**E-Supplemental Appendix**

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# **Table e1:** Variable descriptions, ranges, and coding

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| Measures | Description | Value Range | Variable Coding |
| Independent Variables |
| Clinical Frailty Scale (CFS)1 | Judgement-based ordinal scale where ranging from 1 to 9, where 1= fit, 8= very severely frail, and 9= terminally ill but otherwise not evidently frail. | 1-9 | CFS<5= 0CFS≥5=1 |
| Dependent Variables |
| Physical Function in ICU Test-scored (PFIT-s)2 | Performance-based measure assessing function in four categories (shoulder strength, knee strength, assistance with sit-to-stand, and step cadence). A total score is generated between 0-12 on an ordinal scale which is then converted to a score between 0-10 on an interval scale. Higher scores indicate greater functional capacity.  | 1-10 | N/A |
| Medical Research Council Sum Score (MRC-SS) 3 | Global performance-based measure of peripheral muscle strength, grades muscle strength on a 6-point scale ranging from 0 (no visible contraction) to 5 (normal power) applied to 6 bilateral upper and lower-limb muscle groups. Higher scores indicate greater muscle strength. | 0-60 | N/A |
| Hospital Mortality  | Vital status at time of hospital discharge. | 0 or 1 | 0-Alive1-Dead |
| Co-variates |
| Acute Physiology and Chronic Health Evaluation II (APACHE II)4 | Combines an individual’s acute physiology within the first 24 hours in ICU, age, and chronic health into one cumulative score where a higher score is indicative of worse illness severity | 0-71 | N/A |
| Randomized Intervention  | Control=Routine physiotherapy; Intervention=Cycling plus routine physiotherapy | 0 or 1 | 0-Control1-Intervention |

**Table e1 Legend:** We describe independent variables, dependent variables, and covariates and indicate their value ranges and, if applicable, how they were coded in our analysis.

# **Regression Analysis Methods**

**Linear regression**: Satisfaction of linear regression assumptions were verified through visual inspection of scatterplots, residual plots, P-P plots and Q-Q plots. If assumptions of linearity, homoscedasticity, or normality were not met, appropriate transformations of the dependent variable were considered. Overall model significance was assessed using F-tests and goodness-of-fit was measured using R2 values. Influential observations with leverage values above calculated cutoff points and Cook’s distances >1 were scrutinized.

 Logistic regression: The Hosmer Lemeshow’s goodness-of-fit statistic was used to evaluate model fit. Discriminatory ability of the model was assessed using the c-statistic. DFbetas, C values and CBar values were assessed to evaluate the impact of excluding observations on parameter estimates for leverage values >2 times the average leverage, deviance residuals >2, or Pearson residuals >2.

We assessed collinearity between predictors for linear and logistic regression models using both informal (correlation matrix of independent variables) and formal (variance inflation factors (VIF) >10 and low tolerance statistics (Tk)) diagnostics.

# **Regression Diagnostic Results**

**Linear Regression:** In linear regression models, no observations had leverage values >0.121. Studentized residuals demonstrated homoscedasticity with slight bias. P-P plots and Q-Q plots demonstrated weak satisfaction of the normality assumption. Transformations did not improve satisfaction of assumptions and were therefore not applied. All VIFs were >10 and Tks were low.

**Logistic Regression**: The logistic regression model could correctly discriminate between an individual who died versus survived 47% of the time (c-statistic =0.47). No observations had a Pearson residual >2.

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| **Table e2:** Multivariable linear regression analysis of PFIT-s scores and MRC-SS for 66 patients  |
| Dependent variables | Mean Difference (CFS≥5) | 95% CI | p |
|       PFIT-s | 0.20 | -2.08 to 2.47 | 0.86 |
|  MRC-SS | 1.96 | 12.6 to 16.6 | 0.79 |
| PFIT-s MD (95% CI): APACHE II -0.06 (-0.17 to 0.06); cycling intervention: 0.63 (-1.39 to 2.64)MRC-SS: MD (95% CI): APACHE II: -0.24 (-1.00 to 0.51); cycling intervention: 4.34 (-8.61,17.3) |

Table e2 Legend: Predictors explained 2.0% of the variance in PFIT-s scores and the model was not statistically significant (F(3,62)=0.38, p=0.77). Similarly, predictors explained 1.3% of the variance in MRC-SS and the model was not statistically significant (F(3,62)=0.27, p=0.85).

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| **Table e3**: Binary logistic regression analysis to estimate the association of pre-hospital CFS scores with hospital mortality for 66 patients  |
| Dependent variable | Odds Ratio (CFS≥5) | 95% CI  | p |
|       Hospital Mortality | 0.91 | 0.28 to 2.93 | 0.87 |
| Odds Ratio (95% CI): APACHE II: 1.00 (0.94 to 1.07); cycle intervention: 1.32 (0.47 to 3.75) |

**Table e3 Legend:** Using binary logistic regression (n=66 patients), we present the odds of hospital mortality for those with frailty vs. those without frailty, after controlling for APACHE II scores and the cycling intervention. The overall model was not statistically significant ($χ$2(df=3)=0.32, p=0.96) with no evidence of poor fit based on the Hosmer Lemeshow’s goodness-of-fit test ($χ$2(df=7)=9.18, p=0.24).

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| **Table e4:** Sensitivity analyses using multivariable linear regression analysis to estimate the association between pre-hospital CFS scores and outcomes at hospital discharge |
| Dependent Variable | Imputation Approach  | n | Mean Difference (CFS≥5) | 95% CI | p |
| PFIT-s | PFIT-s set to 0 for those who diedPFIT-s set to 7.95δ (mean of survivors) for those who diedComplete caseα | 666643 | 0.20 -0.13-0.09 | -2.08 to 2.47-0.95 to 0.69-1.31 to 1.14 | 0.860.750.89 |
| MRC-SS | MRC-SS set to 0 for those who diedMRC-SS set to 54.0δ (mean of survivors) for those who diedComplete caseα,β | 666641 | 1.96-0.250.57 | -12.6 to 16.6-3.45 to 2.94-3.39 to 4.56 | 0.790.880.77 |
| PFIT-s:  PFIT-s set to 0: MD (95% CI): APACHE II: -0.05 (-0.17 to 0.07); cycling intervention: 0.58 (-1.45 to 2.59)  PFIT-s set to 7.95: MD (95% CI): APACHE II: -0.05 (-0.09 to -0.01); cycling intervention: -0.13 (-0.85 to 0.60) Complete case: MD (95% CI): APACHE II: -0.08 (-0.14 to -0.14); cycling intervention: -0.35 (-1.43 to 0.73)MRC-SS: MRC-SS set to 0 for those who died: MD (95% CI): APACHE II: -0.24 (-0.10 to 0.51); cycling intervention: 4.34 (-8.61 to 17.3) MRC-SS set to 54.0 for those who died: MD (95% CI): APACHE II: -0.19 (-0.36 to -0.03); cycling intervention: -0.77 (-3.60 to 2.07) Complete case: MD (95% CI): APACHE II: -0.15 (-0.35 to -0.05); cycling intervention: 0.35 (-3.09 to 3.79)δ-Mean calculated excluding ICU discharge values for patients with missing hospital discharge values for missing cases due to unexpected discharge or incomplete assessmentα-Excludes ICU discharge scores for 2 patients with missing hospital discharge assessments due to unexpected dischargeβ-Excludes ICU discharge scores for 2 patients with incomplete hospital discharge assessments |

**Table e4 Legend:** Sensitivity analyses using multivariable linear regression analysis to estimate association between pre-hospital CFS scores and outcomes at hospital discharge with 1) outcome variables set to 0 for those who died; 2) outcome variables set to mean of survivors for those who died; 3) complete cases only.

# **Figure e1:** Sensitivity analysis using multivariable linear regression analysis to estimate association between pre-hospital CFS scores and PFIT-s scores at hospital discharge



**Figure e1 Legend:** Average change in PFIT-s scores for those with frailty (CFS≥5) vs. those without frailty (CFS<5) when using: 1) outcome variables set to 0 for those who died; 2) outcome variables set to mean of survivors for those who died; 3) complete cases only.

# **Figure e2:** Sensitivity analysis using multivariable linear regression analysis to estimate association between pre-hospital CFS scores and MRC-SS at hospital discharge



**Figure e2 Legend:** Average change in MRC-SS for those with frailty (CFS≥5) vs. those without frailty (CFS<5) when using: 1) outcome variables set to 0 for those who died; 2) outcome variables set to mean of survivors for those who died; 3) complete cases only.

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