies for the measure of frailty. It includes questions about general health status, cognition, functional independence, social support, medication use, nutrition, mood, self-reported performance and continence. Patients scoring >10 were classified as severely frail, 6-9 as mildly frail or vulnerable and 0-5 as non frail. Patients were evaluated daily after admission for development of delirium and other complications and were followed with phone calls at one, two and three months after discharge. The study will enroll a total of 200 patients admitted for urgent surgeries, 100 patients for medical conditions and 100 patients admitted for elective surgeries. Results: Of the 212 patients who were enrolled till now, 110 were admitted for urgent surgeries or trauma, 38 for elective orthopedic surgeries and 64 for medical conditions. Mean age was 76.70 (SD = 8.3) and 131 were female (61.8%). 93.4% were admitted from home, 3.8% from assisted living and 2.8% from a nursing home facility. The mean Edmonton Frailty Scale (EFS) for the entire patient cohort was 5.10 (SD = 3.6). Mean EFS was 4.7 (SD = 3.4) for urgent surgery/trauma patients, 7.2 (SD = 3.1) for medical patients and 2.8 (SD = 3.0) for elective surgeries. The following components of the EFS are reported. One in four patients had more than 1 falls in the 6 months prior to admission. For the urgent surgery/trauma, mean number falls was 1.66 (SD = 11.5). For the medical group, mean number falls was 0.88 (SD = 1.3). For the elective group, mean number of falls was 0.32 (SD = 0.7). On the 3 objects recall test, one fourth of the patients were able to remember only one word. 68% of patients were on >5 medications before coming to the hospital and 20% admitted that they forget to take their medications sometime. 17% of patients admitted to being depressed and 19% having urinary incontinence. Only 60% of the patients were able to walk 2 blocks in the 2-3 weeks prior to being admitted. Overall 61.3% of patients were vulnerable-mildly frail and 14.2% were severely frail. Medical patients were the most likely to be frail (72%) and patients undergoing elective surgeries the least likely (5%). 168 patients consented for phone calls follow up. Until now, we were able to obtain follow up for 121 at 30 days, 100 patients at 60 and 57 at 90 days. The study is ongoing and additional results will be available for the meeting. Conclusion: Less than half of the patients over 65 years of age hospitalized for urgent or emergent surgeries and for 3 frequent medical conditions were non frail. Medical patients were the most likely to be frail and had the higher score on EFS, followed by patients admitted for urgent surgeries. As expected, patients admitted for elective orthopedic procedures were most likely to be non frail.

| | Total | Non Frail (EFS<5) | Vulnerable-Mildly Frail (6<EFS<9) | Moderately-Severely Frail (EFS>10) |
|---|---|---|---|---|
| Overall | 212 | 121 | 61 | 30 |
| Urgent surgeries | 110 | 70 | 27 | 13 |
| Medical | 64 | 18 | 31 | 15 |
| Elective surgeries | 38 | 33 | 3 | 2 |

**P117- CHANGE IN TIMED UP AND GO PERFORMANCE OVER TIME IN COMMUNITY-DWELLING OLDER MEN.** S. De Buyser[1], M. Petrovic[1], Y. Taes[1], B. Lapauw[1], S. Verlaan[3], K. Toye[1], J.-M. Kaufman[1], S. Goemaere[1] *(1. Ghent, Belgium; 2. Wageningen, The Netherlands)*

Backgrounds. The aim of this study was to assess which baseline factors related to patients' clinical profile are associated with incident decline in Timed Up and Go (TUG) performance over 3 years in community-dwelling older men. Methods. Data are from a longitudinal study of a population-based sample of 352 ambulatory older men. The study started in 1996 with follow-up visits annually until 2000, one visit in 2003, and thereafter annual followup by telephone. The TUG test was performed at each visit until 2000 to assess subjects' physical performance. Mean annual change in performance time was calculated using linear regression analyses with data from 1997 until 2000. Depression was assessed in 1997 using the 30-item Geriatric Depression Scale [range 0 – 30, scores >11 indicate depression]. Cognitive status was evaluated through a 5-item recall performed 3 times [range 0 –15, higher scores indicate better cognitive status]. Subjects were asked about their history of falls in the past year [binary variable]. Functional status was assessed by 8 questions on activities of daily living in the Rapid Disability Rating Scale-2 (RDRS-2) [range 8 – 32, higher scores indicate more assistance needed]. Subjects with low performance (TUG > 20s) or function (RDRS-2 > 16 / 32) at baseline and subjects who were deceased before 2000 were excluded from the analyses. Results. Between 1997 and 2000, 195 well-functioning men had completed at least 2 visits according to the protocol. Their mean age in 1997 was 75.6 ± 3.5 years [range 71 – 86y] and mean TUG time was 10.82 ± 2.43 seconds. Mean change in TUG performance per year was +0.12 ± 0.92 seconds. Subjects with decline in TUG performance had, on average, higher scores on the Geriatric Depression Scale (5.6 vs 4.4, P = 0.045), older age (76.2 vs 75.0 years, P = 0.013) and higher baseline performance (10.3 vs 11.4, P < 0.0001), compared to subjects who improved. Mean functional decline was higher in subjects who fell in the previous year compared to subjects with no history of falls (+0.67 seconds / year vs +0.03 seconds / year, P = 0.001) and in subjects with depression compared to subjects without depression (+0.50 seconds / year vs +0.07 seconds/year, P = 0.036). A multivariate linear regression model identified the following factors to be predictive for TUG decline: higher baseline TUG performance (B = -0.17, 95% CI = -0.23 – -0.12 , P < 0.001), older age (B = 0.08, 95% CI = 0.04 –0.11, P < 0.001), history of falls (B = 0.55, 95% CI = 0.21 – 0.89, P = 0.002), lower cognitive function (B = -0.09, 95% CI = -0.15 – -0.03, P = 0.005 ), and depression (B = 0.52, 95% CI = 0.15 – 0.88, P 0.006). The model explained 28% of the variance in annual TUG change. Conclusion. Subjects with TUG decline have different profiles at baseline compared to subjects without decline. Comprehensive Geriatric Assessment should include history of falls, physical performance, depression and cognitive function.

**P118- INTERRELATIONSHIP BETWEEN RECREATIONAL PHYSICAL ACTIVITY, RELATIVE MUSCLE STRENGTH AND FUNCTIONAL CAPACITY.** S. Barbat-Artigas, C.H. Pion, S. Dupontgand, M. Aubertin-Leheudre *(Montréal, Canada)*

Backgrounds: In recent years, a significant effort was made to identify a marker to detect individuals at risk of functional impairments, even in clinical and medical routines where time and access to sophisticated equipment are limited. Relative muscle strength (the muscle strength to body weight ratio) emerged as a relatively consistent and relevant index. Indeed, we and other observed that this index was a better predictor of functional impairments than many other index of muscle function, including absolute muscle strength, muscle quality and muscle mass. One may thus hypothesize that changes in this ratio may influence functional capacity. In order to improve functional capacity, it is then justified to develop interventions or identify factors that may improve this ratio. Consequently, the present study aims at investigating the relationship between recreational physical activity (which is known to influence both muscle function and body composition) and relative muscle strength. Methods: Five hundred and twenty five men and women aged 50 years and over, members of the YMCAs of Montreal, volunteered to participate in the study. Functional capacity was evaluated through 4 tests; the Timed Up and Go, the repeated chair test, the alternate step test and a balance test. Body weight, hand grip and knee extension strength were measured. Recreational exercise habits have been identified using structured interview conducted by a trained kinesiologist. Participants were asked to specify the exercise time (in min/week) for each activity in which they were currently engaged, either inside or outside the YMCAs, and for how long these activities have been practiced (in months). Activities were then categorized in three main groups: resistance, aerobic and body and mind activities. Based on this information, the weekly exercise time, as well as the average exercise duration, were calculated for each category of activity. Results: After correcting for comorbidities, age and gender, results confirmed that both relative handgrip ($\beta$=0.304, p<0.001) and knee extension ($\beta$=0.116, p=0.023) strength indexes were related to functional capacity. However, results were conflicting regarding the relationship between physical activity and relative muscle strength indexes. After controlling for comorbidities, age and gender, only the weekly amount of resistance activities was associated with relative knee extension strength ($\beta$=0.143, p=0.001) while only the weekly amount of aerobic activities was associated with relative handgrip strength ($\beta$=0.088, p=0.026). The weekly amount of resistance activities explained an additional 2% of the variance of relative knee extension strength (p=0.001). The weekly amount of aerobic activities explained an additional 1% of the variance of relative handgrip strength (p=0.026). Conclusion: First, results confirm that relative muscle strength is associated with functional capacity. Results then suggest that physical activity may improve relative muscle strength, which may in turn positively influence functional capacity. However, it was surprising to observe that relative handgrip and knee extension strength were sensitive to different aspect of physical activity. In both cases, relative strength was influenced by the weekly amount of practice rather than for how long activities have been practiced, suggesting a short term rather than a long-term effect of physical activity on relative muscle strength. However, relative handgrip strength was influenced by aerobic activities while relative knee extension strength was influenced by resistance activities. One may hypothesize that, in the case of relative handgrip strength, aerobic activities may influence the body weight component of relative strength while in the case of relative knee extension strength, resistance activities may influence the strength component of the ratio. In line with recommendations of physical activity, these results suggest that both aerobic and resistance activities may be combined to maximize the potential effects of physical activity on functional capacity.

**P119- USING FRAILTY TO ASSESS PREMATURE BIOLOGICAL AGEING IN OPIATE-DEPENDENT ADULTS.** J. Bressan, A.M. O'Halloran, B.L. King-Kallimanis, M.D.L. O'Connell, A. Olohan, E. Keenan, J. Barry, R.A. Kenny *(Dublin, Ireland)*

Introduction: There is an internationally recognised need to be pro-active in identifying and managing premature morbidity and mortality in drug users. High morbidity and mortality within the Heroin using population is well documented, as is premature ageing (Reece et al. 2007; Rosen et al. 2011) This increased rate of ageing is likely to be as a result of many factors, including pre-existing determinants of chronic disease, complications of infectious disease, exposure to toxicity in lifestyle, and the iatrogenic side effects of psychiatric and medical treatment. This mirrors the complex health profiles observed in the general older adult populations. However, the relatively increased rate of ageing within the Heroin using population compared to the general community-living population has not been measured. One approach to examining rates of biological ageing is through the lens of frailty. Frailty is a distinctive health state related to the ageing process in which there is a gradual decrease in biological reserves across multiple body systems. This enhances vulnerability to even minor stressors or insults, ultimately resulting in the increased risk of adverse health outcomes. Therefore, the concept of frailty captures differential vulnerability to such adverse outcomes e.g. disability, intensive healthcare use and mortality (Fried et al. 2001; 2004). For this reason frailty may be considered a marker of premature biological or unsuccessful ageing. In this pilot study, phenotype frailty was measured to assess the relative rate at which opiate-dependent populations age more rapidly when compared to the general ageing population. Methods: Data from the first wave of The Irish LongituDinal Study on Ageing (TILDA) (N=4,242; mean age 58 years; 56% female) and a sample of patients (N = 41: mean age 44 years; 22% female) in Methadone treatment for heroin addiction at an inner-city Dublin clinic, were analysed. All subjects were aged 40-69 years. The five frailty phenotype criteria (unintentional weight loss, exhaustion, low walking speed, low grip strength, low physical activity) were measured using the same methodology in both samples. Participants were classified as non-frail, prefrail and frail if 0, 1-2 and ≥3 of the five indicators recorded were present, respectively. Descriptive statistics were used to compare demographics, frailty criteria, and self-reported health variables. Results: Preliminary results from our pilot study indicate that frailty (≥3 criteria) was significantly more prevalent in the Methadone (22%) compared to the TILDA (1.6%) sample (p<0.01). Pre-frailty (1 or 2 criteria) was also significantly higher at 49% versus 29%, respectively (p<0.05). Despite the older mean age and higher percentage of females in the TILDA sample, both of which are associated with frailty, the frequencies of exhaustion, weight loss, low walking speed and low activity were 5-, 6-, 11- and 12-times higher in the Methadone sample. Low grip strength was at 9% in both samples. The Methadone sample were significantly more likely to be smokers, have poorer cognitive function, be unmarried and live alone but were less likely to have ≥1 chronic conditions (59% versus 72%). Finally, all 8 HIV positive patients were categorized as frail or pre-frail. Conclusion: These preliminary findings suggest that the phenotype frailty model is an appropriate tool for assessing premature ageing and risk of adverse health outcomes in an opiate dependent population. The phenotype frailty model is an appropriate, evidence-based, reproducible, low-threshold assessment tool that is practical and highly feasible for community-based settings in which older substance users are accessing services. This methodology may provide a valuable first step in developing new models of care for opiate dependent and other vulnerable population, both nationally and internationally.

**P120- PREDICTION OF ONE-REPETITION MAXIMUM FROM SUBMAXIMAL RATINGS OF PERCEIVED EXERTION IN OLDER ADULTS PRE AND POST-TRAINING.** F.-D. Desgorces[1], R. Thomasson[1], S. Aboueb[1,2], J.-F. Toussaint[1], P. Noirez[1] *(1. Paris, France; 2. Orléans, France)*

Background: Individual's one-repetition maximum (1-RM) is required to calculate and prescribe intensity for resistance training while testing protocols enhance the risk

of injuries and are time consuming. In training and rehabilitation fields, the 1-RM is frequently predicted by using submaximal tests and applications of equations for 1-RM prediction. However, direct as well as indirect assessment of 1-RM require participants to perform repetitions to muscular failure that enhanced muscular and cardiovascular health risks in untrained individuals and particularly olders. To avoid risks associated with tests performed until exhaustion in population at risk, some authors supported the use of ratings of perceived exertion (RPE) recorded during submaximal lifts to predict 1-RM. The aim of the present study was to assess the accuracy of 1-RM prediction from RPE of resistance exercises performed in submaximal sets in older adults at the beginning and the end of a 12-week rehabilitation program. Methods: 18 untrained subjects (70.4 ± 4.5 years), completed, firstly 1-RM direct assessment in horizontal leg press pre and post-training. Thereafter, participants performed, in a random order, 2-repetition sets at unknown intensities (equivalent to 20, 45 and 70 % of 1-RM). The RPE was recorded immediately after the sets and was subjected to linear regression analysis to extrapolate maximal RPE score and corresponding 1-RM. Results: RPE and relative intensities of sets appeared related pre- (r2=0.59, SEE=13.3%) and post-training (r2=0.83, SEE=8.1%). Differences between measured and predicted 1-RM were reduced from the beginning to the end of training but standard deviations remained high (17.4±11.8 vs 4.2±11.1kg). Relationships between measured and predicted 1-RM appeared improved from beginning to end of training (r2=0.45, SEE = 10.2 vs r2=0.52, SEE = 8.2kg). Conclusion: Older adults present ability for RPE use that allows to predict 1-RM and to identify the relative intensities of resistance exercises. In a practical point of view, errors of estimates at the beginning and the end of the training period could be assumed as quite high for older populations according to the health perspective of rehabilitation programs. After 1-RM prediction and loads determination, loads to lift should be tested by subjects before being included in the sets of strength training programs.

**P121- LARGE HETEROGENEITY IN THE RESPONSE TO RESISTANCE-TYPE EXERCISE TRAINING IN ELDERLY PEOPLE.** M. Tieland[1], T.A. Churchward-Venne[2], L.B. Verdijk[2], M. Leenders[2], L.C.P.G.M. de Groot[1], L.J.C. van Loon[2] *(1. Wageningen, The Netherlands; 2. Maastricht, The Netherlands)*

Background: Aging is associated with a decline in skeletal muscle mass, strength, and physical performance. Resistance-type exercise training is an effective interventional strategy to increase skeletal muscle mass and strength in the elderly. The adaptive response to exercise, however, is remarkably heterogeneous. Small subsets of individual subjects show no increase or even a decline in muscle mass which may suggest that some older individuals may be unresponsive to the benefits of exercise. Purpose: To examine the heterogeneity in resistance-type exercise training induced changes in lean body mass (LBM), muscle fiber size, strength, and physical performance in a large cohort of older men and women. Methods: Older subjects were selected to participate in 3 to 6 months of supervised resistance-type exercise training. Changes in LBM (DXA), muscle fiber size (biopsy), leg strength (1-RM on leg press and leg extension), and physical performance (chair rise-time) were assessed at baseline, and after 3 and 6 months of resistance-type exercise training. Results: LBM increased by 0.7±0.1 kg at 3 months, with individual data ranging from -3.8 to 5.4 kg. By 6 months, LBM had increased to 1.1±0.2 kg, with individual data ranging from -1.8 to 9.2 kg. 1-RM on the leg press and leg extension increased by 33±2 and 20±1 kg at 3 months, with individual data ranging from -36 to 87 and -22 to 56 kg. At 6 months, 1-RM strength increased to 50±3 and 29±2 kg on the leg press and leg extension, with individual data ranging from -28 to 145 kg and -19 to 60 kg, respectively. Chair rise-time decreased by 1.3±0.4 s at 3 months, with individual data ranging from -12.5 to 21.6 s. At 6 months, chair rise-time had decreased by 2.3±0.4 s, with individual data ranging from -23 to 10.5 s. Muscle fiber data will be available at the conference. Conlusions: A large heterogeneity exists in the adaptive response to prolonged resistance-type exercise training elderly people. Non-responsiveness, however, was not apparent in any subject, as positive changes on one or more outcome measures (LBM, strength and physical function) were evident in all subjects. Furthermore, the magnitude of responsiveness was impacted by the duration of training, with more positive responders at 6 vs 3 months. We conclude that there are no non-responders to the benefits of resistance-type exercise training. Resistance-type exercise should be prescribed to support healthy aging in the elderly population.

**P122- AGE-RELATED CHANGES OF THIGH MUSCLE FAT INFILTRATION IN SUBJECTS OF THE OAI MRI COHORT WITHOUT NON-RADIOGRAPHIC OSTEOARTHRITIS.** H.J. Yu, C. Tan, Z. Yan, C.G. Miller, T. Fuerst, K. Engelke, D. Metaxas *(Princetown, USA)*

Background Similar to age-related sarcopenia, increasing age is a known risk factor for knee osteoarthritis (OA), which results in increased muscle weakness and decreased mobility. The quantities of inter-muscular adipose tissue (inter-MAT), intra-muscular adipose tissue (intra-MAT) and muscle in the thigh reflect adverse metabolic effects and muscle function. Traditional manual analysis, especially of 3D datasets, is time-consuming and operator-dependent and therefore not well suited for use in clinical routine or in clinical trials. Methods: The OAI database was queried for subjects with the bilateral KLG scores of 0 or 1 and mid-thigh axial T1-weighted MRIs (15 contiguous slices, 5 mm slice thickness) at baseline. 234 subjects out of 4,796 participants were identified, and 166 subjects (58 male, 108 female; age: 45-77) were processed after image QC. The left leg of each subject was processed. An automatic quantification technique was applied, which included 5 major steps: 1) intensity inhomogeneity correction; 2) subcutaneous adipose tissue (SAT) removal; 3) tissue labeling of bone, marrow, fat and muscle; 4) inter- and intra-MAT classification; 5) tissue assessment. Figure 1 shows two examples. All results were visually inspected for segmentation errors. Volume (15 slices) was calculated for total thigh muscle, SAT, and inter- and intra-MAT. Each variable was normalized to subject's BMI. Correlations were examined between normalized tissue volume and age. Age-related gender differences were also examined. Differences in tissue volumes per decade were explored using one-way ANOVA in each age group. Results: There was a statistically significant inverse correlation between age and normalized total muscle volume in all subjects (r= 0.20, p= 0.12) with a 4.1% decrease of total muscle volume per decade. This correlation was higher in women (r=0.37, p=0.0038) than in men (r=0.10, p=0.93) (Figure 2). Loss of muscle volume was accompanied by increasing inter- and intra-muscular fat (r=0.085, p=0.38) with a 2.16% increase of total muscular fat (inter- and intra-) volume per decade. Muscle fatty infiltration was more pronounced in men (r=0.38, p=0.027) than in women (r=0.05, p=0.65) (Figure 2). No significant correlation between age and normalized SAT volume was found. Conclusion: The proposed framework provides an automated approach for quantitative thigh tissue assessment in T1 weighted MRI images. In healthy subjects of the OAI cohort we found an age-related muscle volume decrease in women and age-related increase of muscular fat in men. These results have to be confirmed in other normal and sarcopenic cohorts. The current work will also be expanded to the ROA population to further examine the effect of fatty infiltration for the onset and progression of OA. Ongoing development efforts include comparison to manual segmentation, enhancement of clustering and contouring accuracy and precision for fatty infiltration. It will also be of interest to assess individual muscles separately.

**Figure 1**
Examples of Tissue Classification. Original T1 weighted MRI (left) and multi-labeled segmentation results (right) of subcutaneous fat (red), muscle (brown), inter-MAT (blue), intra-MAT (green) and bone and marrow (purple). Top: axial slice from female, age: 71; bottom: male, Age: 48

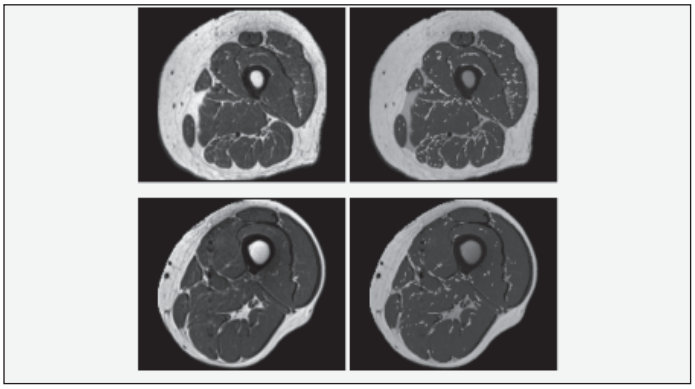
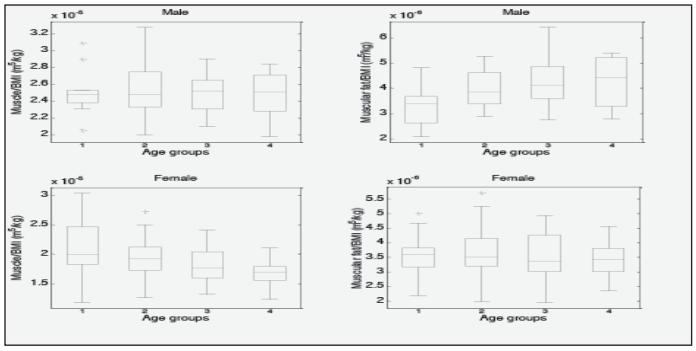


**Figure 2**
Box-plots for BMI adjusted mean muscle and fat values per each age decade: Group 1 (40-50, Group 2 (51-60), Group 3 (61-70), Group 4 (71-80)




**P123- CHANGE IN INTRAMUSCULAR ADIPOSE TISSUE IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES COMPARED TO WOMEN WITHOUT DIABETES.** J.M. Pritchard[1,2], A. Chan[2], M. Maly[2], J.D. Adachi[2], A. Papaioannou[2] *(1. Toronto, Ontario, Canada; 2. Hamilton, Canada)*

Background: Most adults with type 2 diabetes experience accelerated musculoskeletal aging, with frailty often identified in adults with diabetes at a younger age compared to adults without diabetes. As a result, adults with type 2 diabetes are at higher risk of falls and fractures. Intramuscular adipose tissue (IMAT) may contribute to functional decline and fracture risk in adults with diabetes. The objectives of this study were to: 1) determine the difference in changes over 2 years in IMAT of the lower leg in postmenopausal women with type 2 diabetes compared to those without type 2 diabetes; 2) determine the relationship among changes over 2 years in IMAT, functional mobility and strength. Methods: This 2-year longitudinal study included women ≥ 65 years with type 2 diabetes recruited from diabetes out-patient clinics at Hamilton Health Sciences and participants without type 2 diabetes recruited from the community. A 1 Tesla MRI (OrthOne, GE)

and fast spin echo sequence was used to acquire 10 T1-weighted axial images of the non-dominant lower leg (66% site) at baseline and follow-up visits. Images were segmented with Slice-O-matic (Tomovision) using watershed and region growing to determine the cross-sectional area of IMAT. Percent IMAT was calculated at baseline and follow-up according to the following equation: IMAT cross-sectional area/ muscle cross-sectional area x 100%. The absolute difference (follow-up – baseline) in % IMAT was calculated. Timed-up-and-go (TUG) and dominant-hand grip strength (Takei Dynamometer) measurements were also collected to assess functional mobility and strength, respectively. The changes in IMAT were compared between groups and linear regression was used to determine if change in IMAT was related to a decline in functional mobility or strength. The dependent variables were follow-up TUG score and grip strength, and covariates included change in % IMAT, diabetes status and baseline measurement of TUG or grip strength. P-value ≤ 0.05 was significant. This study was approved by Hamilton Integrated REB. Results: Of the 29 women with type 2 diabetes and 28 women without type 2 diabetes who attended the baseline visit, 14 women and 18 women, respectively, returned to the follow-up visit and had valid (no motion artifact) MRI scans included in the analysis. The mean (standard deviation) age at baseline was 71.3 (3.6) years for women with type 2 diabetes and 69.7 (4.0) for women without diabetes. At baseline and follow-up, women with type 2 diabetes had a higher BMI than women without diabetes (baseline: 35.0[5.0] kg/m2 vs. 27.7[3.9]kg/m2, follow-up: 35.5[5.5]kg/m2 vs. 27.4[3.6]kg/m2, p<0.05). Over 2 years, there was no difference in the change in TUG score (-1.4[2.7] seconds vs. -0.4[1.2] seconds, p=0.170) or grip strength (-2.0[2.8]kg vs. -1.5 [4.0]kg, p=0.654) for women with type 2 diabetes compared to women without diabetes, respectively. However, women with type 2 diabetes experienced a greater absolute change in IMAT over 2 years (2.4[2.6]% vs. 0.4[2.6]%, p<0.05). Regression analysis revealed that change in IMAT was not related to follow-up TUG score (standardized beta coefficient -0.117, p=0.304) or grip strength (standardized beta coefficient 0.149, p=0.126). Conclusions: Despite a greater increase in % IMAT over 2 years, participants with type 2 diabetes did not have a significantly greater decline in function or strength, and % IMAT was not related to change in function or strength in all participants. There may be other factors contributing to functional decline in adults with diabetes, however these results are limited by the small sample size at follow-up, and a larger study should be undertaken to rule out the contribution of IMAT to frailty progression.

**P124- IRON DEFICIENCY DETERIORATES CLINICAL AND FUNCTIONAL OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE.** N. Scherbakov[1], M. Knops[1], A. Sandek[1], N. Ebner[2], M. Valentova[2], S. von Haehling[2], S.D. Anker[2], W. Doehner[1] *(1. Berlin, Germany; 2. Göttingen, Germany)*

Introduction The role of iron homeostasis in stroke is unclear. Iron deficiency and anaemia contribute to the functional performance and quality of life. The aim of this study was to evaluate the role of anaemia and iron deficiency in patients with acute ischemic stroke and their role in the functional outcome and neurological deficits. Serum ferritin and transferrin saturation (TSAT) were used for diagnosis of iron deficiency anaemia. Pateints and methods We consecutively evaluated 80 patients (age 68±13y, mean ±SD) admitted to stroke unit with acute ischemic stroke of the middle cerebral artery. 30 patients were treated with thrombolytic agent Actilyse at admittion. Healthy individuals of similar age (n=31) were used as controls. The neurological status was elevated according to National Institute of Health Stroke Scale (NIHSS) and functional outcome according to Barthel Index (BI) within 3±2 days after acute event. Blood parameters were measured from venous blood samples after overnight (>8h) fasting. Anaemia was diagnosed by haemoglobin levels <12g/l for females and <13g/l for males. Functional iron deficiency was diagnosed by ferritin levels <300$\mu$g/l and TSAT <20% for both genders. Results Serum ferritin was increased in patients with acute ischemic stroke compared to controls (201±145 vs. 139±102 $\mu$g/l, p=0.0307, respectively). TSAT was reduced in patients compared to controls (24±10% vs. 31±18%, p=0.128). Anaemia was presented in 27% of female and in 18% of male patients. 43% of female and 18% of male patients showed functional iron deficiency. Ferritin, functional iron deficiency and thrombolytic therapy were identified as independent explanatory factors for NIHSS score. Ferritin, age and functional iron deficiency were significantly associated with the BI score. However, the presence of anaemia was not significantly associated with BI and NIHSS scores in patients with acute stroke. Conclusions Functional iron deficiency affect functional and neurological outcome in patients with acute ischemic stroke. Functional Iron deficiency might be used as an additional parameter for evaluation of functional status of stroke patients. Haemoglobin levels did not reveal a strong prognostic information. Further large studies are required to clarify the role of iron metabolism in patients with stroke.

**P125- ENHANCEMENT OF SATELLITE CELL REGENERATIVE POTENTIAL IN SARCOPENIC RATS BY POLYPHENOL-ENRICHED PLUM EXTRACT.** M. Tian, W. Kline, N.K. Edens, D.C. Guttridge, S.L. Pereira *(Columbus, USA)*

Backgrounds: The loss of regenerative capacity is likely a significant contributor to age-related loss of muscle mass and functionality. The ability of muscles to regenerate after injury or due to ageing-related damage relies predominately on satellite cells (SCs). Following muscle injury, SCs are activated, proliferate and differentiate into myotubes. These newly formed myotubes fuse with existing myofibers to regenerate the muscle. Aging has been shown to impact the number of satellite cells and the regenerative potential of SCs due to changes in circulating factors in the old muscle micro niche. It is possible that nutritional intervention could modulate the number of SCs or the circulating environment and hence affect SCs regenerative potential. Dried plum/plum extract has demonstrated benefits on bone in osteoporotic and osteopenic animals and humans. Here we examined the impact of chronic supplementation of a plum extract on the myogenic potential of aged muscle-derived SCs. Methods: Aged Sprague Dwaley rats (20 months) were randomized to two group (n=12 each) to either receive control diet (AIN-93M, Harlan) or plum extract (PE, 500 mg/kg BW) supplemented AIN-93M diet for eight weeks. Upon sacrifice, gastrocnemius muscles from each group (n=5 per group) were processed for further analysis at the level of single myofibers. Muscle fibers were isolated and cultured in growth media (GM) for 6 days to promote the activation of satellite cells and the expansion of myoblasts. Afterwards, GM was replaced with differentiation media (DM) to induce myotubes formation. Immunohistochemical staining was performed to assess 1) the number and activation of SCs (pax7+/fiber); 2) the extent of SCs proliferation (Phospho-histone H3); 3) the extent of differentiation and myogenesis as determined by myotube conversion (myosin heavy chain (MyHC)). Immunohistochemistry was performed at day 0-the time of myofiber isolation, day 1 and 3 in GM, and day 4 in DM. Data is represented as mean ± SEM. Analysis was performed between different groups using 2-tailed Student's t test with p<0.05 considered significant. Results: Compared to control, 8-week intervention with PE did not significantly impact body weight, food intake, or muscle wet weights. There was no increase in the basal number of Pax7+ SCs in myofibers from PE-treated muscles over that of control. However at day 3, there was significantly greater numbers (~2-fold) of Pax7+ cells/fiber from the PE-treated group suggesting that PE was effective at stimulating the activation phase of SCs under culture conditions. Consistent with this, there was a significant increase in proliferative capacity of SCs (Phospho-histone H3+) in the PE-treated group compared to control by day 1 (175 %) and day 3 (163%). In addition, myoblasts derived from PE-treated group exhibited a significantly greater fusion index (DAPI+: 6.5±0.4 vs. 5.8±0.3) and concomitantly produced a higher number of myotubes (MyHC+: 24.1±0.6 vs. 19.5±1.5) compared to control. Conclusion: Plum extract may be useful as a natural compound to stimulate the regenerative capacity of skeletal muscle stem cells in aging rats. Funding: Supported by Abbott Nutrition

**P126- NUTRITIONAL STATUS AMONG PERSONS WITH DEMENTIA. AN ANALYSIS OF SWEDISH QUALITY REGISTRIES.** L. Johansson, L. Christensson *(Jönköping, Sweden)*

Background: In Swedish health care the use of national quality registries have increased in the last decades in order to develop and create better care and improve health care outcomes. Swedem is a national quality registry aiming to improve quality of diagnostics, treatment and care of patients with dementia disorders. Senior Alert is a registry for preventive care processes aiming at prevent malnutrition, pressure ulcers and falls in elderly care. There is a dearth of knowledge regarding the nutritional status for persons with dementia with different diagnosis and living conditions but by linking the two registries, Svedem and Senior Alert, together it is possible to conduct a national survey and gain such knowledge. Further it is possible to investigate which interventions that are being used, and the effect of these interventions, when a person is at risk of malnutrition. This is significant as malnutrition is common for persons with dementia. Malnutrion have been found to decrease physical capacity, health and wellbeing as well as increase risk of morbidity and mortality. Therefore the aim of this study is to describe the nutritional status for persons with dementia as well as interventions used for those at risk of malnutrition. Methods: A quantitative study with descriptive design will be conducted. The study will be based upon two quality registers (Svedem and Senior Alert). All persons that was registered in Svedem, i.e. was diagnosed with dementia, during 2013 and also assessed regarding their nutritional status (Senior Alert) within six month will be included in the study. It is not yet possible to know the amount of participants but in 2012 approximately 7300 persons were registered in Svedem. The same year about 221000 nutritional status were assessed using the Mini Nutritional Assessment Short Form (MNA-SF). For the analysis both descriptive and analytical statistics will be used. Results: The study is in an early stage and outcome and results will be presented at the conference. The nutritional status for persons with dementia disorders with different living conditions such as community-dwelling persons and persons living in nursing homes will be presented. Further, different interventions and their effects for those persons at risk of malnutrition will be examined and presented. Conclusion: Using quality registers makes it possible to investigate the quality of care given to specific groups of patients. Good nutritional status is essential to maintain health not least for persons with dementia which are considered to be a high risk group for developing malnutrition. Paying attention to the nutritional status is therefore important and evaluating effects of given interventions can help to prevent malnutrition among these persons.

**P127- THE INFLUENCE OF A 4-MONTH RESISTANCE TRAINING ON MUSCLE CELLS OF SARCOPENIC OBESE PATIENTS.** A. Heber, H. De La Haye, A. Pyka, K. Stöver, C. Brinkmann, J. Latsch, W. Bloch, S. Eichberg, K. Brixius *(Cologne, Germany)*

Introduction: Sarcopenic obesity as acute geriatric syndrome characterizes a confluence of aging and obesity contributing the loss of muscle mass and function. Research on muscle tissue by means of biopsis is often a painful intervention especially for elderly. To prove to what extent C2C12 cells could be used as in vitro model in geriatric research the aim was to investigate effects of resistance training on fusion and accumulation of myonuclei and myotubes in sarcopenic muscle cells incubating human serum. Method: 10 sarcopenic, obese, non-active men (age: 72±3 years, BMI: 35±2 kg/m2) worked out twice a week with 80-85% of 1RM regarding the main muscle groups, 3 sets, 8-12 repetitions over 4 month. The cohort was selected due to the cut-off points of EWGSOP for muscle mass (skeletal muscle mass index) (bioelectrical impedance analysis), muscle

strength (kg) (leg press, hand dynanometer), 4m-gait-speed (m/s) and fitness level (watt) (spiroergometry). To determine metabolic changes in the muscle cells, C2C12 cells were incubated with men's blood serum before and after training comparing the Fusion Index (FI) (%) (myonuclei in mytotubes/total amount of myonuclei). Results: The mean Fusion Index, leg strength and 4m-gait speed increased significantly after the intervention. No significant differences were measured in the mean handgrip strength, BMI, muscle mass and fitness level comparing data before and after the intervention. Discussion: The results provide convincing evidence that hyperplasia and recovery are stimulated through a 4-month resistance training although the stimulus does not seem to affect the total amount of muscle mass significantly. An in vitro model incubating human serum on C2C12 cells could be a suitable model to study muscle alterations measuring accumulation and fusion of myonuclei/myotubes. To support these findings further studies with bigger cohorts are indicated.

**P128- EFFECT OF RECREATIONAL PHYSICAL ACTIVITY ON OBJECTIVE MEASURES OF FUNCTIONAL PROFILE AND PERCEIVED HEALTH STATUS IN ELDERLY WITH OR WITHOUT MCI.** M. Dulac, S. Barbat-Artigas, C. Verret, N. Bier, S. Belleville, M. Aubertin-Leheudre *(Montreal, Canada)*

Backgrounds: The cognitive state, which includes Alzheimer disease and Mild Cognitive Impairment (MCI), seems to be related to functional decline (i.e physical capacities, muscle function) and poor perceived health status during aging (Sauvaget C et al. ,Gerontology, 2002; Cesari M et al, JNHA, 2013; Rolland Y et al, Alzh Res Thep 2013). It has been demonstrated that exercise intervention (laboratory based training) has the potential to decrease or stabilize cognitive decline, functional decline and perceived health in elderly adults (Bherer et al, YU F et al., 2006; Rolland Y, JAGS 2007). However, it is unknown if the positive effect of practicing recreational physical activities on functional capacities and perceived health status differs as a function of cognitive status. Methods: To compare muscle function, physical capacities and perceived health status in recreationally active elderly adults with or without MCI. 155 elderly (mean age: 61 ± 7yrs) were recruited through 5 YMCAs of Montreal. To be included in the study, the participants had to be active, i.e. having a recreational physical activity level superior to 180 min/week. The participants were divided in 2 groups according to their performance on the MOCA using 25 as a cut-off. Participants with a MOCA score below the cut-off were included in the group of MCI (n=42) whereas those who score above (N=113) were considered as having normal cognition (NC group). Body composition (DXA), functional profile (one-leg stance test; normal and fast walking speed), muscular profile (appendicular, total and legs lean body mass; leg muscle strength; leg muscle power) and perceived health (SF-36 questionnaire) were measured. Results: By design, both groups showed different cognitive performances on the MOCA (mean: 23.5±1.8 versus 28.1±1.3; p<0.001). Age, BMI, body composition, lower body muscle strength and lower body muscle power were similar between the groups (all p values > 0.05). In addition both groups were comparable on type (aerobic vs resistance versus body and mind), frequency (min/week) and duration (month) of recreational physical activity (all p values > 0.05). Only perceived general health (SF-36) was significantly lower in the group with MCI compared to the group with NC (p = 0.005). Conclusion: Elderly adults with MCI were not found to have a lower functional profile (muscle function and physical capacities) than persons with NC when measured in a group of participants considered as recreationaly active. However, they showed reduced perceived general health. Thus, physically active elderly adults with cognitive decline seem to be protected against a decrease in objective measures of functional profile but not in perceived health status. Furthermore, further studies with non-active and older participants are needed to directly compare the magnitude of the protective effect and to confirm the potential protective effect of practicing recreational physical activity on physical capacities in elderly with MCI.

**P130- ENERGY EXPENDITURE OF PEOPLE LIVING WITH HIV/AIDS ASSESSED BY THE DOUBLY LABELED WATER METHOD AND BY AN ACCELEROMETRY-BASED ACTIVITY MONITORING SYSTEM.** M. Palma Guimarães, E. Ferriolli, F. Pinheiro Amador dos Santos Pessanha, K. Pfrimer, A. Marliere Navarro *(Ribeirão Preto, Brazil)*

Backgrounds: Several studies have reported an increase in the resting energy expenditure (REE) in people with human immunodeficiency virus (HIV). However, limited data exists on total energy expenditure (TEE). The aim of this study was to evaluate TEE in people living with HIV/aids using the highly accurate doubly labeled water method (DLW) and to compare the results with those obtained by an accelerometry-based activity monitoring system (ActivPALTM, Glasgow, UK). Methods: Fifteen men with HIV/AIDS in use of antiretroviral therapy (ART) have been recruited at the Clinics Hospital of the Ribeirao Preto Medical School. REE was measured by indirect calorimetry and TEEDLW was assessed using the protocol of two weeks multi-point doubly labeled water method. The ActivPALTM activity monitor was used for 7 days to evaluate the pattern of physical activity and provide the energy cost of activity through the estimation of metabolic equivalents (METs). TEEActivPAL was calculated by the formula {(REE * METs / 24) * 1.1}. The results of both methods were compared. Weight, height and BMI were measured. Body composition was measured by bioelectrical impedance, using the formula of Kotler et al. (1996). The viral load and TCD-4 were obtained from the records of patients. Data were processed using SPSS, p<0.05. To evaluate the concordance and reproducibility of the methods the intraclass correlation (ICC) test was employed. Correlation was considered strong when the values were above 0.75, satisfactory for values between 0.4 and 0.75, and weak when the values were below 0.4. Results: Mean age of the participants was 47.3 ± 8.8 years. All were clinically stable without evidence of opportunistic infections. CD4 count was 573.9 ± 297.7. Eighty percent of the sample had undetectable viral load (only three patients had detectable viral load, however the highest value was 133 copies/mm3). Weight was 71.8 ± 10.4 kg, BMI was 24.3 ± 3.0 kg.m-2 and body fat 19.3 ± 3.7%. REE contributed with 57.2% of TEE. TEEDLW was 2601 ± 627 kcal/day (44.6 ± 7.3 kcal/kg FFM) and TEEActivPAL was 2377 ± 320.6 kcal/day (41.4 ± 5.8 kcal/kg FFM). There was no significant difference in TEE and TEE/FFM between the methods (p = 0.22 and p = 0.23, respectively). However, there was poor agreement between the methods (ICC = 0.30 - 95% confidence interval -0.17 - 0.68). Conclusion: The total energy expenditure of eutrophic patients with clinically stable HIV/AIDS was 41.4 kcal/kg. The use of an accelerometry-based activity monitoring system has underestimated TEE in 8.6% and it does not seem to be a good method to evaluate the TEE of this population.

**P131- INVESTIGATION OF THE EFFECTS OF AGING ON SKELETAL MUSCLE PHENOTYPE IN MEN.** F. St-Jean Pelletier, C.H. Pion, F. Lemieux, J.P. Leduc-Gaudet, S. Barbat-Artigas, N. Sgarioto, P. Gaudreau, R.T. Hepple, S. Chevalier, M. Belanger, J.A. Morais, M. Aubertin-Leheudre, G. Gouspillou *(Québec, Canada)*

Background: Aging is associated with a progressive loss of muscle mass and strength, a biological process resulting from a reduction in muscle fiber size and number. It is commonly believed that type II (fasttwitch) fibers are preferentially affected during aging, while type I (slow-twich, oxidative) fibers are relatively preserved. However, it has to be acknowledged that many controversies on this preferential type II atrophy and loss with aging exist in the literature. Furthermore, whether aging differentially affects type IIa (fasttwitch, oxidative) and IIx (fast-twitch, glycolytic) fibers remains a matter of debates. Therefore, our understanding of the effects of aging on skeletal muscle phenotype in humans remains, at best, unclear. Finally, although it is well known that physical activity can significantly impact muscle phenotype, it is rarely taken into account when investigating the effects of aging on skeletal muscle phenotype. The objective of the present study was therefore to investigate the effects of aging and physical activity on skeletal muscle fiber type proportion and size in men. Methods: Fifty-three men, aged from 20 to 94 years old (yo), were divided into 3 groups: Young Adult (YA; 23.7±0.8 yo; N=11), Middle-Age (MA; 55-65 yo) and 65 yo and older (65+). Participants in the MA were further divided into 2 sub-groups: Active (MA-ACT; 62.4±0.8 yo; N=4) and sedentary (MA-SED; 61.7±1.2 yo; N=7), while participants in the 65+ group were divided into 3 sub-groups: Active (65+ACT; 73.4±0.7 yo; N=9), sedentary (65+SED; 72.3±0.9 yo; N=15) and pre-frail (65+PF; 75.9±3.1 yo; N=7). Participants in the YA group were mostly active. Physical activity levels were assessed based on self-reported activity (questionnaires; to be considered active, participants needed to report over 120 min of structured physical activity/week or over 180 min of voluntary physical activity/week). To be considered PF, individuals needed to meet 1 or 2 of the 3 functional Fried criteria (i.e. level of physical activity, walking speed and muscle strength). Vastus lateralis (VL) muscle samples were obtained from each subject using needle biopsies. VL muscle cross-sections were prepared and immunolabelled for the 3 myosin heavy chains expressed in human skeletal muscle (type I, IIa, IIx) to assess skeletal muscle phenotype (muscle fiber size and type). Results: Subjects in the 65+SED and 65+PF groups displayed a significantly lower general fiber size (i.e all fiber types grouped together) as compared to YA (Mean±SD: YA: 7220±1887$\mu$m2 ; 65+SED: 5524±1632 $\mu$m2, p=0.012 vs YA; 65+PF: 5318±1269$\mu$m2, p= 0.033 vs YA). No differences in the general fiber size were observed in MA-ACT (7302±2641$\mu$m2, p=0.361 vs YA), MA-SED (6034±899$\mu$m2, p=0.189 vs YA), and 65+ACT (6233±1405$\mu$m2, p=0.305 vs YA) as compared to YA. No significant differences in type I fiber size were observed between all groups. As compared to YA, subjects in the 65+SED and 65+PF groups displayed significantly lower type IIa fiber size (YA: 7765±2410$\mu$m2; 65+SED: 5401±1651$\mu$m2, p=0.008 vs YA; 65+PF: 4965±1708$\mu$m2, p=0.016 vs YA). A trend for lower type IIa fiber size was observed in 65+ACT compared to YA (6075±1310$\mu$m2, p=0.053 vs YA). No differences between YA and all MA groups were observed. No significant changes in type I and IIx fiber proportions were observed across all groups. Interestingly, the 65+SED showed a significantly lower type IIa fiber proportion as compared to YA and 65+ACT (YA: 46.5±12.3; 65+ACT: 45.2±12.3%; 65+SED: 32.7±12.4%, p=0.012 vs YA and p=0.025 vs 65+ACT). No other significant changes were observed between all other groups for type IIa fiber proportion. As compared to YA, the MA-SED displayed a significantly higher proportion of type IIa/IIx hybrid fibers (YA: 3.3±4.2% vs MASED: 8.6±6.4%, p=0.025), while the 65+SED (8.6±8.6%) and 65+PF (6.4±4.6%) displayed trends for higher proportion of the type IIa/IIx hybrid fibers (p= 0.087 and p=0.090 vs YA, respectively). No such trends were observed between YA and the MA-ACT (7.5±7.0%, p=0.245 vs YA) and 65+ACT (3.3±3.5%, p=0.614 vs YA) groups. Conclusion: As could be expected, participants in the 65+SED and 65+PF groups displayed signs of significant muscle atrophy. In contrast, no significant signs of muscle atrophy were observed in our 65+Act group. Neither aging nor physical activity had significant effects on type I and IIx fiber sizes and proportions. The significant atrophy of type IIa fibers observed in the 65+SED and 65+PF groups, as well as the significantly lower type IIa fiber proportion in the 65+ SED as compared to YA suggest that type IIa fibers are the most susceptible to the effects of aging. Finally, the trends for higher type IIa/IIx hybrids fibers observed in the MA SED, 65+ SED and 65+ PF group suggest aging-related muscle remodelling that deserves further investigations. Overall our results indicate that aging-related changes in skeletal muscle phenotype are more complex than commonly acknowledged and that physical activity partly prevents aging-related changes in skeletal muscle phenotype in men.

**P132- FRAILTY AND COGNITIVE FUNCTION AMONG THE COMMUNITY-DWELLING ELDERLY.** R. Aparecida Partezani Rodrigues, N. Amorim, J.R. Silva Fhon, S.C. Coelho, F. Wehbe *(Ribeirão Preto, Brazil)*

Background: The population pyramid has changed in recent decades both in Brazil and in the world. Physical and psychological changes occur along with the aging process such as cognitive decline and the development of the frailty syndrome. Estimates show that between 10% and 25% of community-dwelling seniors over 65 years of age and 46% of those over 85 years are frail, i.e. these individuals are at higher risk of experiencing adverse clinical events. This study's aim was to determine the incidence of frailty and identify alterations in the cognitive function among community-dwelling elderly individuals. Method: This longitudinal retrospective study with five-year follow-up was conducted over two waves of a cross-sectional cohort involving 515 elderly individuals aged 65 years old or older (2008/2013) in Ribeirão Preto, SP, Brazil. A total of 262 (50.87%) individuals were interviewed in 2013. A two-stage cluster probabilistic sampling was performed in 2008. Data were collected using an instrument addressing sociodemographic information, the Edmonton Frail Scale, and the Mini-Mental State Exam. Results: A total of 515 individuals were interviewed in 2008 and 262 (50.87%) of these individuals were located and consented to participate in the interview in 2013. A total of 127 (24.66%) individuals died while 126 (24.45%) either moved away, refused to participate, were institutionalized, or were not found at home after three attempts. The elderly individuals interviewed in 2008 were 75 years old on average (sd=7.28) while in 2013 they were 79 years old (sd= 6.34) on average. In regard to the assessment of cognitive function, 148 (56.48%) of the seniors did not present cognitive deficit in 2008 while 114 (43.51%) presented cognitive impairment. In 2013, 103 (39.31%) individuals did not presented cognitive deficit and 159 (60.68%) individuals experienced cognitive deficit. In 2008, cognitive deficit was more frequently observed among women and older seniors while in 2013, cognitive deficit was more prevalent among men and older individuals. In both assessments, cognitive deficit was more prevalent among elderly individuals without partners. In regard to the assessment of frailty, of the 262 individuals assessed in 2008, 46 (17.6%) were frail (mild frailty 27: 10.3%; moderate 14: 5.3%, and severe 5: 1.9%) and 216 (82.4%) did not present frailty (not frail 156: 59.5%, and apparently vulnerable 60: 22.9%). In the second assessment performed in 2013, of the 262 interviewees, 99 (37.8%) were frail (mild 60: 22.9%; moderate 23: 8.8%, and severe frailty 16: 6.1%) while 163 (62.2%) were not frail (not frail 107: 40.8%, and apparently frail 56: 21.4%). Average frailty observed in 2008 was 4.16 and 5.47 in 2013 and the average number of individuals with cognitive deficit was 6.00 while the average of individuals without cognitive deficit was 4.00. Most of the elderly individuals were women (2008: 66.6%) and about the same percentage remained in 2013 (66.4%). Married individuals were majority in 2008 (44.3%) while most individuals were widowed in 2013 (44.3%). In 2013, the frailty syndrome was more prevalent in elderly individuals without partners, with low educational level, and with cognitive impairment. Conclusion: Data reveal that the average of frailty in 2008 was 4.16 while in 2013 the average was 5.47. The average number of elderly individuals with cognitive deficit was 6.00 and those without cognitive deficit was 4.00. The factors associated with higher means of frailty in 2013 included cognitive deficit (37.79%), being older, not having a partner, and scoring above 3.29% when comparing with the assessment of 2008. A higher educational level serves as a protective factor. These findings show that geriatric nurses play a key role in assessing and monitoring elderly individuals, especially the older ones, in regard to cognitive function and frailty. Descriptors: Aged, Cognitive status, Frailty syndrome, Community, Geriatric nursing.

**P133- QUALITY OF LIFE AND FRAILTY IN ELDERLY PEOPLE LIVING IN COMMUNITIES.** M. de Lourdes de Farias Pontes, R. Aparecida Partezani Rodrigues, A. de Oliveira Silva *(Ribeirão Preto, Brazil)*

Background: Quality of life of elderly people is a subjective, broad and multifactorial concept resulting from interaction of people who live in society undergoing changes, and from their community, intra- and extra individual relationships. The aim of this crosssectional study was to assess the quality of life of elderly individuals vulnerable to frailty and that of frail elderly individuals who live in community. Methods: The probabilistic sample resulted in the participation of 131 elderly individuals living in 20 census sectors in the municipality of João Pessoa, state of Paraiba. Data were collected by means of home interviews, in the period between April and June of 2011, using as instrument containing sociodemographic questions so as to characterize the elderly and to identify self-reported health care problems, namely: Edmonton Frail Scale, Geriatric Depression Scale, WHOQOL-BRIEF and WHOQOL-OLD. Data were analyzed using descriptive statistics and tests to compare the means between the two groups (student's t test); three or more groups (analysis of variance – Anova) and the correlation between the variables (Pearson test). Results: The mean age was 75.4 (SD = 7.7) years. There was predominance of female (74.0%), mixed race (45.0%), married (45.0%), and illiterate (29.8%) individuals, with a family income of 1 to 2 minimum wages (31.3%); and predominance of the apparently vulnerable state to frailty among the elderly (45.8%). Relating the frailty scores with the sociodemographic variables allowed to observe that the skin color $p = 0.036$) and the occurrence of comorbidities ($p = 0.002$) were statistically significant. The most frequent self-reported health problem among the elderly was arterial hypertension (69.5%), and women presented a higher frequency in all of the health problems, with statistical significance for arterial hypertension and impaired hearing. Statistical dependence was also observed between the comorbidities: Broncho pulmonary disease – Chronic obstructive disease / emphysema ($p = 0.012$), stroke ($p < 0.001$). cardiac disease ($p < 0.001$), neurologic disease – Parkinson / sclerosis ($p = 0.022$) arterial hypertension ($p = 0.031$), urinary or fecal incontinence ($p = 0.001$) and the frailty syndrome. The highest mean scores of quality of life were found in the domain of social relationships (68.06) and in the dimension of intimacy (63.93). There was a statistically significant difference ($p = 0.029$) in the comparison of the means of the dimensions of sensory skills and autonomy ($p = 0.043$ and $p=0.013$) according to the age range variable. The physical domain was the only domain in quality of life to present a statistically significant difference ($p = 0.001$) with the scores of frailty. All of the domains in the WHOQOL-BREF and the dimensions of autonomy ($p < 0.001$) and intimacy ($p < 0.001$) showed a statistically significant difference when related to the symptoms of depression. Conclusion: The knowledge of frailty levels favors the identification of risk groups, assisting to elaborate a care plan towards frail elderly individuals, aimed to promote their health and quality of life. Descriptors: Aged, Frailty, Quality of life, Aging, Community.

**P134- TRAUMA BY TRAFFIC ACCIDENT IN ELDERLY PEOPLE: RISK FACTORS AND CONSEQUENCES.** A.M. Ribeiro dos Santos, R. Aparecida Partezani Rodrigues, J. Roberto Silva Fhon, M.A. Diniz, S.C. Coelho Fabrício-Wehbe *(Ribeirão Preto, Brazil)*

Background: Healthcare toward aged people is presently deemed to be a priority, as the aging process stands out as a world challenge. The occurrence of traumas has been increasingly observed in this population and traffic accidents are one of the most frequent sources of such events. The aim of the present longitudinal, retrospective study was to assess trauma by traffic accident in elderly people cared for at a municipal hospital, a reference in emergency health care services, in 2010 and 2011. Methods: The study was carried out at an emergency reference hospital and at a Transit Crime Repression Precinct. The study was composed of 524 aged people. Data were collected from medical records, emergency care reports, official traffic accident reports, and police reports with the application of forms validated by trauma experts. A descriptive analysis was carried out to all variables, including position and dispersion scales of measurement for all quantitative variables. The spatial analysis employed the Moran Local Statistics and the Kernel density estimate. The relative risk tool was used as a correlation measurement to assess accident risk, trauma and death. Results: From the total amount of 524 injured elderly people, characterized by the mean of 67.5 years of age, 69.1% were men; 66.9% were married; and 65.3% had completed elementary school. Among the injured people, 78.6% presented trauma, being 34.9% pedestrians; in 27.2% of the accidents, the motorcycle was the type of vehicle involved. Lower limbs were reported as the most injured body parts in the accidents, corresponding to 24.1%. Among the consequences, 47.7% were counted to be immobilization processes. Orthopedic surgeries responded to 26.1% of procedures. Hospital discharge represented 83.2% in the total number of people leaving the hospital. From all researched accidents, 92.5% did not present casualties, and 56.2% of recorded deaths occurred to people between 60 and 69 years of age. From these, 59.7% were pedestrians, and 47.3% took place in the emergency room, being 28.3% caused by traumatic brain injury. Spatial analysis showed that the deaths were mostly recorded in urban areas, at high density neighborhoods displaying high occurrence of traffic accidents, thus showing a positive correlation. The assessment also pointed out the existence of regions with higher occurrence of traffic accidents. Conclusion: The results of this study also showed a strong correlation between the male sex and the accident occurrence, trauma and injury followed by death in practically all analyzed conditions and age groups, especially among more senior citizens. Traffic accidents presented specific characteristics at elderly groups, thus generating a need for broader studies that could come up with the real figure of the problem and the adoption of adequate and applicable protection measures. The spatial analysis of the accidents per site of occurrence showed to be quite a relevant procedure, as it enabled the identification of priority regions for the implementation of preventive and corrective measures toward preventing and monitoring these occurrences. Descriptors: Aged. Traffic accidents. Wounds and injuries. Relative risk. Spatial analysis.

**P135- CHARACTERISTIC DEPRESSIVE SYMPTOMS OF THE CONDITIONS OF FRAILTY IN ELDERLY BRAZILIANS: DATA FIBRA - POLO UNICAMP.** P. Pascarelli Pedrico do Nascimento[1], A. Liberalesso Neri[1], S. Sathler Tavares Batistoni[2] *(1. Campinas, Brazil; 2. São Paulo, Brazil)*

Backgrounds: Despite evidence of overlap between the criteria of frailty and depression by the literature, and both syndromes are associated with damage to health and the adverse outcomes, there is still a big gap on their relationships. There are no investments and attention to the specifics of this association, and there are few publications devoted to this theme. In this sense, this work is the result of the analysis of data collected by FIBRA Study (Frailty of Brazilian Elderly) polo UNICAMP, and aimed to identify the relationship between frailty syndrome and depressive symptoms in a sample of community-dwelling elderly symptoms, and identify characteristic depressive symptoms of pre-conditions of fragility and weakness in this sample, controlling for the presence of disease and disability, and sociodemographic characteristics. Methods: The present study has a descriptive and cross-sectional, based on data obtained from the electronic database of the Network FIBRA, descriptive research, population-based multicenter, conducted in 17 Brazilian cities, the result of a partnership between four Brazilian public universities (State University of Campinas - UNICAMP, University of São Paulo at Ribeirão Preto - USP-RP, Federal University of Minas Gerais - UFMG, and the State University of Rio de Janeiro - UERJ). FIBRA Network aims to identify conditions of fragility in urban elderly community residents, aged 65 and more, and its relationship with demographic, socioeconomic, psychosocial and physical health variables. This study analyzed the data of 2.402 older adults (≥ 65 years) without cognitive impairment suggestive of dementia, according to the Mini-Mental State Examination (MMSE), and

who responded to sociodemographic variables; frailty criteria as the phenotype established by Fried and colleagues (2001); self-reported diseases, and advanced performance in instrumental activities of daily living, and Geriatric Depression Scale (GDS-15), residents in the seven localities investigated by polo Unicamp: Campinas (SP), Belém (PA), Parnaíba (PI), Campina Grande (PB), Poços de Caldas (MG), Ermelino Matarazzo (SP) and Ivoti (RS). Results: The overall sample consisted mostly of women, with mean age of 72.3 years (SD=5.5), mostly belonging to the age groups of 65-69 and 70-74 years, with low education (1-4 years), married or widowed and low income. The average number of disabilities was 4 (SD=2.4), and of diseases was 2.2 (SD=1.5). The prevalence of depression as measured by the GDS-15 in the total sample was 20.2%, and the prevalence of frailty and pre-frailty were 6.9% and 50.2%, respectively. To study the prevalence ratios of pre-frailty and frailty used the Poisson regression analysis of univariate and multivariate analysis with stepwise selection criterion. Remained in pre-frailty model, age (75-79 and> 80 years), and 7 (be happy), 13 (feeling full of energy) and 15 (finding that others are better) items of the GDS-15, and the frailty model to age (75-79 and> 80 years), the number of diseases (>=3), and 2 (leave interests/activities), 3 (feel life empty), 13 and 15 (finding that others are better) items of the GDS-15. By the models it was observed that the number and the types of elucidative depressive symptoms of these conditions aggravated continuously. Conclusion: The investigation of the relationship of specific symptoms of depression with specific criteria of frailty showed that there is variability in the prevalence of depression among the profiles of frailty, and there's depressive symptoms characteristic of the syndrome of each profile.

**P136- PREVALENCE OF SARCOPENIA IN THE ELDERLY FROM DIFFERENT COUNTRIES: AN INTEGRATIVE REVIEW.** J. Ude Viana, J. Bergamaschine Mata, A. Oliveira Leopoldino, L. Souza Máximo Pereira, L. Paccini Lustosa, R. Corrêa Dias, J.M. Domingues Dias, B. de Souza Moreira *(Minas Gerais, Brazil)*

Background: The presence of sarcopenia has become one of the major challenges for gerontology today. Estimating its occurrence is essential for proper management of this geriatric syndrome. Therefore, the aim of this review was to provide a summary of the results of epidemiological population-based studies on the prevalence of sarcopenia in community-dwelling elderly from different countries, also showing the differences between genders. Methods: An integrative review of the literature with a systematic search of data from large surveys on the prevalence of sarcopenia in the elderly was conducted, seeking data from different countries. Studies with more than 900 individuals living in the community, described as healthy, both male and female genders and aged 60 years or more were established as the inclusion criteria. 'Prevalence', 'epidemiology', 'sarcopenia' and 'elders' were the key words searched in the following databases: Pubmed, Embase, Lilacs and CINHAL. No Blackout Dates at the optimized search strategy descriptors in English were used. Results: 502 articles on the subject were identified between the years 1998 and 2014. Of these, 416 were excluded for not presenting summary, were not in the language used in the search or not fit the theme proposed by this revision. Thus, 86 articles were reviewed by three researchers and according to the inclusion criteria previously established. Seven prevalence studies were selected, between the years 2002 and 2014 which met the above criteria. These studies were from the following countries: Brazil, United States, UK, Japan, South Korea, Taiwan and Australia. The average age of the elderly of the studies included in this review was 71.5 years, ranging from 67 ± 2.6 (UK) and 74.9 ± 5.5 years (Japan). The overall prevalence of sarcopenia in the evaluated studies, obtained by weighted average was 9.7% at age of 60 years or older. In men it was 9.3%, ranging from 2.5% (Australia) to 21.8% (Japan), and in women was 10.1%, ranging from 0.3% (Australia) to 22.1% (Japan). Therefore, higher values of prevalence of sarcopenia were observed in the Japanese study, followed by the Brazilian study (men and women = 14.4% = 16.1%). The prevalence was higher in women compared to men in five of the seven assessed studies. The lowest prevalence values were observed in the Australian study, regardless of gender. The countries that showed closer prevalence values were US and Taiwan for males, and the United States and South Korea for women. The Brazilian study had the highest prevalence of sarcopenia among the Western countries (Brazil, United States and United Kingdom), and the greatest prevalence for the Eastern countries (Japan, South Korea, Taiwan and Australia) was the Japanese study. At the age of 80 years or more, the highest values of sarcopenia prevalence were still showed for the Japanese study, reaching 75.0% in men and 54.3% in women, and the lower values were from the Australian study (men = 7.0 % and women = 1.6%). In all studies, the prevalence of sarcopenia increased with age, in a more subtle way in the US study and more markedly in the Japanese and Brazilian studies. Conclusion: Studies tend to show different prevalences due to the difficulty of establishing a validated and homogeneous definition for sarcopenia, given the peculiarities of each assessment and the multiple factors that affect muscle mass and strength population. The increase of sarcopenia associated with increasing age in both sexes, has been reported in all studies. Moreover, sarcopenia was associated with low physical capacity, functional limitation and disability, among other factors such as comorbidities, social status, lifestyle and falls. Studies on this topic should be encouraged, but always taking into account the technique used for the diagnosis of this syndrome as well as all individual factors that could affect this outcome. Key words: Prevalence, Sarcopenia, Elders.

**P137- HIGH-INTENSITY PHYSICAL THERAPY IMPROVES FUNCTIONAL OUTCOMES IN OLDER ADULTS FOLLOWING ACUTE HOSPITALIZATION.** A. Kosir[1], J. Falvey[1], B.J. Loyd[1], C. Bilyeu[1], E. Cumbler[1], K. Mangione[2], J. Stevens-Lapsley[1] *(1. Aurora, USA; 2. Glenside, USA)*

Background: Hospitalization is a profound contributor to diminished function and disability in older adults. Less than one third of older adults discharged from the hospital return to their baseline levels of function. Additionally, declines in physical function can increase the risk of being re-hospitalized six-fold and may infer other long term effects such as increased risk for mortality, morbidity, and institutionalization. To reduce disability subsequent to hospitalization, older adults frequently receive home health (HH) physical therapy. The purpose of this small, randomized control trial was to 1) evaluate the effectiveness of a home-based Progressive Multi-Component (PMC) intervention on improving function in older adults with multiple chronic conditions, compared to a home-based usual standard of care (UC), 2) evaluate the safety of the PMC intervention, and 3) explore mobility as a predictor of re-hospitalization and the potential of the PMC program to prevent these re-hospitalizations, compared to usual care. Methods: Twenty-two patients with a minimum of three comorbid conditions and a Mini Mental Status Examination (MMSE) score ≥ 21 were randomized to one of two groups: PMC: 12 (7 female, 5 male, aged 87 ± 8.8 years) and UC: 10 (7 female, 3 male, aged 83 ± 6.8 years). Intervention for the PMC group consisted of HH physical therapy training aimed at progressive, high-intensity activities of daily living, mobility, and strength training. Home health therapy for UC subjects involved lower intensity mobility and strengthening interventions. In-home assessments performed prior to the start of home care (baseline) and 60 days after hospital discharge (primary endpoint) included gait speed as measured by 4-meter walk test, physical function as assessed by the modified physical performance test (mPPT) and short physical performance battery (SPPB), and the six minute walk test (6MWT). Intervention safety was assessed by documentation of adverse events. Readmissions were documented based on patient self-report at 60 days post-hospitalization. Results: Between the two groups no significant differences in age, BMI, or number of comorbidities were established. PMC demonstrated greater improvement in gait speed compared to UC (0.36 ± 0.07 vs. 0.14 ± 0.07 m/s (p= 0.04), respectively). PMC demonstrated significantly greater improvements in mPPT score (5.2 ± 2.10 p=0.02) and SPPB score (2.56 ± 0.99 p=0.02) compared to UC. The PMC intervention resulted in a trend for improvement in the 6MWT (p=0.07). No adverse events associated with the intervention were recorded in either group. Notably, of the subjects who were re-hospitalized, 77% scored a "0" on the SPPB chair rise component. Comparatively, 45% of the subjects who were not re-hospitalized scored a "0" on this portion of the SPPB. Conclusion: The high-intensity strengthening and mobility training used in this study was more effective than conservative usual care for sustaining improvement in the physical function of this patient population at 60 days following acute hospitalization. Importantly, our findings support the feasibility and safety of the home based PMC intervention. Furthermore, results suggested impaired lower extremity strength, as measured by the chair rise test, is a risk for re-hospitalization, and the PMC has the potential to mitigate this risk. Further studies need to be conducted to investigate the role of mobility and high-intensity physical therapy interventions in transitional models of care for older adults following hospitalization.

**P138- A 12-WEEK AEROBIC EXERCISE PROGRAM INCREASED THE VOLUME OF FEMORAL MUSCLE WITH METABOLIC SYNDROME JAPANESE: A RANDOMIZED CONTROLLED TRIAL.** Y. Hatamoto, H. Tanaka, Y. Yamada, Y. Kose, Y. Higaki, A. Kiyonaga *(Fukuoka, Japan)*

Background: Although resistance exercise usually was recommended to inhibit decrease of muscle volume, the purpose of this study was to examine whether aerobic exercise training alone could increase muscle volume. Method: 153 people participated in the metabolic syndrome intervention program for 12 weeks and were divided into three groups randomly, which were Control (CON), Calorie Restriction (CR) and Exercise Group (EX). The number of participants in each group were 56 (CON), 40 (CR), 57 (EX). EX group was instructed to perform step exercise, bicycle ergometry and walking or running for 60 min per session, three times per week under supervision of exercise trainers, and a further 120 min per week on their own at home to perform a total of at least 300 min of moderate exercise per week. Exercise intensity was set at the lactate threshold. CR group was instructed to follow a diet with total energy content based on their body weight in order to reduce body weight during 12 weeks intervention. Muscle volume of femoral area was evaluated by Computed tomography (CT) scan (normal density muscle area (30-100 HU)). Result: The percent of change differed significantly between the groups with 3,5±0,7% for CON, -3,6±0,6% for CR and 4,1±0,8% for EX. Conclusion: This study proved that the muscle volume can be increased with aerobic exercise.

**P139- CORRELATION BETWEEN FUNCTIONALITY AND FRAILTY IN ELDERLY OF A PROGRAM OF PREVENTION OF FALLS IN PRIMARY CARE.** K. Gramani-Say, A.J. de L. Bomfim, D.C.C. Morais, C. Marques, M. Trevisan, F.A. Vasilceac *(Sao Carlos, Brazil)*

Backgrounds: Frailty is an important geriatric syndrome associated to falls risk as well as increased mortality and morbidity. Falls are the most common cause of injury and hospitalization and one of the principal causes of death and disability in older adults. The falls is considered one of important the public health problem. Among geriatric syndromes, fall and fall-related fractures are one of the leading causes of the elderly's need for long-term care. In Brazil, about 30% of the elderly suffer falls at least once a year. According to World Health Organization (WHO), falls are responsible for 20% to 30% of minor

injuries, in addition to account for 10% to 15% of all visits to emergency services. Thus, it is essential that the frailty syndrome is identified and monitored in primary care factors related functionality such as balance and mobility for adequate assistance to prevent falls. However, few studies accompany elderly fallers and non-fallers participants a falls prevention program in primary care in relation to frailty and functionality. Thus, the aim of this study was to verify the correlation between the identification of frailty and functional aspects related to balance, mobility, gait, fear of falling and cognition in elderly fallers and non-fallers in a program of prevention of falls in Primary Care. Methods: The elderly were evaluated for the equilibrium by the Berg's Equilibrium Scale (BERG), for the mobility by the Timed Up & Go Test (TUG), for gait by the Performance Oriented Mobility Assessment (POMA), for fear of falling (FES-Brazil) by and for cognition by the Mini Mental State Exam. The number of falls was assessed by selfreport with the question «do you fallen in the last year? 'If yes how many times?." And the fragility was assessed by the scale of fragility of Edmonton. The correlation of the data was verified by Spearman correlation (SPSS)(R>0,7: strong). Results: The 32 elderly evaluated were 72,22±8,83 years old and after evaluation with Scale Fragility of Edmonton seniors were classified as non-frail 31.25% (n = 10), 31.25% apparently vulnerable (n = 10), 15.63% in mild frailty (n = 5 ), 15.63 moderate frailty (n = 5) and 6.25% by severe frailty (n = 2). Results suggest that data has a moderate and inversely correlated with BERG (p = 0.006, r = -0.44) and the POMA (p = 0.003, r = -0.47), as with the FES and TUG showed a moderate correlation but directly proportional (p = 0.01, r = 0.4) and (p = 0.01, r = 0.41), respectively, and the number of falls there is no correlation (p = 0.95). Conclusion: Under the experimental conditions used, it is observed that it is important for elderly people with different levels of fragility monitor factors related to falls prevention and balance, mobility, gait, cognition and fear of falling, independent of elderly fallers are or not. Thus, the related functional impairment frailty syndrome may be present even before the report of the fall, so the elderly should be evaluated in relation to brittleness and functionality provided primary care.

**P140- FRAILTY, QUALITY OF LIFE AND NUTRITIONAL STATUS OF ELDERLY HD PATIENTS: A CROSS-SECTIONAL STUDY.** J. Giglio, F. Santin, J. Cordeiro, A. Moutinho, B. Domingues, C. Avesani *(Rio de Janeiro, Brasil)*

Background: The proportion of elderly patients starting dialysis is increasing worldwide. The chronic kidney disease and the hemodialysis procedure contribute to the development of frailty mediated by some physiologic mechanisms and associated conditions, like accumulation of advanced glycation end products, oxidative stress, chronic inflammation, insulin resistance, vascular calcification, and osteoporosis. Given that frailty has not been well studied in a cohort of exclusively elderly on hemodialysis, we aimed to examine the association between frailty, quality of life, nutritional status and clinical condition in elderly patients on hemodialysis. Methods: This is an observational and cross sectional study conducted in 157 non-institutionalized patients aged > 60 years on chronic hemodialysis for at least 3 months. All participants completed the Kidney Disease and Quality of Life (KDQOL-SF™ 1.3) and had the nutritional status assessed by subjective global assessment (SGA), body fat percentage (BF%; by skinfold thicknesses), skeletal muscle mass (by bioelectrical impedance; Janssen equation, 2000), clinical condition (by urea Kt/V (dialysis adequacy), serum urea, creatinine, albumin, 25 OH Vitamin D and C-reactive protein (CRP)). Frailty was defined on the basis of a modification of the 5 frailty criteria from Fried et al., as follows: 1. Weight loss: Unintentional weight loss ≥ 2,5 kg in 6 months prior to the study; 2. Slow walking: Defined if participants answered "yes, limited a lot" for the question: "How much your health now limits you to walk one block?"; 3. Weakness: Handgrip strength in the lowest 20% percentile of our sample according to gender (≤20kg for men and ≤14kg for women); 4. Exhaustion: Defined when the participant answered "Some of the time", " a good bit of the time", "most of the time" or "all of the time" for the question "How much of the time during the past 4 weeks did you feel worn out?"; 5. Low physical activity: defined from self-reported exercise at the beginning of the study. Three groups were created based on the number of positive frailty criteria: 3 to 5 domains were grouped as Frailty group (FrailG); 1 to 2 domains as Pre-frailty group (PreFG) and the remaining as Non-frailty group (Non-FG). A one-way analysis of variance (ANOVA) or Kruskal-Wallis test and chi-square tests were used to compare the groups, as appropriate. Results The prevalence of frailty, prefrail and non-frail was 30.6%, 61.8% and 7.6%, respectively. The mean age was similar among the 3 groups (FrailG=71.6 ±8.1; PreFG=69.8 ±6.7; Non-FG=73.2 ±7.9 years; p=0.16). The proportion of women was higher in the FrailG than in the remaining groups (FrailG=62.5%; PreFG=23.7%; NonFG=25%, p<0.001). Regarding QOL, among the 22 domains of KDQOL, 18 showed a significant lower score in the FrailG (p<0.05). Regarding the nutritional status, the SGA score was different among the groups and the FrailG and PreFG had median scores indicative of protein energy wasting (FrailG=5.0 (25th-75th percentiles, 4–6); PreFG=5 (25th-75th 5–6) and Non-FG=6 (25th-75th 5–7); P=0.001). BF% was higher in FrailG than in the remaining groups (FrailG=34.6±7.8; PreFG= 30.3±8.0; Non-FG=25.7±6.2; p=0.008) and the same result was observed for body fat index. On the order hand, the skeletal muscle mass index was not different among the groups (FrailG=8.5 ±1.8; PreFG=8.7 ±1.5; Non-FG=9.1 ±1.9 kg/m2; P=0.11). Regarding the clinic condition, only CRP was statistically different among groups: FrailG=0.37 (25th-75th, 0.2–1.2 mg/dl); PreFG=0.51 (25th-75th, 0.2–1.1 mg/dl) and Non-FG=0.20 (25th-75th, 0.1–0.5 mg/dl); P=0.04. The urea Kt/V, serum urea, creatinine and 25OHvitD were not different among the groups. Conclusion: The data presented in the current study allowed us to conclude that the FrailG and PreFG had worse QQL, nutritional status and higher body fat than the Non-FG. The inflammatory status was worse in the Pre-frail group. No association between frailty and the remaining markers of clinic condition was observed. Therefore, therapeutic interventions are needed in order to implement better patient care and improve QOL, nutritional status and the clinic condition in elderly patients on hemodialysis.

**P141- EVALUATION OF INFLAMMATORY MARKERS AND AUTONOMIC NERVOUS SYSTEM MODULATION IN FRAIL ELDERLY.** L. Passos Aragão, A. Aires Peixoto Junior, R. Pessoa de Carvalho, L. Passos Aragão, J.P. do Vale Madeiro, J. de Sá Roriz Filho, C. Barbosa Nogueira, J. Wellington de Oliveira Lima, P.C. Cortez, A. Aguiar dos Santos, M. Coelho Filho *(Fortaleza, Brazil)*

Background: sarcopenia, chronic inflammation status and impairment of cardiac autonomic modulation are often described in frailty elderly. However, the role of inflammation and decreased autonomic modulation in loss of muscle mass associated with aging need to be enlightened. We aimed to identify, in community-dwelling frailty and robust elderly, correlations among autonomic changes, serum levels of biochemical markers of inflammation and decreased muscle strength and performance. Methods: community elders aged 60 years or older were recruited randomly from the database of the Research Network on Fragility Studies in Brazilian Elderly Network (FIBER). The elderly were assessed by geriatricians and then were asked to perform additional tests with laboratory collecting peripheral blood samples, as well as to obtain electrocardiograms for analysis of heart rate variability. Results: 98 volunteers aged 60 or older was assessed by clinical evaluation, laboratory tests and analysis of heart rate variability (HRV) in the supine and standing positions. The natural logarithm of the HRV index Low Frequency (LF) was inversely related with the biochemical marker of inflammation fibrinogen in frail elderly (p=0.049), but not in robust. There was no association between heart rate variability indices and biochemical markers of inflammation interleukin-6 and C-reactive protein high sensitivity. Gait speed was negatively correlated with fibrinogen in frail elderly (p=0.033), but not in elderly robust. In all elderly, gait speed correlated negatively with fibrinogen (p=0.017), IL-6 (p=0.038) and high-sensitivity CRP (p=0.010). Conclusion: our results suggest that inflammation-related sarcopenia can be at least partially influenced by decreased autonomic modulation in the elderly.

**P142- PREVALENCE OF SARCOPENIA AND MUSCLE WASTING IN MEXICANS.** W. Rodríguez-García, L. García-Castañeda, L. Castillo Martínez, A. Orea-Tejeda, D. González-Islas, C. Santillán-Díaz, J.A. Pineda-Juárez, T.L. Arista-Ugalde, M. Ruiz-Ramos, V. Mendoza-Núñez *(México City, México)*

Backgrounds: The involuntary loss of skeletal muscle mass (SMM) is a common and natural process of aging; according to the European Working Group on Sarcopenia in Older People (EWGSOP) sarcopenia is a syndrome characterized by progressive and generalized loss of SMM and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death. The EWGSOP proposes different criteria to determine the prevalence of sarcopenia, including low muscle mass and low muscle function (strength or performance). European consensus proposes an algorithm which suggests different cut-points for the diagnosis of sarcopenia (Janssen 2002 and 2004) that can be used as a reference. The EWGSOP proposes different stages for sarcopenia classified according to the result: presarcopenia is characterized by low muscle mass without effects on muscle strength and physical performance, sarcopenia is characterized by low muscle mass combined with low muscle strength and severe sarcopenia is characterized by all three criteria (low muscle mass, lower muscle strength and lower physical performance). The importance of identifying the population with this syndrome lies in the development of therapeutic measures in SMM and muscle strength loss aimed to older people. The aim of this study was to determine the prevalence of sarcopenia and muscle wasting in older people of Mexico City, using two cut-off points: Janssen and Mexican population. Methods. Cross sectional study. A sample of 316 adults (>60 years) from Mexico city were included (129 men and 187 women). Personal data, anthropometric measurements, handgrip strength in both hands with dynamometer (Takei) and body composition by bioelectrical impedance (RJL) were collected. Muscle mass was calculated, normalized by height and termed skeletal muscle mass index (SMMI=skeletal muscle mass index/body mass*100). The cut-off points for presarcopenia diagnostic were based on two standard deviations below the mean value of SMMI derived from healthy young Mexican adults (unpublished data). For sarcopenia diagnosis, we took low muscle mass plus low muscle strength (based on the first tertil of handgrip strength of the sample). Results. The mean age was 68.5 ± 5.4 to 67.2 ± 5.1 women and men respectively. The prevalence of presarcopenia for the study population according to the stages proposed by the European consensus was 23.36% (43) in females and 81.3% (100) in men according to the cut-points proposed by Janssen (≤6.75 kg/m2and ≤10.75 kg/m2, respectively). According to the cut-off point in young Mexican population based on two standard deviations below for SMMI was 9.23% (17) in women and 5.69% (7) in men (≤6.22 kg/m2 and ≤8.54 kg/m2, respectively). The prevalence of muscle wasting using handgrip strength was 41.2% (77) in women and 35% (45) in men based on the first tertile (≤20 kg and ≤34 kg, respectively). The prevalence of sarcopenia in women was 16.9% (12) when they presented SMMI ≤6.22 kg/m2 plus handgrip strength ≤20kg (1st tertile). The prevalence of sarcopenia in men was 11.9% (5) when they presented SMMI ≤8.54 kg/m2 plus handgrip strength ≤34kg (1st tertile). Conclusion. Presarcopenia prevalence in the population study is lower when the cut-off point based on Mexican population was used, compared to the proposed European consensus cut-off point for americans. Women had higher prevalence of presarcopenia, muscle wasting and sarcopenia compared to men when cut-off point are used for the Mexican population. The muscle wasting prevalence is higher in both sexes compared with presarcopenia prevalence, when both indicators are used the prevalence of sarcopenia decrease. This data contribute to the detection and diagnosis of sarcopenia, considering both factors loss of muscle mass and muscle strength in older adults from Mexico City.

**P143- INFLUENCE OF THE INITIAL AMOUNT OF PROTEIN INTAKE ON MUSCLE ADAPTATION IN RESPONSE TO A RESISTANCE TRAINING PROGRAM IN ELDERLY MEN.** O. Reynaud, F. Lemieux, C. Pion, R. Colaneri, P. Gaudreau, J. Morais, S. Chevalier, M. Belanger, G. Gouspillou, M. Aubertin-Leheudre *(Montreal, Canada)*

Background: The loss of skeletal muscle function during aging has important impacts on the quality of life of our elders since it progressively increases physical incapacities. It is therefore urgent to develop and optimize non-pharmacological strategies aiming at counteracting this age-related deterioration of skeletal muscle function. Resistance training is one of the most effective strategies to improve muscle function (mass, strength, power) and functional capacities in old subjects. In addition, protein intake also seems to play an important role in the preservation of muscle function with aging, and it has been recently suggested to increase the recommended daily allowance of protein from 0.8g/d/kgBW to 1.2g/d/kgBW in order to prevent the loss of physical function in elderly. However, to the best of our knowledge, it is currently unknown if this initial daily protein intake (i.e. the protein intake pre-training) affects skeletal muscle adaptations in response to a resistance training program. Investigate the impact of initial daily protein intake on muscle function adaptation in response to a 12 weeks resistance training program in males aged 55 years and older. Method: Design: 40 males aged 55 yrs and older (68±6 yo), were recruited and divided in 2 groups : a first group of participants who ingested less than 1.1g/kg/d of proteins but more than 0.8g/kg/d (group PROT1.1- (n=17); mean protein intake: 1.03±0.5 g/kgBW/d), and a second group composed of participants who ingested more than 1.2g/kg/d but less than 2g/kg/d of proteins (PROT1.2+ (n=23); mean protein intake: 1.41±0.17 g/kgBW/d). Measures: Body composition (DEXA), grip strength (dynamometer), lower limb strength (1RM test), physical activity (accelerometer), dietary intake (candat) and functional capacities (SPPB tests) were evaluated before and after a 12 weeks resistance training program. Results: At baseline, no difference was observed between our groups except for the amount of protein intake ($p=0.000$; by design). After the intervention, both groups improved their lean body mass (total, arm, leg and appendicular LBM; $p\leq0.001$); functional capacities such as time up and go (normal and fast), chair and stair tests, balance test ($p\leq0.007$); muscle strength (1-RM leg and chest; $p\leq0.001$, and handgrip: $p= 0.010$), leg muscle quality ($p\leq0.001$) and muscle power (Takai; $p\leq0.001$). Conclusion: Our results confirmed that resistance training is efficient to improve muscle function and functional capacity in elderly men. Our results indicate that once the RDA is reached, the initial amount of protein intake (1 versus 1.2+) does not influence skeletal muscle adaptation in response to resistance training. Further studies are required 1) to explore whether the quality of protein intake (i.e. essential amino acid content) can influence muscle adaptations to resistance training and 2) to study the mechanism underlying resistance training induced adaptations in skeletal muscle function in elderly men.

**P144- SARCOPENIA AND FUNCTIONALITY IN OLDER ADULTS HOSPITALISED AT EMERGENCY DEPARTMENT.** L.V. Robles-Jiménez, P. Tella-Vega, M. González-Lara, M.U. Pérez-Zepeda, C. Espinel-Bermúdez, C. García-Peña *(Cuauhtemoc, México)*

Backgrounds:To recognize sarcopenia in clinical practice at emergency rooms, and begin to address how its recognition may impact clinical care it is very important. Physical performance tests have demonstrated to predict adverse outcomes in older adults. Sarcopenia is defined as the gradually loss of muscle that eventually represents a decrease in the strength and also disability. Is associated with functional impairment, poor quality of life, mortality, even though the appearance of depressive symptoms. Loss of functionality at discharge represents a serious issue because of its consequences. The aim of this study was to describe the relationship between EWGSOP stages of sarcopenia and functional capacity in older patients at Emergency Department. Methods: Data are from the study "Elderly patients in the emergency services: Effectiveness of an educational intervention to improve health outcomes". Patients 65 years or older who were admitted to the emergency services in two General Hospitals of the Mexican Institute of Social Security, regardless the clinical reason, previous informed consent were included to the study. This observational report includes measurements at admission of Emergency Department. The study included diverse sociodemographic and clinical variables; also previous use of health services, quality of life and economic evaluation. EWGSOP´s definition of sarcopenia was used. Handgrip strength was measured using a handheald dynamometer, this measurement was repeated three times for each hand and the best measure in the stronger arm was chosen anda standardized for height. Subjects who could not perform the test were scored as zero. Gait speed was calculated for each participant using distance in meters and time in seconds. All participants were advised to walk at usual pace and from standing point. Patients were instructed to walk down a hallway trough 50 centimeters for acceleration. Gait speed was measured over a distance of 4 meters. Patients could use assistive devices if needed, and each participant was timed for two walks. Value higher than 0.8m/s was considered positive. Low muscle mass was assessed by Bioimpedance analysis. Functionality was measured by Katz and Barthel scales. Data were collected from March to July, 2013 through a standardized questionnaire, face-to-face interviews by nurses previously trained, during 7 days per week. Data analyses were performed using STATA v10, descriptive and bivariate analysis is presented. Results: From a total sample of 722 older adults; 164 were included; 255 patients were discharge to the hospital and 13 died during hospitalization in Emergency Department. Conclusion: Our findings demonstrate that loss of functionality was related, at discharge of the emergency department, to severe sarcopenia. Further analysis has to be performed.

**P145- INFLUENCE OF PROTEIN INTAKE DISTRIBUTION ON SKELETAL MUSCLE ADAPTATION IN RESPONSE TO RESISTANCE TRAINING IN ELDERLY MEN AGED OVER 70 YRS.** R. Colaneri, O. Reynaud, C.H. Pion, S. Barbat-Artigas, P. Gaudreau, J.A. Morais, S. Chevalier, M. Bélanger, G. Gouspillou, M. Aubertin-Leheudre *(Montreal, Canada)*

Backgrounds:Normal aging is associated with losses of skeletal muscle mass and function. Both are essential to maintain physical fitness and perform regular activities of daily living (ADL). Exercise interventions, such as resistance training, have been demonstrated to efficiently improve skeletal muscle function and functional capacity. In addition, protein intake [quality (i.e. proportion of essential amino acids; EAA) and quantity (at least 0.8g/kg body weight/d; (BW))] is important to maintain muscle function in such population. Interestingly, Paddon-Jones et al. (2009) suggested that not only the amount, but also the distribution of protein per meal - more specifically, 20g of protein – may influence the maintenance of proper muscle functioning in ageing. To our knowledge, the possible effects of such protein distribution (20g of protein/meal) on muscle adaptation in response to resistance training in elderly men are still unknown. The main objective of this study was to investigate the effects of protein intake distribution on skeletal muscle adaptation in response to resistance training in elderly men with a protein intake above the recommended daily allowance (RDA). We hypothesized that elderly men ingesting at least 20g of protein at every meal would show greater improvement in muscle adaptation following a resistance training program as compared to those ingesting less than 20g of protein in at least one meal. Methods: Population: This study is a secondary data analysis including twenty-one sedentary men aged over 70 years (mean age: 73±3yrs), independent with healthy BMI, ingesting at least 0.8g protein/kg BW/d (RDA) at baseline and who completed a 12-week resistance training intervention (PROMU project). The participants were divided in 2 groups according to the amount of protein ingested at each meal: the first group ingested at least > 20g of protein in each meal (n=9) and the second group ingested < 20g of protein in at least one meal (n=12) Measurements: Body composition (BMI, DXA), muscle strength ((handgrip strength (dynamometry)), and leg and chest strength (one repetition maximum; -1RM) and functional capacity (SPPB tests: unipodal balance; walking speed, chair test, stair test) were measured at baseline and at the end of the intervention. The nutritional intake (total kcal, protein, carbohydrates, lipids, EAA) was assessed using a 3 day dietary report including a weekend day. Physical activity was controlled throughout the study using tri-axial accelerometer (armband Sensewear). All these measurements were realized at baseline and at the end of the intervention. Statistical analysis: Non-parametric tests (Mann Withney) were used at baseline to compare both groups before intervention. Repeated measures analyses (GLM) were performed to assess the intervention effect in both groups. Results: No differences were observed in baseline parameters between the two groups except for the amount of protein ingested at breakfast (mean: 15g vs 25g; $p=0.005$). More specifically, at baseline, no difference was observed for protein intake was 15±6 g at breakfast, 28±15 g at lunch and 39±15 g at dinner, total (including snacks) 87±18 g, versus 25±10 g at breakfast, 30±13 g at lunch and 40±14 g at dinner, total 100±18 g, in the uneven group. Following the intervention, both groups improved significantly their BMI ($p=0.022$), leg strength ($p=0.001$), chest strength ($p=0.021$) and lower body muscle strength ($p= 0.001$). Leg strength (mean difference: 31 vs 65 kg; $p=0.048$) and lower body muscle quality index (mean difference: 0.54 vs 1.16; $p=0.037$) increased significantly more in the group that ingested more than 20g of protein in each meal compared to the other group. It is important to note that according to our analyses of the dietary intake realized at the end of the intervention, we still observed a significant difference on protein ingestion during breakfast ($p\geq0.001$) but not on total protein (1.22 vs 1.26 g/kg BW/d; $p=0.79$) and EEA intake (28.8 vs 29.8; $p=0.83$). Thus, we could assume that participants in both groups do not change their diet during the intervention. Conclusion: Our results indicate that while no difference was observed between the groups for total protein intake (1.28g/kg BW/d vs 1.17g/kg BW/d; $p=0.23$) and total EEA (30.5 vs 31.7; $p=0.72$), ingesting at least 20g of protein in each meal can enhance/optimize muscle function gain in response to resistance training in elderly men. These results suggest that not only the total amount of protein ingested each day is important, but also its distribution. Accordingly, for the same total intake (before and after the intervention) ingesting meals containing at least 20g of protein would be beneficial over an uneven distribution pattern. Further studies (controlled diet, different population, larger sample size) are needed to confirm our results and to explore if 1) this dose (20g) is important to reach only at breakfast and, 2) the mechanisms underlying these greater adaptations.

**P146- FRAILTY IN FAMILY PRACTICE.** H. Yaman, A. Yaman *(Antalya, Turkey)*

The frequency of frailty is increasing with world population aging. Frailty is a long-term process and physiopathological theory described six different dysfunction systems to be considered (i.e. hemoglobin, IL-6, IGF-1, DHEA-S, HgbA1c, triceps skinfold, fine motor movement, micronutrients). The definition of frailty is an important task. Two different models have been described: the Phenotype of frailty and cumulative deficit model. Symptoms and findings of frailty are commonly non-specific. Additionally extreme fatique, unexplained weight loss and infections are observed. Frailty is a leading cause of mortality and the prevalence is 4-59% depending on the definition. It is frequent in women and the prevalence increase with age (65–69: %4; >84:%26). Even the number of studies have increased in family medicine, further studies and guidelines are needed, which will prioritize this entity in family practice.

**P147- FRAIL SCALE AND HEALTH OUTCOMES IN THE BALTIMORE LONGITUDINAL STUDY OF AGING (BLSA).** T.K. Malmstrom[1], E.M. Simonsick[2], L. Ferrucci[2], J.E. Morley[1] *(1. St. Louis, USA; 2. Baltimore, USA)*

Background: Frailty is a condition that places older persons at increased risk for poor outcomes when exposed to stressful events or with advancing age. The FRAIL scale was recently developed by the International Academy of Nutrition and Aging (IANA) as a simple diagnostic tool for frailty. The FRAIL scale was constructed to include only interview questions and require minimal administration time so health professionals can use easily use in it clinical practice. This study investigates the validity of the FRAIL scale in the Baltimore Longitudinal Study of Aging (BLSA). Methods: The BLSA was started in 1958 and is an on-going longitudinal study of normal human aging. BLSA participation is limited to adults who at the time of enrollment screening do not have major diseases, cognitive dysfunction, or functional impairment, but once enrolled are followed for life. BLSA participants complete comprehensive health testing on a repeated cycle (1 to 4 years). The analytic sample for this study includes N=1028 BLSA participants evaluated between April 2003 and December 2012 who were aged 60 and above and had valid data on the 5 items needed to construct the FRAIL scale. The FRAIL scale includes 5 components: Fatigue, Resistance, Ambulation, Illness, and Loss of weight. FRAIL scale scores range from 0-5 (1 point for each component; 0=best to 5=worst). Fatigue was measured by asking respondents how often in the past month they felt unusually tired, with responses of all or most of the time scored one point. Resistance was assessed by asking participants whether they had any difficulty walking up 10 steps without resting and ambulation by asking whether they had any difficulty walking a quarter of a mile without resting; yes responses were each scored as one point. Illness was scored one point for respondents who reported more than five illnesses. Loss of weight was scored one point for respondents with a weight loss of 5% or more in the past year. ADL difficulty included 4 items (bathing, dressing, eating, toileting) and was scored as the number of items for which the respondent reported difficulty performing the task. IADL difficulty included seven items (preparing meals, shopping for groceries, managing money, making phone calls, doing light housework, doing heavy housework, and managing medications) and was scored as the number of items for which the respondent reported difficulty performing the task. Grip strength was defined as the average (kg) of 3 maximal trials for each hand separately. Vital status up to 9.75 years later was coded 1 for decedents and 0 for survivors. Data were analyzed using IBM SPSS Statistics, version 21 (Somers, NY). Descriptive statistics are reported as means ± standard deviations (SD) or percentages. Linear regression and logistic regression, adjusted for age and gender, were used to examine the association of FRAIL scores with outcomes. Results: Respondents were ages 73.3±9 and 47.1% female. Cross-sectional analyses were computed to investigate the association of FRAIL scale scores with disability and strength. FRAIL scale scores were positively associated with disability, including ADLs (B=.174, SE=.017; p<.001) and IADLs (B=.425, SE=.030, p<.001). FRAIL scale scores were negatively associated with grip strength in the right (B=-.916, SE=.313; p<.01) and left (B=-.751; SE=.302; p<.05) hands. In a longitudinal analysis FRAIL scores were predictive of mortality (OR=1.36, 95% CI = 1.09, 1.70). Conclusion: Commonly used frailty measures, such as the Cardiovascular Health Study (CHS) and Study of Osteoporotic Fractures (SOF) scales, require physical examination techniques not routinely performed by practicing physicians. The FRAIL scale is a simple robust scale that predicts clinically significant outcomes and can be rapidly administered by a physician.

**P148- PREVALENCE OF SARCOPENIA IN COMMUNITY DWELLING CHILEAN OLDER PEOPLE.** L. Lera, C. Albala, H. Sánchez, B. Ángel, M.J. Hormazabal, F. Insunzay *(Santiago de Chile, Chile)*

Background: Sarcopenia-the progressive loss of mass and skeletal muscle strength quality-highly impacts the health of older people; which population is increasing worldwide. The objective of this study was to determine the prevalence of sarcopenia in Chilean older adult and its relationship with age, sex and BMI. Methods: Cross sectional study in 991 no-disabled community dwelling subjects aged 60 years and older (mean ± SD: 71.1±6.4 years; 67.9% female) living in Santiago, participating in ALEXANDROS and FONIS studies. Anthropometric measurements, handgrip strength, physical performance tests and dual-energy x-ray absorptiometry (DXA) scan were performed. Sarcopenia was defined using the algorithm of European Group on Sarcopenia in Older People (EWGSOP). Appendicular skeletal muscle mass index (SMI) was calculated as the ratio of appendicular skeletal lean mass (ASM) and height2 (kg/m2). Mass muscle was measured with DXA and SMI; and defined with cut-off points obtained for the Chilean population (men: 7.19 kg/m2; women: 5.77 kg/m2) and muscle strength by handgrip strength also (≤25th Percentile: men 27 Kg; 15 Kg women). Physical performance was measured by the 3 m walking speed (0.8 km/seg, EWGSOP). Nutritional status and obesity were defined according to WHO. Association between sarcopenia with age, sex and BMI was estimated by logistic regression. Results: The prevalence of sarcopenia was 19.2% (95%CI: 16.8% to 21.8% ), similar in men and women (19.5% in male and 19.0% in females; p=0.859). There is an increasing trend of sarcopenia by age groups: 60-64.9 y: 12.3%; 65-69.9 y: 13.5%; 70-74.9 y: 18.2%;75-79.9 y: 27.2%; ≥80 y: 39.6% (p<0.001) and a decreasing trend with nutritional status: BMI <20:75% ;BMI 20.0-24.9: 45.0%; BMI 25-29.9: 17.6 % and BMI ≥30: 2.0% (p<0.001). After adjustment for sex, the prevalecence of sarcopenia is positively associated with age (OR=1.08: 95%CI: 1.05 to 1.11) and negatively associated with BMI (OR: 0.70; 95%CI: 0.66 to 0.74). Conclusions: The prevalence of sarcopenia increased with age up to 39.6% for the group ≥80 years, while there was no difference by sex in Chilean older adults. A negative association with BMI was observed being only 2% of obese being sarcopenic. This present study is supported by FONIS SA12I2337 and FONDECYT 1080589.

**P149- CALF CIRCUMFERENCE VS. MUSCLE MASS SKELETAL INDEX BY BIOELECTRICAL IMPEDANCE ANALYSIS FOR DIAGNOSING SARCOPENIA IN COLOMBIAN MALES AND FEMALES.** C.H. Gonzalez-Correa, D.R. Gonzalez-Gonzalez, A.M. Lopez-Salazar *(Caldas, Colombia)*

Background: The concept of sarcopenia and the criteria for its diagnosis even produce controversy, however there is some consensus that it requires having a reduced skeletal muscle plus low muscle strength or weak physical performance. The estimation of fat free mass (FFM) and skeletal muscle mass index (SMI) are the most critical component of the definition. It requires technological tools such as Magnetic resonance imaging (MRI), Bioelectrical impedance analysis (BIA), or Dual energy X-ray absorptiometry (DXA) which are not available in all clinical locations. Perhaps this is one reason why many geriatrics and gerontology healthcare professionals do not diagnose this condition early. Therefore, it is necessary to define user-friendly tools in clinical practice. This should facilitate the early detection of the disease and its inclusion in public health programs. Calf circumference has been proposed as an alternative for skeletal muscle mass estimation. Recently, Kawakami et al defined the cut offs for predicting low muscle mass as less than 34 cm for males and less than 33 cm for females in Japanese subjects. It has been postulated that the anthropometry of the Colombian population is more similar to Asians than Caucasians, Europeans and other races. We aimed to compare the results of frequency of sarcopenia by using calf circumference with cut offs from Kawakami et al to evaluate skeletal muscle mass and exam the differences between results using y bioelectrical impedance analysis by reference values from NHANES III (1996) and Chien et al study (2008). Methods: Based on data from the Manizales population census at the time of the study design, two hundred and nine Colombians aged 65 to 75 years living in the urban area of Manizales were evaluated. Body mass index, dominant calf circumference, handgrip strength test (HGS), Short physical performance battery, and multi frequency BIA (Hydra 4200 by Xitron Technologies) was measured. Estimation of skeletal muscle mass by bioelectrical impedance was made using reference values from two studies: NHANES III (1996) and Chien et al study (2008). Results: 122 females and 87 males with mean age 69.6 ± 3.0 years (69.6 ± 3.1 females and 69.5 ± 2.9 males) were evaluated. For females, the results obtained for sarcopenia and severe sarcopenia with calf circumference measurements were similar to results obtained with the parameters of NHANES III, not so with Chien et al (36.1, 35.3 and 25.4%, respectively). By contrast, in males, the results obtained using the measurements of calf circumference were more similar to the values obtained using the parameters of Chien et al. 26.4, 36.8, and 20.6% respectively. Conclusions: The European consensus on definition and diagnosis of sarcopenia European (2010) did not recommend anthropometry for routine diagnosis of this condition; however, in countries like Colombia, where technological resources are scarce, it is possible that calf circumference can be used as an early marker of sarcopenia in females, when compared with the results obtained by BIA in NHANES III. In males, the results are less conclusive although it appears that using this anthropometric parameter, the diagnoses would be closer to those produced by the studio Chien. It is likely that these differences have to do with a higher percentage of obesity in Colombian women than males which can lead to errors in estimating the frequency of sarcopenia. Further studies are required to validate the usefulness of anthropometry in the diagnosis of sarcopenia and to have cut off points representing the Colombian population for this parameter because, even the European Consensus, has a lower cutoff (31cm) for calf circumference which would contribute to errors of estimation and different results from those reported in this study.

**P150- QUALITY OF LIFE AND NUTRITIONAL STATUS IN MODERATE ALZHEIMER´S DISEASE PATIENTS.** O. Vicente de Sousa, T.F. Amaral *(Porto. Portugal)*

Background: Several factors affect the quality of life (QOL) of Alzheimer`s disease (AD) patients and nutritional status could be the most important but this effect has not been quantified. The aim of this study is to explore the association between undernutrition and QOL in AD patients. Methods: A cross-sectional study was conducted amongst 73 patients with moderate AD (31 men and 42 women; age: 77.9±7.7 years). Nutritional status using MNA and serum 25-hydroxyvitamin D3[25(OH)D3] were assessed. Functional status using hand grip strength, gait speed, Lawton-Brody and Barthel Index were determined. Mental status was assessed by MMSE and QOL was evaluated using the validated Portuguese scale (QOL-AD). Association between NS and QOL was quantified through linear regression analysis. Results: Twelve patients (16.4%) showed low QOL and 34 (46.6%) an average QOL. Among low QOL patients, 66.7% were classified as undernourished and the remaining were at undernutrition risk. The majority of patients with low QOL (91.7%) and with average QOL (97.1%) had a phase angle <4.6º. Among patients with low and average QOL, 2 (16.7%) and 6 (17.6%) had severe 25(OH)D3 deficiency (<10ng/mL) respectively. An high proportion of patients with low QOL (83.3%) and with average QOL (73.5%) had 25(OH)D3 insufficiency(<30ng/mL). Linear regression analysis showed that phase angle was strongly associated with the QOL (β=0.257, ϱ=0.028), regardless functional, mental and dependence status (R2 =0.497). Conclusion: Only 37% of patients showed good QOL, 52% were undernourished and the rest were at undernutrition risk. These results confirm a high frequency of hypovitaminosis D. Phase angle was the undernutrition indicator more strongly associated with QOL. Disclosure of interest: None Declared.

**P151- GENDER DIFFERENCE IN THE ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG THE ELDER POPULATION: A CROSS SECTIONAL STUDY OF TAIWANESE PREVENTIVE SERVICE UTILIZERS.** Y.-W. Chang, W.-H. Fang, T.-W. Kao *(Taipei, Taiwan)*

Backgrounds: Physical activity has beneficial effect on health-related quality of life (HRQoL) in older adults. However, the effect of gender difference on quality of life is not clear. The purpose of the study was to determine the gender difference in effect of physical activity on HRQoL between the male and female population. Methods: This was a cross sectional study conducted in a medical center in Taipei, Taiwan from March to August 2011. Adults aged 65 or more who came for an annual health check-up without dementia, cancer and immobilized were eligible. Physical activity in kcal per week was measured with International Physical Activity Questionnaire - Taiwan version. HRQoL was measured with SF-36 questionnaire, consisted of 8 scaled scores and 2 summary scales, physical component scores (PCS) and mental component scores (MCS). Cognitive function and depression was assessed using MMSE, and PHQ-9. Physical examination and medical history reviewing was performed by doctors. A multiple hierarchical regression model was used to investigate the relationship between physical activity and HRQoL (summary score of PCS and MCS) in men and women. A total of 188 old people (M: 50.5%) participated in this study. Mean age of men and women were 71.9±5.3 and 77.1±6.4 years. Results: Old women had higher physical activity then men did (4786.1+/-1065.6 vs 4422.2 +/-1114.3 kcal/wk, p=0.023). There were no significant differences on PCS and MCS between men and women. After adjusting for sociodemographic and health-related covariables, the hierarchical regression analysis showed that old men with higher physical activity had better scores on both PCS (β=0.225, p=0.031) and MCS (β=0.277, p=0.007). However, the association was not significant in the female population. Conclusions: The effect of physical activity on HRQoL was different between male and female population.

**P152- PHYSICAL CAPABILITY IS ASSOCIATED WITH OBJECTIVELY MEASURED MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY BUT NOT SEDENTARY TIME.** V.L Keevil[1,2], A.J.M. Cooper[1], K. Wijndaele[1], R. Luben[1], N.J. Wareham[1], S. Brage[1], K.-T. Khaw[1] *(1. Cambridge, UK; 2. Dorset, UK)*

Background: Sedentariness, time awake spent sitting or lying when energy expenditure is low, has been proposed as an independent risk factor for poor health. However, most research to date has focused on cardio-metabolic outcomes with few studies examining the association of sedentary time with physical functional health. Methods: Community-based men and women (n=8623, aged 48-92 years old) participating in the European Prospective Investigation of Cancer-Norfolk study attended a health examination for objective measurement of physical capability, including grip strength (Smedley dynamometer, kg), usual walking speed (UWS, cm/s) and timed chair stands speed (TCSS, stands/minute). Of these, 4051 participants wore an activity monitor (GT1M Actigraph) for 7 consecutive days and had at least 4 days of valid data (at least 10 hours per day). The activity monitors measured the amount of moderate-vigorous physical activity (MVPA, >1952 counts/minute) and sedentary time (ST, <100 counts/minute) undertaken. We examined associations between physical capability and both ST and MVPA using linear regression models. The mutual independence of associations between the exposure measures and physical capability, as well as the possibility for interaction between them, was also examined. We used fractional polynomial models to account for any non-linear associations. Results: Men in the highest versus lowest sex-specific quartile of MVPA were 1.84 kg stronger (95% Confidence Interval [CI] 0.79, 2.89), with 11.7 cm/s faster UWS (95% CI 8.4, 15.1) and 2.35 stands/minute faster TCSS (95% CI 1.11, 3.59) after adjustment for age, anthropometry, lifestyle factors, co-morbidities, monitor wear-time and date of clinic visit. Similarly, in adjusted models women in the highest versus lowest quartile of MVPA were 2.47 kg stronger (95% CI 1.79, 2.68), with 15.5 cm/s faster UWS (95% CI: 12.4, 18.6) and 3.27 stands/min faster TCSS (95% CI 2.19, 4.35) (Ptrends <0.001 for both sexes). With respect to UWS we found strong evidence to suggest that associations deviated from linearity in an exponential fashion, with greater differences in UWS observed across the lower compared with the upper quartiles of MVPA. Accordingly, models examining variability in UWS performed better when MVPA quartiles were included as a categorical rather than as a linear predictor variable (Plinearity <0.001 both sexes.) Although we found associations between higher ST and lower physical capability in men and women, after additional adjustment for MVPA these associations were completely attenuated. Furthermore, after combining men and women in analyses and entering ST and MVPA as continuous variables in fractional polynomial models (ST in min/day and MVPA in hours/day), no MVPA-ST interactions were observed (UWS: Pinteraction= 0.14, Grip: Pinteraction= 0.69, TCSS: Pinteraction= 0.76). Results did not change if the cohort was stratified by age-group (<70 years old versus > 70 years old). Conclusions: Higher volume of MVPA was associated with higher physical capability, irrespective of the physical capability measure used. Importantly, these associations persisted at low volumes of MVPA and, particularly with respect to UWS, the steepest gradient of association was observed across the lower end of the MVPA volume range. These findings warrant further investigation in longitudinal and interventional studies. If MVPA does confer functional benefit even below amounts recommended by physical activity guidelines, this would have important public health implications since many older adults are unable to sustain MVPA for the duration required to meet the current guidelines. However, in contrast to previous studies, we did not observe independent associations for ST.

**P153- CHANGES IN ANTHROPOMETRY AND BODY COMPOSITION IN OLDER, OBESE ADULTS ON DIFFERENT DIETS.** C.J. Haywood[1,2,3], W.K. Lim[1,2], J. Proietto[1,3] *(1. Melbourne, Australia; 2. Northern Health, Australia; 3. Austin Health, Australia)*

Background: The rate of obesity in older adults is increasing. Obesity (in particular, truncal obesity) is a risk factor for physical disability in older adults. The presence of abdominal adiposity leads to the metabolic syndrome, worsening meta-inflammation and contributing to sarcopenia. Weight loss achieved with hypocaloric diet and exercise has been shown to improve physical function. Small losses in bone and muscle mass do occur during this process, however the clinical significance of this is unclear. Exercise helps offset these losses, and can improve physical function even without the need for weight loss. Very low energy diets (VLEDs), or meal preparations that are low-carbohydrate and contain approximately 3280 kJ (800kCal) per day, have been safely and effectively used in the management of obesity in younger adults for many years. They have not been trialled in older adults. This paper investigates the effects of healthy diet advice, a hypocaloric diet and a VLED, all with exercise, on weight, waist circumference, both total and abdominal fat mass, muscle mass and bone mineral density. Methods: Older (aged 65-85) adults with a body mass index of greater than 35 were included in the study. They attended 12 weeks of thrice weekly multimodality exercise classes (endurance, strength, flexibility and balance exercises). In addition, they were randomised to receive once-off healthy eating advice (group A), a hypocaloric, higher protein diet (group B) or a VLED (group C). Weight and waist circumference was measured at baseline and every 2 weeks up to 12 weeks. Dual Energy XRay Absorptiometry (DEXA) for body composition was performed at baseline and 12 weeks. Mean changes in weight, waist circumference, fat mass (total and abdominal/android), muscle mass and bone mineral density by group were compared using ANOVA. Results are expressed as mean ± SD. Results: 79 participants completed the study (22 in group A, 28 in group B and 29 in group C). Their mean age was 70.2 years, mean baseline weight was 105.5kg, BMI was 40.3 kg/m2 and 65.2% were female. All participants had bone mineral density within the normal range, and all groups had matched initial BMI. Percentage weight losses were 3.1 ± 2.8, 4.9 ± 8.0 and 11.4 ± 4.2 in groups A, B and C respectively (p<0.001). Percentage decreases in waist circumference were 3.0 ± 2.0, 4.4 ± 3.0 and 9.3 ± 4.8 respectively (p<0.001). Mean fat masses loss in grams were 1888 ± 2274, 2479 ± 2282 and 7407 ± 3709 respectively (p<0.001). Mean android (abdominal) fat losses in grams were 307 ± 380, 269 ± 928 and 1131 ± 618 respectively (p<0.001). Mean lean mass losses in grams were 690 ± 2302, 1903 ± 3243 and 2755 ± 2381 respectively (p=0.029). Despite these lean mass losses, lean mass as a percentage of total body weight increased by 1.1± 2.1, 0.9 ± 2.5 and 3.7 ± 2.8 respectively (p<0.001). Minor changes in bone mineral density were observed; 0.7 ± 1.8% loss, 0.2 ± 2.2% gain and 1.2 ± 2.2% loss respectively (p=0.047). Conclusions: Over 12 weeks, use of a VLED lead to significantly greater weight losses and decreases in waist circumference than did hypocaloric diets and healthy eating advice. Total fat, android fat and lean mass losses were greatest in the VLED group. However, lean mass as a percentage of total body mass improved most in this group. Small changes in bone mineral density were seen in each group, their clinical significance is unclear in a person with normal bone mineral density.

**P154- ASSOCIATIONS BETWEEN DIETARY INTAKES OF PROTEIN AND ESSENTIAL AMINO ACIDS WITH SKELETAL MUSCLE MASS, GRIP STRENGTH AND CIRCULATING C-REACTIVE PROTEIN IN WOMEN AGED 18-79 YEARS.** A. Welch, E. Kelaiditi, A. Jennings, A. MacGregor, A. Cassidy *(Norfolk, UK)*

Objective: Age-related loss of skeletal muscle mass, strength and function are key contributors to the onset of sarcopenia (loss of muscle mass and strength or physical performance), weakness and frailty. Protein and the amino acid leucine have a well-recognised role in muscle metabolism and treatment of sarcopenia but the role of other amino acids with skeletal muscle mass and grip strength have not explored in a general population (1, 2, 3). Chronic low grade inflammation is also a risk factor for loss of skeletal muscle with age. Therefore we investigated the relationship between dietary protein and the essential amino acids with skeletal muscle mass and strength. We also investigated the relationship of C-reactive protein concentrations with skeletal muscle and the potential attenuation of this relationship by diet. Methods: Cross-sectional investigation of the relationship between fat free mass index (as fat free mass/height2 - FFMI) measured by dual-energy X-ray absorptiometry, hand grip strength and dietary protein and essential amino acid intake in 2570 women aged 18-79 years from the TwinsUK Cohort. Associations between circulating hsCRP and FFMI and diet were investigated in a sub-set of 1658 women. Protein and amino acid intake (measured by a Food Frequency Questionnaire), expressed as a percentage of energy, was divided into quintiles. Relationships between diet and FFMI and grip strength were adjusted for covariates: age, physical activity, smoking, anti-inflammatory medication, HRT (and for FFMI by BMI and for grip strength by height). The association between circulating hsCRP and FFMI was calculated and also adjusted for covariates and then repeated with the addition of glutamine. The difference in the beta coefficients from these two sets of analyses was calculated to estimate the effect of glutamic intake. Results: Although there were trends towards increased FFMI with increasing intakes of protein and amino acids, the associations were not statistically significant. No associations were found between grip strength and diet. There were significant, positive associations between CRP and amino acids (arginine, glutamic acid) and trends towards significance for histidine, isoleucine, leucine, lysine and methionine but no association was found for protein. The between quintile differences (Q1 vs Q5) for arginine were 0.33 mg/L (P trend = 0.03) and for glutamic acid were 0.36 mg/L (P trend = 0.03). CRP was negatively related to

FFMI (-0.07kg/m2 P=0.001) and this negative association was further strengthened by the addition of glutamic intake to the model by per -1.35% per quintile (P=0.001). Conclusions: Despite the known importance of protein to skeletal muscle FFMI and grip strength these were not significantly associated with either dietary protein or essential amino acid intake. CRP was significantly and negatively related to FFMI. However, unexpectedly, arginine and glutamic intake were positively and significantly related to CRP. Moreover, the negative association of CRP with FFMI was potentiated by glutamic acid intake. This finding deserves further investigation in men as well as with other measures of chronic inflammation. References: (1) Welch AA Proc Nutr Soc 2014 (2) Cruz-Jentoft AJ Age & Ageing 2014 (3) Pedersen AN & Cederholm T Food Nutr Res 2014. Funding: The present study is supported by a UEA FMH studentship & the UK Department of Health via the NIHR comprehensive Biomedical Research Centre award to Guy's & St Thomas' NHS Foundation Trust in partnership with King's College London.

**P155- PREVALENCE AND PREDICTORS OF POTENTIALLY INAPPROPRIATE MEDICATIONS IN FRAIL ELDERLY.** X. Li, J. Finkelstein *(Baltimore, USA)*

Background: Frailty is associated with the decline of physiologic reserves in multiple systems and the inability to respond to stressful insults. Inappropriate medication prescription may results in significant adverse events which in frail elderly frequently lead to hospitalization. Older adults are twice as likely as others to come to emergency departments for adverse drug events (over 177,000 emergency visits each year) and nearly seven times more likely to be hospitalized after an emergency visit. Limited information is available regarding population-based prevalence and predictors of potentially inappropriate medications (PIM) in community dwelling older frail adults. The objective of this study was to estimate population-based prevalence of PIM in frail and non-frail elderly and to identify PIM predictors. Methods: The National Health and Nutrition Evaluation Survey (NHANES) dataset (2005-2006) containing results from 10348 participants was used for the analysis. The updated 2012 American Geriatric Society version of Beers criteria of PIM in older adults was used to identify the medication items from the prescription medication data files. Fifty-three medications or medication classes that have been strongly recommended to avoid according to the 2012 Beers criteria were used in the analysis. Participants of 65 years and older taking at least one PIM from this list were classified as PIM subjects. Frailty was identified using previously validated criteria reflecting physical, psychological and social domains of frailty. Physical activity was measured by an accelerometer, psychological and social domain variables were based on self-report. A multivariate logistic regression model was built to assess the independent association of PIM with demographics, poverty-to-income ratio (PIR), private insurance coverage, general health, health status compared to the last year, type of place for routine healthcare, number of healthcare encounters over past year, number of hospitalizations last year, mental health, co-morbidities, and polypharmacy. Results were reported in terms of odds ratios with 95% confidence intervals, which were calculated from model parameter coefficients and standards errors, respectively. A p-value <0.05 was considered as statistically significant. Results: The data set included 594 non-frail and 554 frail individuals. PIM prevalence in frail elderly was 45% in males (N=265) and 43% in females (N=289), 44% in Whites, 50% in Blacks, 49% in Mexican American and 29% in other race. PIM prevalence in non-frail elderly was lower in all subgroups with 30% in males and 25% in females, 27% in Whites and Blacks, 19% in Mexican American and 30% in other race. PIM prevalence depended on underlying condition and number of comorbidities. In women, frail elderly with chronic kidney disease had highest PIM prevalence (73%), followed by angina (70%), and congestive heart failure (68%), where non-frail elderly with the same conditions had lower PIM prevalence. In men, frail elderly with emphysema had highest PIM prevalence (79%), followed by congestive heart failure (73%) and angina (70%). Increase in comorbidities resulted in increase of PIM. PIM prevalence in elderly with one chronic condition was 36% in frail and 22% in non-frail individuals. In elderly with more than 5 conditions PIM prevalence was 71% in frail and 64% in non-frail individuals. After adjustment for covariates in logistic regression, following factors were identified as significant predictors of PIM in frail elderly: polypharmacy (OR=5.5; 95%CI=2.8-11.5), receiving mental health services last year (OR=3.67; 95%CI=1.06-12.73) and number of healthcare encounters last year (OR=3.4; 95%CI=1.4-8.4). Stratified analysis identified number of people in the family (OR=0.11; 95%CI=0.01-0.94) and private insurance coverage (OR=0.44; 95%CI=0.20-0.95) as protective in frail women, whereas polypharmacy (OR=7.83; 95%CI=3.08-19.91) was significant predictor in this population. In frail men, polypharmacy (OR=6.73; 95%CI=2.93-15.01), ten or more of healthcare encounters last year (OR=8.23; 95%CI=1.90-35.70), and PIR>1 (OR=2.1; 95%CI=1.2-3.5) were significant predictors of PIM. Conclusion: PIM is widespread in frail elderly. Risk factors for PIM may help in identification and prevention of PIM in elderly. Gender differences in factors affecting PIM risk warrant further investigation.

**P156- FRAILTY CLINICAL PHENOTYPE: A PHYSICAL AND COGNITIVE POINT OF VIEW.** S.D. Anton[1], A.J. Woods[1], M. Aubertin-Leheudre[2], M.R. Cohen[1], M. Pahor[1] *(1. Gainesville, USA; 2. Montreal, Canada)*

Frailty is recognized as a clinical geriatric syndrome used to describe the weakest or most vulnerable older adults. Frailty has been described as a state of increased vulnerability to poor resolution of homeostasis after a stressor event, which increases the risk of adverse health outcomes, including fall-related injuries, delirium, hospitalization, disability, and even death [1, 2]. Accordingly, frailty is associated with high utilization of health care resources, especially within the last two years of life [3]. Thus, there is great importance in identifying and treating individuals who are frail or at risk of becoming frail to maximize their functional independence for as long as possible. It is widely accepted that the prevalence of frailty increases dramatically with age [4], and appears to be a result of a vicious cycle influenced by endogenous and exogenous factors. The United States Census Bureau has predicted that by 2050, Americans aged 65 years or older will number nearly 89 million people, which is more than double the number of older adults in the United States in 2010 [5]. Given these projections, it is critical that healthcare practitioners are able to identify individuals with this condition or at risk for this condition. Without intervention, the number of frail older adults is likely to dramatically increase in the next few decades. Thus, there is an urgent need for interventions that can assist frail older adults in maintaining independence and reducing adverse health outcomes associated with frailty [6]. Although the term frailty is commonly used in clinical practice, and the theoretical phenomenon is well accepted, it remains an evolving concept that lacks a universally accepted definition and specific diagnostic criteria. Different perspectives on frailty have led to two distinct viewpoints of this phenomenon in the literature. The first describes the phenomenon based solely on physical attributes and capabilities. In contrast, more recent perspectives describe the phenomenon in broader, multidimensional terms by incorporating the concept of cognitive frailty. In support of this view, there is increasing evidence that consideration of both cognitive and physical factors can better improve the ability to predict adverse health outcomes among frail older adults over physical factors alone. The recent recognition of the importance of cognitive factors has increased the complexity of this phenomenon and difficulty in developing a consensus definition. To add to this challenge, frailty can present in different stages of severity (from mild to severe), and there appears to be a dynamic relationship between these stages. Despite the challenges involved in coming up with a consensus definition of frailty, the development of an accepted operational definition is essential to advance the understanding of the causes and improve the treatment of this syndrome. Such a definition would be helpful in characterizing subsets of vulnerable older people (i.e., those with chronic disease conditions), who are not evaluated for disability risk in the clinical health care process. The following factors will contribute to advancing research and treatment of this condition: (1) a consensus on an international definition of frailty including physical and cognitive criteria; (2) the development of simple screening tools for frailty; (3) longitudinal studies of factors that predict frailty and its consequences in diverse populations; (4) interventional studies to delay frailty and its adverse health outcomes; and (5) translation into clinical practice of the scientific findings regarding the predictors and treatments for this condition. Acknowledgements: Acknowledgements. Support was provided by the University of Florida's Claude D. Pepper Older Americans Independence Center (NIH/NIA P30AG028740), and Clinical and Translational Science Institute (NIH/NCRR UL1TR000064). Stephen Anton is supported by a K23 AT004251-01A2 and was Thomas H. Maren Foundation. References: 1. Clegg A, Young J, Iliffe S, et al. Frailty in elderly people. Lancet 2013; 381: 752-762. 2. Walston J, Hadley EC, Ferrucci L, et al. Research agenda for frailty in older adults: toward a better understanding of physiology and etiology: summary from the American Geriatrics Society/National Institute on Aging Research Conference on Frailty in Older Adults. J Am Geriatr Soc 2006; 54: 991-1001. 3. Fassbender K, Fainsinger RL, Carson M, Finegan BA. Cost trajectories at the end of life: the Canadian experience. J Pain Symptom Manage 2009; 38: 75-80. 4. Rockwood K, Hubbard R. Frailty and the geriatrician. Age Ageing 2004; 33: 429-430. 5. Population Projections Bureau, Population Division, US Census Bureau. Summary File: Projected Population of Single Year of Age, Sex, Race, and Hispanic Origin for the United States: 2012 to 2060. Middle Series, 2013. Available at http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html, 6. Abellan van KG, Rolland Y, Bergman H, et al. The I.A.N.A Task Force on frailty assessment of older people in clinical practice. J Nutr Health Aging 2008; 12: 29-37.

**P157- CLINICAL COMPONENTS LINKED TO SARCOPENIA: THE SARCOPHAGE STUDY.** C. Beaudart, J.Y. Reginster, J. Petermans, S. Gillain, A. Quabron, M. Locquet, J. Slomian, F. Buckinx, O. Bruyère *(Liège, Belgium)*

Background: The SarcoPhAge project is an ongoing longitudinal study following community-dwelling elderly subjects with the objective to assess some health and functional consequences of sarcopenia. The sarcopenia diagnosis algorithm developed by the European Working Group on Sarcopenia in Older People (EWGSOP) and used in the present study needs further validation trough cross-sectional and longitudinal studies. The aim of the present study is to assess, using this algorithm, the prevalence of sarcopenia and the clinical components linked to this geriatric syndrome. Methods: Participants were community dwelling subjects aged 65 years or older. To diagnose sarcopenia, we applied the definition of the EWGSOP. Muscle mass was measured by Dual-Energy X-Ray Absorptiometry, muscle strength by a hydraulic dynamometer and physical performance by the SPPB test. Large amounts of socio-demographic, anamnestic and clinical data were collected in all subjects. Results: 534 subjects were recruited for this study (60.5 % of women, mean age of 73.5 ± 6.16 years), among whom 73 subjects were diagnosed sarcopenic, which represents a global prevalence of 13.7 %. Prevalence was 11.8 % in men and 14.9 % in women. After adjustment for age and sex, sarcopenic subjects presented a significant lower body mass index, lower calf, wrist, waist and arm circumferences, used more drugs, presented more comorbidities, were at higher risk of falls (Tinetti test, Timed Up and Go test), had a worse nutritional status (Mini Nutritional Assessment), had a worse physical health-related quality of life (SF-36) and were more dependent in some activities of daily living (Katz scale and Lawton scale). Discussion: Sarcopenia is linked with many harmful clinical components making this geriatric syndrome a real public health burden. Follow-up data of the SarcoPhAge study will be helpful to assess the outcomes of sarcopenia based on the EWGSOP diagnosis algorithm and its different proposed cut-offs.

**P158- BAROREFLEX SENSITIVITY IN FRAILTY.** A.C. de M. Takahashi[1], M.S. de S. Buto[1], M.O. Gois[1], V. de V. B. Carmelo[1], A.M. Catai[1], A. Porta[2] *(1. São Paulo, Brazil; 2. Milan, Italy)*

Backgrounds: Aging process is associated with several functional and structural alterations in multiple physiological systems. Among these systems, cardiovascular has been focused, since senescence, by itself, produces changes in the mechanisms which regulate heart rate (HR) and blood pressure (BP). On the other hand, frailty syndrome is characterized by progressive decline in the ability to maintain homeostasis as a result of decline in resilience and physiological reserves. In this scenario, evaluation of baroreflex could provide important information about this syndrome. The aim of this study was to evaluate the baroreflex sensitivity (BRS) in nonfrail, prefrail and frail. Methods: 39 elderly subjects (60-85 years) were evaluated and divided into three groups: nonfrail, prefrail and frail according to frailty phenotype. The electrocardiographic signal was collected by an ECG amplifier (BioAmp FE132, ADInstruments, Australia) with electrodes placed on the MC5 lead. The arterial blood pressure waves were obtained by plethysmographic arterial pressure device (Finometer Pro Finapres Medical Systems, Amsterdam, Netherlands) with the cuff placed on the middle finger of the right upper limb. All equipment was coupled to a commercial device for acquisition and analysis of biological signals (PowerLab 8/35, ADInstruments, Australia). Signals were sampled at 1000 Hz. The simultaneous collection of ECG and arterial blood pressure signals was performed for 15 minutes in the supine position and for 15 minutes in the orthostatic position. Stable sequences of 256 points, with sinus rhythm, in the supine and orthostatic position were chosen for analysis. The cross spectral analysis was performed by the bivariate autoregressive model and the transfer function gain from SAP to RR (αLF), phaseLF and coherence (K2) were computed in low frequency band. For statistical analysis, Kolmogorov-Smirnov test was used to evaluate normality of data, one way ANOVA for comparison of anthropometric characteristics of the subjects (age, weight, height, and body mass index), chi-square test for comparison of gender, betablocker user and comorbidities and two way ANOVA for repeated measures with Tukey post hoc to evaluate the effects of group, position and interaction between them. Data are presented as average ± standard deviation. A significance level was set to 5% ($p < 0.05$). Results Nonfrail (n = 14, 71.7 ± 4.8 years), prefrail (n = 14; 77.4 ± 8.3 years) and frail (n = 11; 77.4 ± 7.9 years) showed no significant differences for age, gender and betablocker user. There was a significant reduction of K2 in orthostatic position in frail compared to nonfrail and lower values of K2 after postural change only in prefrail and frail groups (nonfrail: supine 0.63 ± 0.17, orthostatic 0.58 ± 0.18; prefrail: supine 0.68 ± 0.14, orthostatic 0.55 ± 0.17; frail: supine 0.55 ± 0.23, orthostatic 0.39 ± 0.17). No significant differences were observed for the variables phaseLF (nonfrail: supine -1.75 ± 0.61 rad, orthostatic -1.09 ± 1.12 rad; prefrail: supine -0.93 ± 1.76 rad; orthostatic -0.59 ± 1.59 rad; frail: supine -1.54 ± 0.88 rad, orthostatic -1.00 ± 0.95 rad) and αLF (nonfrail: supine 5.79 ± 3.86, orthostatic 4.53 ± 4.50; prefrail: supine 7.30 ± 6.13; orthostatic 5.13 ± 4.92; frail: supine 6.82 ± 4.96, orthostatic 3.81 ± 3.25) when groups and postures were compared. Conclusions: Frailty individuals showed a decoupling between systems that control HR and BP, observed by significant reduction of coherence in orthostatic posture when compared to individuals that don't course frailty syndrome. This finding may be related to the genesis of the syndrome, in other words a greater difficulty in interaction and regulation between control systems that result in homeostasis impairment. Key words: aging, frailty, autonomic control, baroreflex. Apoio financeiro: Fapesp (process 2013/ 17936-9), CAPES-PVE (Process 23028.007721/2013-4 and CNPq (process 479769/2013-3).

**P159- THE PROFILES OF LIPID AND APOLIPOPROTEIN IN ROBUST, PHYSICAL FRAILTY, PHYSICAL FRAILTY WITH MCI IN OLDER HAN CHINESE MALE ADULTS.** Z. Yu, Q. Ruan, J. Li, C. Ma, Z. Bao *(Shanghai, China)*

Background Dyslipidemia and apolipoprotein changes in plasma may be responsible for cognitive impairment and are positively associated with physical frailty in the elderly. The aim in this study is to investigate the differences in the profiles of lipid metabolism and apolipoprotein in robust, physical frailty and physical frailty with MCI in older adults. Methods Design: A cross-sectional study. Setting: Hospital-based physical examinations from 2012 to 2013. Participants: Three hundred sixty-five male subjects (65~97 years old) with a complete medical history for lipid experiment. The subjects were divided into three groups, the physical frailty group (FRAIL 1-5, including pre-frailty and frailty, MMSE≥28, CDR = 0), physical frailty with MCI group (FRAIL 1-5, MMSE 24~27, CDR = 0.5), and robust older adult group (FRAIL 0, MMSE≥28, CDR = 0). Each group was further divided into two subgroups according to age (≥65 and ≤84, ≥85). Measurements: Plasma total cholesterol, triglycerides (TG), HDL-C and LDL-C were measured using standard enzymatic colorimetric technique. The levels of different apolipoproteins were detected by using ELISA KIT (ApoJ and ApoH) or The Luminex 200TM System cytokine assays (ApoA1, ApoA2, ApoB, ApoC2, ApoC3). Two-way ANOVA was used to compare apolipoprotein concentrations among the different experimental groups. A p value < 0.05 was considered statistically significant. Results Age had a significant effect on the values of TG ($F_{2,359} = 4.37$, $p = 0.037$) and HDL-C ($F_{1,359} = 11.31$, $p < 0.001$). The levels of some apolipoproteins are significant differences among those three subjects. The levels of ApoA2 ($F_{1,193}=4.885$, $p=0.046$), ApoC2 ($F_{1,193}=6.065$, $p=0.015$) and ApoC3 ($F_{1,193}=5.539$, $p=0.02$) showed great disparities in different age subgroups. The level of ApoB ($F_{2,193}=3.985$, $p=0.02$) was quite related with older adult with different phenotype. Age factor and interaction between phenotype factor and age factor had significant effects on the level of ApoA1 ($F_{1,193}=13.13$, $p<0.001$; $F_{2,193}=4.89$, $p = 0.009$ respectively). The phenotype factor, age factor and their interaction did not have significant effect on the levels of ApoJ and ApoH according to our study. Conclusion Our findings demonstrate TG, HDL-C, ApoA2, ApoC2 and ApoC3 levels are highly associated with age ; ApoB levels are associated with phenotypes; and ApoA1 levels are associated with both age and phenotype. Keywords: Physical frailty; MCI; Lipid, Apolipoprotein

**P161- REDUCED MUSCLE MASS OR MUSCLE WEAKNESS: EXPLORING SARCOPENIA DEFINITIONS AND ASSOCIATIONS WITH FUNCTIONAL AND HEALTH-RELATED OUTCOMES IN OLDER PEOPLE.** J.C. Menant, F. Weber, D.L Sturnieks, J. Lo, S.R. Lord *(Sydney, Australia)*

Background: Sarcopenia was originally defined as the degenerative loss of skeletal muscle mass (0.5–1% loss per year after the age of 25) and quality associated with aging. However, more recent researchers including the European Working Group on Sarcopenia in Older People have broadened the definition of sarcopenia to not only include a measure of muscle mass, but also measures of muscle strength and walking speed. By doing so, such sarcopenia definitions overlap with other terms commonly used in geriatrics such as frailty. This study's primary aim was to contrast various definitions of sarcopenia in their ability to classify a large sample of community-dwelling older people with respect to functional and health-related outcomes. The study also aimed to determine whether outcome classifications were improved when (i) taking obesity into account; (ii) combining anthropometric and clinical measures of sarcopenia. Methods: 423 community-dwelling older adults (210 women and 213 men) aged over 70 years (mean (SD): 81.2 (4.5) years) undertook measurements of body composition (lean mass) using dual energy x-ray absorptiometry. Measures of body weight, height and waist circumference were also recorded. Participants completed a series of sensorimotor tests (Physiological Profile Assessment) which together provide a composite falls risk score: vision, lower-limb proprioception, hand reaction time, quadriceps strength and postural sway. Participants also performed tests of handgrip strength, controlled leaning balance (coordinated stability test), choice-stepping reaction time, fast timed-up and go test and six-metre walk test at self-selected speed. Disability was assessed with the WHODAS questionnaire. Falls were recorded prospectively with monthly falls diaries for 12 months. A range of sex-specific anthropometric definitions of sarcopenia based on appendicular skeletal mass obtained from DXA measurements in Caucasian populations of older people (similar to our sample) were selected (1-4). Clinical measures of sarcopenia were defined as the bottom sex-specific quartile for knee extension strength or handgrip strength. Waist circumference measurements of greater than 102 cm for men and 88cm for women defined participants as obese (3). Results: The number of participants defined as sarcopenic based on the selected anthropometric definitions varied greatly, ranging between 58 and 310 participants (23% to 73% of total sample). No anthropometric measure of sarcopenia was associated with the composite falls risk score or the choice-stepping reaction time measure. Compared to their non-sarcopenic counterparts, sarcopenic older adults defined as per Levine and Crimmins (3) showed significantly worse dynamic balance, slower gait speed and timed-up and go test and reported worse disability ($p<0.05$ for all measures). However there were no significant differences in the number of fallers between groups. Adding a measure of obesity to identify sarcopenic obese participants (n=48), did not improve the discrimination compared with normal lean (n=139), with regards to the functional and health-related outcomes. Clinical sarcopenia defined as poor knee extension strength was significantly associated with all the balance and gait measures ($p<0.05$) but not self-reported disability or prospective falls. Adding a measure of obesity to the clinical sarcopenia measure revealed an additional significant association between sarcopenic obese participants (n=54) and increased levels of disability ($p<0.05$). However, combining both anthropometric (3) and clinical sarcopenia measures (n=19; 4.5%of total sample) did not reveal additional associations with the outcome measures. Conclusion: Measures of sarcopenia that relied only on muscle mass were equivalent to measures of lower limb muscle strength in their predictive accuracy of functional and health-related outcomes in older people. As postulated in previous research, muscle quality may be more critical than muscle mass in determining functional outcomes. Given that DXA assessments are costly, time consuming and only provide measures of muscle mass but not quality, simple tests of lower limb strength are likely to remain more cost-effective in predicting balance, functional mobility and disability. Overall, our findings suggest that the term sarcopenia has limited value as a diagnostic entity in older people and that broader, more descriptive terms such as frailty or motor impairment more accurately reflect the syndrome underlying increased risk of falls and fractures, impaired ability to perform activities of daily living, disabilities and loss of independence in older age. References: 1. Baumgartner et al., Obes Res, 2004. 2. Bouchard et al., Obesity, 2009; 3. Levine and Crimmins., Obesity, 2012. 4. Scott et al., Osteoporos Int, 2014.

**P162- IMPACT OF PREOPERATIVE WEIGHT LOSS, ABNORMAL SERUM-ALBUMIN AND BODY COMPOSITION ON OVERALL SURVIVAL AFTER MAJOR UPPER ABDOMINAL SURGERY.** E.K. Aahlin[1], G. Tranø[2], N. Johns[3], A. Horn[4], J.-A. Søreide[4], A. Bernstein[5], K. Fearon[3], A. Revhaug[1], K. Lassen[1] *(1. Tromsø, Norway; 2. Trondheim, Norway; 3. Edinburgh, United Kingdom; 4. Bergen, Norway; 5. Arendal, Norway)*

Background: Traditionally, preoperative weight loss and abnormal serum-albumin have been recognized as factors associated with increased risk for postoperative complications and reduced survival after abdominal surgery. More recently, a possible significance of the relative proportion of skeletal muscle, visceral adipose tissue and subcutaneous adipose tissue has been examined with conflicting results. We aimed to investigate if there was an association between preoperative weight loss, abnormal serum-albumin, body composition and overall survival after major upper abdominal surgery. Methods: From 2001 to 2006, 447 patients were included in a Norwegian multicenter randomized controlled trial in major upper gastrointestinal (GI) and hepatopancreatobiliary

(HPB) surgery. Patients were analyzed as a single prospective cohort. Prospectively recorded data was compared with overall survival from the National Population Registry. The body composition indices: L3 Skeletal muscle index, L3 Visceral adipose tissue index and L3 Subcutaneous adipose tissue index were calculated from CT images taken within three months preoperatively. Results: Median follow up was almost five years. Preoperative serum-albumin <35 g/l and weight loss >5% were independently associated with reduced overall survival. There was no association between any preoperative body composition index and reduced overall survival. Conclusion: Our study has confirmed the robust and sinister significance of the traditional nutritional indicators, preoperative serum-albumin <35 g/l and weight loss >5%. The body composition indices did not prove any benefit as global tools for risk assessment in major upper abdominal surgery but larger prospective studies are required to confirm these findings.

**P163- ARE THERE SUBTYPES OF (INTERMEDIATE)FRAILTY? A LATENT VARIABLE ANALYSIS OF A HEALTH DEFICIT INDEX.** M.D.L. O'Connell, R.A. Kenny, B.L. King-Kallimanis *(Dublin, Ireland)*

Background: The concept of frailty is widely used to capture differences in vulnerability to adverse outcomes in older adults. It is hypothesised that the progression of frailty reflects the accumulation of multi-domain health deficits and subsequent depletion of individual reserves. Understanding this process presents a statistical challenge. Latent class analysis (LCA) provides a probabilistic framework to incorporate large numbers of health variables and explore underlying classes. This study aimed to use latent class analysis to examine underlying classes from an age-related health deficit index. A further aim was to assess the ability of different deficits to discriminate across classes. Methods: The Irish Longitudinal Study on Ageing is a population representative, internationally comparable longitudinal study of community dwelling adults aged 50 and over in Ireland. Participants aged 65 and older from wave 1 of the study were included in this analysis. A 50 item age-related health deficit index was constructed, comprising self-reported items related to falls and steadiness, physical function, disabilities, mental health, sensory deficits, cognitive function, cardiovascular disease and other chronic conditions. Latent class analysis was used to explore underlying classes from the deficit index. The method provides probabilities of membership in each class for each observation, with individuals assigned to their most likely class. The probability of having each deficit can then be estimated for each class. A series of models were fit testing 2-6 latent classes. The best fitting models were selected based on goodness of fit statistics and substantive interpretability. In addition to deficit probabilities, the demographic correlates of each class were explored. The relationship between class membership and 2-year mortality was assessed using logistic regression. Results: 3511 participants aged 65-105 (mean 73, 53% female) were included in analysis. The data could be best fit by a 3 or 4 class solution. From the three class model, 1814 (51.7%) participants were assigned to class 1, 1362 (38.8%) to class 2 and 335 (10.1%) to class 3. The overall probability of experiencing deficits generally increased across classes from low in class 1, intermediate in class 2 and high in class 3, consistent with the frequently used robust, intermediate and frail categorization. Adding the fourth class essentially split the intermediate group into 2 groups, a larger group of 952 participants with mainly physical deficits and self-reported chronic conditions (intermediate 1) and a smaller group of 452 participants with primarily cognitive and sensory deficits (intermediate 2). Mean (SD) age for the intermediate 1 group was 73.5 (6.0), 65% were female and 40% had only a primary education. For the intermediate 2 group, mean age was 76.7 (7.1), 47% were female and 66% had only primary education. The results from the logistic regression using the four class solution suggest that mortality at 2 years was more common in participants from the frailest class (OR=6.6, 95%CI=4.3-10.1) or the intermediate 2 class (OR=2.4, 95%CI=2.2-5.3) compared to the fittest class. The relationship was borderline statistically significant for the intermediate 1 class (OR=1.5, 95%CI=0.95-2.3, p=0.08). Comparing the probabilities for each item across classes suggested functional items, especially those related to physical function, generally discriminated well across classes. For example, the probability of having difficulties stooping or crouching ranged from 0.01 in the fittest group to 0.91 in the frailest group. Cardiovascular and other chronic conditions were less common in this sample and probabilities were more similar across classes. For example, the probability of reporting diagnosed diabetes ranged from 0.07 to 0.17 across classes. The probability of reporting disability items was relatively high in the frail class, ranging from 0.18-0.54 across the 6 items, and negligible in the other classes. Conclusions: Applying latent class analysis to an index of age-related health deficits we find broad support for the widely used three tiered frailty classification system, rather than identifying distinct classes of like deficits, for example, a class for disability, another for chronic conditions etc. In addition, the analysis provides some evidence for two different intermediate profiles, one with predominantly physical deficits and co-morbidities and a second with primarily cognitive and sensory deficits. These profiles differ in their demographic characteristics, particularly sex and educational background, suggesting possibly that deficits accumulate differently in different groups of older adults. Functional items, especially related to physical functioning, generally discriminate better across categories than age-related chronic conditions. Disability related items occur only in the frailest community dwelling older adults. Latent class analysis has the potential to refine deficit indices and identify different profiles of deficit accumulation in older adults.

**P164- SARCOPENIC OBESITY IS ASSOCIATED WITH FRAILTY IN TREATMENT CONTROLLED HIV PATIENTS.** J. Falutz[1], L. Rosenthall[4], C. Prado[2], T. Brothers[3], S. Kirkland[3], A. Malagoli[4], K. Rockwood[3], S. Zona[4], G. Guaraldi[4] *(1. Montreal, Canada; 2. Edmonton, Canada; 3. Halifax, Canada; 4. Modena, Italy)*

Background: Body composition abnormalities, specifically sarcopenia and obesity, independently impact on clinical outcomes including frailty, as well as morbidity and mortality in the general population. Evidence suggests that patients (pts) with both sarcopenia & obesity (sarcopenic-obese phenotype), may have even worse health effects than those with either abnormality alone. HIV pts responding to effective highly active antiretroviral therapy (HAART) may develop body composition changes, including sarcopenia, as well as obesity, consisting of both generalized and visceral adiposity. Frailty has recently been documented in some successfully treated HIV patients with significant immune recovery. We investigated whether sarcopenic-obesity is associated with a higher Frailty Index compared to either abnormality alone in a cohort of stable, treated HIV pts. Methods: This was a retrospective analysis of routine data collected prospectively from pts receiving HAART and followed in the Modena HIV Metabolic Clinic (MMHC). Several definitions of sarcopenia are current; we used Baumgartner's criteria: DXA-derived total appendicular skeletal muscle index (ASMI [kg/m2] < 7.26 for males and < 5.45 for females. Obesity was defined as either gender specific a- highest quartile of DXA-derived % total body fat mass [%BFM], or, b- highest quartile of CT-derived visceral adipose tissue (VAT). Patients with sarcopenic-obesity were defined as having gender specific sarcopenia plus either highest quartile %BFM or VAT. We defined frailty using the cumulative deficits model. A frailty index, determined either with (HIVFI) or without (FI) HIV specific parameters (HIV-viral load, CD4 T-cell counts, duration of HIV infection, plus HAART related parameters) was calculated for each pt. The FI represents the proportion of health deficits that subjects accumulates out of a group of common but relatively non-specific clinical and laboratory variables collected during routine MMHC assessments. Observations were included if at least 80% of the health variables were available at the index visit. The FI and HIVFI scores are reported as means ±SD. T-tests were used to compare the FI & HIVFI between the 4 body composition groups (normal, sarcopenia, obese and sarcopenic-obese). Results: The FI and HIVFI scores were available in a total of 1957 pts; 68% males and 32% females. For clarity we report results using only the HIVFI. The $r^2$ between the indexes was 0.94; the mean FI and HIVFI values were 0.301 (range 0.057-0.638) and 0.315 (range 0.071-0.651). This difference of 0.014 is statistically significant but of limited clinical relevance. We also report results only in the males as the small sample size for females in the sarcopenic-obese group precludes reliable intergroup comparisons. The males' mean age was 47±7.9, range 18-78, 37% > 50 yr old. The mean known duration of HIV infection was 196 ±89 months, range 2-345; 100% were on HAART and the mean absolute nadir and current CD4+ T-cell counts were 210± 162 and 632± 265 per $\mu$L respectively, in keeping with an overall effective immune recovery. The HIV viral load was undetectable in 70%. The mean VAT was 125 ± 75 $cm^2$ (highest quartile > 173 $cm^2$).The kappa score in pts diagnosed as obese by either highest quartile %BFM or VAT was low, 0.222, suggesting that these parameters identify distinct pt populations. Using the %BFM did not differentiate the HIVFI between body composition groups. The highest quartile of VAT was therefore used to diagnose obesity. In the males sarcopenia occurred in 249 (19%), obesity in 301 (22%), sarcopenic-obesity in 40 (3%) and 766 (56%) were normal. The mean HIVFI in patients with the different body composition phenotypes (normal, sarcopenia, obesity and sarcopenic-obesity) was respectively 0.302± 0.094, 0.312±0.101, 0.344±0.087, and 0.365±092. Although the HIVFI was not different between pts with sarcopenia compared to normal, it was significantly higher in pts with both obesity ($p<0.0001$) and sarcopenic-obesity ($p<0.0001$) compared to normal. A progressive increase in the HIVFI is evident but the small sample size of the sarcopenic group resulted in only a trend towards an increased HIVFI ($p=0.155$) in sarcopenic-obesity compared to obese pts. Conclusions: The overall increased HIVFI in this cohort of treated male pts with longstanding HIV infection suggests they are at risk for potentially deleterious long-term effects on morbidity and mortality. Body composition was abnormal in over 44% of these pts. A significant increase in the HIVFI was seen in pts with increased VAT and may possibly be even higher in pts with sarcopenic-obesity, a condition associated with adverse clinical outcomes in the general population. Further investigations into the determinants of sarcopenic-obesity and particularly into its ability to predict the development of frailty in these pts is warranted. Improved understanding of these conditions will allow for interventions aimed at limiting their negative health effects in this increasingly vulnerable population.

**P165- COGNITIVE AND MOBILITY DECLINE CONCUR IN SENIORS AND PREDICT PRE-FRAIL STATUS. RESULTS FROM THE "GAIT & BRAIN STUDY".** M. Montero-Odasso, I. Anton-Rodrigo, A. Oteng-Amoako, S.W. Muir-Hunter, K. Gopaul, M. Speechley *(London, Canada)*

Background: Slow gait predicts mobility and cognitive decline..Gait control relies in cognition and dual-task gait" studies suggest that cognitive deficits have a role in the gait slowing of aging and the development of frailty. Gait variability measures brain gait regulation and high variability predicts mobility, cognitive decline, and falls. We have previously demonstrated that high gait variability is associated with frailty suggesting a "cognitive" component in the frailty construct. However the role of cognitive dysfunction to predict mobility decline and frailty status is not very well understood. Methods: The "Gait and Brain Study" is a cohort study following non-disable seniors with cognitive complaints without dementia and without frailty at baseline. The main goal is to determine predictors of cognitive and mobility decline and frailty status in community dwelling seniors. This analysis includes the bi-annual assessments during a 24 month

follow up. At each assessment a complete battery evaluating demographic and clinical characteristics and cognitive measures was performed. Similarly, gait was assessed at each visit using electronic gait mat ( GaitRITE®) to record temporal and spatial quantitative gait variables. Mean gait velocity and stride time variability were evaluated under simple and three separate dual-task conditions. Frailty status was evaluated using a modified frailty phenotype index which was composed by the 4 original criteria without hand grip assessment. Analysis by linear regression models and analysis of covariance and relative risk analysis were used to evaluate association between cognition and development mobility decline and frailty status. Mobility decline was defined as a reduction on gait speed by at least 10 cm/s after 24 month of follow up and pre-frail as the incidence of 2 out of the 4 criterion from the frailty phenotype. Results: One hundred twenty older participants, mean age 77+6 y/o and 57.6% female without disability were included for this analysis. Univariate analysis showed that cognitive dysfunction at baseline predicts future with gait disturbances, mobility disability and development of pre-frailty status (1-2 of the 4 components) after 24 month of follow-up. These findings remain significant after adjusting by age, gender, history of falls, physical activity and comorbidities. Specifically, cognitive impairment (MoCA<26) confers a risk for mobility decline, [RR=2.13 (1.5-4.0)] and for pre-frailty [RR= 1.44 (0.5-2.4)]. From the different cognitive domains assessed, executive dysfunction (evaluated using TMTA-B) and low performance in the Frontal Assessment Battery were significantly associated with the development of mobility decline and pre-frail status. Conclusions: Cognitive dysfunction, specifically episodic memory impairment and executive dysfunction predicts mobility disability and prefrail status in a cohort of non-disable seniors with cognitive complaints. Cognitive and mobility decline coexist, which suggests that shared common factors mechanism may mediate the development of frailty status. Cognition appears to be a component of the frailty construct.

**P166- PREVENTION OF SARCOPENIA IN STROKE: INTERVENTIONAL CONCEPTS FROM EXPERIMENTAL TO CLINICAL TRIALS.** W. Doehner *(Berlin, Germany)*

Stroke is the second leading cause of death and the leading cause of disability in Western countries. More than 60% of patients remain disabled, 50% of patients suffer from hemiparesis and 30% remain unable to walk without assistance. The skeletal muscle is the main effector organ accountable for disability in stroke. Yet, the disability is primarily attributed to the brain lesion and skeletal muscle impairment is not targeted in post stroke rehabilitation. Emerging evidence from clinical and experimental studies suggests a stroke specific type of sarcopenia with global and local muscle wasting: A combination of denervation, disuse, inflammation, remodelling and spasticity account for a complex pattern of muscle tissue phenotype change and atrophy. The molecular mechanisms of muscle degradation after stroke are only incompletely understood. Reinnervation, fibre–type shift, disuse atrophy, and local inflammatory activation are only some of the key features yet to be explained. Despite its importance for optimum post stroke recovery, stroke-related sarcopenia is not considered in current guidelines for stroke therapy or rehabilitation and measurement tools to address sarcopenia are infrequently used. A proof of concept clinical trial is under way, testing the impact of essential amino acid oral supplementation to prevent or reverse muscle wasting and to improve functional outcome after stroke (AMINO-Stroke, registration: DRKS00005577). This presentation will provide an overview on current and novel evidence and ongoing trials to target sacopenia in stroke There is a significant need for this topic to be addressed: - There is a very relevant proportion of patients in this field, - stroke rehab is a considerable proportion in the health sector. - muscle tissue in stroke is currently not at all addressed in clinical guidelines and is not recognized by clinicians as a relevant issue, - research on stroke related muscle changes (local and global muscle during rehab) is only beginning but novel data is emerging, - there is a paucity of scientific insight into muscle changes after stroke.

**P167- STRUCTURAL AND SOCIAL FACTORS AS PREDICTORS OF FRAILTY IN A NATIONAL SAMPLE OF OLDER MEXICAN ADULTS.** B. Manrique-Espinoza[1], K. Moreno-Tamayo[1], L. Zhang[2], M. Romero-Martínez[1], A. Salinas-Rodríguez[1]. *(1. Cuernavaca, Mexico; 2. Boston, USA)*

Background: Frailty is an important geriatric syndrome who leads to adverse health outcomes. That is why identification of subjects who are frail is a key factor for preventive and curative medicine. A large number of evidence has been published in recent years which provide a framework for understanding frailty. However, less evidence has focused on linking social determinants and frailty, area of research which may provide insights on how other factors, such as structural and/or social may be potential underlying aspects related to frailty. Thus, the objective of this paper was to examine the association of structural and social factors with the prevalence of frailty in a sample of older Mexican adults. Methods: Cross-sectional study based on a national representative sample of 2,124 older adults (OA) aged 50 years and above. Data came from the Study of Global Aging and Adult Health collected in 2009 (SAGE-2009). The following structural and social factors were included: ethnicity, living arrangements, marriage status, education, employment status, household income, health insurance affiliation, area of residence (rural, urban or metropolitan), and index of marginalization of the area of residence. Prevalence of frailty was identified as the presence of three or more of the five components proposed by Fried et al., which included shrinking, weakness, exhaustion, slowness, and low physical activity. In addition, other covariates such as lifestyle characteristics, self-reported chronic conditions (i.e., hypertension, chronic lung disease, diabetes, heart disease, stroke, arthritis, and dyslipidemia), activities of daily living (ADL) and instrumental activities of daily living (IADL) disability, and depressive symptoms (assessed through a set of symptomatic questions based on the World Mental Health Survey version of the Composite International Diagnostic Interview). Logistic regression analysis was used to examine the association of structural and social factors with frailty. The final model was adjusted for covariates. Results: Mean age was 62.6 years (SE=0.8) and 53.6% were women. The prevalence of frailty was 8.1%. After adjustment for covariates, we found that OA living in metropolitan area (OR=4.2, 95%CI 1.5-12.0) and marginalization (OR=2.4, 95%CI 0.98-6.0) increased the odds of being frail. Presence of hypertension (OR=2.1, 95%CI 1.2-3.8), depressive symptoms (OR=2.6, 95%CI 1.4-5.0), ADL (OR=4.0, 95%CI 1.8-8.8) and IADL (OR=7.7, 95% CI 3.8-15.3) disability were also associated with frailty. Conclusion:Findings of this study support the notion that in addition to individual factors, other dimensions such as area of residence and marginalization are closely associated with frailty. Although further research is needed, health care practitioner and/or policymakers may take it into account these factors to better design strategies of attention.

**P168- THE EFFECT OF FRAILTY INDEX FORM ROUTINE LABORATORY DATA ON MORTALITY IN AN OLDEST OLD CHINESE COMMUNITY SAMPLE.** Q. Hao *(Chengdu, China)*

Objective: Frailty index (FI) based on deficit accumulation from self-reported data and laboratory data plus blood pressure can identify older adults at increased risk of death. How the FI only based on the routine laboratory data (FI-LAB) in determining mortality in the oldest old people was not well understood. Here, we investigated the effect of FI-LAB on mortality, using a very old Chinese community cohort. Methods: Data were from the Project of Longevity and Aging in Dujiangyan, a community study on a 90+ year cohort in Sichuan Province in China. Participants who completed baseline health assessment at baseline (in 2005) and had the laboratory data were analyzed (n=761). The FI-LAB was constructed from routine laboratory data and calculated as the ratio of abnormal of 22 health related blood variables (e.g., white blood cell, red blood cell, and alanine transaminase). The effect on death was examined using multivariable Cox regression. Results: Of 761 participants (age=93.7±3.4 years; 67.5% women), 53.6% died in the four-year follow-up. The mean baseline value of the FI-LAB was 0.21 (standard deviation 0.10; range 0 to 0.57). Increased level of the FI-LAB was associated with an increased risk of dearth (age, gender adjusted): the odds ratio was 1.013 (95% confidence interval 1.004, 1.023) with each 1% percent increase of the FI-LAB. Conclusions: The FI only base on the routine laboratory data was still a significant risk factor of death even in the oldest old Chinese people. Key words: frailty; frailty index; mortality; laboratory data.

**P169- FRAILTY RESEARCH IN INDIA.** A.B. Dey, J. Swapnil Sudhakar, N. Mohan, S. Dey *(New Delhi, India)*

Backgrounds: In the large older population of India, frailty can be a major clinical issue in Geriatric practice. Our group has been working various aspects of the problem. In our first report it was observed that a third of all older hospitalized patients were frail as per Fried's criteria and they had significantly lower hemoglobin and higher risk of heart failure, tuberculosis and cognitive impairment. As several difficulties were encountered while applyingthis criteria for detection frailty, efforts were made to established a novel diagnostic platform and identify clinical and biochemical markers of frailty among older Indians. Methods: To establish determine the feasibility of a novel scale directed older population of India and similarly placed societies, 140 ambulatory older persons were assessed with Reuben's physical performance test and Brown's modified physical performance tests. Forty out of 140 patients were frail and which compared well with Fried's criteria. A new scale was created with features from Fried's criteria and the physical performance scales with assessment culturally and socio-economically acceptable for population to be assessed. The scale was validated in 200 ambulatory older subjects. It was further revalidated in 143 hospitalized patients and compared with frailty phenotype of Fried et al and frailty index of Rockwood et al. These subjects were assessed for markers of alteration in body composition: weight, height, BMI; energy metabolism: performance based tests of physical function; homeostatic dysregulation: thyroid function test, Vitamin D, Sirtuins, IL -6 and CRP; and neuro-degeneration: assessment of global cognition and timed up and go test. Results: The novel scale for detection of frailty identified 82 of 200 cases as frail while 81 of were termed frail as per frailty phenotype criteria. Cohen's Kappa coefficient of agreement between two scales was 0.89 (0.76 – 1.0). The scale had sensitivity of 93.83% and specificity of 94.96% with relation to frailty phenotype. Among hospitalized patients (143) in Geriatric Medicine ward, the frequency of frailty approached 50%. Frailty phenotype, frailty index and the new scale scales were consistent in detecting frail individuals. Although associated with increasing age, frailty is associated with other factors such as comorbidity, cognitive impairment and diabetes. Slow gait speed was seen to be associated with cognitive impairment and poor functional status. Sirtuin 1 and 2 levels were low in frail patients by Fried's criteria, whereas IL 6 levels were higher in frail group by Rockwood's criteria. Conclusion: Our studies on frailty have established a research base in frailty in India. The novel scale is comparable to established tools. The study of biomarkers needs to be further pursued on large scale, with focus on sirtuin, inflammatory markers like IL6 and CRP. Longitudinal studies can be helpful to ascertain their prognostic value, and to judge response to treatment.

**P170- PERIPHERAL NERVE SENSATION AT THE GREAT TOE IS RELATED TO FOOT REACTION TIME IN MOBILITY-LIMITED OLDER ADULTS.** E.S. Strotmeyer[1], B. Lange Maia[1], M. Skjødt[2], L.G. Hvid[2], P. Caserotti[2] *(1. Pittsburgh, USA; 2. Odense, Denmark)*

Background: Sensorimotor peripheral nerve impairments may influence the speed of movement and have been related to gait speed, chair rise speed and muscle power

(force*velocity) in older adults. Peripheral nerve impairments also increase the risk for geriatric outcomes such as falls and disability. Foot reaction time is shown to be slower in diabetic neuropathy patients and related to falls in this group, though is not well examined in frail older adults. Therefore, the relationship of reduced peripheral nerve sensation and foot reaction time was evaluated in mobility-limited older adults. Methods: Participants from the Healthy Ageing Network of Competences (HANC; N=56, aged 82.3±4.7 years, 66% women) were community-dwelling with gait speed <0.9 m/s from a 3-m usual walk and a mini-mental state exam (MMSE) score >21. Sensation at the dorsum of the great toe was measured bilaterally with a 1.4-g light monofilament and 10-g standard monofilament. The total number detected from 4 touches per toe was tallied for each monofilament (continuous detected out of 8) and each side (impaired: <3/4 detected). Multivariate linear regression was used to model separate outcomes of foot reaction time in seconds to either a light or sound stimulus, which were log transformed due to skewed distributions. Models were adjusted for the monofilament predictor of interest and, if p<0.10, age, sex and MMSE score. Results: Overall 53% of participants had impaired monofilament detection on one side, with impaired 1.4-g detection in 28% and impaired 10-g detection in an additional 25%. Median (interquartile range) number of touches detected for the 1.4-g and the 10-g monofilaments were 6.0 (2.5-7.0) and 8.0 (6.0-8.0) respectively. Median (interquartile range) foot reaction time in seconds to either a light or sound stimulus were 0.33 seconds (0.29-0.40 seconds) and 0.31 seconds (0.28-0.36 seconds) respectively. The log transformed foot reaction time to light vs. sound had a correlation=0.70 (p<0.001). No differences existed in women compared to men for either the monofilament detection predictors or foot reaction time outcomes. In multivariate linear regression models, higher total number of touches detected from the 1.4-g monofilament were significantly related to faster foot reaction time to a light stimulus (p<0.05). Each additional touch from the 1.4-g monofilament that was detected corresponded to a 2.2% improvement in foot reaction time in seconds. A consistent direction of association was noted for the total number of touches detected from the 10-g monofilament and impaired 1.4-g/10-g monofilament detection, though these were not statistically significant. Foot reaction time to the sound stimulus was not related to any of the monofilament predictors either before or after adjustment for age, sex and MMSE score. Conclusion: Ability to detect a 1.4-g light touch monofilament is related to a faster foot reaction time in response to a visual stimulus for older adults with low gait speed, suggesting a potential role for integrated sensory impairment in falls and mobility disability.

**P171- THE EFFECTS OF FASTING AND EXERCISE ON MUSCLE PROTEIN METABOLISM (IGF1-AKT-MTOR-FOXO SIGNALLING PATHWAY) IN VERY OLD MICE.** Z. Soffe, T. Shavlakadze, M. Grounds *(Perth, Australia)*

Background: Skeletal muscle makes up approximately 40-50% of total body mass and is the major protein reservoir in the human body. The maintenance of muscle mass is controlled by the dynamic balance of (anabolic) protein synthesis and (catabolic) protein breakdown: such protein turnover is controlled by interacting signaling pathways. Where protein degradation predominates (i.e. under conditions of disuse, disease, starvation and aging) the loss of muscle mass (atrophy) can occur. Age-related loss of muscle mass and function is termed sarcopenia. Extensive studies in our laboratory using time course molecular analyses of aging muscles (both female and male mice up to 29 months old) have identified striking changes between 15 and 24 months of age, especially related to myofibre denervation and altered metabolism. Furthermore, we have shown that lifelong voluntary wheel exercise prevents the expression of molecular biomarkers of myofibre denervation. Exercise is widely recognized as a simple intervention to help reduce the extent of sarcopenia, yet the molecular mechanisms involved and impact on overall protein metabolism are not clear. Our research investigates the capacity of aging muscle to respond to both anabolic (resistance exercise) and catabolic (over-night fasting) stimuli and their effects on the IGF1-Akt-mTOR-FoxO signalling axis, including proteolytic pathways (proteasomal and autophagosomal degradation). Methods: Our skeletal muscle related research integrates three key studies: Study 1: Time course of aging in male C57Bl/6J mice, from adult (4 m) through to middle-age (15 & 18 m) and old (22 & 24 m). This study focuses on changes to basal protein metabolism, with a particular emphasis on the transition period (between 15 – 22 m) when sarcopenia is first evident. Study 2: Influence of fasting (16 h food deprivation) on age-related signaling in muscles of male C57Bl/6J mice aged 4 and 24 m. This study analyses the differential response of young and old muscle to food deprivation, with a focus on pathways of protein synthesis (mTORC1 signalling) and protein degradation (proteasomal and autophagosomal via interacting Akt-FoxO pathways). Study 3: Impact of exercise on protein metabolism and sarcopenia. To date we have tested 3 different exercise regimes using voluntary running wheels: (a) lifelong exercise from 4 m (with muscles sampled at 24 m); (b) late onset exercise with resistance from 25 – 27 m and (c) mid-life onset of resistance exercise for 8 months between 15 and 23 m (male and female). Results: (1). Time course of aging: studies of basal anabolic signalling revealed only modest changes to IGF1-Akt-mTOR signalling. Rather, the most striking changes in ageing muscle were associated with an increase in insoluble protein aggregates including autophagy marker p62/SQSTM1 (increased 1-fold between 4 and 24 m) and Ubiquitin (increased 3-fold between 4 and 22 m). (2) Fasting: After 16 h of fasting, a comparison of old (with young) mice highlights an inability of old muscle to regulate key markers of mTORC1 signalling, despite a rapid increase in proteasomal and autophagosomal markers. (3) Exercise: Old male mice displayed a remarkable capacity for endurance running, even after the application of 4-6 g of wheel resistance; responding with increased muscle mass. Mid-life onset of resistance exercise for 8 months in male and female C57Bl/6J, also highlighted progressive changes to wheel performance and running patterns, with a strong gender influence. Sampling of the latter exercised (and sedentary control) mice will be completed by December 2014. Analyses of these tissues from old exercising mice will provide deep molecular insight into the impact of exercise and gender on all aspects of protein metabolism and phenotype. Conclusions: This experimental work provides novel insight into the mechanisms of age-related skeletal muscle deterioration, as well as the responsiveness and capacity of protein turnover mechanisms in aging muscle under both anabolic and catabolic conditions.

**P172- AGE-RELATED ATTENUATED HYPERTROPHIC RESPONSES TO RESISTANCE EXERCISE TRAINING ARE ASSOCIATED WITH CHRONIC DEFICITS IN MUSCLE PROTEIN SYNTHESIS AND ANABOLIC HORMONES.** M.S. Brook[1], D.J. Wilkinson[1], B.E. Phillips[1], W.K. Mitchell[1], N.J. Szewczyk[1], P.L. Greenhaff[2], K. Smith[1], P.J. Atherton[1] *(1. Derby, UK; 2. Nottingham, UK)*

Background: Skeletal muscle mass gradually declines with advancing age, ultimately leading to both physical and metabolic impairments. Resistance-exercise-training (RET) is known to increase muscle mass and function and currently represents the most effective strategy for mitigating/ treating age-related muscle loss (sarcopenia). That being said, we have shown RET-induced increases in acute muscle protein synthesis (MPS) and chronic hypertrophy are blunted in old (O) vs. younger (Y) individuals 1,2. Despite the etiology of age-related "hypertrophy resistance" and sarcopenia being poorly defined, it could be conjectured that imbalances in anabolic/ catabolic factors (i.e. testosterone/ IGF-1/myostatin) may drive these phenotypes. Nonetheless, definitive links between ageing, RET-induced hypertrophy and systemic hormones are poorly defined. Moreover, the true mechanistic extent to which the acute blunting of MPS in response to a single bout of RET relates to chronic deficits in hypertrophic responses in older age remains entirely unknown. Therefore, we hypothesized that blunted hypertrophic responses to RET in older individuals would be reflected in impaired chronic MPS (using our newly developed heavy-water (D2O) methodologies) and that this would be associated with 'pro-anabolic' hormone imbalances. Methods: 10 younger (Y: 23±1y) and 10 older (O: 69±3y) healthy men undertook 6-wks supervised progressive unilateral RET (i.e. one-leg knee-extensor: 6×8 reps, 75%-1RM 3.wk-1). In both legs: Vastus Lateralis muscle thickness, myo-architecture, maximal voluntary contraction (MVC) and 1-repetition maximum (1-RM) were assessed at regular intervals with DXA at baseline (0-wks) and completion (6-wks). Habitual physical activity and food-intake were monitored via accelerometry and diet diaries, respectively. After baseline testing, subjects consumed 150ml D2O (70-Atom%) with a further 50ml.wk-1; bi-lateral biopsies and blood samples were taken ~60-90 min post exercise at 0/3/6-wk to temporally quantify rested and exercised MPS via GC-Pyrolysis-IRMS methods: MPS=(%.d-1)=-Ln((1-[APEAla/APEP])/t))×100. In addition, we collected blood samples at baseline and following the first bout of unilateral RET, to quantify systemic hormones (i.e. myostatin, IGF-1, testosterone ELISA's). Results: After 6-wks RET, 1-RM (an index of strength-related performance) had increased 35±4% P<0.01 in Y and 25±3% in O P<0.01, while MVC increased at various joint angles in Y (e.g. 70o 29± 6% P<0.01) but not O (8±3% P=NS). Similarly, quadriceps mass assessed by DXA increased only in Y (Y: 4±1% P<0.01 vs. O: 1±0.3% P=0.3). This was also consistent with blunted increases in muscle thickness (Y: 8±1 and 11±2%, P<0.01 vs. O: 2.6 ±1 and 3.5 ±2%, P=0.07 at 3 and 6-wks, respectively). Resting MPS was not different between groups (Y: 1.35±0.1%.d-1 vs. O: 1.39±0.1%.d-1). In contrast, reflecting [early] hypertrophy, MPS increased in Y but not O after 3-wks RET (Y: 1.61±0.1%.d-1 P<0.01 vs. O: 1.50±0.09%.d-1 P=0.1). Again, matching hypertrophic responses, MPS was not enhanced 3-6wks in either group (Y: 1.23±0.13%.d-1 and O: 1.39±0.15%.d-1). Basal concentrations of myostatin did not differ between groups (Y: 4563±403 pg/ml vs. O: 3781±373 pg/ml), whilst Y presented greater testosterone (Y: 3.6±0.2 ng/ml vs. O: 2.6±0.2 ng/ml P<0.05) and IGF-1 (Y: 155.1± 16 ng/ml vs. O: 84.2±8 ng/ml P<0.01) concentrations. Following the first bout of unilateral RET (i.e. 60-90 min), only serum testosterone increased and this occurred only in Y (post-RET: 3.93±0.2 ng/ml P<0.05). During the study, neither protein (Y: 1.7±0.1 g(kgFFM.d)-1 vs. O: 1.4±0.1 g(kgFFM.d)-1 P=0.1) nor caloric (Y: 44±5 Kcal(kgFFM.d)-1 vs. O: 35±6 Kcal(kgFFM.d)-1 P=0.1) intake significantly differed between Y and O. However, Y subjects were more habitually active: 76573±7521 vs. 50313±6996 activity counts.d-1 (P<0.05). Conclusions: Hypertrophic responses to RET predominate in the early stages of exercise training i.e. <3-wks, and are underpinned by sustained increases in MPS. In contrast, hypertrophic adaptations are blunted in older age, likely the result of chronic deficits in MPS. Agreeing with previous work 3 we observed lower levels of anabolic hormones and speculate that these may contribute to blunted hypertrophy and sarcopenia; in contrast, a lack of difference in myostatin further impacts its physiological association with sarcopenia. We conclude D2O is proving insightful for long-term measures of MPS and has potential for muscle sub-fraction turnover (e.g myofibrillar, mitochondria, satellite cells). Ease of application in these methods and minimal invasiveness heralds great promise for unraveling mechanisms of muscle loss in ageing populations and for investigating the efficacy of trophic interventions in longer-term 'free-living' situations. References: 1. Greig, C. a et al. Blunting of adaptive responses to resistance exercise training in women over 75y. Exp. Gerontol. 46, 884–90 (2011). 2. - Kumar, V. et al. Age-related differences in the dose-response relationship of muscle protein synthesis to resistance exercise in young and old men. J. Physiol. 587, 211–7 (2009). 3. Kraemer, W. & Häkkinen, K. Acute hormonal responses to heavy resistance exercise in younger and older men. Eur. J. … 206–211 (1998). at <http://link.springer.com/article/10.1007/s004210050323>

**P173- THE GEOMETRIC FRAMEWORK TECHNIQUE TO ASSESS THE RELATIONSHIPS BETWEEN NUTRITION AND FRAILTY IN A SAMPLE OF AUSTRALIAN MEN.** R.V. Waern, R.G. Cumming, V. Hirani, F.M. Blyth, V. Naganathan, D.G. Le Couteur, D. Raubenheimer, S. Simpson *(Sydney, Australia)*

Backgrounds: Nutrition plays an important role in the prevention, development and treatment of frailty, yet little is known about what represents a macro-nutritionally balanced diet. This study aims to evaluate the associations between macronutrient intake and frailty and its components. Methods: Nutritional data of 696 men aged ≥75 years participating in the population based Concord Health and Ageing in Men Project (CHAMP) was obtained through diet history interview. Frailty was determined using the Cardiovascular Health Study (CHS) criteria (weight loss ≥15%, self-reported exhaustion, weakness measured by grip strength, slow walking speed, and Physical Activity Scale for the Elderly (PASE) score ≤72). General Additive Models (GAM) and the Geometric Framework - a state-space nutritional modelling technique - was used to measure interactive effects of dietary protein, fat and carbohydrate on frailty and it components. Results: Participants' mean age was 81 years (SD4.3), mean energy intake was 8909kJ (SD2111.5), frailty was present in 47 men (7%), 330 (47%) men were pre-frail, and 319 (46%) were robust. Both high and low fat intakes were associated with frailty as outlined by the GF, but carbohydrate and protein did not influence overall frailty. As for frailty components, higher protein intakes were significantly associated with faster walking speed as were high PASE scores with high carbohydrate intakes. Conclusion: Patterns of nutrition and macronutrient balance showed relationship with CHS frailty and its components. The direction of causality in this cross-sectional study cannot be determined, but the results do suggest some possible nutritional approaches to prevent or treat frailty.

**P174- BODY COMPOSITION AND NEUTROPHIL TO LYMPHOCYTE RATIO IN COLORECTAL CANCER PATIENTS.** C.H. Kroenke[1], C.M. Prado[2], J. Xiao[2], E. Weltzien[1], J. Meyerhardt[3], B.J. Caan[1] *(1. Oakland, USA; 2. Edmonton, Canada; 3. Boston, USA)*

Background: Suboptimal body composition, particularly low muscle mass (MM), has been related to poorer colorectal cancer (CRC) survival but mechanisms are not well understood. We examined whether body composition was related to the neutrophil-to-lymphocyte ratio (NLR), which has been used as a marker of inflammation and is associated with tumor progression and poorer survival. Methods: We identified men and women from Kaiser Permanente Northern California diagnosed with stages I-III CRC between 2006-2011 with data on weight and height at diagnosis, for whom body composition data on 657 patients was analyzed using computed tomography (CT) images, and data on neutrophil and lymphocyte counts were available within 45 days of a CT scan performed near diagnosis and prior to treatment with chemotherapy. Data on body composition were analyzed by one of the authors (JX) and body composition values were obtained using the Slice-O-Matic software program. Using logistic and linear models, we evaluated associations between tertiles of MM, visceral fat (VF), and subcutaneous fat (SF), and dichotomous (< vs. > 5) NLR, a predictor of CRC survival in previous research, and log continuous NLR. Models were adjusted for sociodemographics, stage, and treatment with chemotherapy, and simultaneously for MM, VF, and SF. We also evaluated analyses stratified by body mass index (BMI), stage, age, sex, and presence of comorbidity. Results: Compared to those in the highest tertile of MM, patients in the middle (OR=1.13, 95% CI: 0.66-1.95) and lowest (2.47, 95% CI: 1.41-4.32) tertiles of MM had higher odds of NLR>5 (p-value, continuous MM<0.001; p-value, continuous MM with log continuous NLR=0.03). By contrast, patients in the middle (vs. lowest) tertile of SF had lower (OR=0.47, 95% CI: 0.28-0.78), and those in the highest (vs. lowest) tertile of VF had higher odds (OR=1.82, 95% CI: 1.01-3.28), of NLR>5 (p-value, continuous VF with NLR>5= 0.11; continuous VF with log continuous NLR=0.05). Additional adjustment for body mass index did not qualitatively influence results. There was some evidence of effect modification by BMI with the most pronounced inflammation among obese patients with the lowest MM. However, interaction terms were statistically nonsignificant. There was little evidence of effect modification by other variables we examined. Conclusion: CRC patients with low MM and those with high VF had a higher NLR, suggesting that these aspects of body composition are relevant to inflammatory processes in CRC patients.

**P175- DO THE FRAILTY INDEX AND LATE LIFE FUNCTION & DISABILITY INSTRUMENT ENHANCE THE FRAILTY ASSESSMENT COMPARED TO THE NATIONAL ASSESSMENT STANDARDS USED ON TRANSCATHETER AORTIC VALVE PATIENTS?** A.K. MacPhedran, M. Mieczkowski, M. Tattersall, J. Therasse, J. Wilson, M. Izzo *(Pennsylvania, USA)*

Background: Transcatheter aortic valve replacement (TAVR) has recently become a more utilized procedure to perform on patients that are too frail to handle the demands of a standard open heart surgical approach. The question of how to determine frailty in cardiac patients has been difficult to objectively quantify. With that being stated, health professionals need to find an efficient and accurate way to determine the individual's health status in order to help determine surgical candidacy, ensure a better surgical success rate and improve overall quality of life. The current frailty assessment tools used to assist in determining eligibility for TAVR and considered the standards to use by the national Transcatheter Valve Therapy Registry (TVT Registry) are the Kansas City Cardiomyopathy Questionnaire (KCCQ) and the 5-meter walk test (5MWT). Every potential TAVR candidate has severe aortic stenosis as part of the criteria, however, not every one of them necessarily has congestive heart failure and cardiomyopathy, such that the KCCQ may not be the most appropriate and accurate tool to use to capture frailty in this population. Impairments in activities of daily living have been associated with disability and when combined with physiologic components such as gait speed, physical activity, and grip strength, frailty has been shown to be more accurately assessed. Fried's Frailty Index and Late-Life Function and Disability Instrument (LLFDI) were designed to measure deficits based on a wide variety of physical functions and activities of daily living (ADLs) in the geriatric and cardiac population but as yet, have not been combined to assess frailty. Therefore, the purpose of this research was to determine which of these outcome tools most accurately depicted frailty in patients who underwent TAVR. Methods: This retrospective study analyzed data from frailty assessments conducted on subjects who underwent TAVR from April, 2013 - October, 2014 at Saint Vincent Health Center. Preoperative LLFDI questionnaires were collected for ADL information and the "physical activity" criterion of the Frailty Index, along with 5MWT, weight loss and exhaustion questions, and grip strength (per Fried et al's methodology), for all other baseline Frailty Index measurements. Concurrently, baseline KCCQ's were obtained and their summary scores were calculated (0-100). According to Frailty Index, subjects with scores ≥ 2 (out of 5) were classified as frail, and 0-1 as not frail. In congruence with New York Heart Association (NYHA) Class III or IV, subjects with KCCQ scores 0-59 (out of 100) were classified as frail and scores ≥ 60 as not frail. Retrospective chart reviews were conducted to calculate 30-day all-cause mortality rates and morbidity events (bleeding, major and minor vascular, arrhythmia, stroke, myocardial infarct, renal failure). With the cohort dichotomized into frail and not frail groups according to each measurement tool, and morbidity and mortality data obtained, sensitivity, specificity, as well as negative and positive predictor values were evaluated for both the Frailty Index and the KCCQ. Association of frailty with mortality and morbidity was assessed with hazard ratio using CI at 95%. Results: Frailty was assessed retrospectively in 45 subjects, of which there were 3 deaths and12 with complications (15 total, including deaths). With the Frailty Index, 41/45 subjects were identified as frail (n=4, not frail) and of those deemed frail, the negative predictor value was 75%. Frailty Index had 93.8% sensitivity in accurately identifying subjects deemed frail as those who later had complications. Overall positive predictor value for Frailty Index was 38.8% with n=26 false positives, yielding a specificity of 10.3%. Using the KCCQ, 43 /45 subjects were identified as frail (n=2, not frail) and of those deemed frail, the negative predictor value was 100% and thus, sensitivity was 100%. Overall positive predictor value for KCCQ was 34.9% with n=28 false positives and a specificity that yielded 6.7%. Conclusion: Both the KCCQ and Frailty Index appear to have high sensitivity in detecting individuals that truly are frail. Further research is recommended on a larger, more diverse TAVR population using the KCCQ and Frailty Index, in order to calculate a more accurate specificity for frailty, and ultimately, to assess associated risk of mortality and morbidity [hazard ratio].

**P176- IDENTIFICATION OF SERUM SIRTUINS AS NOVEL NON-INVASIVE PROTEIN MARKERS FOR FRAILTY.** S. Dey, R. Kumar, N. Mohan, A. Datt Upadhyay, A.P. Singh, V. Sahu, S. Dwivedi, A.B. Dey *(New Delhi, India)*

Background: The term "frailty" in old age has been use in clinical practice for nearly three decades. Its understanding has improved with increase in the size of the ageing populations has increased in most societies. It has emerged as a major health issue among older patients Activation of sirtuins, a conserved family of NAD-dependent proteins, is one of the many mimics of calorie restriction which improves lifespan and health in experimental animals. In this cross sectional study, association of serum sirtuin concentration was assessed in frail and non-frail older subjects with an objective of examining it as a marker of frailty in old age. Methods: Serum SIRT1, SIRT2 and SIRT3 were estimated by Surface Plasmon Resonance (SPR) and Western Blot in 119 (59.5%) non-frail and 81(40.5%) frail individuals, diagnosed by Fried's criteria. Results: Serum sirtuins level in Mean+SD ; SIRT1 (non frail-4.67 ± 0.48ng/$\mu$l; frail-3.72±0.48ng/$\mu$l; p<0.0001), SIRT2 (non frail- 15.18±2.94ng/$\mu$l; frail- 14.19±2.66 ng/$\mu$l; p=0.016) and SIRT3 (non frail-7.72±1.84 ng/$\mu$l; frail- 6.12±0.97ng/$\mu$l; p<0.0001) levels were significantly lower among frail patients compared to the non frail. In multivariable regression analysis, lower sirtuins level were significantly associated with frailty after adjusting age, gender, diabetes mellitus, hypertension, cognitive status and number of co-morbidities. For detecting the optimum diagnostic cut-off value a ROC analysis was carried out. The area under curve for SIRT1 was 0.9037 (cutoff-4.29ng/$\mu$l; sensitivity-81.48%; specificity-79.83%) and SIRT3 was 0.7988 (cutoff- 6.61ng/$\mu$L; sensitivity-70.37%; specificity-70.59%). Conclusion: The present study shows that lower circulating SIRT1 and SIRT3 levels can be distinctive marker of frailty.

**P178- DYNAMIC PROTEOMIC RESPONSES TO SKELETAL MUSCLE INFLAMMATION AND REPAIR IN MICE AND MAN.** M. Shankaran[1], C. King[1], P.A. Wong[1], S. Turner[1], M. Hellerstein[1], J. Mallinson[2], P. Greenhaff[2], T.W. Shearer[3], S.A. Stimpson[3], F. Kramer[3], A. Billin[3], A. Russell[3], R. Clark[3], W.J. Evans[3] *(1. Emeryville, USA; 2. Nottingham, UK; 3. Research Triangle Park, USA)*

Background: Skeletal muscle regeneration and repair is a coordinated process in which multiple factors, such as satellite cells, transcription factors, signaling molecules and other proteins are sequentially activated to restore or preserve muscle structure and function after injury. This ability to maintain muscle plasticity and integrity is impaired in age-related conditions such as sarcopenia and frailty. Identification of early biomarkers of muscle repair can aid in development of therapeutic interventions. We evaluated the use of proteome dynamic measurements following muscle inflammation induced by eccentric exercise in rodents and humans. Methods: Unilateral high load eccentric contraction was used to identify functional markers of muscle repair. To determine whether changes in protein kinetics accompanied alterations in muscle function, we used a dynamic

proteomics approach, involving heavy water (D2O) labeling of newly synthesized muscle proteins and tandem mass spectrometry to measure the fractional synthesis rate (FSR) of 150-200 individual skeletal muscle proteins in both the exercised leg and the contralateral 'rest' leg. The preclinical studies were conducted in accordance with the GSK Policy on the Care, Welfare and Treatment of Laboratory Animals and were reviewed by the Institutional Animal Care and Use Committee either at GSK. The human biological samples from eight volunteers were sourced ethically and their research use was in accord with the terms of the informed consents. Muscle tissues obtained after various time-points of D2O labeling were processed for sequential protein extraction followed by trypsin digestion before high-resolution tandem mass spectrometric analysis. Results: Eccentric exercise induced an isometric strength deficit 24-hrs after injury, which was 30% and 16% in mice and humans respectively. Functional restoration occurred in 3-4 weeks in mice and ~1 week in humans. When mice were labeled with D2O at varying time-points after exercise-induced muscle inflammation, protein kinetic analysis revealed distinct time-dependent patterns. An early reduction in FSR of individual myofibril, extracellular matrix, cytosolic and mitochondrial proteins was observed within 1-3 days with a subsequent increase in FSR of these proteins after 3 days. Eight human volunteers consumed D2O from 3 days prior to eccentric exercise up to 3 weeks post-exercise. Proteome dynamics measured in these subjects' revealed individual signatures in their protein FSR response. Proteins involved in myogenesis and repair such as Filamin-C, Cysteine and glycine-rich protein 3, and tripartite motif-containing protein 72 showed a significant increase in the exercised leg compared to the rested leg. Early response in both rodents and humans was characterized by significantly increased FSR of several proteins, including desmin, heat-shock protein beta-1 and alpha-crystallin B. Conclusion: Dynamic proteomics represents a powerful translational technique to explore temporal responses to eccentric exercise-induced skeletal muscle inflammation and recovery, with the potential for development of robust biological and pharmacodynamic markers of repair in both animal models and humans.

**P179- DYNAPENIA WITH OBESITY AND RISK OF FUNCTIONAL IMPAIRMENT: DATA FROM THE LONGITUDINAL OSTEOARTHRITIS INITIATIVE.** J.A. Batsis[1,2], A.J. Zbehlik[1,2], D. Pidgeon[1,2], S.J. Bartels[1,2] *(1. Hanover, USA; 2. Lebanon, USA)*

Background: Obesity is associated with functional impairment, institutionalization and increased risk of death in older adults. Dynapenia or muscle weakness is also an independent predictor of adverse events and disability. The interaction of dynapenia and obesity is thought to lead to worse outcomes than either independently. We sought to identify the impact of having dynapenia with obesity in a cohort at risk for developing osteoarthritis to determine its impact on subjective patient-reported disability measures. Methods: We used secondary data from the longitudinal Osteoarthritis Initiative to identify adults aged ≥60years. Obesity was defined as a body mass index (BMI) ≥30kg/m2. Dynapenia was classified using the lowest sex-specific tertile of low knee extensor strength (KES) in this cohort (males<365.8N; females <235.3N). Persons were categorized into four categories according to obesity status and knee extensor strength: dynapenia with obesity (DynO); dynapenia without obesity (DynWO); obesity without dynapenia (OWDyn); and subjects without dynapenia nor obesity (WDynWO). Data was available on our measures at 4-years. Our primary outcomes included the frequency and limitations domains of the Late-life Disability and Function Index (LLFDI) and self-reported activities of daily living (ADL) impairments assessed at 4-years. We performed multivariable regression analysis using linear and logistic regression analyses, adjusting for age, sex, Charlson co-morbidity index, physical activity, race, education, and smoking status. Results: Of 2,252 subjects, mean age was 68.2 years and 1,269 (56.3%) were female. Of these, 182 (24.1%) were labeled as DynO; 493 (21.9%) as DynWO; 482 (21.4) as OWDyn, and 868 (38.5%) participants had neither dynapenia or obesity. Unadjusted LLFDI-limitation scores were 52.6, 53.5, 53.9 and 53.9 (p=0.004) in males, and 54.5, 56.5, 55.1 and 57.3 (p<0.001) in females, in the DynO, DynNO, OWDyn, and WOWDyn groups respectively. Unadjusted LLFDI-limitation scores were 75.3, 80.6, 82.4 and 85.2 (p<0.001) and 75.2, 79.5, 78.5, and 82.9 (p<0.001) in females, respectively. Adjusted LLDFI model estimates are indicated below along with the odds of having an ADL-impairment by Dynapenia/Obesity category. Conclusion: Among older adults at risk for osteoarthritis, dynapenia with obesity may be a unique risk for functional decline over time, suggesting the value of targeting and intervening subjects with low muscle strength and high BMI.

| | LLDI-Frequency | | | LLDI-Limitations | | | ADL-Impairment |
|---|---|---|---|---|---|---|---|
| Males | β | S.E. | p-value | β | S.E. | p-value | Odds Ratio (95% CI) |
| Intercept | 53.52 | 1.73 | <0.001 | 109.4 | 4.61 | <0.001 | --- |
| Dynapenia with obesity | 1.55 | 0.419 | <0.001 | -5.00 | 1.12 | <0.001 | 2.23 [1.42:3.50] |
| Dynapenic without Obesity | -0.63 | 0.26 | 0.15 | -3.14 | 0.69 | <0.001 | 0.98 [0.66:1.46] |
| Obesity without Dynapenia | -0.27 | 0.26 | 0.29 | -4.44 | 0.69 | <0.001 | 1.98 [1.39:2.80] |
| No dynapenia nor obesity | Referent | -- | -- | Referent | -- | -- | Referent |
| **Females** | **β** | **S.E.** | **p-value** | **β** | **S.E.** | **p-value** | **Odds Ratio (95% CI)** |
| Intercept | 56.3 | 1.49 | <0.001 | 85.1 | 3.48 | <0.001 | --- |
| Dynapenic with obesity | -0.685 | 0.345 | 0.05 | -4.34 | 0.808 | <0.001 | 2.45 [1.63:3.68] |
| Dynapenic without Obesity | -0.263 | 0.22 | 0.24 | -2.38 | 0.52 | <0.001 | 1.60 [1.15:2.22] |
| Obesity without Dynapenia | -0.743 | 0.23 | 0.001 | -3.67 | 0.54 | <0.001 | 1.47 [1.06:2.04] |
| No dynapenia nor obesity | Referent | --- | --- | Referent | --- | --- | Referent |

**P180- INOS-DEPENDENT INHIBITORY S-NITROSYLATION OF THE CXXC MOTIFS IN SIRT1 FUNCTION AS A PRO-INFLAMMATORY SWITCH LEADING TO SUSTAINED ACTIVATION OF P53 AND P65 NF-KB IN AGE-RELATED MUSCLE WASTING.** S. Shinozaki[1,2], A. Ishigami[2], K. Ben[1,3] M.E. Starr[3], H. Saito[4], H. Ito[2], K. Shimokado[4], M. Kaneki[1] *(1. Charlestown, USA; 2. Tokyo, Japan; 3. Poughkeepsie, USA; 4. Lexington, USA)*

Background: Sarcopenia, an age-related muscle wasting disorder, is associated with inflammation and apoptosis in skeletal muscle. Activation of NF-κB and p53, and inducible nitric oxide synthase (iNOS) are implicated in the pathogenesis of muscle wasting. Nonetheless, the relation between iNOS, p53 and NF-κB remains unknown. SIRT1 is an NAD+ -dependent deacetylase and a mammalian homolog of the putative yeast longevity gene, Sir2. SIRT1 deacetylates and inhibits p53 and p65 (a subunit of NF-κB, also known as RelA). The Cys-X-X-Cys (CXXC) motifs in the catalytic domain of Sir2 family proteins (sirtuins), including SIRT1, are phylogenetically conserved from yeast to humans. We have shown that S-nitrosylation, the covalent attachment of nitric oxide (NO) moiety to cysteine thiols, of the CXXC motifs in SIRT1 disrupts zinc binding to the CXXC motifs and thereby inactivates SIRT1 in vitro and in cultured cells. The CXXC motifs are the major S-nitrosylation site in SIRT1. In cultured C2C12 myotubes, LPS and cytokines (TNF-α + IFN-γ) induce iNOS expression, which, in turn, inactivates SIRT1 by S-nitrosylation, leading to increased acetylation and activity of p53 and p65 NF-κB and muscle atrophy. To clarify the molecular pathogenesis of sarcopenia, we studied roles of iNOS and SIRT1 S-nitrosylation in inflammatory response and apoptosis in aging-related muscle wasting in rats. Methods: Male F344 rats at 2 months and 23 to 28 months of age were used in this study (n=7-8 rats per group). Gastrocnemius muscle was excised under anesthesia from rats. To study the role of iNOS in the age-related alterations, the rats at 23 months of age were injected daily with a specific inhibitor for iNOS, 1400W (10 mg/kg, ip) or saline for 10 days. S-nitrosylation of SIRT1 was assessed by the biotin-switch method. Apoptotic nuclei were evaluated by TUNEL staining. Acetylation of p53 and p65 NF-kB was assessed by immunoblotting. Activities of p53 and p65 NF-kB were examined by DNA-binding capability and mRNA expression of the downstream genes. Mitochondrial DNA-to-nuclear DNA ratio was assessed by real-time PCR. Results: Skeletal muscle of aged rats had increased numbers of TUNEL-positive nuclei, which are indicative of apoptosis, compared to young rats. Mitochondrial DNA-to-nuclear DNA ration was significantly lower in aged rats than young counterparts, suggesting mitochondrial dysfunction and disintegrity. Moreover, the mRNA abundance of Fas and FasL (which encode proteins that induce of apoptosis and are targets of p53 and NF-κB), as well as Atrogin-1 and Murf1, which encode muscle-specific ubiquitin ligases involved in muscle wasting and are targets of NF-κB, were increased in skeletal muscle of aged rats compared to young rats. The skeletal muscle of aged rats had significantly increased abundance of iNOS (over 2-fold, p<0.01), S-nitrosylated SIRT1 (~5-fold, p<0.01), and acetylated p53 (~2.5-fold, p<0.01) and p65 NF-κB (~4-fold, p<0.05). However, total SIRT1 protein expression did not differ between aged and young rats. Whereas the abundance of p53 but not p65 NF-κB was greater in skeletal muscle of aged rats compared to young counterparts, the increase in acetylated p53 exceeded that of total p53 and hence acetylated p53-to-total p53 ratio was approximately 2-fold greater in aged rats than young rats (p<0.05). The skeletal muscle of aged rats had increased binding of p53 and p65 NF-κB to target DNA. Treatment with 1400W for 10 days decreased the S-nitrosylation of SIRT1 by 75% (p<0.001), and significantly reduced the acetylation and DNA binding of p53 and p65 NF-κB, and the expression of p53 and NF-κB target genes in skeletal muscle. Conclusions: Our data show that iNOS protein expression and SIRT1 S-nitrosylation were increased in skeletal muscle of aged rats compared with young rats, which paralleled the age-related increases in acetylation and activity of p53 and p65 NF-κB. All of these changes were reversed or ameliorated by iNOS inhibitor, 1400W. These data indicate that iNOS-dependent S-nitrosylation-mediated inactivation of SIRT1 plays a role in activation of the p53 and NF-κB pathways and thereby contributes to apoptosis and inflammation in skeletal muscle of aged rats, which, in turn, causes or exacerbates age-related muscle wasting. iNOS is a major mediator of inflammation and a downstream target gene of NF-κB. Together, our findings identify a positive feedback loop composed of NF-κB, iNOS, SIRT1, and p65 NF-κB that enhances and sustains the inflammatory response in

a rat model of age-related muscle wasting. Our results confirm that concerted activation of p53, NF-κB and iNOS plays a pivotal role in the pathogenesis of age-related muscle wasting in rats. Collectively, our data suggest that SIRT1 may be a hub for inflammatory and cell death signaling pathways and that S-nitrosylation of the CXXC motif of SIRT1 may function as a pro-inflammatory switch, leading to sarcopenia. Our study identifies S-nitrosylation of the CXXC motifs in SIRT1 as a novel potential molecular target to prevent and/or reverse age-related muscle atrophy.

**P181- TRANSITION IN FRAILTY STATUS AND ASSOCIATED FACTORS IN COMMUNITY-DWELLING CHINESE: THE BEIJING LONGITUDINAL STUDY ON AGING II (BLSAII).** Z. Zheng, H. Ding, J. Zhao, S. Guan, J. Zhang, J. Ma, Y. Jiang, P. Chan *(Beijing, China)*

Background: Frailty is a state of vulnerability to adverse outcomes in elderly. Unlike disability, it is described as a dynamic stage and reversible to robust condition. However little evidence is known about the characteristics associated with frailty transition. The objective of our study is to investigate the frailty transition and associated factors in community-dwelling elderly with both prevalence and incidence data from the Beijing Longitudinal Study on Aging II (BLSAII) cohort. Methods: This is a secondary analysis of data from the Beijing Longitudinal Study of Aging II (BLSA II) project. A multi-stage cluster random sampling method was used to select a representative community cohort of residents older than 55. Frailty status, assessed at baseline and 12-month follow-up visit, was defined using a frailty index (FI) as the number of deficits in 34 health variables. FI ≥ 0.25 was used as the cut-off criteria for frailty. Odds ratios (ORs) of progression and regression of frailty in individual risk factors were estimated using multivariate logistic regression adjusted for age, gender and residence. Results: There were 10,039 participants at baseline and 7,168 (71.7%) at one-year follow-up visit. Eight hundred and twenty one (13.02%) of robust participants at the baseline transited to a frailty condition at one year follow-up. Among participants presenting frailty at the baseline, 451 (50.79%) transited to robust condition and 437 (49.21%) remained frail. Women were more likely than men to change their frailty status from robust to frail($p<0.0001$). There was an increased risk of transition from robust to frailty and staying in frail with ageing($p<0.0001$). After adjustment for other predictors, hypertension (adj. OR 0.54, 95%CI 0.32, 0.9), cardiovascular diseases(CVD) (adj. OR 0.57, 95%CI 0.39, 0.82), arthritis(adj. OR 0.40 95%CI 0.28, 0.58), hearing loss (adj. OR 0.48, 95%CI 0.29, 0.81), and Tinetti's mobidity score (POMA<24) (adj. OR = 0.49 (95%CI 0.33, 0.75) negatively related with transition from frailty to robust and positively related with transition from robust to frailty [adj. OR = 1.8 for hypertension (95%CI 1.42, 2.28) , 2.13 for CVD (95%CI 1.67, 2.70) , 2.13 for arthritis (95%CI 1.65, 2.74), 2.00 for hearing loss (95%CI 1.2, 3.32), and 1.67 for POMA<24 (95%CI 1.14, 2.44)]. In addition, depression (GDS-15 ≤ 5) was negatively associated with recovery of frailty(adj. OR 0.59 95%CI 0.39, 0.90). And kidney failure (adj. OR 5.96, 95%CI 2.15, 16.58), impaired hearing (adj. OR 1.4, 95%CI 1.11, 1.76), fall risk (adj. OR 2.07, 95%CI 1.39, 3.07), impaired memory (adj. OR 1.53, 95%CI 1.22, 1.91), dyslipidemia (adj. OR 1.39, 95%CI 1.11, 1.74) and elevated plasma glucose (adj. OR 1.43, 95%CI 1.09, 1.89) were associated with increased likelihood of transitioning from robust to frail. Conclusions: Our findings suggest that frailty is a dynamic process, characterized by frequent transitions between frailty states over time. Ageing is the most important factor for frail status. Transitioning into frail status is primarily associated with certain comobidities and geriatric syndromes, some of which are readily modifiable. This study is supported by grants from Ministry of Health (No. 201002011), Beijing Municipal Commission of Science and Technology (D07050701130701), Ministry of Science and Technology (2012AA02A514, 2011CB504101)

**P182- PREVALENCE OF SARCOPENIA AMONG COMMUNITY-DWELLING ELDERLY OF A MEDIUM-SIZED SOUTH AMERICAN CITY: RESULTS OF THE COMO VAI?** T. Gonzalez Barbosa-Silva, R. Moraes Bielemann, A.M. Baptista Menezes, M.C. Gonzalez *(Pelotas, Brazil)*

Background: There is not enough data concerning sarcopenia prevalence in South America. The aim of this study was to estimate the prevalence of sarcopenia and its clinical subgroups in a Southern Brazilian city, besides evaluating possibly associated factors. Methods: A cross-sectional population-based study was performed among community-dwelling elderly aged 60 or over. Subjects were evaluated according to criteria established by the European Working Group on Sarcopenia in Older People (EWGSOP). Muscle mass was estimated by calf circumference (CC). Cutoff CC points were defined by a subsample's dual X-ray absorptiometry (DXA) estimation of the appendicular skeletal muscle mass index (ASMI), which was subsequently compared with the values of a population of young adults from the same city. Muscle strength was measured by manual digital dynamometry. Muscle performance was assessed through the 4-Meter Walk Gait Speed Test (4mGST). Results: The three diagnostic tests were successfully performed in 1291 subjects. CC of ≤34cm (males) and ≤33cm (females) were defined as indicatives of low ASMI, based on the comparison of the DXA-obtained ASMI of the substudy sample (N: 189) with a young adult sample (N: 3332) from a previous cohort study. Pre-sarcopenia was present in 10.1% (CI95% 8.5; 11.7%) of the population. The overall sarcopenia (including sarcopenia and severe sarcopenia only) prevalence was 13.9% (CI95% 12.0; 15.8%). Its frequency was significantly higher among elderly with low schooling, without a partner, with low socioeconomic status, smokers, inactives and with low body mass index (BMI). A higher prevalence of pre-sarcopenia was found in the youngest elderly, and a higher prevalence of the clinical stages of the syndrome was found in older age groups. Conclusions: The overall sarcopenia prevalence in Pelotas, a medium-sized South American city, was 13.9%. Approximately, one in ten elderly aged 60-69 years had not yet developed the syndrome, but was found to be in its preclinical stage. This is the age group in which public policies should focus to establish early diagnosis and to prevent progression of the syndrome to its clinical stages.

**P183- COMFORTABLE AND MAXIMAL GAIT SPEED: REFERENCE VALUES OF CHINESE SENIORS LIVING IN COMMUNITY AND RELEVANT FACTORS.** L. Cao, S. Hai, H. Wang, P. Liu, L. Zeng, B. Dong *(Chengdu City, China)*

Background: Gait speed at usual pace has been found to be a reliable and simple tool to identify community-dwelling older people at risk of adverse outcomes (Abellan van Kan et al., 2009). It is also an component of sarcopenia diagnosis criteria (Cruz-Jentoft et al., 2010). However, the reference values of gait speed in Chinese mainland people are not clear. In concern of walkway length, measuring apparatus (for example, using stopwatch or camera equipment), there is no uniform method to measure the gait speed in published articles (Bohannon & Williams Andrews, 2011). The aims of the present study are: 1) to know the gait speed at usual pace and at maximal pace in healthy Chinese seniors, 2) to compare the comfortable and maximal gait speed of the Chinese seniors and detect the relevant factors, 3) to know the effect of measuring methods on the result of gait speed, 4) to know the relationship between gait speed and height, gender, age, grip strength and leg muscle mass in the Chinese seniors. Method: The design of the study is descriptive and cross-sectional. Nine hundred subjects over 60 years old from Yulin community, Chengdu City in China are to be recruited in the study. All participants are generally healthy. Excluded subjects include athletes or body builders, disabled persons, too frail individuals and patients with thyroid function disorders or terminal stage carcinoma or serious heart and lung diseases or serious kidney diseases. All participants are asked to walk for 8 meters most comfortable pace and maximal pace twice respectively. The gait speed of the first 6 meters is measured by researchers with stopwatch at each walking. At the same time the whole course of the walking are recorded by a camera (Kodak, UA). The gait speed is also measured through analyzing the camera record. The general information, disease information, height, body weight are collected. The grip strength are measured using a dynamometer (CAMERY, CN) at both hands. The muscle mass are measured using a bioimpedence analysis apparatus (Bioscan, UK). Results: We have recruited 280 subjects for the study and collected all information needed. Averagely, 40 subjects can be recruited. The study will end in March, 2015. The results of the study could be reported on The 4th International Conference on Frailty & Sarcopenia Research (ICFSR2015). Conclusion: The study is expected to get reference values of gait speed in Chinese seniors and relevant factors. The effects of measuring method on the results to gait speed will also be studied. Abellan van Kan, G., Rolland, Y., Andrieu, S., Bauer, J., Beauchet, O., Bonnefoy, M., . . . Vellas, B. (2009). Gait speed at usual pace as a predictor of adverse outcomes in community-dwelling older people an International Academy on Nutrition and Aging (IANA) Task Force. J Nutr Health Aging, 13(10), 881-889. Bohannon, R. W., & Williams Andrews, A. (2011). Normal walking speed: a descriptive meta-analysis. Physiotherapy, 97(3), 182-189. doi: S0031-9406(11)00030-7 [pii] 10.1016/j.physio.2010.12.004. Cruz-Jentoft, A. J., Baeyens, J. P., Bauer, J. M., Boirie, Y., Cederholm, T., Landi, F., . . . Zamboni, M. (2010). Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing, 39(4), 412-423. doi: afq034 [pii] 10.1093/ageing/afq034.

**P184- HEALTH STATUS OF ELDERLY POPULATION OF EASTERN RAJASTHAN.** M.L. Sharma, P. Srivastava, S. Sharma, P. Sharma, S. Jain *(Jaipur, India)*

Background: Aging is inevitable. The world over, populations have been aging. People at or over the age of 60, constitute above 7.7% of total population. A variety of changes take place during the aging process. These can be hastened by the decline in antioxidant defenses. Nutrition is an important element of health in the older population and affects the aging process. Objectives: To study biosocial, nutritional and chronic disease risk factor profile of elderly population. Methods: A food frequency multiquestion questionnaire is used to explore dietary intake over a period of time. Study was conducted in Bharatpur and Dausa district, Rajasthan. 156 elderly persons of age 60 years and above were interviewed on predesigned questionnaire with average age of 76.4±2.86years. Out of these 94 were male and 62 were female. Results: Prevalence of high-risk factors for chronic diseases is quite high amongst elderly population, especially amongst elderly females. In all, 43.7% elderly were underweight and out of these females are 64.7%, 9.6% were overweight and remaining were in obese category. As per the Waist and hip ratio 45.8% elderly belonged to the moderate to high risk category .Frality is more in females. Females are more prone to fall in house in comparision of male. Conclusions: Females were more malnutrited than male this may be due to traditional system. Smoking (Bidi), Gutkha eating and inadequate physical activity (18.4%) are highly prevalent. Keywords: Aging, Nutrition, Health.

**P186- LOW URINARY CREATININE EXCRETION IS A REFLECTION OF PHYSICAL FRAILTY IN PATIENTS WITH ADVANCED CHRONIC KIDNEY DISEASE.** H.A. Polinder-Bos[1], H. Nacak[2], F.W. Dekker[2], C.A.J.M. Gaillard[1], R.T. Gansevoort[1] *(1. Groningen, The Netherlands; 2. Leiden, The Netherlands)*

Background: Twenty-four hour urinary creatinine excretion (UCrE) is an established measure of muscle mass and muscle performance. Loss of muscle mass and performance are key physiologic components of frailty, which is highly prevalent in advanced stage CKD. However, whether a low UCrE is a valid surrogate for frailty in this population is unknown. We studied this issue using data of patients with CKD stages 4 and 5 (not on dialysis) and used data of healthy subjects to define normal values for UCrE. We investigated in these CKD patients the cross-sectional associations between a low UCrE

and (the individual components that define) physical frailty, and frailty-associated variables. Methods: We selected 2801 healthy individuals from the PREVEND study, a general population based observational study, to define a low UCrE as below the 5th percentile. The 5th percentile was calculated per 5-year age category, stratified by gender, and indexed for height. For the frailty analyses, 973 CKD patients participating in the NECOSAD and 323 CKD patients participating in the PREPARE-2 study were included who had data on UCrE available. The NECOSAD and PREPARE-2 study are observational cohort studies, the first in dialysis-initiating CKD stage 5 patients and the latter in CKD stage 4 patients. NECOSAD participants were included only if 24-hour urine samples were collected before dialysis initiation. Different methods were used to assess the quality of the urine collections. Physical frailty was defined as a composite construct that incorporated poor self-reported physical functioning, exhaustion/fatigue, low physical activity, and underweight defined as a body mass index <18.5. Consistent with the modified definition of frailty developed by Woods et al , a total of 5 points was possible, with 2 points for low physical functioning and 1 point for each of the other criteria. Patients scoring ≥ 3 were defined as frail. Frailty-associated determinants included hemoglobin, albumin, PTH, the Charlson Comorbidity index, and nutritional status according to the Subjective Global Assessment. Logistic regression models were used to characterize cases with a low UCrE, and to study the associations with physical frailty. Results: The median UCrE in CKD patients was 6.90 mmol/day for women and 9.40 mmol/day for men, whereas for healthy individuals this was 9.85 and 14.36 mmol/day, respectively. A low UCrE, as defined by the healthy population, was found in 68% of the CKD patients (women 32% and men 67%). Multivariate logistic regression analysis showed that factors associated with a low UCrE were male gender (OR 2.10, CI 1.38-3.20, p 0.001), younger age (OR 0.91 for every 5 year increase, CI 0.85-0.97, p 0.003), peripheral vascular disease (OR 1.66, CI 1.03-2.65, p 0.04), chronic lung disease (OR 2.15, CI 1.11-4.19, p 0.02), and a lower renal function measured by creatinine clearance (OR 0.76 for every 1 ml/min increase (CI 0.72-0.79, p 0.000)). Physical frailty doubled the risk for a low UCrE (OR 2.14; CI 1.25-3.68, p 0.006). Of the individual components that were used to define frailty, underweight (OR 3.84, CI 1.79-8.25, p 0.001) and exhaustion/fatigue (OR 2.39, CI 1.40-4.06, p 0.001) increased the risk of a low UCrE most, followed by low physical activity (OR 1.76, CI 1.06-2.92, p 0.03) and poor physical performance (OR 1.34; CI 1.01-1.78, p 0.04). Of the frailty-associated determinants, hemoglobin (OR 0.70 per 1mmol/L increase, CI 0.62-.79, p 0.000), albumin (0.93 per 1 g/l increase, CI 0.91-0.95, p 0.000) and PTH (OR 1.16 per 10 pmol/L increase, CI 1.02-1.32, p 0.03) were associated with a low UCrE. Conclusions: In individuals with CKD stages 4 and 5 not on dialysis, a low UCrE is associated with physical frailty, with the individual components that define frailty, and with the frailty-associated variables hemoglobin, albumin and PTH. These data indicate that UCrE is a valid surrogate for frailty in patients with later stage CKD. In addition, we found that lower renal function was independently associated with an increasing percentage of individuals with a low UCrE, suggesting that decreasing kidney function induces changes in muscle mass and performance, leading to physical frailty.

**P187- IS THERE ASSOCIATION BETWEEN MUSCLE STRENGTH AND BODY COMPOSITION PARAMETERS IN ELDERLY PATIENTS ON HEMODIALYSIS?** F. Santin, J. Giglio, J. Cordeiro, A. Moutinho, F. Brito, C. Avesani *(Rio de Janeiro, Brasil)*

Background: It is well known that chronic kidney disease and the hemodialysis procedure contribute to a reduction of muscle mass. In addition, aging contributes to a reduction of muscle mass, increased fat mass and diminished strength. Therefore, the combination of CKD, hemodialysis and aging can lead to diminished muscle mass and muscle strength. However, it is not clear whether the reduction of strength in elderly in hemodialysis is accompanied by a concomitant reduction in muscle mass, body weight and increased fat. Thus, the aim of this study is to evaluate whether changes in handgrip strength (HGS) are associated with changes in body weight, body fat (BF%), fat free mass (FFM) and skeletal muscle mass (SMM) in a group of elderly patients on hemodialysis. Methods: Observational, longitudinal and prospective study including 66 patients aged ≥ 60 years on chronic hemodialysis for at least 3 months. All participants underwent anthropometric measurements, bioelectrical impedance, HGS (by dynamometer), laboratory measurements (albumin), SMM (by bioelectrical impedance; Janssen equation, 2000), and the assessment of nutritional status by subjective global assessment (SGA). After 12 months from baseline, patients were reassessed using the same protocol applied at baseline. Three groups were built, according to the HGS change (final value - initial). Participants who gained ≥ 1 kg of HGS were classified as having gained strength (HGS Gain Group), whereas those who lost ≥ 1 kg of HGS were considered to have lost strength (HGS Loss Group). The remaining participants were considered to be strength-stable (HGS Maintenance Group). A one-way analysis of variance (ANOVA) or Kruskal-Wallis test and chi-square tests were used to compare the groups, as appropriate. Bivariate correlations and multiple linear regression analysis were done to evaluate whether changes in HGS were associated with changes in body weight, BF%, FFM and SMM. All reported P-values (P) was compared to a significance level of 5%. Results: Sixty-six patients were included in the study. The majority of them were male (n=54; 81.8%), with a mean age of 71.7 ±6.9 years, length of dialysis of 2.2 (1.2; 4.9) years (median and 25th-75th percentile) and body mass index (BMI) of 25.5 (22.8; 29.4) kg/m2 (median and 25th-75th percentile). Out of 66 patients, 32 (48.5%) showed a gain in HGS (minimum of 1kg, maximum of 8kg), 20 (30.3%) showed a loss in HGS (minimum of 2kg, maximum of 6kg) and 14 (21.2%) have not changed the HGS. When comparing the baseline characteristics among the 3 groups we noted that the HGS Gain Group had a significantly lower age (HGS Gain Group: 69.4 ±5.8 years; HGS Loss Group: 71.2±6.7 years; HGS Maintenance Group: 77.7 ±6.3 years; P=0.001), lower proportion of malnutrition (HGS Gain Group: 43.8%; HGS Loss Group: 75%; HGS Maintenance Group: 71.4%, P=0.04) and higher serum albumin (HGS Gain Group: 4.2 (3.9; 4.4) g/dL (median and 25th-75th percentile), HGS Group loss: 3.9 (3.5; 4.1) g/dL, HGS Maintenance Group: 3.7 (3.5; 3.8) g/dL, P <0.001). The proportion of males and diabetes, length of dialysis, body weight and BMI were similar among the 3 groups. To examine the potential associations between changes in HGS and changes in body weight, BF%, FFM and SMM, bivariate correlations were conducted with all patients and then separately within the groups of HGS Gain (n=32) and HGS Loss (n=20). When evaluating all patients (n=66), no significant associations between changes in HGS and changes in body weight, as well as with changes in BF%, FFM and SMM were observed. Similarly, when evaluating these association in the HGS Gain Group, no significant associations were found, but there was a trend toward a positive association between gain in HGS and changes in skeletal muscle mass (r=0.33, P=0.08). In the HGS Loss Group, a negative association was observed between loss in HGS and changes in BF% (r= -0.56, P=0.011), implying that higher decline in HGS was associated with higher BF% gain over 12 months. In addition, a similar trend was observed between loss in HGS and changes in body weight (r= -0.40, P=0.08). Finally, for the HGS Loss Group, the linear regression analysis adjusted for gender and age showed that a greater decline in HGS was associated with higher gain in BF% (ß= -0.57, P=0.005). Conclusion: Over 12 months of follow up, there was no association between changes in HGS and changes in body composition parameters in the total group. In addition, our results suggested that the group that gained strength had better overall condition indicated by the younger age, lower prevalence of malnutrition and increased serum albumin concentration. Finally, the group that lost strength was associated with an increased gain in BF%, suggesting that this body compartment seems to negatively influence change in strength in elderly patients on hemodialysis.

**P188- OBSTRUCTIVE SLEEP APNEA SYNDROME IN OLDER ADULTS: GENETIC FACTORS AND COGNITIVE FRAILTY.** G. Andreou, K. Makanikas, M. Tasioudi *(Thessaly, Greece)*

Backgrounds: Obstructive Sleep Apnea Syndrome (OSAS) is a complex chronic clinical syndrome in which the upper airway becomes blocked repeatedly during sleep, resulting in increased respiratory effort and snoring, recurrent hypoxia, and frequent arousals from sleep. It affects 4-5% of the population and it has multiple predisposing factors (e.g. obesity, age, sex, craniofacial abnormalities). Several studies provide evidence that approximately 30–40% of the variance of OSAS can be explained by genetic factors associated with obesity, ventilatory control abnormalities, and craniofacial dysmorphism. Family aggregation has also been noted in some studies supporting the genetic basis of the syndrome (Casale et. al., 2009). Moreover, OSAS has an adverse effect on inductive and deductive reasoning, attention, vigilance, learning, and memory, according to the literature (Lal C. et al., 2012). Nevertheless, the relationship of those genetic factors with cognitive impairment is yet unknown. Therefore, our goal is to investigate the associations between Obstructive Sleep Apnea Syndrome, obesity, diabetes, and high cognition functions of semantic and phonemic verbal memory in adults. Methods: In the present study, 118 patients with severe OSAS [Apnea/Hypopnea Index (AHI) = 35,94±22,10], aged 50-70 years were recruited from the area of Thessaly, in Greece. 67,4% of those patients were obese. Pearson correlations and their 95% confidence intervals were performed using the IBM SPSS v.21 statistical analysis software. Dependent variables were Boston naming test (BNT), Peabody Picture Vocabulary Test (PPVT), Controlled Oral Word Association Test (COWAT) as well as General ability Measure for Adults (GAMA) performance. Predictors were Body Mass Index (BMI), hyper¬tension, diabetes as well as other OSAS' parameters such as Apnoea Hypopnea Index (AHI), which defines the presence and the severity of OSAS, Hypopnea index (HI), sleep arousals, oxygen desaturation and sleep defragmentation. Results: It was found that only the presence of diabetes had a negative effect on the performance of OSAS patients on BNT, PPVT and the phonemic test of COWAT. The presence of hypertension and obesity was not directly associated with impaired semantic and phonemic verbal memory. However, BMI was found to correlate with higher number of desaturation per hour of sleep and higher duration of desaturation per hour of sleep measured in minutes, parameters that have been found to be related with poor performance on the phonemic test of verbal fluency. Moreover, BMI showed a strong correlation with AHI (r=0,324), HI (r=0,332) and sleep arousals (r=0,308). Conclusion: In the present study, it is indicated that adults with OSAS, esp. those who also have diabetes, present signs of cognitive frailty esp. in the domain of phonemic verbal memory. The co-existence of hypertension and obesity in OSAS patients does not seem to affect their cognitive abilities directly. However, the fact that BMI, an index of obesity, is closely associated with OSAS' parameters may indicate common genetic risk factors for both OSAS and obesity (Casale et al., 2009). In general, obesity and its fat deposition in upper airway lumen is associated with the presence of Obstructive Sleep Apnoea Syndrome which has repeatedly been found to result in cognitive frailty. References/ Casale M., Pappacena M., Rinaldi V., Bressi F., Baptista P., and Salvinelli F. (2009). Obstructive Sleep Apnea Syndrome: From Phenotype to Genetic Basis. Current Genomics, 10: 119-126. Lal C., Strange C., and Bachman D. (2012). Neurocognitive impairment in obstructive sleep apnea. Chest, 141(6):1601-10.

**P189- VALIDATING A MODIFIED FRAILTY INDEX FOR USE IN A MEDICINE USE STUDY.** I. Widagdo, N. Pratt, M. Russell, L. Roughead *(Adelaide, Australia)*

Backgrounds: Frailty is common among the older population. Studies have shown that being identified as frail by the frailty index was associated with an increased risk of a range of adverse health outcomes, including mortality, hospitalisations, falls, and nursing home admission. Medicine use is also prevalent among the older population and

often associated with adverse outcomes. Incorporating frailty assessment in a medicine use study is essential to understand the association between medicine use and frailty. However the frailty index contains comorbidity variables which can introduce bias when used in a medicine use study. Therefore this study aimed to examine the validity of a modified frailty index which excludes comorbidity variables. Methods: Data from the 2087 participants of the Australian Longitudinal Study of Ageing (ALSA) was used to validate a modified frailty index which excluded comorbidity variables. Frailty was assessed at baseline using both the modified and the full frailty index. The validity analysis included analysis of construct, predictive, and concurrent validity. Rasch analysis was used to examine the construct validity by assessing the unidimensionality of the modified frailty index. The criteria of unidimensionality is based on the results from principal component analysis of the residuals analysis, where 50% or more of the raw variance is explained by the measures (first construct - frailty) and less than 5% is unexplained variance in the first contrast (additional construct). In addition item fit analysis was also used to assess misfitting items, with the items classified as misfits when the mean square (MnSq) values were outside the range of 0.5 – 1.7. The predictive validity was examined by assessing the performance of the modified frailty index in predicting a range of adverse outcomes: mortality, hospitalisation, nursing home admission, fall, and a combination of all outcomes. The predictive performance was assessed by measuring the odds ratio (OR) of the association between frailty and outcomes, as well as the analysis of sensitivity, specificity, positive and negative predictive values (PPV and NPV), and area under the curve (AUC). Lastly, concurrent validity was assessed using a correlation analysis to examine the strength of the relationship between the modified and the full frailty index. Results: The modified frailty index had good unidimensionality, with 76.7% of variance explained by the measure and 1.8% unexplained variance. There were no misfitting items, the MnSq values ranged from 0.79 – 1.37. Being identified as frail by the modified frailty index was significantly associated with an increased risk of a range of adverse outcomes, OR (95% confidence interval): 3.3 (2.6 – 4.2) for mortality, 1.7 (1.3 – 2.1) for hospitalisation, 5.2 (2.5 – 10.9) for nursing home admission, 2.3 (1.8 – 3.0) for fall, and 2.6 (2.1 – 3.1) for all outcomes. The modified frailty index was most sensitive in predicting nursing home admission (sensitivity: 64.5%), the PPV was highest for predicting all outcomes (61.5%). The modified frailty index had low accuracy in predicting outcomes with AUC only ranging from 0.553 – 0.693. There was a high correlation coefficient between the modified and the full frailty index: 0.876. Conclusion: The validity of the modified frailty index was satisfactory, with good construct validity and strong correlation with the full frailty index.

**P190- A REVIEW OF FRAILTY IN DEVELOPING COUNTRIES.** T.N. Nguyen, R.G. Cumming, S.N. Hilmer *(Sydney, Australia)*

Backgrounds. As the population ages, the prevalence and clinical importance of frailty are increasing. There have been few published studies about frailty in developing world. This study aims to review the evidence from developing countries on the prevalence of frailty, definition of frailty and factors associated with frailty. Methods. A literature search was conducted via MEDLINE and EMBASE. Keywords included "frail", "frailty", "prevalence", "criteria", "definition", "risk factors", "outcomes", "developing country", "developing world", and names of low and middle income countries according to the classification of the World Bank. Results. A total of 14 articles were reviewed from Brazil (n=6), China (n=3), Mexico (n=2), and one each from Russia, India, and Peru. There were 9 articles from community-based studies and 5 articles from hospital-based studies. Fried's phenotype for frailty was used to define frailty in the majority of studies. The prevalence of frailty in community-dwelling older people was 17%-31% in Brazil, 15% in Mexico, 5%-31% in China, and 21%-44% in Russia. The prevalence of frailty was 49% in institutionalized older patients in Brazil and 32% in hospitalized older patients in India. The prevalence of frailty in outpatient clinics was 55%-71% in Brazil and 28% in Peru. Frailty was associated with increased mortality and comorbidities, decreased physical and cognitive function, and poor perceptions of health. Conclusion. The limited studies available suggest that frailty occurs frequently in older people in the developing world and it appears to be associated with adverse outcomes. This has implications for policy and health care provision for these ageing populations.

**P191- RESPONSE TO ANTIPLATELET DRUGS IN FRAIL AND NON-FRAIL OLDER INPATIENTS WITH ATRIAL FIBRILLATION.** T.N. Nguyen, D. Pepperell, M.-C. Morel-Kopp, C. Ward, R.G. Cumming, S.N. Hilmer *(Sydney, Australia)*

Backgrounds. The utilisation of antiplatelet therapy in treatment for cardiovascular diseases is increasing, especially in older people. In frail older people it is unclear whether response to antiplatelet therapies is altered. This study aims to investigate the platelet function of older inpatients with atrial fibrillation (AF) taking antiplatelet drugs and explore differences between frail and non-frail patients. Methods. We recruited inpatients with AF aged ≥65years (mean 86±7) from Royal North Shore Hospital, Sydney. Frailty was determined using the Reported Edmonton Frail Scale. Platelet aggregation studies were performed using Whole Blood Impedance Aggregometry (Multiplate). The platelet agonists arachidonic acid and adenosine diphosphate were used to evaluate the response to aspirin and clopidogrel respectively. Cut-off for response to aspirin is an area under the curve (AUC) < 40 units (U). The target AUC in response to clopidogrel is comprised between 20U-42U. Results. Amongst participants taking aspirin, mean±SD AUC was 15±13U (n=33) overall and did not differ with frailty (18±15U frail, n=20; 11±8U non-frail, n=13; p=0.1); 2 had AUC>40U (both frail). Amongst participants taking clopidogrel AUC was 31±15U overall (n=14), 30±16U in frail (n=8) and 33±15U in non-frail (n=6), p=0.8; 4 had AUC<20U and 3 had AUC>42U. Correlation of frailty and arachidonic acid-induced platelet aggregation in participants taking aspirin showed an increased variability in response to aspirin with increased frailty score. Discussion. Nearly all participants responded to aspirin and half were outside the therapeutic range for clopidogrel. Platelet response did not differ between frail and non-frail older participants, although there was a trend towards increased variability in response to aspirin with increased frailty score. Sibbing D et al (2010) J Thromb Haemost 8(2):250-25; Capodanno D et al (2010) Journal of the American College of Cardiology 56(21):1683-1692

**P192- COAGULATION CHANGES IN FRAIL AND NON-FRAIL OLDER INPATIENTS WITH ATRIAL FIBRILLATION.** T.N. Nguyen, D. Pepperell, M.-C. Morel-Kopp, C. Ward, R.G. Cumming, S.N. Hilmer *(Sydney, Australia)*

Backgrounds: Studies suggest that ageing is associated with hypercoagulability and compared to non-frail, frail older people have a hypercoagulable state1 and an increased risk of bleeding complications with anticoagulant therapy2. This study aims to comprehensively assess coagulation function in older inpatients with atrial fibrillation (AF). Methods: Inpatients aged ≥ 65 years with AF at Royal North Shore Hospital, a teaching hospital in Sydney, Australia were recruited. CHA2DS2-VASc score was used to assess risk of stroke (total score ≥ 2 indicates high risk). HAS-BLED score was used to assess risk of bleeding in patients with AF receiving anticoagulant therapy (total score ≥ 3 indicates high risk). Frailty was determined using the Reported Edmonton Frail Scale (REFS). Overall Haemostatic Potential (OHP) assay, which measures ex vivo fibrin generation and fibrinolysis over time, were performed during hospitalisation. This assay detects both the coagulation system (with parameters overall coagulation potential – OCP and overall haemostatic potential – OHP) and fibrinolysis system (with parameter overall fibrinolysis potential after 45 minutes – OFP 45min). An increase in OCP, OHP and a decrease in OFP 45min indicate a hypercoagulable change. Data from young healthy volunteers at the Northern Blood Research Centre, Kolling Institute of Medical Research (N=64, 63% female, mean age 37.7±13.2 male, 40.6±11.9 female) was used as control group. Coagulation parameters were compared between the control group and study group, and between frailty groups, using unpaired t-tests for normally distributed variable and Mann-Whitney U-tests for non-normally distributed variables. Two-sided p values <0.05 were considered significant. Results: Ninety-five consecutive inpatients were enrolled: 59 participants were taking warfarin and 36 participants were not taking any anticoagulants. Amongst the thirty-six participants that were not taking any anticoagulants (mean age 87.3 ± 6.2, 39% female, 61% frail, mean REFS 8.3 ± 3.3, mean CHA2DS2-VASc score 4.4 ± 1.3), OHP assays showed increased fibrin generation and decreased fibrinolysis compared to controls (OCP: 56.9 ± 19.9U vs 44.4 ± 9.2U , p<0.0001; OHP: 17.7 ± 8.5U vs 9.3 ± 3.2U, p<0.0001; OFP 45min: 61.9 ± 14.3U vs 75.8 ± 5.3U, p<0.0001 in older and control group, respectively); frail participants showed significantly reduced fibrin generating capacity compared to non-frail (OCP: 52.6 ± 16.6U vs 63.6 ± 23.4U, p=0.03; OHP: 15.4 ± 6.7U vs 21.4 ± 9.9U, p=0.03; OFP 45min: 65.8 ± 9.0U vs 56.2 ± 18.6U, p=0.05 in frail and non-frail, respectively). Amongst the fifty-nine participants taking warfarin (mean age 84.4 ± 6.0, 41% female, 44% frail, mean REFS 7.2 ± 3.0, mean CHA2DS2-VASc score 4.8 ± 1.6, mean HAS-BLED score 3.1 ± 0.9), there were no significant differences in fibrin generation and fibrinolysis: mean ± SD of coagulation parameters was: OCP 50.8 ± 17.6U overall (51.0 ± 14.0U frail, 50.6 ± 20.2U non-frail, p=0.63); OHP 15.6 ±7.8 overall (15.2 ± 7.8U frail, 15.9 ± 7.9U non-frail, p=0.74); OFP 45min 64.3 ± 16.7 overall (68.3 ± 11.3U frail, 61.4 ± 19.5U non-frail, p=0.29); there were also no differences in INR (International Normalized Ratio) values between frail and non-frail (mean INR 2.30 ± 0.59 overall, 2.27 ± 0.5 frail vs 2.33 ± 0.67 non-frail, p=0.68). Conclusion: Overall, OHP assays in older patients with AF showed increased fibrin generation and decreased fibrinolysis compared to young healthy people, consistent with hypercoagulability. In patients not taking anticoagulants, frail subjects showed reduced fibrin generating capacity compared to non-frail. This contradicts previous studies measuring clotting factors only 3. For subjects taking warfarin, no difference in OHP parameters was seen between frail and non-frail, suggesting that warfarin therapy reverses hypercoagulability in the non-frail, with less effect on the frail cohort. A major limitation of this study is that it was done in the acute care setting, in which coagulation may be influenced by acute illness and inflammation. More data are needed to confirm this finding and explore potential confounders. References: 1. Kanapuru, B. and W. B. Ershler (2009). «Inflammation, Coagulation, and the Pathway to Frailty.» American Journal of Medicine 122(7): 605-613. 2. Johnson C, E., K. Lim W, et al. (2005). «People aged over 75 in atrial fibrillation on warfarin: the rate of major hemorrhage and stroke in more than 500 patient-years of follow-up.» J Am Geriatr Soc 53: 655-659. 3. Walston, J., M. McBurnie, et al. (2002). «Frailty and activation of the inflammation and coagulation systems with and without clinical comorbidities: Results from the cardiovascular health study.» Archives of Internal Medicine 162(20): 2333-2341.

**P193- THE ASSOCIATION OF GAIT SPEED WITH ENDOTHELIAL DYSFUNCTION AS MEASURED BY REACTIVE HYPEREMIA INDEX.** J.A. Brenes-Salazar, M. Gharacholou, R. Lennon, M. Singh (*Rochester, USA)*

Background: With the growth of the elderly population, the burden of coronary heart disease (CHD) shifts towards the older age groups, and frailty, a construct germane to the elderly, assumes increasing importance. It is estimated that 7% of the US population over 65 years and 30% of octogenarians are frail. Endothelial dependent vasodilatation is known to attenuate with aging in humans. Previous studies underscore that noninvasive measurement of extent of CHD are associated with frailty. Endothelial dysfunction precedes and portends the development of atherosclerosis and its evaluation in patients with CHD may shed light on its role in the development of frailty. Most studies examining the prognostic role of endothelial dysfunction consistently demonstrate its association with

adverse short- and long-term cardiovascular events. The clinical relevance of endothelial dysfunction is supported by studies in human coronary and peripheral circulation demonstrating correlation between impaired endothelial dependent vasodilatation and future cardiovascular events. Endothelial dysfunction provides additional prognostic information beyond that tendered by measuring the extent of atherosclerosis and traditional cardiac risk factors. On the other hand, gait speed in itself is considered a simple indicator of health status, frailty and of survival in older persons. It has been extensively validated and is gaining importance in risk-prediction models. The relationship between gait speed and endothelial function in older adults with cardiovascular disease has not been characterized; hence we performed a prospective analysis in community-dwelling older adults with known CHD. Methods: Between July 2008 to December 2009, a total of 119 patients over the age of 65 with stable coronary artery disease were enrolled at the Franciscan Skemp Hospital in La Crosse, WI, which is an affiliated site of the Mayo Clinic in Rochester. Standardized 15 –feet walk times were recorded for all patients, and stratified according to pre-established normal cut-offs for gender and height. We used reactive hyperemia peripheral arterial tonometry (RH-PAT) as a noninvasive tool to measure endothelial function in all patients. As a measure of reactive hyperemia, RH-PAT index was calculated as the ratio of the average amplitude of the PAT signal over a 1-min time interval starting 1 min after cuff deflation divided by the average amplitude of the PAT signal of a 3.5-min time period before cuff inflation (baseline). RH-PAT values below 1.35 will be used to define endothelial dysfunction. Results: 69 patients (58%) were found to have an abnormal reactive-hyperemia index (RHI) below 1.35. 27 patients (23%) were found to have a mean gait speed below 1.8 m/s, and thus, considered to have a frail gait. A discrete association between normalized walk speed and RHI was observed (Spearman's correlation coefficient r= -0.19, p= 0.038). Conclusions: A significant proportion of community-dwelling elderly individuals with stable coronary artery disease have evidence of endothelial dysfunction and abnormal gait speed. In such population, there appears to be a significant association between gait speed and endothelial dysfunction as measured by reactive-hyperemia index. These results emphasize the important interaction between vascular aging and frailty.

**P194- PREVALENCE OF THE SYNDROME OF THE FRAILTY IN HOSPITALIZED ELDERLY PATIENTS: DATA FROM A REFERENCE HEALTH CENTER IN SOUTHERN BRAZIL.** D.R. Oliveira, J. Sturmer, P. De Carli Tonial, L.A. Bettinelli, E.L. Colussi, A. Pasqualotti *(Passo Fundo, Brazil)*

Blackground: The frailty is a multidimensional syndrome characterized by a state of vulnerability to adverse health outcomes. This study aimed to measure the prevalence of frailty syndrome in elderly inpatients in a hospital in southern Brazil, through a crosssectional study. Methods: We evaluated ninety-nine elderly with 65 years of age or older who were hospitalized at the Hospital São Vicente de Paulo (HSVP) in Passo Fundo, during one month, who agreed to participate in the study by signing the Term of Informed Consent. The elderly were evaluated for the phenotype of frailty, the sociodemographic, clinical, anthropometric and cognitive variables. Results: Among the 99 patients in the study the mean age was 74.5 ± 6.8 years and 50 (50.5%) were women. Were classified as not frail 4 (4%), intermediate 49 (49.5%) and frail 46 (46.5%). No factors were identified statistically associated with the prevalence of fragility. According to the phenotype criteria proposed by Fried et al. (2001), it can be seen that the most frequent in frail elderly is the decrease in grip strength, followed by exhaustion, by decreasing the travel speed, by weight loss and the less common item is the reduction in physical activity levels. Conclusion: As was expected the prevalence of the syndrome of the frailty in hospitalized elderly patients was considered high when compared to the community. It is believed that early detection and the interdisciplinary intervention are efficient and effective strategies in the care of frail elderly, preventing progression of frailty, reducing the incidence of complications and length of hospital admissions and readmissions.

**P195- PREVALENCE OF HYPO-ALBUMINEMIA AND ASSOCIATED FACTORS IN ELDERLY HOSPITALIZED.** F. Brock, J. Sturmer, P. De Carli Tonial, L. Antonio Bettinelli, E.L. Colussi, J.C. Stobbe *(Passo Fundo, Brazil)*

Blackground: The albumin is a major serum protein capable of transporting microparticles into the blood stream and help maintain oncotic pressure, its serum depletion may lead to a worsening of symptoms, mainly in hospitalized elderly, because they generally are frail. The aim of this study was to relate hypo-albuminemia and determinants to health problems of elderly people admitted to a hospital. Methods: It is a cross-sectional study of a quantitative and descriptive nature that was developed with 200 patients admitted to a large hospital in southern Brazil, the technique was simple random selection in the elderly who were hospitalized during three months. Data were collected through a questionnaire, after signing the consent form. For data analysis we used the SPSS software v. 18. Results: Mean age was 72,6 ± 8,3 years. The result albuminemic averaged 2,9 ± 0,5 g/dL. The diagnosis of hypo-albuminemia was found in 173 subjects (87%) and 27 (13%) had albumin standard showed this difference is statistically significant (p=0,000). Using the Mini Nutritional Assessment, observed that the worsening of the nutritional status of hospitalized elderly is related to decreased levels of albumin. When comparing the results albuminemic of patients with grip strength (p = 0.079), hypertension (p = 0.367), diabetes mellitus (p = 0.748) and body mass index (p = 0.119) there was no statistical difference. Conclusion: The prevalence of hypo-albuminemia is high, constantly monitor the albumin and nutritional status enables early intervention and consequently decreases the length of stay, cost and appearance of other comorbidities.

**P196- RELATIONSHIP BETWEEN REDUCTION OF MUSCLE MASS AND ADVERSE OUTCOMES AFTER CARDIAC SURGERY.** P. De Carli Tonial, D. D'Agostini Jorge Lisboa, J. Sturmer, L.A. Bettinelli, E.L. Colussi *(Passo Fundo, Brazil)*

Background: Several studies about nutritional status preoperative cardiac surgery have used the body mass index as diagnostic, however this parameter is inefficient to measure the body composition. The cardiac surgical is a high-risk procedure, thus the patients who submit this surgery need a mayor care. The association between loss muscle mass and cardiac surgery can cause harm to patient, resulting in physical changes and nutritional deficiencies. The objective of this study was to conduct a literature review through scientific publications, about associating low fat free mass index and cardiac surgery. Methods: The research utilized the key-words: cardiovascular surgical procedures, fat free mass and fat mass índex. The studies were selected in english, spanish and portuguese, were excluded the studies with different thematics of the research. Results: The review of literature showed important outcomes about reduction of muscle mass and cardiac surgery. Cardiac patients with less fat free mass had more severe systemic inflammatory response. The low fat free mass index proved to be more reliable to classify malnourished patients than traditional parameters. The authors advocate the fat free mass index as the leading parameter in classifying and treating undernourished cardiac surgical patients. In relation to sarcopenic obesity, there is a combination of low fat free mass index and high fat mass concomitantly, the results of the one study realized with cardiac surgical patients suggest an additional risk of a low fat free mass index and high fat mass index present at the same time. Most of the articles showed longer hospital stay in patients with low muscle mass. Conclusion: It is observed a relationship between low fat free mass index and adverse events after cardiac surgery, demonstrating the need for a comprehensive assessment of preoperative body composition.

**P197- THE PREDICTION OF FALL RISKS USING BODY COMPOSITION AND PHYSICAL PERFORMANCE IN HOSPITALIZED ADULTS.** H. Tsuboi, J. Hashimoto *(Osaka, Japan)*

Backgrounds: Falls in elderly people are problems associated with increased morbidity and disability. Falls sometimes cause such problems as fractures because of frailty for not only healthy adults but also hospitalized adults. In our country, when patients are admitted to a hospital, their fall risks are always assessed only by some questionnaires provided by medical safety committees in many hospitals. Therefore, the purpose of this study is to investigate the possibility to predict fall risks of hospitalized patients using body composition and physical performance. Methods: 120 patients (79 male, 41 female) were enrolled in the study. The patients had a mean age of; male, 68.4 (43-87) years and female, 67.4 (39-88) years. All patients were classified in three groups at the time of admission using a fall risk assessment questionnaire provided by our medical safety committee, A; high risk group, B; moderate risk group, C; low risk group. In addition, the body composition of the muscle mass was measured using by BIA (Bioelectrical Impedance Analysis; MC190,Tanita, Tokyo, Japan) method and muscle strength was assessed by hand grip strength. Moreover, patient's physical performance was evaluated measuring timed up and go test (TUG). Results: 12 patients (5 male, 7 female) were assessed in Group A, 62 patients (43, 19) were assessed in Group B and 46 (31, 15) were group C. In Group A, muscle mass of lower extremities were 12.4±2.5 kg in male and 11.0±1.3 kg in female respectively. In Group B, 17.1±2.3 and 11.2±2.6 respectively, and in Group C, 17.5±2.6 and 11.8±1.6 respectively. Hand grip strength in Group A were 25.6±2.4 kg in male and 11.7±7.4 kg in female respectively, in Group B;26.0±8.8 and 15.6±5.3 respectively, and in Group C; 31.2±8.6 and 17.8±6.9 respectively. TUG in Group A were 9.2±2.0 sec. in male and 20.5±16.5 sec. in female respectively, in Group B; 9.4±4.5 and 10.9±3.5 respectively, and in Group C; 8.1±2.5 and 7.0±1.8 respectively. Conclusions;This study shows that results of muscle mass in lower extremities, hand grip strength and TUG were tend to decrease as the assessment for the fall risks was worse. In male, muscle mass was reflected more clearly in fall risks, on the other hand, hand power strength and TUG were reflected more clearly in fall risks in female. Therefore, the examination of the combination among body composition, muscle strength and TUG may be useful as a screening test for assessment for fall risks in hospitalized adults.

**P198- GAIT SPEED. CUTOFFS IN ELDERLY MEXICAN POPULATION.** E. Cruz, M.T. López, L.M. Gutiérrez *(México City, México)*

Backgrounds: Gait speed has been considered as one of the indicators of risk for adverse events in elderly. This activity of daily living can predict the clinical and physical performance in elderly. It has also documented that factors such as ethnic group and phenotypic characteristics can modify the gait speed; they would differ between populations. The purpose of this study is to determine population gait speed cutoffs for Mexican elderly. Methods: We performed a secondary analysis of data obtained from the Mexican Health and Aging Study 2012 (MHAS) in a representative subsample of 1, 206 elderly male and female aged 60 years and over who had data of gait speed; this variable was quantified in seconds from a distance of 4 meters (m/s). The cutoffs for gait speed were determined through measures of relative position: tertiles, quartiles, quintiles and z scores ($-2 \leq z$ score $\leq +2$) and were adjusting by sex and height (high and low). Then, the proportions of elderly were compared for different cutoffs. Results: Men with high height had a gait speed of 0.80 in T1, Q1 and Qu1 and 0.36 in -2 z scores and with low height of 0.67 (T1 and Q1), 0.57 (Qu1) and 0.24 in -2 z scores. In women with high height was 0.67 (T1), 0.62 (Q1), 0.57 (Qu1) and 0.21 in -2 z scores and with low height of 0.57 (T1), 0.50 (Q1 and Qu1) and 0.31 in -2 z scores Conclusion: Taking a cutoff without considering the characteristics of the population, could limit the detection of elderly with low gait speed;

the cutoffs were different compared with those reported in other populations. Is necessary to perform other studies to associate a low gait speed, as a potential screening tool, with adverse health outcomes.

**P199- CHANGE IN PHYSICAL PERFORMANCE MEASURES FOLLOWING KIDNEY TRANSPLANT.** B. Kotajarvi, E. Lorenz, N.K. LeBrasseur *(Rochester, USA)*

Background: Measurement of physical performance is increasingly being used for assessment of outcomes following medical interventions. These measures have been shown to predict risk of short-term mortality, functional decline, disability and future health care use. Although numerous performance measures exist, there is little information in the literature describing their use in the kidney transplant population. The objective of this study was to evaluate the change in physical performance measures in younger, middle-aged and older adults following a living donor kidney transplant. Methods: This was a prospective study of recipients of a living donor kidney transplant in the Mayo Clinic Transplant Center from 2012-2014. Subjects were tested before and 4- months after transplant in the clinical setting. Performance variables were 5-repetition chair rise time (sec), standing balance, gait speed (m/sec) and dominant hand grip strength (kg). Measures of chair rise, balance and gait speed were also combined in the Short Physical Performance Battery (0-12 points), a composite measure of lower extremity function. Results: A sample of convenience was enrolled consisting of 113 subjects. Subjects were divided into 3 age groups; ≤ 40 years (younger), 41-60 years (middle-aged), and ≥ 61 years (older). Prior to transplant, older subjects exhibited significantly slower performance in chair rise and gait speed measures, significantly weaker grip strength and significantly lower SPPB scores than younger subjects. Paired T-tests were used to evaluate change in the performance variables after transplant within groups. In younger subjects, grip strength significantly improved (36.02 kg-38.35, p≤.01). Both chair rise (9.24 sec to 8.14, p≤.01) and SPPB score (11.09 points to 11.61, p≤.01) improved significantly in the middle-aged group. Meanwhile, gait speed (1.10 m/sec to 1.27, p≤.001), chair rise time (10.80 seconds to 9.30, p≤.01), and grip strength (28.65 kg to 29.89, p≤.05) performance improved in the older group. Correspondingly, comparisons of changes in performance across groups by analysis of variance demonstrated that improvements in gait speed among middle-aged (0.013 m/s) and older subjects (0.17 m/s) following transplant were greater than those observed in younger subjects (0.007 m/s)(both $p < 0.05$). Conclusion: We observed significant improvements in measures of physical performance after kidney transplantation, particularly in older subjects. Additional work is needed to determine the extent to which physical performance following transplant is associated with future health outcomes. Moreover, given the younger age of persons receiving kidney transplants and the relatively low ceiling of measures such as gait speed and the SPPB, more arduous measures of physical performance may be needed to assess change. The authors acknowledge the generous support of Robert and Arlene Kogod and the Hoeft family. This project was supported by CTSA Grant Number UL1 TR000135 from the National Center for Advancing Translational Science (NCATS). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

**P200- CAN L-ARGININE IMPROVE SKELETAL WEAKNESS AND FORCE IN DMD?** G. Danialou *(Saint-Jean-sur-Richelieu, Canada)*

Introduction: Effective drug therapy for reducing or delaying the skeletal muscle weakness and necrosis could be a great hope for individuals suffering from Duchenne Muscular Dystrophy (DMD). Here we hypothesized that the early treatment of mdx neonatal mice with L-arginine could ameliorate muscular dystrophy. Methods: Seven days old animals were treated IP daily with 800 mg/kg of L-arginine (L-arg) or saline (control group) for six weeks. The hind limb skeletal muscle, the Tibialis Anterior (TA) was investigated. The following parameters were evaluated: the force generated, muscle resistance to mechanical stress, the level of centronucleation, detection of utrophine by immonostaining and western blot, creatine kinase (CK) activity and, nitric oxide (NO) production. Results: Our results show that: 1) TA weight and the percentage of centronucleation in L-arg treated animals were significantly lower than in control animals despite the fact that body weights were not different; 2) L-arg improved TA ability to resist injury caused by highstress contractions; 3) CK level was two time higher in control animals compared to Larg treated mice, however, this difference was not statistically significant; 4) NO production was significantly higher in L-arg treated animals; 5) there was no evidence that the improvements observed in L-arg treated mice were associated with utrophin upregulation. Conclusion: Our data strengthen the usefulness of L-Arginine as a powerful pharmacological tool in Duchenne muscular dystrophies. However, the improvements observed were not associated with utrophin upregulation.

**P201- INTERVENTIONS FOR THE TREATMENT OF SARCOPENIA IN THE ELDERLY: AN INTEGRATIVE LITERATURE REVIEW.** A. Fernandes Bolina, G. Aparecida Caetano Calil, L. Perticarrara Ferezin, M. Soares Bernardes, L. Kusumota, R. Aparecida Partezani Rodrigues, S. Marques *(Ribeirão Preto, Brazil)*

Background: Sarcopenia is defined as the progressive loss of muscle mass and strength caused by the aging process. Frailty, falls and functional dependence are some of the adverse outcomes deriving from sarcopenia in the elderly. Therefore, several therapeutic strategies have emerged in recent years to treat this condition, which remits to the need to summarize the state of the art in order to support the professional practices in gerontology and geriatrics. The objective in this integrative review was to identify in the scientific literature the interventions that have been used to treat sarcopenia in the elderly. Method: An integrative review of the literature was undertaken, between January 2004 and November 2014 in the electronic databases LILACS and PubMed. In LILACS, the descriptor used was "sarcopenia" while, in PubMed, besides that descriptor, the qualifier "Therapy" was used. The inclusion criteria were: original articles, fully available on the different sites, related to the treatment of sarcopenia in the elderly population and in the languages English, Portuguese or Spanish. The data analysis followed the reference framework by Ganong (1987). Results: In total, 212 articles were identified, 20 (9.4%) of which complied with the inclusion criteria and were fully analyzed. All of the articles that were fully analyzed (20; 100%) were published in the last five years (2010 till 2014), mostly in 2013 (7; 35 %). The articles were grouped in four categories according to the type of intervention used: physical exercise combined with pharmacological or nutritional treatment (7; 35%), physical exercise (5; 25%), nutritional therapy (4; 20%) and other types of treatment (4; 20%). The study findings evidenced beneficial effects of protein supplements (Whey protein), omega-3 fatty acids and protein administration in the treatment of sarcopenia in the elderly. In addition, physical exercise programs, especially resistance training, were also demonstrated as an effective therapeutic strategy. Some studies found, however, that the use of dietary supplements combined with physical exercise is more effective when compared to isolated therapies. Other types of intervention used in sarcopenia treatment in the elderly population are highlighted, such as electrostimulation and the use of alphacalcidol. Conclusion: It is evidenced that different interventions can be used in the treatment of sarcopenia in the elderly population; therefore, the activity of an interdisciplinary team is fundamental to guarantee the efficacy of the therapeutic approaches. Keywords: sarcopenia, therapy, ageing, muscle mass, elderly Reference: Ganong LH. Integrative reviews of nursing research. Res Nurs Health 1987 Mar; 10(1):1-11.

**P202- EFFECTS OF AGEING ON NEUROMUSCULAR JUNCTION AND MUSCLE FUNCTION.** E. Lach-Trifilieff, A. Doelemeyer, M. Rausch, P. Rolland Allegrini, N. Gerwin *(Basel, Switzerland)*

Background: Functional muscle denervation is one of the principal factors leading to sarcopenia, the ageing-related loss of muscle mass and function. Our goal is to develop a treatment for sarcopenia that promotes neuromuscular junction (NMJ) regeneration and recovery of neuromuscular transmission. Here we characterized the time course of structural and functional neuromuscular degeneration in ageing rodents to use them as preclinical models for treatment efficacy testing. Methods: Cohorts of mice (C57Bl/6; n=8-18) aged 6, 13, 22, 24, 26, 28 and 30 months were characterized for muscle volume, force and fatigue, exercise performance, gait and NMJ structure. One large cohort of 48 rats (Wistar) was monitored longitudinally from 18 to 27 months-of-age during the development of sarcopenia for changes in muscle volume, force and fatigue, gait, NMJ structure and transmission. Results: Muscle wasting progressed steadily with ageing in mice and rats from 13 and 18 months onward, respectively. Muscle force declined concomitantly, but was much more pronounced than muscle loss in both species. Likewise, voluntary exercise and incremental speed running capacity in mice declined more dramatically than muscle mass during aging. Neuromuscular transmission, measured as CMAP upon sciatic nerve stimulation in rats, was reduced and delayed with ageing. Finally, NMJ structural degeneration, measured as NMJ fragmentation and dispersion and endplate denervation by histomorphometry, was less pronounced and significant only late in sarcopenia in mice and rats. Overall, rats showed a more rapid decline of all analysed parameters with ageing than mice. Conclusion: Degeneration of neuromuscular structure and function was measurable during the development of sarcopenia in both, mice and rats, suggesting that both models can be used for efficacy testing of neuromuscular regenerating agents. The much more pronounced decline in muscle function compared to mass, may result from muscle denervation and might therefore be improvable by such a neuromuscular regenerative treatment.

**P203- LONGITUDINAL PERFORMANCE ASSESSMENT FOR PREDICTING ADVERSE OUTCOMES: THE ADDED VALUE TO SINGLE TIME POINT TIMED UP AND GO ASSESSMENT.** S. De Buyser, M. Petrovic, Y. Taes, B. Lapauw, K. Toye, J.-M. Kaufman, S. Goemaere *(Ghent, Belgium)*

Backgrounds. Low physical performance has been associated with adverse health outcomes. The aim of this study was to assess whether the change of patients' Timed Up and Go (TUG) performance over time (longitudinal assessment) adds value to the prediction of functional dependency, low quality of life, and mortality compared to their baseline TUG performance (single time point assessment), in older communitydwelling men. Methods. Data are from a longitudinal study of a population-based sample of 352 ambulatory older men. The study started in 1996 with follow-up visits annually until 2000, one visit in 2003, and thereafter annual followup by telephone. The TUG test was performed at each visit until 2000. Mean annual change was calculated using linear regression analyses with data from 1997 until 2000. Functional status was assessed through 8 questions on activities of daily living in the Rapid Disability Rating Scale-2 (RDRS-2) [range 8 – 32, scores > 8 indicate assistance is needed]. Quality of life was assessed using the subscales of the Short Form-36 [range 0 –100, higher scores indicate better quality of life]. Low quality of life was defined as all scores below the value corresponding to the worst quartile in 2000. Subjects with low performance (TUG > 20s) or function (RDRS-2 > 16 / 32) at baseline and subjects who were deceased before 2000 were excluded from the analyses. Results. Between 1997 and 2000, 195 well-functioning older men completed at least 2 visits according to the protocol. Their mean age in 1997 was 75.6 ± 3.5 years [range 71 – 86y] and mean TUG time was 10.82 ± 2.43 seconds. Mean annual change in TUG performance was +0.12 ±0.92 seconds. In 2003, 99 patients completed the Short Form-36 and RDRS-2. Both baseline TUG in 1997 (OR = 1.42, 95%CI = 1.09 - 1.85, P = 0.009,

Wald = 6.8) and change in TUG (OR = 2.14, 95%CI = 1.06 - 4.32, P = 0.034, Wald = 4.5) were predictive for incident dependency (RDRS-2 > 8 in 2003). Baseline TUG was not associated with incident low quality of life, except for the subscale Physical Functioning [< 55 / 100] (OR = 1.35, 95%CI = 1.04 - 1.74, P = 0.024, Wald = 5.1). However, decline in TUG was significantly associated with incident low score on the subscales Bodily Pain [< 64 / 100] (OR = 1.96, 95%CI = 0.99 - 3.91, P = 0.055, Wald = 3.7), Physical Functioning (OR = 2.29, 95%CI = 1.12 - 4.71, P = 0.024, Wald = 5.1), Physical Roles [< 25 / 100] (OR = 2.02 , 95%CI = 1.01 - 4.05 , P = 0.048 , Wald = 3.9) and Social Functioning [< 75 / 100] (OR = 2.10 , 95%CI = 1.07 - 4.14, P = 0.032, Wald = 4.60). By the end of 2011, 119 subjects (61%) were deceased. Median survival time since the assessments in 2000 was 8.25 years. Both baseline TUG (HR = 1.12, 95%CI = 1.03 - 1.22, P = 0.010, Wald = 6.6) and change in TUG (HR = 1.58, 95%CI = 1.26 - 1.98, P < 0.001, Wald = 15.5) were predictive for mortality. Conclusion. Longitudinal assessment of physical performance adds value to the prediction of functional dependency, low quality of life, and mortality compared to TUG assessment at a single time point.

**P204- ASSESSMENT AND DEFINITION OF LEAN BODY MASS DEFICIENCY IN UKRAINIAN WOMEN.** V. Povoroznyuk, N. Dzerovych *(Kyiv, Ukraine)*

Introduction. Sarcopenia is been defined as an age-related reduction in muscle mass, strength and performance. Muscle mass peaks by fourth decade and then decreases at the rate of 1% after the age of 50 years. Prevalence of sarcopenia varies widely (5-70%) according to age, sex, ethnicity and the criteria used for its definition [Marwaha R. et al., 2014]. The aim of this study was to evaluate the normative data of lean mass in Ukrainian healthy women. Materials and methods. 301 women aged 20-87 years (mean age – 57.6±0.9 yrs; mean height – 1.62±0.004 m; mean weight – 63.5±0.5 kg, body mass index – 24.2±0.2 kg/m2) were examined. All subjects were free of systemic disorders (endocrine, renal, hepatic et al.) and not taking medications known to affect skeletal and muscle metabolism. The women were divided into the following age-dependent groups: 20-29 yrs (n=25), 30-39 yrs (n=27), 40-49 yrs (n=22), 50-59 yrs (n=62), 60-69 yrs (n=91), 70-79 yrs (n=59), 80-87 yrs (n=15). The lean and fat masses, bone mineral density (BMD) were measured by the DXA method (Prodigy, GEHC Lunar, Madison, WI, USA). Appendicular skeletal mass (ASM) was measured at all the four limbs with DXA. We've also calculated the appendicular skeletal mass index (ASMI) according to the formula: ASM/height (kg/m2). Low muscle mass was based on the following definitions: European guidelines (ASMI <5.5 kg/m2) [Cruz-Jentoft A.J. et al., 2010], less than 20% of sex-specific normal population and two SD below the mean of Ukrainian young adult females (20-39 yrs). The study results are presented in the following manner: M±SD. An one-way ANOVA test was used to compare the differences among the multiple groups. Multiple regression analysis was done to ascertain the association between lean mass with BMD at various sites and fat mass. Significance was set at p<0.05. "Statistika 6.0" © StatSoft, Inc. was used for data processing purposes. Results. We observed a significant decrease of ASM with age (20-29 yrs – 16.5±0.4 kg, 30-39 yrs – 16.4±0.3 kg, 40-49 yrs – 17.0±0.5 kg, 50-59 yrs – 16.9±0.3 kg; 60-69 yrs – 16.5±0.2; 70-79 yrs – 15.8±0.3; 80-87 yrs – 15.3±0.3; F=2.7; p=0.01). The ASMI values corresponding to a cutoff of low muscle mass by the definitions used were as follows: <5.5 kg/m2 (European guideline), <5.7 kg/m2 (<20th percentile of sex specific population), <4.8 kg/m2 (two SD below the mean of young Ukrainian females aged 20-39 yrs). The prevalence of low muscle mass in women aged 65 yrs and older based on the above three criteria was 12%, 16% and 1.7%, respectively. ASM was positively correlated with total fat mass (r=0.20, p=0.0006) and BMD at all sites (BMD of spine (r=0.22, p=0.0002), BMD of femoral neck (r=0.29, p<0.0001)). Conclusion. Peak muscle mass among Ukrainian women is achieved in the fifth decade. The cutoff value of ASMI (<4.8 kg/m2) defined as two SD below the mean of reference young population was lower in this study compared with Rosetta Study (<5.5 kg/m2). According to sex specific cutoff (ASMI <5.7 kg/m2), this index was similar to the data of Health ABC study (<5.67 kg/m2) [Cruz-Jentoft A.J. et al., 2010]. Appendicular skeletal mass was positively correlated with total fat mass and BMD at all sites.

**P205- BODY COMPOSITION AND BONE MINERAL DENSITY, SPINAL MICRO-ARCHITECTURE (TBS DATA) IN THE OLDER UKRAINIAN WOMEN WITH VERTEBRAL FRAGILITY FRACTURES.** V. Povoroznyuk, N. Dzerovych *(Kyiv, Ukraine)*

Introduction: Osteoporosis and sarcopenia are the most frequent musculoskeletal disorders affecting older people. Fracture incidence as well as the number of fractures increase due to the population's ageing. Recent studies show that a low skeletal muscle mass is associated with the poor structural bone parameters and impaired balance of the elderly people. The aim of this study is to evaluate the bone mineral density (BMD), trabecular bone score (TBS) and body composition in women taking into account the presence of vertebral fragility fractures (VFF). Materials and methods: We've examined 171 women aged 65-89 years (mean age – 73.12±0.39 yrs; mean height – 1.58±0.004 m; mean weight – 72.54±0.99 kg). The patients were divided into the groups depending on the VFF presence: A – no VFF (n=105; mean age – 72.70±0.54 yrs; mean height – 1.58±0.006 m; mean weight – 74.43±1.33 kg), B – present VFF (n=66; mean age – 73.79±0.55 yrs; mean height – 1.58±0.008 m; mean weight – 69.53±1.37 kg). Total body, lumbar spine, femoral neck, forearm BMD, lateral vertebral assessment, trabecular bone score (L1-L4), lean and masses were measured by DXA densitometer (Prodigy, GE). Appendicular skeletal mass (ASM) was measured at all the four limbs with DXA. We've also calculated the appendicular skeletal mass index (ASMI) according to the formula ASM/height2 (kg/m2). Results: We have found the following parameters to be significantly lower in women with the VFF compared to women having no VFF: BMD of total body (A – 0.859±0.01 g/cm2, B – 0.764±0.02 g/cm2; p<0.05), spine (A – 1.038±0.02 g/cm2, B – 0.927±0.03 g/cm2; p<0.05), femoral neck (A – 0.787±0.01 g/cm2, B – 0.711±0.01 g/cm2; p<0.05), 33% forearm (A – 0.690±0.01 g/cm2, B – 0.600±0.01 g/cm2; p<0.05), TBS (A – 1.171±0.01, B – 1.116±0.02; p<0.05), whole-body fat mass (A – 30736.87±939.92 g, B – 25877.45±966.90 g; p<0.05), whole-body lean mass (A – 41202.44±498.18 g, B – 39440.77±594.78 g; p<0.05), ASM (A – 16.47±0.22 kg, B – 15.81±0.22 kg; p<0.05) and ASMI (A – 6.59±0.07 kg/m2, B – 6.34±0.09 kg/m2; p<0.05). The frequency of sarcopenia was 2% in women with no VFF and 14% - in women with the VFF. Conclusion: Women with the VFF have the BMD, TBS, lean and fat masses data significantly lower in comparison to women with no VFF.

**P206- FRAILTY PREDICTS CAUSE-SPECIFIC HOSPITALIZATION AMONG PERSONS AGING WITH HIV INFECTION AND DRUG USE.** D.A. Piggott[1], A.D. Muzaale[1], S.H. Mehta[1], R.P. Westergaard[2], T.T. Brown[1], K.V. Patel[3], S.X. Leng[1], G.D. Kirk[1] *(1. Baltimore, USA; 2. Madison, USA; 3. Seattle, USA)*

Background: Hospitalization events exact a substantial economic and clinical burden for aging HIV-infected populations. Frailty is a key aging-related syndrome, predictive of major adverse clinical outcomes, including all-cause hospitalization among older HIV-uninfected adults. We have previously reported the association of frailty with advanced HIV disease and mortality; however, limited data exist on the relationship of frailty to hospitalizations due to infectious or non-infectious causes among HIV-infected persons or their uninfected counterparts. Methods: Frailty was ascertained in the AIDS Linked to the IntraVenous Experience (ALIVE) cohort of persons with prior or current injection drug use based on the 5 Fried phenotype criteria: slow gait speed, decreased grip strength, low physical activity, exhaustion, and weight loss. Hospitalization events were ascertained from 2005-2012 and categorized using Agency for Healthcare Research and Quality clinical classification software into: chronic disease, infectious disease, and non-chronic non-infectious conditions. Cox proportional hazards models were used to estimate the risk (hazard ratios [HR] with 95% confidence intervals [CI]) for time to first hospitalization for each category. Results: Among 1303 participants with a median age of 48 years, 32% were HIV infected, and 12% were frail. In multivariable models adjusting for age, sociodemographics, comorbidity, substance use, and HIV/AIDS status, frailty was significantly associated with chronic disease (aHR 2.03; 95% CI, 1.40, 2.96), and infectious disease (aHR 2.41; 95% CI, 1.54, 3.76) hospitalization; but not with non-chronic non-infectious hospitalization risk (aHR 1.07; 95% CI, 0.72, 1.59). A prior AIDS diagnosis was associated with increased hospitalization risk in all 3 categories. Among HIV-infected persons, independent of CD4 count, HIV viral load, or prior AIDS, frailty was significantly associated with increased AIDS hospitalization risk (aHR 6.30; 95% CI, 1.20, 33.1). Frailty was also independently associated with Non-AIDS infectious disease hospitalization risk (aHR 2.21; 95% CI, 1.40, 3.50). Conclusion: The frailty phenotype selectively predicts vulnerability to chronic disease and infectious disease related hospitalization. Frail persons are susceptible to increased hospitalization for both AIDS and Non-AIDS infection. Further elucidation of frailty pathways may facilitate targeted interventions to reduce health care utilization and improve clinical management for aging HIV-infected persons and their high risk counterparts.

**P207- ABOUT FRAILTY AND DISABILITY: WHERE TO DRAW THE LINE BETWEEN THE TWO?** M. Herr[1], S. Andrieu[2], J. Ankri[1], J.M. Robine[3] *(1. Versailles, Saint Quentin, France; 2. Toulouse, France; 3. Paris, France)*

Background: The concept of frailty, developed in the early 2000s, was not part of the debates of the 1980s and 1990s about the classification models of functioning. Therefore, there is still a point of ambiguity in where to draw the line between frailty and disability. The frailty index defined by Rockwood and colleagues is a scale ranging from no problem of physical and cognitive functioning to total dependence for the activities of daily living, in which functional disabilities contribute to the identification of frail old people. However, in the approach of Fried and colleagues, there is a theoretical distinction between frailty and disability, because frailty is presented as a major risk factor for disability and mortality. By definition, the frailty status should hence concern only individuals not disabled. But most often, individuals with disabilities or dependent for activities of daily living are included among the pre-frail or frail individuals in clinical and research settings. As a consequence, it is harder to distinguish the respective contributions of frailty and disability to the prediction of worsening disability or mortality. The objective of this study was to describe the changes in the prevalence of frailty and mortality prediction depending on how frailty was defined in relation to disability. Methods: The SIPAF cohort (Information System for Loss of Functional Autonomy) consisted of 2,350 subjects aged 70 years and over recruited across France. Participants were visited at home by trained nurses between 2008 and 2010. Data were collected during a standardized interview using validated tools. Information collected dealt with chronic health problems, medications, mood, cognition, and social isolation. The need of help to perform activities of daily living was assessed in five activities of daily living (ADL), namely eating, sleeping, toileting, bathing, and dressing, and in six instrumental activities of daily living (IADL), namely preparing meals, telephone, shopping, heavy cleaning, light cleaning, and managing finances. Frailty was defined by the presence of at least three factors among: involuntary weight loss and/or body mass index ≤18.5 kg/m², feeling of weakness and/or lack of energy, low level of physical activity (according to the International Physical Activity Questionnaire), difficulty going up and down stairs and difficulty weighting a 5 kg bag. Subjects with one or two factors were considered pre-frail. The vital status of the subjects was followed until June 2012 (median follow-up=2.8 years). Six definitions of frailty were compared. They differ depending on the threshold that individualizes the states of

frailty and disability: IADL ≥1 / ≥2 IADL / ≥3 IADL / ≥1ADL / ≥2 ADL / no separation of frail and disabled individuals. The mortality risk associated with frailty was analyzed using Cox models adjusted for gender, age, socioeconomic status, marital status, social isolation, cognitive status, comorbidities and polypharmacy. Results: The analysis included 2,275 subjects, with 59.3% women, of mean age 83.2 +/- 7.4 years. Among them, 835 (36.7%) needed help in IADL and 343 (15.1%) in ADL. Regardless of disability, the prevalence of frailty was 29.7% (n=675) and pre-frail accounted for 41.5% (n=944) of the population. When excluding individuals with disability from the frail group, the prevalence of frailty varied between 6.1% (n=139) and 21.6% (n=492), depending on how stringent the definition of disability was. The dispersion of the values increased with advancing age, with the largest range of prevalence observed among the oldest olds (6.8% to 54.0% among people aged 90 and over versus 6.5% to 13.5% among people aged 70 to 79). During the follow-up period, 350 people died (15.7%). Compared to non-frail subjects, frail people had a risk of dying during the study period multiplied by 3.56 [2.39 to 5.31]. The mortality risk associated with frailty was reduced when individuals with disabilities were considered separately from frail people, with a minimum value of 2.39 [1.47 to 3.91] (limit set at ≥3 IADL) and a maximum value of 2.99 [1.95 to 4.57] (limit set at ADL ≥1). With advancing age, the overall mortality risk associated with frailty decreased and the mortality risks corresponding to the different definitions of frailty became closer. Conclusion: Depending on where the limit between frail and disabled people is set, the prevalence of frailty can vary up to threefold. It is likely that the definitions of frailty that do not take into account disability overestimate the prevalence of frailty, especially in the oldest olds. Disability and frailty are two processes leading to loss of autonomy, which should be considered together with age to refine the predictions of adverse health outcomes in old people.

**P208- FRUITS AND VEGETABLES INTAKE AND PHYSICAL ACTIVITY AS PREDICTORS OF DISABILITY RISK FACTORS IN AFRICAN-AMERICAN HEALTH STUDY.** S.M.L. Ribeiro[1], J.E. Morley[2], T.K. Malmstrom[2], D.K. Miller[1] *(1. São Paulo, Brazil; 2. Saint-Louis, USA)*

Background: Due to the health benefits, the World Health Organization (WHO) recommends, besides a regular practice of physical activity (PA), an intake of five servings per day of a variety of fruits and vegetables. However, data from National Health and Nutrition Examination Survey (NHANES) show that the American population has low fruits and vegetables intake (FVI), as well as low level of PA. Few studies of African Americans on this issue have been published, pointing the importance of our investigation. Aims: -To investigate FVI and PA as predictors of factors associated with risk of disability (body composition, physical performance measures, incident chronic diseases, and frailty) in the African American Health study (AAH). Methods: AAH is a population-representative cohort study of non-institutionalized late middle-aged African Americans living in the St. Louis, MO, area (at baseline: N = 998, age = 49-65) that investigated different aspects of health and focused on disability and frailty. The first data collection was in 2000-01 (wave 1). The present study investigates data obtained in wave 8 (2008) and wave 10 (2010). In Wave 8, participants were questioned regarding their typical FVI in five categories (fruit juice, whole fruits, green salad, carrots, and other non-potato vegetables), and the frequency of each category (number of times daily, weekly, monthly or annually). Daily or weekly intakes were classified as "acceptable"; monthly or yearly intakes were classified as "low". In addition, the daily intake was summed across all five categories, and the sum was classified as "5 servings/day" (45.8%) or "less than 5 servings/day" (54.2%). In the same wave, dimensions of PA (vigorous activity Index, standing Index, seating Index, leisure walking index, moving Index), as well as the PA summary index, were obtained from the Yale Physical Activity Survey (YPAS). Two years late, in Wave 10, the participants were investigated for body mass index (BMI, in Kg/m2), grip strength (GRIP, in Kg), gait speed (GSP, in m/s), the number of new chronic diseases (CD) out of 12 investigated, and a questionnaire to identify the presence of frailty (FR) based on five components (scored 0-5). The disability risk factors (BMI, GRIP, GSP, CD and FR) were predicted using forward stepwise multiple linear regression, considering FVI, PA, gender, and age as predictor variables. Two different approaches to modeling were used: the first one (Mod 1) included the different types of FVI and the different dimensions of PA. The second (Mod 2) included only the total FVI (5/day or less) and the PA summary index. The data were analyzed using Statistica software v. 12 (Stat soft®). Main results: Mod 1 explained 12% of BMI, including as independent predictor variables: leisure walking (B= -0.17; p= 0.00), gender "male" (B= -0.26; p= 0.00) and fruit Juice "acceptable" (B= -0.11; p= 0.03). Mod 2 explained 14% of BMI, and included age (B= -0.16; p= 0.00), PA summary index (B= -0.17; p= 0.00), gender "male" (B= -0.27; p= 0.00), and less than 5/day FVI (B= -0.13; p= 0.00). Mod 1 explained 47% of GRIP, including age (B= -0.15; p= 0.00), gender "male" (B= 0.64; p= 0.00), standing index (B= 0.13; p= 0.00), and green salads "acceptable" (B= 0.12; p= 0.00). Mod 2 explained 46% of GRIP, including gender "male" (B= 0.61; p= 0.00), age (B= -0.14; p= 0.00), and PA summary index (B= 0.16; p= 0.00). Mod 1 explained 5% of GSP, including vigorous activity index (B= 0.18; p= 0.00), carrots "acceptable" (B= 0.14; p= 0.01, and "other" vegetables "acceptable" (B= -0.12; p= 0.04). Mod 2 explained 4% of GSP, including only PA summary index (B= 0.20; p= 0.00). Regarding CD, Mod 1 explained 12%, including leisure walking index (B= -0.21; p= 0.00), sitting index (B= 0.16; p= 0.00), whole fruits "acceptable" (B= 0.14; p= 0.05), vigorous activity index (B= -0.12; p= 0.00) and gender "male" (B= -0.10; p= 0.04). Mod 2 explained 7% of CD, and included PA summary index (B= -0.24; p= 0.00) and gender "male" (B= -0.09; p= 0.03). Mod 1 explained 18% of FR, including leisure walking index (B= -0.26; p= 0.00), sitting index (B= 0.19; p= 0.00), gender "male" (B= -0.12; p= 0.01), and standing index (B= -0.12; p= 0.05). Mod 2 explained 10% of FR and included summary PA (B= -0.29; p= 0.00) and gender "male" (B= -0.09; p= 0.03). Limitations: restricted geographic and age ranges of cohort and cross-sectional nature of analyses. Conclusions: from our data, fruit juice intake seems to be protective against high BMI, whilst green salads and carrots are associated with better muscle performance. PA, but not FVI seems to be protective against frailty and chronic diseases. Studies investigating more details of diet and PA could clarify our findings. Keywords: vegetables, diet, physical activity, disabilities, frailty, African American population.

**P210- PREVALENCE OF SARCOPENIA AND ITS ASSOCIATION WITH DISABILITY IN MEXICO'S RURAL SETTINGS.** A. Salinas-Rodríguez, J. Fernández-Niño, K. Moreno-Tamayo, B. Manrique-Espinoza *(Cuernavaca, Mexico)*

Background: Sarcopenia is defined as a generalized and progressive loss of skeletal muscle mass and is accompanied by loss of strength or muscle performance, and primarily occurs in older adults (OA). Today, sarcopenia is considered a geriatric syndrome with variable prevalence and multifactorial etiology. The public health significance of sarcopenia is derived from its various impacts on morbidity and mortality in the elderly; and is mainly associated with the occurrence of fractures, diminished quality of life, disability and even mortality. Of all of the aforementioned impacts, the latter's association with disability has probably been the one considered most relevant in the OA population, mainly by the implications of disability on OA´s health, living arrangements, and the burden for the health systems. Objective: Estimate the prevalence of sarcopenia as well as its association with disability in a rural setting in Mexico: Methods: Cross-sectional study conducted in 2013 with a sample of 600 OA who resides in rural localities in Mexico. Sarcopenia was defined according to the three dimensions suggested by the European Working Group on Sarcopenia in Older People: muscle mass (using the calf circumference), muscle strength (using dynamometer) and physical performance (using short physical performance tests). Outcome variable –disability- was operationalized using the Katz index, and logistic regression model (adjusted for potential confounders) was used to estimate the association of sarcopenia with disability. Results: Prevalence of moderate sarcopenia was 39%, and 5.6% for severe sarcopenia. Sarcopenia prevalence (moderate and severe) increases with age: 11% for the OA aged <70 years, 40.7% for those aged between 70 and 89 years, and 64.9% for OA aged 80 and above; and was more prevalent in women (54.5%) than in men (33.4%). Results of the logistic model shows that presence of moderate sarcopenia (OR= 4.46; p<0.001) and severe sarcopenia (OR=9.10; p<0.001) increases the odds of disability, controlling for health conditions and socio-demographic characteristics. Conclusion: Results of this study highlight the necessity of having an evaluation of the sarcopenia status in OA as a possible strategy to identify people in risk of disability, and even more in vulnerable settings as the rural localities in Mexico. Keywords: Sarcopenia, disability, rural setting.

**P212- SARCOPENIC OBESITY IS ASSOCIATED WITH FRAILTY AND MORTALITY IN COMMUNITY DWELLING OLDER MEN: THE CONCORD HEALTH AND AGEING IN MEN PROJECT.** V. Hirani, V. Naganathan, F. Blyth, D. Le Couteur, R. Cumming *(Sydney, Australia)*

Background: The combination of sarcopenia and obesity, an age-related change in body composition, is recognised as a major clinical problem for older people and is associated with adverse outcomes. The aims of this study were to explore the relationship between sarcopenic obesity and frailty and all-cause mortality among community-dwelling older men participating in the Concord Health and Ageing in men project (CHAMP), using recently developed definitions from the Foundation for the National Institutes of Health (FNIH). Methods: Cross-sectional and longitudinal analysis of 1,705 participants aged ≥70 years at baseline (2005-2007) living in the community in Sydney, Australia. The main outcome measures were frailty and mortality (median 7 year follow up). The independent variables were low appendicular lean mass (ALM), measured by dual-energy x-ray absorptiometry, using the FNIH criteria and percentage fat mass (above 27%). Logistic regression models were used to assess risk of frailty and cox proportional hazard models to assess the risk of mortality. Results: Of the 1705 participants (mean age 77 years), 158 (9.5%) of men were frail and 535 (31%) died during follow-up (median 7 years). At baseline, a total of 138 (8.2%) of men had sarcopenic obesity. Fully adjusted analysis (adjusted for demographic, lifestyle factors, comorbidities and health conditions), showed that sacropenic obesity was associated with increased risk of frailty (OR 2.99 95% CI 1.84-4.87) and mortality (HR 1.56; 95% C.I. 1.19–2.04). Conclusions: This study shows that, in community-dwelling older men, the FNIH defined sarcopenic obesity predicts increased risk of frailty and mortality. Early diagnosis might provide prognostic information regarding the occurrence of these adverse outcomes.

**P213- SOCIAL ACTIVITY MODERATES THE EFFECT OF EXERCISE ON MOBILITY DISABILITY AMONG OLDER ADULTS.** D.B. Corbett[1], C. Tudor-Locke[2], J. Rejeski[3], N. Glynn[4], S.B. Kritchevsky[3], M.M. McDermott[5], T.S. Church[5], R.A. Fielding[5], T.M. Gill[6], A.C. King[7], M.E. Miller[3], H. Chen[5], M. Pahor[1], T.M. Manini[1] *(1. Gainesville, USA; 2. Baton Rouge, USA; 3. Winston-Salem, USA; 4. Pittsburgh, USA; 5. Boston, USA; 6. New Haven, USA; 7. Stanford, USA)*

Background: Older adults are at a greater risk of experiencing social inactivity. Social inactivity is an objective measure of individuals who live alone, have fewer friends or family, and have limited contact with other people. Up to 17% percent of older adults may be socially inactive and at higher risk of cognitive decline, dementia, physical inactivity, and mortality. As such, the magnitude of health risk associated with social inactivity is severe and number of isolated individuals is expected to increase with the rising aging population. The presence of social inactivity in older adults is linked to a greater

association with mobility impairment, leading to greater likelihood in loss of independence and premature mortality. Physical activity interventions have shown to be effective towards increasing mobility in older adults. However, the moderating role that social activity plays between physical activity and mobility outcomes is unclear. Methods: 1,635 men and women (78.9±5.2 yrs) who were at high risk for major mobility disability (Short Physical Performance Battery score=7.4±1.6) were randomized at baseline to receive either a physical activity (PA) or successful aging (SA) intervention. Participants performed a standardized walking test (400m walk test) at baseline and follow-ups (every 6 mos, over 42 mos). Major mobility disability (MMD) was defined as the inability to complete the 400m walk test. Persistent MMD was defined as two consecutive occurrences of not being able to walk 400m. Social activity was defined categorically based on living alone, frequency of visitation with friends and family, and frequency of attending organized group functions. According to social activity score, participants of each intervention were categorized as most socially active (MSA) or lower social activity (LSA) (PA-MSA: n=126, PA-LSA: n=692, SA-MSA: n=112, SA-LSA: n=705). Results: At baseline, the SA-MSA group had 10% fewer non-whites, 11.5% more post-education graduates, 13.2% higher hypertension, and 9.5% lower rate of depression than the SA-LSA group. Also at baseline, the PA-MSA group had 9.7% fewer individuals who were married and 10.5% more better scores on a standardized cognitive test than the PA-LSA group. There were no differences in age, BMI, or SPPB scores between groups. The group attendances of scheduled sessions were 63% and 73% for the PA and SA groups, respectively. Based on CHAMPS questionnaire responses, over the initial 24-month intervention period the PA-MSA group maintained an average of 262 min/wk in walking and weight training activities with a similar amount seen in the PA-LSA group (251 min/wk). The SA-MSA group reported 162 min/wk that was similar to the SA-LSA group (166 min/wk). Average change from baseline was 120 min/wk for the PA-MSA group that was similar to changes seen in the PA-LSA group (128 min/wk). The SA groups showed little changes (4 min/wk for the SA-MSA group and 27 min/wk for the SA-LSA group). Objectively measured physical activity assessed with accelerometry demonstrated similar effects between groups, where the PA-MSA group had an average of 213 min/wk compared to the SA-MSA group at 167 min/wk. The PA-LSA group had a similar level of moderate intensity activity with 216 min/wk that was significantly higher than the SA-LSA group at 170 min/wk. There was no effect of baseline social activity on the incidence of MMD (p>0.40), but there was a significant intervention by social activity interaction (p=0.003). Socially active participants randomized to PA had significantly lower incidence of MMD [HR, 0.43 (95% CI, 0.27-0.68); p<0.01] compared with their socially active SA counterparts. Individuals who had lower social activity showed a reduced benefit of the PA intervention [HR, 0.92 (95% CI, 0.77-1.11); p=0.40]. There was also a modification of social activity on persistent MMD (p=0.038). Individuals with most social activity randomized to PA showed similar rates of persistent MMD compared to those randomized to SA [HR, 0.37 (95% CI, 0.19-0.74); p<0.01]. Similar findings were seen in the least socially active individuals where there was no effect of PA [HR, 0.80 (95% CI, 0.62-1.03); p=0.09]. Conclusion: This study showed that socially active older adults who engage in structured physical activity show greater mobility benefits than their less socially active counterparts. This effect was not likely due to adherence to physical activity because no differences were found in PA time and thus a support system of friends and community might be beneficial to other components of mobility. Previous literature shows that social inactivity among older adults is associated with decreased physical health, regardless of its negative impact on psychological health. Therefore, social activity may moderate the effect of physical activity on physical health through its impact on psychological health. Our findings suggest that social activity has a strong effect on the physical activity induced improvements on mobility among older adults. These results implicate baseline social activity as a key component to further the success of an intervention designed to prevent or delay the onset of mobility disability among older adults.

**P214- ULTRASOUND ESTIMATES OF MYOSTEATOSIS: RELIABILITY AND COMPARISION OF ADOBE PHOTOSHOP® AND IMAGE J FOR GRAYSCALE ANALYSIS OF MUSCLE ECHOGENICITY.** M. Harris-Love[1], B. Seamon[1], C. Teixeira[1,2] *(1. Washington, USA; 2. Columbia, USA)*

Background: Ultrasound imaging has been used to assess skeletal muscle morphology and examine the composition of muscle tissue. Estimates of muscle tissue composition can be used for the assessment of neuromuscular diseases, muscle loss due to aging, and myosteatosis – diminished muscle quality due to excessive amounts of intramuscular adipose tissue. Tissue composition may be derived from ultrasound image echogenicity via grayscale analysis. Quantitative grayscale analysis has proven to be more reliable than the visual evaluation of ultrasound images in clinical practice. Adobe Photoshop® and ImageJ are two common image processing programs with grayscale analysis capability. However, the comparative reliability of these image processing programs has yet to be reported for the grayscale analysis of ultrasound images of muscle. The primary objective of this study is to determine the intrarater and interrater reliability of Adobe Photoshop® and ImageJ for grayscale analysis of ultrasound images of muscle tissue from older adults. The secondary objective was to compare the mean grayscale estimates calculated with both image processing programs. Methods: This study featured a sample of generally healthy, community-dwelling older male Veterans (n = 18, age = 61.5 ±2.32 years; BMI: 27.6 ±1.15). Ultrasound images of the right limb rectus femoris were obtained by a trained investigator using B-mode scanning with a 13-6 MHz linear array transducer. Image capture was completed using the longitudinal view with the ultrasound transducer oriented 90º to the muscle bundle. Two raters independently used image segmentation tools from Adobe® Photoshop® (version 6.0) and ImageJ (version 1.48) editing programs for image post-processing. The segmentation tools used included the Rectangular Marquee Tool (RMT) and Quick Selection/Freehand Tool from Adobe Photoshop®, and the analogous tools featured in ImageJ. Echogenicity was quantified via the mean values from grayscale histogram analysis of the selected region of interest (ROI). Each rater independently selected the area and completed the analysis using the tools from each program on every individual ultrasound image. The image post-processing methods were assessed using intraclass correlation coefficients for intrarater (ICC 3, k) and interrater (ICC 2, k) reliability, and absolute reliability via the standard error of the measurement (SEM). Linear regression was used to determine the association between the grayscale values from both image processing programs. Results: The mean grayscale values obtained by Rater 1 were 27.47 ± .66, and 27.56 ± .51 for Rater 2, across all measurement techniques. Grayscale analysis for muscle tissue echogenicity proved to be a reliable measure using both the Adobe Photoshop® and ImageJ programs. The raters demonstrated strong intrarater reliability (ICC 3, k = .993 - .995, SEM = .72 - 1.05, p < .001) and interrater reliability (ICC 2, k = .992 - .996, p < .001) using both of the programs. Additionally, the corresponding ROI selection methods used in Adobe Photoshop® and ImageJ, with the RMT and Quick Selection/Freehand Tools, exhibited a high degree of association across software platforms (R2=.988 - .991, p < .001). Conclusion: Our findings indicate that Adobe Photoshop® and ImageJ are reliable programs for quantitatively measuring echogenicity in ultrasound images of the rectus femoris from older men. Both raters demonstrated a high degree of intrarater and interrater reliability performing grayscale analysis using both the RMT and Quick Selection/Freehand Tool methods. These techniques were equally reliable with both image processing programs. Moreover, grayscale values obtained from both programs were highly associated and produced similar results. While the Freehand Tool is designed to accurately select a given ROI, it did not provide any benefit over the use of the more rapid RMT method since the rectus femoris featured largely parallel and uniform fascial borders in the longitudinal scans. These findings suggest that the public domain, open architecture, ImageJ program may be preferred over the commercially available Adobe Photoshop®. However, the semi-automated edge detection algorithms of Adobe Photoshop® may confer advantages over the Freehand Tool and Lasso Tool macros of ImageJ during the segmentation of non-uniform ROI boundaries associated with other muscle groups. (This study was funded by a Veterans Affairs VISN 5 Pilot Grant award – Station 688, and NIH-CTSA awards: UL1TR000075 and UL1TR000101.)

**P215- DEPRESSION IN ELDERLY AS INDEPENDENT RISK FACTOR OF PERFORMANCE MEASURES TO DEVELOP INCIDENT DISABILITY AND FRAILTY. THE TOLEDO STUDY HEALTHY AGEING.** C. Palumbo[1], J.A. Carnicero[1,2], V. Calderón Suárez[1], C. Alonso-Bouzón[1], F.J. García-García[2], L. Rodríguez-Mañas[1,2] *(1. Madrid, Spain)*

Background: Association between changes in depressive symptoms, frailty and disability is a grooming subject of study. Actual research suggests a substantial correlation between depression and frailty. Less is known, however, about how depressive symptoms can be a risk factor of incident disability and frailty. One of the most used tools to identify frailty is the phenotypic approach using the L.P. Fried criteria. This scale is composed by five items: weight loss, weakness, exhaustion, slowness and low physical activity. Weakness, slowness and low physical activity, were the first frailty manifestations in more than 70% of the population included in a longitudinal study. The aim of this study is: 1) to assess the association of depressive symptoms, evaluated by GDS-15, and incident disability and frailty. 2) To check if the earliest manifestations of frailty (weakness, slowness and low physical activity) linked to GDS keep this predictive ability. Method: We used data from the Toledo Study for Healthy Aging, a prospective Spanish cohort study. They were evaluated in depressive symptoms, assessed by the GDS-15 scale. Slowness was defined using the three-meter walking speed test; individuals were asked to walk 3 meters at their usual pace, following a standardized protocol; the best time was chosen; sex and height adjusted time points were used; the slowest quintile was considered positive. Weakness was measured by grip strength in the dominant hand using a Jamar hydraulic dynamometer; the result was adjusted by the subject's body mass index; those in the bottom quintile were considered positive. Low physical activity was based on the Physical Activity Scale for the Elderly (PASE); those in the worse quintile of physical activity were considered positive for this item. Incident disability was defined as five o less items in the ADL scale (Katz index). Logistic regression models were used to assess the relationship between the GDS-15 scale and/or performance measures with incident frailty and incident disability, with a median follow up of 5 years. As potential confounders, we used age, sex and the Charlson Index. Results: 1645 subjects, 729 (44.3%) men and 916 (55.7%) female, completed the 5 years follow up. The median age was 74 (71-78) years. After exclude disabled individuals at baseline, 1135 individuals without disability were included in the analysis for evaluating incident disability. After exclude frail individuals, 1212 robust subjects were analyzed for incidence of frailty. After adjustments by confounders, the GDS-15 scale was a risk factor for both incident disability and incident frailty (OR (95% CI) in the increment of one unit in results were 1.118 (1.054-1.186) and 1.169 (1.089-1.254) respectively). The early frailty criteria were significantly associated with incident disability and frailty (for incident disability: OR (95% CI) for grip strength, physical activity and gait speed were 0.966 (0.944-0.989), 0.997 (0.993-1.000) and 0.984 (0.961-1.007); for frailty: 0.919 (0.890-0.950), 0.991 (0.985-0.997) and 0.941 (0.907-0.977)). The GDS linked to the earliest frailty manifestations keep the prediction ability (OR (95% CI) for one unit increment in the results of the GDS-15 scale; grip strength, physical activity and gait speed were 1.100 (1.035-1.169), 0.963 (0.939-0.987), 0.998 (0.994-1.002) and 0.982 (0.959-1.007) for incident disability and 1.118 (1.036-1.207), 0.919 (0.887-0.952), 0.991 (0.984-0.998) and 0.923 (0.885-0.963) for incident frailty, respectively). Conclusions: Depressive symptoms, evaluated by GDS-15, were strongly

significant risk factor for both incident frailty and disability. The earliest manifestations of frailty (weakness, slowness and low physical activity) are good predictors of frailty and disability. Further studies should evaluate and compare the ability of prediction of these performance measures in association with GDS for detecting individuals with depression at high risk of frailty and disability. This study was supported by grants PI11/01068, RD 06/0013 and RD12/0043 from the Instituto de Salud Carlos III (Ministerio de Economía y Competitividad), Spain, and FP7-305483-2 from the FP7-Health-2012-Innovation of the European Union.

**P216- SARCOPENIA IS A BIOMARKER OF FRAILTY AND PREDICTS ADVERSE OUTCOME IN THE SURGICAL INTENSIVE CARE UNIT.** N. Mueller[1], S. Murthy[1], C. Tainter[1], J. Lee[1], K. Richard[1], F. Fintelmann[1], S. Grabitz[1], B. Levi[1,2], M. Eikermann[1,3] *(1. Boston, USA; 2. Ann Arbor, USA; 3. Essen, Germany)*

Introduction: Frailty is defined as the status of decreased physiological reserve leading to increased vulnerability to stressors. While it is intuitive to conclude that frail patients are predisposed to adverse outcomes in the surgical intensive care unit (SICU), supporting data is sparse, maybe because it is so far controversial how to best measure frailty. The Frailty Index (FI) quantifies the accumulation of physiologic deficits, but is time-consuming and requires adequate communication with the patient to obtain the self-reported measure. Sarcopenia is a key element of frailty. We speculated that the assessment of sarcopenia by ultrasound may be a viable biomarker of frailty to be used at the bed-side in SICU patients. Our hypothesis was that sarcopenia - low cross-sectional area of rectus femoris muscle (RFCSA) - predicts frailty and adverse outcome of SICU patients. Methods: After Institutional Review Board approval, we conducted a prospective, observational study at two SICUs of Massachusetts General Hospital. Consecutive critically ill patients were enrolled into the study and provided written informed consent. Patient' characteristics, admission diagnoses, Physiology and Chronic Health Evaluation (APACHE) II score, Charlson Comorbidity Index (CCI), laboratory data and outcome data were collected. Frailty was calculated using 50 preadmission frailty items, including baseline functional dependence, social support, nutrition, comorbidities and patient demographics. Frailty was defined by a FI of 0.25 or higher. Sarcopenia was determined by B-mode ultrasound measurement (Philips Ultrasound, Bothell WA) of RFCSA conducted at 60% of the distance from the anterior superior iliac spine to the superior border of the patella. The optimal cutoff value of gender-adjusted RFCSA was identified using receiver-operating characteristic curve analysis determining the discrimination of frailty by gender-adjusted RFCSA. This allowed us to divide our patient population into sarcopenic vs. non-sarcopenic. Primary outcome measure was SICU length of stay (LOS). Secondary outcome measures were hospital LOS and adverse discharge disposition. Adverse discharge disposition was defined as discharge to a skilled nursing facility or in-hospital mortality. Relationship between variables and outcome measures was assessed by multivariable regression analysis. Zero-truncated Poisson regression was used to identify independent predictors for SICU and hospital LOS, and logistic regression was used for adverse discharge disposition. Descriptive data was reported as means (SDs) for continuous, as medians (interquartile ranges) for ordinal and as proportions for categorical variables. NCT02270502. Results: In total, 111 consecutive critically ill patients were prospectively enrolled, of whom 36.0 % (n=40) were frail. In 102 patients who received muscle ultrasound, mean gender-adjusted RFCSA amounted 5.9 (2.1) cm2, with 43.1% of patients (n=44) having sarcopenia defined by a RFCSA threshold of 5.2 cm2. The mean age was 62.1 (15.6) years and 61.3% (n=68) were male. At time of SICU admission, median APACHE II score was 10 (7-15) and mean FI 0.22 (0.12). Twothirds of our study population were patients admitted to the SICU after a major surgical procedure. Gender-adjusted RFCSA correlated with frailty (Spearman coefficient =-0.52, p<0.001) and absence of sarcopenia predicted absence of frailty (negative predictive value =79.3%). Independent of age, APACHE II score, CCI, creatinine, hemoglobin and Glasgow Coma Scale, sarcopenia predicted hospital LOS (incidence rate ratio (IRR) 1.37; 95% confidence interval (CI) 1.19-1.58; p<0.001) and adverse discharge disposition (odds ratio (OR) 7.49; 95% CI 1.47-38.24; p=0.015). Frailty was independent predictor of SICU LOS (IRR 1.55; 95% CI 1.24-1.94; p<0.001), hospital LOS (IRR 1.51; 95% CI 1.32-1.74; p<0.001) and adverse discharge disposition (OR 10.93; 95% CI 2.56-46.61; p=0.001). Conclusion: In this prospective cohort study, we found that sarcopenia is associated with frailty and predicts duration of hospitalization as well as adverse discharge disposition. Diagnosis of sarcopenia early after SICU admission – a method that does not require subject cooperation – may be utilized as biomarker of frailty to predict poor outcomes of patients admitted to the SICU.

**P217- RISK FACTORS OF FRAILTY AND INCIDENT DISABILITY: COGNITIVE STATUS AND PERFORMANCE MEASURES. THE TOLEDO STUDY HEALTHY AGEING.** V. Calderón Suárez[1], J.A. Carnicero[1,2], C. Palumbo[1], C. Alonso-Bouzón[1], F.J. García-García[2], L. Rodríguez-Mañas[1,2] *(1. Madrid, Spain; 2. Toledo, Spain)*

Background: The associations between frailty, incident disability and cognitive impairment have been well studied. Several studies had analysed the higher prevalence of cognitive impairment within the frail population. Otherwise, the risk of develop frailty and disability according to cognitive status has been poorly evaluated. The early detection of these individuals in our clinical practice should be a priority; specifically in memory clinics. To identify frailty, many screening tools have been proposed. Phenotypic approach (LP Fried Clinical Criteria) has the advantage of being relatively simple to administer, being one of the most commonly used. This scale is composed by five items: weight loss, weakness, exhaustion, slowness and low physical activity. Weakness, slowness and low physical activity, were the first frailty manifestation in 76% of the population included in a longitudinal study. Adding these items to the cognitive evaluation in memory clinics, could be useful to watch for the individuals at risk of develop frailty and disability. The aim of the study was: 1) to analyse whether cognitive impairment measured by Mini Mental State Examination (MMSE) is an independent risk factor to develop disability and frailty. 2) To evaluate the predictive capacity for frailty and disability of the early Fried´s criteria (weakness, slowness and low physical activity). Method: We used data from the Toledo Study for Healthy Aging, a prospective Spanish cohort study. Cognitive evaluation was assessed by Mini-Mental State Evaluation (MMSE). Slowness was defined using the three-meter walking speed test; individuals were asked to walk 3 meters at their usual pace, following a standardized protocol; the best time was chosen; sex and height adjusted time points were used; the slowest quintile was considered positive. Weakness was measured by grip strength in the dominant hand using a Jamar hydraulic dynamometer; the result was adjusted by the subject´s body mass index; those in the bottom quintile were considered positive for this criterion. Low physical activity was based on the Physical Activity Scale for the Elderly (PASE); those in the worse quintile of physical activity were considered positive for this item. Incident disability was defined as five o less items in the ADL scale (Katz index). Logistic regression models were used to assess the relationship between the MMSE score and/or performance measures with incident frailty and with incident disability, with a median follow up of 5 years. We used age, sex and Charlson Index as potential confounders. Results: 1645 subjects, 729 (44.3%) men and 916 (55.7%) female, completed the 5 years follow up. The median age was 74 (71-78) years. After exclude disabled individuals at baseline, 1135 individuals without disability were included in the analysis for evaluating incident disability. After exclude frail individuals, 1212 robust subjects were analyzed for incidence of frailty. After adjustments by confounders, the MMSE score was a significant risk factor for both incident disability and incident frailty (OR (95% CI) for one unit increment in the MMSE score were 0.947 (0.915-0.980) for incident disability and 0.903 (0.867-0.941) for incident frailty). In the association of early frailty criteria with incident disability, only the grip strength was significant (OR (95% CI) for grip strength, physical activity and gait speed were 0.966 (0.944-0.989), 0.997 (0.993-1.000) and 0.984 (0.961-1.007) respectively). Nevertheless, in the association with incident frailty were significant the three performance measures (grip strength 0.919 (0.890-0.950), physical activity 0.991 (0.985-0.997) and slowness 0.941 (0.907-0.977)). And finally, we analyze the ability of prediction of MMSE with performance measures: OR (95% CI) for one unit increment in the MMSE score, grip strength, physical activity and gait speed were 0.961 (0.927-0.996), 0.967 (0.944-0.991), 0.998 (0.994-1.001) and 0.987 (0.964-1.011) for incident disability and 0.931 (0.892-0.972), 0.917 (0.886-0.950), 0.993 (0.987-0.999) and 0.947 (0.911-0.985) for incident frailty, respectively. Conclusions: the cognitive impairment measured by Mini Mental State Examination (MMSE) is an independent risk factor to develop disability and frailty. The early criteria of frailty (weakness, slowness and low physical activity) are good predictors of frailty and disability. Further studies should evaluate these performance measures in association with MMSE/different items of MMSE for detecting individuals at risk of frailty and disability. This study was supported by grants PI11/01068, RD 06/0013 and RD12/0043 from the Instituto de Salud Carlos III (Ministerio de Economía y Competitividad), Spain, and FP7-305483-2 from the FP7-Health-2012-Innovation of the European Union.

**P218- DOES THE ASIAN WORKING GROUP'S CONSENSUS DEFINITION FOR SARCOPENIA EFFECTIVELY CHARACTERIZE SENIORS WITH LOW LEVELS OF PHYSICAL PERFORMANCE?** A. Fitr[1,2], B.C. Clark[1], S. Shahar[2], Z. Manaf[2], D. Kaur Ajit Sigh[2], L.H. Jin[2], W.H. Loo[2] *(1. Ohio, USA; 2. Kuala Lumpur, Malaysia)*

Background: The Asian Working Group for Sarcopenia Consensus Report operationally defines sarcopenia as an age-related decline of skeletal muscle plus low muscle strength and/or physical performance. The purpose of this study was to determine the extent to which lean mass, handgrip strength, and several measures of physical performance predict the occurrence of sarcopenia (as defined above) in Asian elders. Methods: A crosssectional study employing a multistage, random sampling approach was used to recruit 400 plus community-dwelling elders (60+ years) from Klang Valley of Malaysia. Sarcopenia was defined using guidelines from Asian Working Group on Sarcopenia. Lean mass was measured using bioelectrical impedance analysis, and other predictor outcomes included: hand grip strength, 2-minute step test, lower extremity flexibility (chair-sit-andreach), upper extremity flexibility (back scratch test), and the 8 foot up-and-go test. The associations between the classification of sarcopenia with the predictor variables were analysed using logistic regression model, with the following potential confounders being controlled for: age, gender, ethnicity, educational level and smoking status. Results: The overall prevalence of sarcopenia among Malaysian elderly was 46.9% with gender specific prevalence were 37.3% and 53.3% for male and female respectively. After adjustment for potential confounders, somewhat surprisingly, none of the measures of physical function exhibited significant association with sarcopenia. Conclusion: Nearly half of Malaysian elderly are affected by sarcopenia, with women particularly exhibiting a high prevalence. Lean mass and handgrip strength appear to be significant indicators for sarcopenia; however, measures of physical performance, including measures of mobility, stepping and flexibility, are not predictive. These findings question whether the Asian Working Group's consensus definition for sarcopenia effectively characterises seniors who have low levels of physical performance. Funding: Ministry of Education Malaysia, LRGS/ BU/2012/ UKM-UKM/K/01.

**P219- PREVALENCE AND AGREEMENT OF DIFFERENT OPERATIONAL DIAGNOSTIC CRITERIA FOR SARCOPENIA IN A HOMOGENOUS COHORT OF 68-YEAR OLD SUBJECTS.** A.Trombetti, M. Hars, E. Biver, T. Chevalley, S. Ferrari, R. Rizzoli *(Geneva, Switzerland)*

Backgrounds: Sarcopenia is a devastating feature of aging associated with extensive burden. However, consensus on an operational definition, combining or not muscle mass and function diagnostic criteria, has not been reached yet. Indeed, different criteria and cutpoints have been proposed, among which recent ones for weakness and low lean mass from the Foundation for the National Institutes of Health Sarcopenia Project (FNIH). In a homogenous cohort of 68-year old community-dwellers, we applied different criteria and cutpoints to evaluate disease prevalence and agreement of operational diagnostic criteria, as proposed by the European Working Group on Sarcopenia in Older People (EWGSOP), the International Working Group on Sarcopenia (IWG), and the FNIH. Methods: Seven hundred sixty-seven subjects (608 women; age 67.9 ± 1.5 years), enrolled in the Geneva Retired Workers Cohort (GERICO), were studied. Appendicular lean mass (ALM), ALM/height2 and ALM/BMI ratios were determined by dual X-ray absorptiometry (Hologic Discovery W). Gait speed was measured over a 4-m distance and grip strength using a digital handheld dynamometer. Sarcopenia prevalence was estimated using EWGSOP, IWG and FNIH proposed criteria, and degree of agreement assessed using kappa statistics. Results: Low lean mass prevalence ranged from 3.8% (FNIH) to 16.0% (EWGSOP). Weakness prevalence ranged from 0.7% (FNIH) to 3.9% (EWGSOP). Prevalence of low lean mass combined with either weakness or slowness fulfilling various proposed sarcopenia definitions was the lowest for FNIH (0.3%) compared with IWG (1.2%) and EWGSOP (1.6%) criteria, with higher prevalence in women across all definitions. There was poor agreement between the groups identified according to the different definitions, with kappa values below 0.3. Conclusion: Our results in a large cohort of healthy 68-year old subjects suggest that muscle weakness, slowness and low lean mass prevalence widely vary depending on the criteria and cutpoints applied. Similarly, sarcopenia, which is infrequent among this population, considerably varies according to the definitions, with poor agreement between classifications. Further studies should compare the predictive ability of candidate sarcopenia criteria for hard outcomes, like incident falls, fractures, activities of daily living and quality of life.

**P220- SKELETAL MUSCLE MASS AND FRACTURE RISK IN 65-YEAR-OLD HEALTHY COMMUNITY-DWELLERS.** A.Trombetti, M. Hars, E. Biver, T. Chevalley, S. Ferrari, R. Rizzoli *(Geneva, Switzerland)*

Backgrounds: Aging is associated with a progressive skeletal muscle mass decline, accompanied by an alteration of function, which lead to increased risk of falls, disability, and mortality. By enhancing the risk of falling, sarcopenia may be considered as a risk factor for fracture. However, the contribution of skeletal muscle mass to fracture risk remains insufficiently documented. Indeed, the predictive ability of various low lean mass diagnosis criteria used in sarcopenia definitions, for hard outcomes like incident fractures, is not firmly established. In this study, we investigated whether lean mass values were associated with 3-year fracture incidence in a homogeneous cohort of healthy 65-year old healthy community-dwellers. Methods: Nine hundred thirteen subjects (729 women; age 65.0 ± 1.4 years), enrolled in the Geneva Retired Workers Cohort (GERICO) study, were prospectively followed-up. Total and appendicular lean masses (ALM) were assessed using dual X-ray absorptiometry (Hologic Discovery W), and ALM/height2 and ALM/BMI ratios derived. Low lean mass was diagnosed using the various thresholds proposed by Baumgartner et al, the European Working Group on Sarcopenia in Older People (EWGSOP), the International Working Group on Sarcopenia (IWG), or the Foundation for the National Institutes of Health Sarcopenia Project (FNIH). Low trauma fracture incidence over a 3-year period was recorded. The associations between lean mass values and low trauma fractures were assessed using univariate and multivariate logistic regression models. Results: During an average follow-up of 3.4 ± 0.9 years, 40 (4.4%) participants sustained at least one incident low trauma fracture. Low lean mass prevalence was 3.5%, 11.2%, and 17.1% according to the FNIH, Baumgartner, and EWGSOP or IWG thresholds, respectively. ALM and total lean masses were lower in future fractured subjects compared to unfractured (17.2 ± 3.3 vs 18.6 ± 4.3 kg, p<0.02, for ALM; 41.2 ± 7.0 vs 43.7 ± 8.8 kg, p<0.04, for total lean mass). After adjusting for sex, age, length of follow-up and FRAX probability including BMD, low muscle mass was associated with a 2.3 (CI95%: 1.0-5.1; p<0.05) (Baumgartner threshold) and 1.3 (CI95%: 0.6-2.7; ns) (EWGSOP or IWG threshold)-fold increase in low trauma fracture risk. No patient with FNIH low lean mass criteria experienced a low trauma fracture. Conclusion: Low appendicular lean mass, as defined with Baumgartner threshold, is a predictor of incident fractures over a 3-year period in a large cohort of healthy 65-year old community-dwellers, independently of FRAX score. The increased risk is related to the threshold selected. Whether assessing in addition muscle function (grip strength or walking speed) improves low trauma fracture risk prediction remains to be determined.

**P221- CAN EXCITATORY BRAIN STIMULATION ENHANCE EXERCISE CAPACITY IN OLDER ADULTS?** K. Oki, N.K. Mahato, S. Amano, M. Nakazawa, B.C. Clark *(Athens, USA)*

Background: We have previously reported that older adults exhibit diminished levels of cortical excitability (McGinley et al., Experimental Gerontology, 2010). We have also reported that excitatory brain stimulation (i.e., anodal transcranial direct current stimulation [atDCS]) enhances the time to task failure of a sustained muscle contraction in young adults (Williams et al, PLoS One, 2013). Accordingly, we hypothesized that raising motor cortex excitability via atDCS could serve to enhance exercise capacity in older adults. Objectives: The objective of this pilot study was to determine whether atDCS, applied to the motor cortex, prolonged the time to task failure of a sustained, submaximal isometric elbow flexion contraction (contraction intensity equal to 20% of maximum strength) in older adults. We used a within-subjects design where all participants received the atDCS treatment or a sham treatment. The order of the treatments was randomized and testing sessions were separated by at least 4 days. Results. Thirteen participants (8 women, 5 men; average age – 68.3±2.0 years) completed the study. A repeated measures ANOVA, with strength entered as a covariate, indicated that the time to task failure of the exercise task was prolonged by 15% during atDCS compared to sham treatment (16.9±2.2 minutes vs. 14.7±1.8 minutes; p<0.05). Conclusions: These results suggest that the application of atDCS during performance of fatiguing activity has the potential to bolster the capacity to exercise in older adults, and as such it provides proof of concept that atDCS may be a feasible modality to increase the benefits of exercise, particularly resistance exercise, for older adults. Additionally, the finding that the targeted delivery of atDCS during task performance increased TTF suggests that augmenting cortical excitability with excitatory brain stimulation enhanced descending drive to the spinal motor pool to recruit more motor units. Funding Source: This work was supported in part by the following NIH grants to BC Clark: R01AG044424 from the NIA, R15HD065552 from the NICHD, R01AT006978 from the NCCAM, and R21AR063909 from the NIAMS.

**P222- SARCOPENIA IN OLDER PATIENTS WITH CANCER: A COMPARISON BETWEEN IMAGE-BASED ANALYSIS AND PATIENT REPORTED OUTCOMES.** B.N. Roussel[1], B. Hensley[2], C. Pandya[2], A.M. Magnuson[2], S.G. Mohile[2], F.J. Fleming[2] *(1. New Brunswick, USA; 2. Rochester, USA)*

Backgrounds: Sarcopenia is gaining research interest as a marker of frailty in older patients with cancer. Recent work reported that patients with decreased muscle mass are at higher risk of adverse outcomes from chemotherapy or surgical intervention, including increased all cause and cancer specific mortality. This observation has inspired research aimed at identifying markers of sarcopenia as a surrogate for frailty for the purpose of predicting poor outcomes and determining candidacy for chemotherapy or surgery. One method of identifying sarcopenia in patients with prior diagnostic imaging is measuring the muscle mass cross sectional area on CT imaging at L3 and using sex specific indices. However, few studies have investigated the relationship between imaging-based sarcopenia measurement and patient reported outcomes measuring frailty and functional status. In this study we sought to document the prevalence of sarcopenia using both imaging-based criteria and patient-reported outcomes in a sample of older patients with a primary solid malignancy who were undergoing a decision to undergo cancer treatment. Furthermore, we compared data from the comprehensive geriatric assessment including validated patient reported outcomes such as Instrumental Activities of Daily Living (IADL) dependency, fall history, physical performance, and sarcopenia scores (Evans, JAMDA, 2011) to image based determination of sarcopenia. Methods: In this cross-sectional study, patients from the Specialized Oncology Care and Research in the Elderly (SOCARE) clinic at the University of Rochester were administered a comprehensive geriatric assessment including IADL assessment, six month fall reporting, and Short Physical Performance Battery (SPPB) was also used to characterize physical disability. Patients who were undergoing a decision for cancer treatment and had a CT scan within 6 weeks of geriatric assessment were included (n=103). Impairment was defined as any assistance required for IADLs, a history of a fall, or SPPB score ≤9. Additionally, analysis of diagnostic CT imaging using Slice-0-Matic software 5.1 was used to calculate muscle area at the third lumbar vertebra. The sarcopenia indices [muscle area (cm2)/height (m)2] of patients calculated from CT scans were compared to a patient reported measure for sarcopenia (SarcoPRO). Bivariate analysis (using chi-square test) was implemented to explore the association between imaging-based sarcopenia and patient reported outcomes – falls, IADL limitations and physical impairment on SPPB. The correlation between sarcopenia scores as determined by imaging and SarcoPRO scores was evaluated using Spearman's correlation. A p-value of <0.05 was considered significant. Results: 103 patients underwent diagnostic CT imaging within six weeks of geriatric assessment and were included in analysis. Patients were predominantly Caucasian (94%), male (62%), and were an average age of 80.4 years (66-95 years). At least one IADL dependency was reported in most patients (69%), and 34% experienced a fall in the six months preceding evaluation. Of the 103 patients, 61% (n=63) fell below the sex specific sarcopenic index threshold for sarcopenia by imaging criteria (men <52.4 cm2/m2, women <38.5 cm2/m2). A larger percentage of men (78% n=50) were found to have sarcopenia by imaging criteria than women (33%, n=13) (p<.001). There was no statistical difference in incidence of falls (32.1% vs. 37.8%, p=0.57) or IADL dependence (75.9% vs 61.5% , p=0.13) between individuals with and without sarcopenia by imaging-based analysis . Similarly, SarcoPRO scores were not statistically associated with sarcopenia determined by imaging analysis (p=0.32). Physical impairment defined using the SPPB scores were not significantly different in sarcopenic vs. non-sarcopenic patients (89% vs 88% p=0.83). Conclusions: To our knowledge this is the first study to compare sarcopenia detected by CT imaging to patient reported outcomes in a cohort of older patients with cancer. Although image analysis identified sarcopenia in a high proportion of older patients with cancer, our results suggest that image based measurement of muscle mass do not significantly correlate to functional status measured by the comprehensive geriatric assessment and SPPB. Image based measurement of sarcopenia appears to be developing a future role in some aspects of patient care, but rather than supplant the comprehensive geriatric assessment as a measure of frailty, it may serve as a complementary modality. Patient reported outcomes assessment continues to be an essential tool in evaluating the older cancer patient for frailty and vulnerability.

**P223- CROSS-SECTIONAL RELATIONSHIP BETWEEN RESPIRATORY AND MUSCLE FUNCTION IN OLDER MALE TAIWANESE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE.** K.-Y. Wang, M.-S. Huang *(Kaohsiung, Taiwan)*

Backgrounds: Depleted muscle mass is one of the important extra-pulmonary features reflecting exercise capacity and physical activity in chronic obstructive pulmonary disease (COPD). The objective of this study was to include nutritional and respiratory func-tion assessment in older COPD patients and determine the association with body composition and grip strength. Methods: We recruited 27 older male patients (aged 63-97 years) with stable COPD attending the pulmonary medicine outpatient clinic of Kaohsiung Medical University Hospital. Muscle strength was determined by handgrip strength (HS), using a hand dynamom-eter. Body mass index (BMI), fat-free mass index (FFMI) and appendicular skeletal muscle mass index (ASMI) were measured by bioelectrical impedance analysis (BIA) device. The nutritional status was evaluated with the measurement of serum albu-min level and the short-form Mini-nutritional assessment (MNA)-Taiwan Version. Obstruction of airways was measured by the forced expiratory volume in one second (FEV1). Symptom level was assessed by using the modified Medical Research Council (mMRC) dyspnea scale and the COPD Assessment Test (CAT). C-reactive protein (CRP) level was determined and log transformed to normalize the distributions. Results: The average of the ASMI and HS were 8.25±1.12 (kg/m2) and 30.9±5 (kg) respective-ly. Four patients (14%) meet the AWGS criteria of sarcopenia. The average of FEV1 in the subjects was 1.37±.61 (L). None of the subjects were at risk of malnutrition. Spearman's correlation analysis showed HS was significantly associated with age, FEV1, BMI, ASMI, FFMI, CRP, albumin and MNA score (p<.05). FEV1 consistently showed to be significantly and positively associated with HS as BMI, ASMI and FFMI were included in the linear regression analysis separately (p<.05). Conclusion: Our results showed that respiratory function is a stronger independent predictor of grip strength compared with the body composition parameters in well-nourished elderly male COPD outpatients. The measurement of FEV1 could be used as a possi-ble surrogate of physical function.

**P224- PSYCHOLOGICAL ASSOCIATED FACTORS AND TRANSITIONS BETWEEN FRAILTY STATES: RESULTS FROM AN ELDERLY MEXICAN COHORT.** L. Ruiz-Arregui, A.R. Villa, O. Rosas-Carrasco *(México City, México)*

Background: Frailty is a dynamic and multidimensional phenomenon resulting from the decrease in homeostasis and stress resistance that increases vulnerability and the risk of negative outcomes. Psychosocial factors such as anxiety, depression and self-esteem are the result of the interaction between social environments and the way senses and mind interpret them and they can be mediators between stressors and health conditions, within which lies frailty. Based on the above, the objective of the present study is to estimate the transitions in the stages of frailty and its association with psychological basal conditions (depression, anxiety and self-esteem) in a 14 months follow-up in people 70 years and older. Methods 750 people aged 70 and older were studied. Frailty was assessed at baseline and 14 months later. Weight loss, exhaustion, low energy expenditure, gait and weakness were defined according to criteria adapted from Fried et al. Depressive symptoms; anxiety and self-esteem were included as psychosocial determinants. Frailty transitions were estimated and its association with anxiety, depression and self-esteem, adjusted by health, socioeconomic and demographic covariates were analyzed. Results Depressive symptoms, age, not having a partner, functional capacity and polypharmacy are factors associated with the shift to a worse stage of frailty, while a lowest score of depressive symptoms and self-esteem are associated with reverting a better brittle stadium to 14 months follow up. Conclusions Depressive symptoms and self-esteem are important risk factors associated with transitions between frailty states at 14 months of follow-up. Key words: frailty, transitions, depression, anxiety, self-esteem.

**P225- HEMATOPOIETIC STEM CELL TRANSPLANTATION IN THE ELDERLY: NUTRITIONAL AND GERIATRIC ASSESSMENT.** A.Z. Pereira, P.M. Rodrigues, L.O. Koch, S.M.F. Piovacari, F. Lucio, M. Tanaka, A.P. Barrere, J.S. Bernardo, M. Nicastro, N. Hamerschlak *(São Paulo, Brazil)*

Introduction: Hematopoietic stem cell transplantation (HSCT) may improve outcomes of patients with hematologic malignancies not curable with conventional therapies. Being in some diseases the only curative option. HSCT in elderly patients with good performance status and no comorbidities could, in fact, not only survive the transplant with reasonable risk, but also benefit in the same measure as younger patients. Objectives: To study and correlate nutrition and geriatric assessment in elderly patients undergoing HSCT. Methods: A retrospective study of 17 elderly patients (>60 years) undergoing HSCT May 2012 to January 2014 in the Hematology-Oncology and Bone Marrow Transplantation Center at Albert Einstein Hospital in São Paulo, Brazil. All patients were evaluated approximately one month prior to HSCT. In the geriatric assessment were done hand-grip strength(HGS), questions about mobility and functional limitation. In the nutrition, we studied the Body Mass Index(BMI) (kg/m2), and serum levels of vitamin D, zinc and albumin.Results: 17 elderly patients were observed in this study, mean age was 65,5±3,8 years, BMI was 28±6,0 kg/m2, HGS was 28±8,5 kg; serum levels of albumin 3,2±0,5g/dl(normal:3,5-5,0); serum level of vitamin D 23,4±14 ng/ml (normal >20); serum levels of zinc 65,5±18 mg/dl (normal: 66-132,5 mg/dl). We found the negative correlation between BMI and HGS (rp=0,42). There were a significant and positive association between serum levels of zinc and albumin, and HGS and grades of mobility questions(p<0,05). The serum levels of vitamin D weren`t significantly associated with geriatric factors.Conclusion: Our study showed that the obese patients with more risks of complications in HSCT had more functional limitation. Besides low levels of zinc and albumin were associated with worst results in the geriatric assessment. In the elderly the immobility and weakness can increased the complications after HSCT. The geriatric and nutrition assessment are important to improve HSCT results.

**P226- EFFECT OF AGE ON PERFORMANCE IN KO HFE MICE.** P. Noirez, H. Djemai, R. Thomasson, F. Desgorces, J.F. Toussaint, R. Denis *(Paris, France)*

Backgrounds: Iron is an essential component, implied in many metabolic reactions and physiological functions. Hepcidin is the central regulator of iron metabolism. In athletes, hepcidin level might be increased. Hemochromatosis is characterized by an iron overload and an inhibition of hepcidin production. The main cause of hemochromatosis is the mutation of HFE gene. Our objective is to evaluate the effects of age and HFE mutation on performance in homozygous mice HFE-/- (KO) and HFE+/+ (WT), and physiological characteristics evolution of this performance. Methods: 24 male sedentary mice of 6 months old (young, 4 KO and 6 WT) and 20 months old (old, 5 KO and 9 WT) were measured regularly by magnetic resonance (Bruker, Germany) for their lean and fat mass. Performance evaluation of each mouse proceeded on a one-way-treadmill equipped with calorimetric system (Phenomaster, TSE, Germany). Protocols were set up with 7 days of recovery. The first protocol consisted in increasing the speed by 1 cm.s-1 every 15s; VO2 peak was determined as the highest value of VO2 reached over 15s. The second protocol was carried out to 75% of their best speed reached during the previous test (Vmax). Results: KO mice had a body weight (g) significantly higher (31±3.3 vs 28.5±3.3; p<0.05). Lean mass (g) was significantly more important both in young (22.3±0.4 vs 18.9±0.8; p<0.001) and in old (22.7±2.6 vs 20.2±0.8; p=0.01) KO mice. Their fat mass was also significantly reduced in both groups. Results of the first protocol indicated that VO2 peak relative to lean mass (ml.h-1.g-1) was significantly reduced in KO mice. RER peak was lower in old (0.85±0.04) than in young (0.96±0.06) mice (p<0.001). The results of the second protocol were similar to those of the first one with regards to the RER peak and RER mean. During the second protocol, the time (sec) of race and the run distance (m) observed for WT were significantly higher than those of the KO mice (1634±1108 vs 978±667; p=0.05 and 504±316 vs 306±187; p<0.05 respectively). Conclusion: HFE-/- KO mice had a greater lean mass and a lower fat mass than the WT. They presented a decrease in oxygen uptake and a reduced capacity in endurance performance. This loss of performance seemed to be amplified with age although old KO mice retained a greater lean mass and a lower fat mass. The observed metabolic modifications could be explained by a dysregulation of muscle and liver metabolism in response to iron overload.

**P227- COMPARISON OF BODY COMPOSITION, MUSCLE FORCE AND PHYSICAL PERFORMANCES BETWEEN FALLERS AND NON-FALLERS PEOPLE INCLUDED IN A COHORT OF 100 COMMUNITY DWELLING VOLUNTEERS.** S. Gillain, C. Schwartz, V. Wojtasik, M. Demonceau, N. Dardenne, C. Beaudart, F. Buckinx, O. Bruyère, J.Y. Reginster, G. Garraux, J. Petermans *(Liège, Belgium)*

Background: Fallers have higher mortality than non-fallers. Sarcopenia leads to fall. Currently, the definition of sarcopenia includes low muscle mass, low muscle strength and low muscle function. The aim of this work is to detect which sarcopenia components are associated with fall among older people. Method: At baseline muscle mass were measured using a bioelectrical impedance device (BodyStat® 1500), muscle strength and endurance (maximal duration of a contraction set a 50 % of maximal force in seconds) were assessed using a Martin's Vigorimeter and functional performances such as comfortable and fast walking speed were manually measured in a 30-meter corridor. Statistical analyses were performed using SAS statistical package (version 9.3) Mean values were compared by one-way analysis of variance (ANOVA). Results were considered statistically significant at the 5% critical level (p < 0.05). Results: 100 community-dwelling older, including 56 women, were recruited volunteers. In this cohort, 23 volunteers have already fallen during the year before (including 17 women), mean age is 70.6 ± 5.67 years, mean Body Mass Index (BMI) is 26.2 ± 4.01, mean Short Mini Nutritional Assessment (MNA) score is 12.9 ± 1.57 (/14). Previously fallers (F) present a lower amount of muscle mass than non fallers people (NF) (64,78 percent compared with 69,43 percent, p-value= 0.0094), a higher amount of fat mass than NF (35,22 percent compared with 30,57 percent, p-value = 0,004), a lower grip strength than NF (52,26 kilopascal (kPa) compared with 63, 57 kPa into NF, p-value = 0,0029), and a lower comfortable walking speed than NF (1,18 m/sec. compared with 1,28 into NF, p-value = 0,021) and lower fast walking speed than NF (1,55 m/sec. compared with 1,69 m/sec. for NF, p-value = 0,0051). Discussion: This study demonstrates a difference between F and NF concerning the amount of lean mass, the amount of fat mass, the grip strength and the comfortable and fast walking speeds. The next two-years-follow up of this cohort will allows to know if these associations are also prospective associations helping the clinician to better detect people at risk to fall and also to consider rehabilitation program including these clinical parameters as outcomes to improve. Conclusion: Sarcopenia components such as muscle force, muscle mass and walking speed seem to be linked to fall occurrence.

**P228- CLINICAL DETERMINANT COMPONENTS OF THE FAST WALKING SPEED IN A COHORT OF 100 COMMUNITY DWELLING VOLUNTEERS INCLUDED IN A TWO-YEAR LONGITUDINAL STUDY.** S. Gillain, C. Schwartz, V. Wojtasik, M. Demonceau, N. Dardenne, C. Beaudart, F. Buckinx, O. Bruyère, J.Y. Reginster, G. Garraux, J. Petermans *(Liège, Belgium)*

Background: Walking speed is included in the definition of sarcopenia as muscle mass and muscle force. The aim of this work is to highlight clinical components and functional performances associated with FAST walking speed in old people. Method: 100 community dwelling old people, living at home, aged 65 years or over, were recruited in a two-year longitudinal study (GABI Study) in order to detect clinical and functional components associated with cognitive and functional decline during the next two years. At inclusion, volunteers were assessed for muscle mass using a bioelectrical impedance device (BodyStat® 1500), for muscle strength and endurance (maximal duration of a contraction set a 50 % of maximal force in seconds) using Martin's Vigorimeter. Functional muscle measures included the walking speed, at both comfortable and fast pace (manually timed in a 30 meters corridor and categorized in quartiles), the Short Physical Performance Battery test (SPPB), the Timed Up and Go test (TUG) and history of fall. Statistical analyses were performed using SAS statistical package (version 9.3). Frail status was considered according the Edmonton Frail Scale in which robust people have a score ≤ 3/17). Mean values were compared by one-way analysis of variance (ANOVA). Proportions were compared by using the Chi-squared test. Results were considered statistically significant at the 5% critical level ($p < 0.05$).Results: In this cohort, 56 women were included, the mean age were 70 ±5.67 years, the mean Cumulative Illness Rating Scale geriatric (CIRS-g) were 8,8 ±4.1 (/56), the mean Body Mass Index (BMI) were 26.2 ±4.01 kg/m$^2$ and the mean Short Mini Nutritional Assessment (MNA) is 12.9 ±1.57 (/14). According quartiles, comparison between clinical components and fast walking speed is presented in the table below. Discussion: In this cohort, the FAST walking speed is associated with age, sex, co-morbidities and the amounts of the lean and the fat masses and the prehension force and to the comfortable walking speed. FAST walking speed is linked with all functional outcomes choose in this work and to the frail status. FAST walking speed could be considered as a good marker of healthy aging at least as good than the comfortable walking speed. The follow up of this two-year prospective study will allow to now if FAST walking speed good be considered as a good predictive marker. Conclusions: According these results, FAST walking speed seems to bring relevant information about the health status of volunteers.

| Fast walking speed quartiles | <=1.51 m/sec. | 1.51 - 1.70 m/sec. | 1.70 - 1.84 m/sec. | >1.84 m/sec. | p-value |
|---|---|---|---|---|---|
| Mean age in years (SD) | 73.54 (7.08) | 68.67 (5.26) | 70.65 (4.64) | 69.38 (4.18) | 0.010 |
| Sex, Number of women (%) | 19 (73.1) | 19 (79.2) | 10 (38.5) | 8 (33.3) | 0,0009 |
| CIRS-G, score/56 (SD) | 11.12 (4.02) | 8.71 (3.29) | 7.58 (4.19) | 7.75 (3.81) | 0.0047 |
| Mean Lean Mass in % (SD) | 64.83 (7.98) | 65.79 (7.40) | 70.20 (5.88) | 72.75 (6.50) | 0.0002 |
| Mean Fat Mass in % (SD) | 35.17 (7.98) | 34.21 (7.40) | 29.80 (5.88) | 27.25 (6.50) | 0.0002 |
| Mean Prehension Force in kPa (SD) | 50.00 (10.91) | 57.54 (10.12) | 66.14 (17.22) | 70.67 (17.36) | <.0001 |
| Mean Endurance in sec. (SD) | 39.80 (19.54) | 49.72 (27.36) | 52.85 (22.96) | 57.09 (34.45) | 0.13 |
| Mean comfortable walking speed in m/sec. (SD) | 1.08 (0.11) | 1.21 (0.10) | 1.34 (0.17) | 1.41 (0.09) | <.0001 |
| Number of frail subjects (%) | 12 (46.2) | 6 (25.0) | 3 (11.5) | 2 (8.3) | 0.0052 |
| Number of robust subjects (%) | 14 (53.8) | 18 (75.0) | 23 (88.5) | 22 (91.7) | 0.046 |
| Number of subjects with a SPPB ≤ 10/12 (%) | 22 (84.6) | 14 (58.3) | 14 (53.8) | 12 (50.0) | |
| Number of subjects with a SPPB > 10/12 (%) | 4 (15.4) | 10 (41.7) | 12 (46.2) | 12 (50.0) | 0.0059 |
| Number of subjects with a TUG ≥ 11 sec. (%) | 10 (38.5) | 5 (20.8) | 2 (7.7) | 1 (4.2) | |
| Number of subjects with a TUG < 11 sec. (%) | 16 (61.5) | 19 (79.2) | 24 (92.3) | 23 (95.8) | 0.012 |
| Number of Fallers (%) | 12 (46.2) | 4 (16.7) | 3 (11.5) | 4 (16.7) | |
| Numbers of Non Fallers (%) | 14 (53.8) | 20 (83.3) | 23 (88.5) | 20 (83.3) | |

**P229- TWELVE WEEKS OF UNCOMPLICATED RESISTANCE TRAINING INCREASES LEAN BODY MASS AND REDUCES MARKERS OF MUSCLE ATROPHY IN OLDER ADULTS.** B. Egan[1], D. Crognale[1], M. Krause[2], K. Cogan[1], P. Newsholme[3], G. De Vito[1] *(1. Dublin, Ireland; 2. Rio Grande do Sul, Brazil; 3. Curtin, Australia)*

Background: Metabolic dysfunction and declining skeletal muscle mass are associated with reduced physical activity and threaten healthy aging. Resistance exercise is an established countermeasure to attenuate the decline in lean body mass (LBM) that occurs with aging. Resistance exercise increases skeletal muscle protein synthesis, but the effects of resistance exercise training on markers of muscle atrophy in older adults is not well-described. The aim of the present study was to investigate the effects of twelve weeks of 'uncomplicated' resistance exercise training on LBM and markers of muscle atrophy in older adults. Methods: Thirty-nine medically-stable, free-living older adults were randomised to either resistance exercise training (REX, n=21; age, 63.9±4.1 y; body mass index, 25.2±2.5 kg m-2) or non-training control (CON, n=18; 63.1±4.8 y; 26.7±2.9 kg m-2) for a 12 week intervention. REX consisted of three supervised exercise sessions per week, each lasting 45 minutes and consisting of uncomplicated resistance exercises in the form of bodyweight resistance (e.g. squat, lunge, push-up) and resistance band exercises (e.g. standing row, bicep curls). Weekly progressions primarily included increasing time under tension, and the resistance of bands. Tests of physical function including 10 m walking test and chair raise tests were assessed before and after the 12 week intervention. Skeletal muscle biopsies from the vastus lateralis were taken prior to commencing training and at 60 h after the final training session. Changes in transcript abundance for molecular markers of fibre type and muscle atrophy were assessed by quantitative polymerase chain reaction (qPCR). Results: REX resulted in an increase in whole-body LBM (0.93±0.83 kg; $p<0.001$) and leg LBM (0.25±0.27 kg; $p=0.001$), which were unchanged in CON. Improvements in 10 m walking test and chair raise tests (reps in 30 sec and time for 5 reps) were observed in REX (all $p<0.05$), but not CON. Relative mRNA expression of FOXO3 was decreased (30%; $p<0.05$), MAFbx tended to be decreased (24%; $p=0.077$), and MYOD was decreased (38%; $p<0.01$) after REX, but myostatin was unchanged. Myosin heavy chain isoform expression was decreased for type I (40%; $p<0.01$) and type IIX (48%; $p<0.05$) and increased for type IIA (43%; $p<0.001$) muscle after REX. Conclusion: The present study describes a REX training intervention of bodyweight- and resistance band-based exercises for older adults, which demonstrates efficacy to increase LBM and physical function in this population. Increases in LBM coincided with reductions in markers of muscle atrophy and elevated expression of type IIX muscle fibres. Future work will explore markers of muscle protein synthesis in these samples.

**P230- A MATURE HUMAN SKELETAL MUSCLE MODEL TO DETECT HYPERTROPHIC COMPOUNDS BY HIGH CONTENT SCREENING.** Y. Margaron, M. Fernandes, D. Morales, P. Poydenot, P. Menager, J. Michaud, S. Degot *(Grenoble, France)*

Sarcopenia is described as a progressive loss of skeletal muscle mass associated to aging. This decrease of muscle mass causes weakness and frailty, which follows muscle atrophy and decrease of activity. Research on compounds able to renew muscle mass is therefore crucial to compensate tissue wasting. In this context, we have developed a physiological muscle model allowing the detection of compounds inducing atrophy and hypertrophy. When cultured on micropatterns, primary human myoblasts faster differentiated into myotubes displaying a higher level of sarcomere striation and nuclei alignment compared to standard culture conditions. Moreover, the use of micropatterns greatly standardized myotube formation and morphogenesis, enabling robust high throughput and high content screening. Thanks to the development of new image analysis algorithms and the reduced variability of myotube morphology, the achieved cellular model enabled accessing new parameters for myotube characterization upon drug treatment. To demonstrate the benefit of this model we tested IGF-1, a known compound inducing hypertrophy, to rescue the effects of muscle atrophy. The results showed increased Z' factors for fusion index and myosin area read-outs. Such model opens up new avenues for screening compounds that either induce hypertrophy or reverse atrophy, which in turn will help identifying new compounds for sarcopenia treatment.

**P231- HYPERINSULINEMIA IS ASSOCIATED WITH THE LOSS OF APPENDICULAR SKELETAL MUSCLE MASS IN OLDER ADULTS.** M. Lopez Teros *(Distrito Federal, México)*

Background and aim: Homeostasis model assessment as a marker of insulin resistance has been associated with the pronounced loss of appendicular skeletal muscle mass in older adults. In the present study, we hypothesized that hyperinsulinemia as an early predictor of insulin resistance may be associated with the loss of appendicular skeletal muscle mass (ASM). Methods: This is a cohort study that included 147 well-functioning older men and women subjects who were followed for a period of 4.6 ± 1.8 years. Lean tissue in arm and legs, or ASM, was derived from dual-energy x-ray absorptiometry at baseline with follow-up measurements to obtain the relative change. Hyperinsulinemia was defined empirically at the 75th percentile. Results: The relative change in ASM was negative and significant throughout the quartiles of fasting insulin levels ($p \leq 0.05$); however, the loss of ASM was more pronounced in the later quartiles (-0.7 kg) compared with the relative change in Q1 and Q2 (-0.5 kg and -0.3 kg). The unadjusted analysis indicates a significant association between hyperinsulinemia and the loss of ASM ($\beta$= -0.28, 95% CI-0.57-.009, $p=0.05$), an association that remained significant after adjusting for several covariates. Conclusion: Hyperinsulinemia as an early marker of insulin resistance was associated with the loss of

ASM in a cohort study of community-dwelling older men and women subjects without other chronic health conditions. The use of fasting insulin levels >8.4 µU/mL may help clinicians identify individuals in the geriatric population who are at a high risk of loss of appendicular skeletal muscle mass. Keywords: hyperinsulinemia, loss of skeletal muscle, older adults.

**P232- NORMAL GAIT SPEED, GRIP STRENGTH AND THIRTY SECOND CHAIR RISING AMONG OLDER INDIANS.** P. Chatterjee, V. Gunasekaran, A. Chakrawarty *(New Delhi, India)*

Background: Gait speed, grip strength and 30 s chair rising are important parameters for physical performance in older people and are used for detection of frailty. But normative data is lacking for Indian population. This study aimed to assess the gait speed, grip strength and 30second chair rising in older Indians. Methodology: In a cross sectional observational study, conducted in Geriatric Medicine OPD and Ward of All India Institute of Medical Sciences, New Delhi, caregivers, above the age of 60 years and without any medical co-morbidity, were recruited with written consent. Comfortable gait speed was assessed by asking the participants to walk on their own pace for a distance of four meters and the time taken was noted by a stopwatch. Grip strength was assessed by using hand held dynamometer by pressing it for 6 times, 3 times in each hand, and the best value of the six values was chosen as the grip strength. Thirty second chair rising was assessed by asking the participants to stand and sit from chair without any support for thirty seconds. The number of times they could perform the test was noted with the help of a stopwatch. Results: Out of 799 participants 68.96% (551) were male and 31.04% (248) were female. Mean age of presentation were 64.5(Sd-4.5). The mean gait speed for men with height below 173 cm was 0.816m/sec (+ 0.83) and for those more than 173 cm it was 0.46m/sec (+ 0.15). The mean gait speed in women with height below 159 cm was 0.70m/sec (+ 0.25) and for those with height above 159 cm, it was 0.75m/sec (+0.63). The mean grip strength for men were 18.21(+9.67), 24.85 (+10.83) and 24.44(+9.67) for with BMI<18.5; 18.5 to 24.99 and >30; respectively. The mean grip strength for women was 9.17 (+5.22), 11.45 (+6.20) and 13.07 (+6.40) for BMI >18.5; 18.5 to 24.99; and >30 respectively. The number of chair risings in 30 seconds for men was 9.95 (+3.87), 10.59 (+2.94), 8.22 (+3.62) and for women 10.39 (+4.67), 9.26(+2.61),8.33(+2.29) in the groups determined by BMI < 18.5, 18.5 to 24.99 and >30 respectively. Gait speed, grip strength and 30 Sec Chair rising decreases significantly with Age p=0,p=0.02 and p=0.006 respectively. Undernourished (BMI<18.5) elders have significantly low (p=0.03) grip strength compared to normal nutrition (BMI 18.5 to 24.99). Conclusion-The values presented above in Indian elderly are different from those of Caucasian population. Normative data will be of immense value to the researchers to assess functionality, identify frailty in elderly subjects accurately and guide the clinical decision making.

**P233- ENDOTHELIAL DYSFUNCTION, EVALUATED BY ADMA, PREDICTS DISABILITY. THE TOLEDO STUDY HEALTHY AGEING.** C. Alonso-Bouzón[1], J.A. Carnicero[1,2], M. El Assar[1], F.J. García-García[2], L. Rodríguez-Mañas[1] *(1. Madrid, Spain; 2. Toledo, Spain)*

Background: Asymmetric dimethylarginine (ADMA), an endogenous inhibitor of NO Synthase is commonly used as a marker of endothelial dysfunction. Recently, an association between ADMA and prevalent frailty has been reported. In this work, we have evaluated the potential association of ADMA levels with incident disability. Method: We used data from the Toledo Study for Healthy Aging, a prospective Spanish cohort study. Biological samples were obtained and ADMA levels were determined using an enzyme immunoassay method. Incident disability was defined as 5 or less items in the ADL scale (Katz Index). Logistic regression was used to estimate the odds ratio (OR) and 95% confidence intervals of incident disability associated with ADMA. Adjustments were made for age, gender, frailty status, atherosclerotic disease (assessed by Ankle-Brachial Index-ABI), BMI and insulin resistance (assessed by HOMA-IR). Results: 719 community-dwelling elderly were included in the analysis with a median follow up period of 4.98 years. After adjustment by confounders, ADMA was a risk factor of disability. OR (95%CI) for one unit increment in the ADMA level (µmol/l) was 2.68 (1.09-6.58). Conclusions: Endothelial dysfunction, assessed by ADMA levels, is a risk factor of disability. This study was supported by grants PI11/01068, RD 06/0013 and RD12/0043 from the Instituto de Salud Carlos III (Ministerio de Economía y Competitividad), Spain, and FP7-305483-2 from the FP7-Health-2012-Innovation of the European Union.