The Journal of Frailty & Aging 15 (2026) 100161

Contents lists available at ScienceDirect

The Journal of Frailty & Aging

journal homepage: www.elsevier.com/locate/tjfa

Editorial

Access to emerging health technologies in aging: from innovation to inclusion

The rapid expansion of digital and data-driven health technologies has generated considerable optimism for improving the health and independence of older adults. Wearable sensors, telemedicine platforms, artificial intelligence (AI)-enabled risk prediction, and personalized digital interventions hold promise to enhance prevention, enable earlier detection of decline, and support more responsive and individualized care. Yet, as with many innovations in healthcare, their benefits do not appear to be evenly distributed which risks amplifying existing inequities, particularly among vulnerable older adults, who stand to gain the most but are often least well served by current models of access [1,2].

A central challenge is the mismatch between technological design and the lived realities of older individuals. Many digital health tools are developed with younger, technologically competent users in mind. Interfaces may be complex, text small, and interaction pathways unintuitive for individuals with visual impairment, cognitive decline, or reduced dexterity. This issue is particularly relevant in frail, multimorbid older adults in whom functional limitations may impact the ability to engage with technology. For instance, wearable devices that monitor physiological parameters and detect early signs of deterioration are increasingly available, but their uptake among older adults remains limited. Relatively high costs, the need for smartphone integration, and ongoing device management pose tangible barriers [3]. Indeed, programs that have attempted to address these gaps through device provision, simplified interfaces, and community-based training have shown that accessibility is not an inherent feature of technology, but an outcome of design and support [4].

These barriers are readily observable in real-world settings. For instance, among vulnerable older adults receiving community-based services, such as home-delivered meal programs, access to and familiarity with digital tools remain highly variable, with only a proportion reporting internet access or use of connected devices [5]. Similarly, participation in technology-enabled interventions that entail access to devices, connectivity, and baseline digital literacy, may be limited among those at greatest risk of frailty or social isolation [6]. These observations highlight that access is influenced not only by availability, but by broader socioeconomic and functional factors.

Telemedicine offers a similarly illustrative case. Its rapid expansion during and after the COVID-19 pandemic demonstrated clear benefits for older populations, especially for those with mobility limitations or living in underserved areas [7]. However, reliance on video-based platforms has exposed a persistent digital divide. Many older adults lack access to high-speed internet, appropriate devices, or the confidence to engage with virtual care [8]. Evidence from geriatric care models suggests that hybrid and community-supported approaches are more effective in maintaining continuity of care among frail older adults [9]. These examples underscore the broader principle that technological innovation alone is insufficient, unless it is embedded within systems that accommodate diverse capabilities and contexts.

AI-driven tools present both significant opportunity and risk. Predictive algorithms designed to identify frailty, falls risk, or malnutrition could enable earlier and more targeted interventions. Digital biomarkers of frailty are increasingly being explored within geriatric research [10], including approaches that leverage continuous, real-world monitoring of intrinsic capacity and functional trajectories [11]. However, these systems are only as robust as the data on which they are trained. Older adults, especially those who are frail, socially isolated, or from minority and low-resource backgrounds, remain underrepresented in many datasets [12,13]. This introduces the risk of systematic bias, where predictions are less accurate for precisely identifying those individuals most in need of support. Addressing this requires technical solutions, such as more representative data and explainable AI, as well as structural changes to ensure that older populations are meaningfully included in research and development processes [13].

Even when technologies are provided at low cost, sustained engagement depends on usability, perceived relevance, and support. Interventions for vulnerable older adults are more likely to succeed when they incorporate human elements (e.g., regular follow-up, caregiver involvement, integration into existing care relationships), suggesting that technology is most effective when it augments, rather than replaces, interpersonal support. This is reflected in emerging models of remotely delivered interventions, where structured support, whether through clinicians, caregivers, or trained volunteers, improves acceptability and engagement among older adults with frailty [14]. At the same time, evidence suggests that when appropriately designed, technology-based interventions can be both feasible and beneficial in older populations. Digitally delivered exercise and monitoring programs have demonstrated high adherence and meaningful improvements in physical and cognitive outcomes, even among at-risk individuals [15]. These findings emphasize that the key challenge is not whether older adults can engage with technology, but whether technologies are designed inclusively and implemented within supportive environments.

Ethical considerations further complicate implementation. Continuous monitoring technologies can enhance safety and enable early intervention; yet they may also be perceived as intrusive. For older adults, whose priorities often include maintaining independence and quality of life, these tensions are particularly relevant. Frailty-focused care emphasizes person-centered outcomes, including function, autonomy, and well-being. Lessons from long-term care settings further highlight the importance of preserving individuality, dignity, and

https://doi.org/10.1016/j.tjfa.2026.100161
Received 2 April 2026; Accepted 3 April 2026
Available online 26 May 2026
2260-1341/© 2026 The Author(s). Published by Elsevier Masson SAS on behalf of SERDI Publisher. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

meaningful engagement in care delivery [16]. Ethical deployment therefore requires a person-centered approach that involves informed consent, transparency, and respect for individual preferences. Co-design methodologies, where older adults are actively involved in shaping technologies, offer a promising pathway to align innovation with user values and expectations [17].

Structural determinants of health must also remain central to this discussion. Frailty is strongly influenced by social determinants, including socioeconomic status, access to care, mobility, and social participation [18,19]. Reduced mobility and social engagement, both common in older populations, can further limit access to both healthcare and enabling technologies. Moreover, periods of enforced isolation, such as during the COVID-19 pandemic, have demonstrated that reduced social interaction and activity can negatively affect health behaviors and accelerate frailty trajectories [20]. While emerging technologies can mitigate some of these effects, they cannot compensate for broader structural inequities. Therefore, ensuring equitable benefit requires alignment between technological innovation and public health strategies, with targeted investment in underserved communities.

From a policy perspective, several practical steps can support more equitable access. Subsidization and reimbursement models can reduce financial barriers, particularly for essential devices and services. Investment in digital infrastructure is foundational. Equally important is the development of age-friendly design standards, ensuring that usability considerations are carefully incorporated into technology development [4]. Training programs for both users and healthcare providers can build confidence and competence, while regulatory frameworks must ensure that commercial offerings meet standards of safety, efficacy, and transparency [12].

Ultimately, the integration of emerging health technologies into geriatric care requires moving beyond a model of innovation driven primarily by capability, towards one guided by inclusivity and real-world applicability. Older adults, especially those living frailty, are a highly heterogeneous group. Recognizing this heterogeneity and designing systems flexible enough to accommodate it are essential for their actual implementation. If employed thoughtfully, emerging health technologies have the potential to support healthier aging, prolong independence, and reduce the burden of frailty. Realizing this potential requires a concerted effort to ensure equitable access, inclusive design, and real-life relevance.

Funding

None.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT-5.2 to assist with language refinement only. The authors reviewed and edited all content and take full responsibility for the accuracy, integrity, and originality of the work.

CRediT authorship contribution statement

Emanuele Marzetti: Conceptualization, Writing – original draft. **Anna Picca:** Conceptualization, Writing – review & editing. **Riccardo Calvani:** Conceptualization, Writing – review & editing. **Hélio José Coelho-Júnior:** Conceptualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] World Health Organization. Global strategy on digital health 2020–2027. Geneva: WHO; 2025. Available at, https://iris.who.int/server/api/core/bitstreams/a64d584f-015b-471f-9d86-9ea263cfb516/content (accessed on 2 April 2026).
[2] Kickbusch I, Piselli D, Agrawal A, Balicer R, Banner O, Adelhardt M, et al. The Lancet and Financial Times Commission on governing health futures 2030: growing up in a digital world. Lancet 2021;398:1727–76. https://doi.org/10.1016/S0140-6736(21)01824-9.
[3] Zhang H, Xu J, Lu X, Xu M. Wearable devices in elderly chronic disease management: a qualitative study of barriers and facilitators. J Nurs Manag 2025;2025:1278057. https://doi.org/10.1155/jonm/1278057.
[4] Zaman SB, Khan RK, Evans RG, Thrift AG, Maddison R, Islam SMS. Exploring barriers to and enablers of the adoption of information and communication technology for the care of older adults with chronic diseases: scoping review. JMIR Aging 2022;5:e25251. https://doi.org/10.2196/25251.
[5] El Shatanofy M, Chodosh J, Sevick MA, Wylie-Rosett J, DeLuca L, Beasley JM. Characterizing intervention opportunities among home-delivered meals program participants: results from the 2017 National Survey of Older Americans Act Participants and a New York City survey. J Frailty Aging 2020;9:172–8. https://doi.org/10.14283/jfa.2020.25.
[6] Jiwani R, Wang J, Li C, Dennis B, Patel D, Gelfond J, et al. A behavioral lifestyle intervention to improve frailty in overweight or obese older adults with type 2 diabetes: a feasibility study. J Frailty Aging 2022;11:74–82. https://doi.org/10.14283/jfa.2021.17.
[7] Omboni S, Padwal RS, Alessa T, Benczúr B, Green BB, Hubbard I, et al. The worldwide impact of telemedicine during COVID-19: current evidence and recommendations for the future. Connect Health 2022;1:7–35. https://doi.org/10.20517/ch.2021.03.
[8] Seifert A, Cotten SR, Xie B. A double burden of exclusion? Digital and social exclusion of older adults in times of COVID-19. J Gerontol B 2021;76:e99–103. https://doi.org/10.1093/geronb/gbaa098.
[9] Baskaran TBP, Raghav P, Naveen KHS. Hybrid model of care for older persons for improvement of frailty index-a community-based interventional study in an urban setting. BMC Geriatr 2024;24:772. https://doi.org/10.1186/s12877-024-05351-0.
[10] Huang J, Zhou S, Xie Q, Yu J, Zhao Y, Feng H. Digital biomarkers for real-life, home-based monitoring of frailty: a systematic review and meta-analysis. Age Ageing 2025;54(4):afaf108. https://doi.org/10.1093/ageing/afaf108.
[11] Piau A, Steinmeyer Z, Cesari M, Kornfeld J, Beattie Z, Kaye J, et al. Intrinsic capacitiy monitoring by digital biomarkers in Integrated Care for Older People (ICOPE). J Frailty Aging 2021;10:132–8. https://doi.org/10.14283/jfa.2020.51.
[12] van Kolfschooten H. The AI cycle of health inequity and digital ageism: mitigating biases through the EU regulatory framework on medical devices. J Law Biosci 2023;10. https://doi.org/10.1093/jlb/lsad031. lsad031.
[13] Obermeyer Z, Powers B, Vogeli C, Mullainathan S. Dissecting racial bias in an algorithm used to manage the health of populations. Science 2019;366:447–53. https://doi.org/10.1126/science.aax2342.
[14] Meredith SJ, Holt L, Varkonyi-Sepp J, Bates A, Mackintosh KA, McNarry MA, et al. Frail2Fit study: it was feasible and acceptable for volunteers to deliver a remote health intervention to older adults with frailty. J Frailty Aging 2025;14:100092. https://doi.org/10.1016/j.tjfa.2025.100092.
[15] Bajdek N, Latham NK, Dishaw M, Farrell S, Shang YV, Pencina KM, et al. Feasibility of a multicomponent digital fall prevention exercise intervention for at-risk older adults. J Frailty Aging 2024;13:349–58. https://doi.org/10.14283/jfa.2024.35.
[16] Wee SL, Yap PLK. Timely lessons from a pandemic on the benefits of person centric care in long term care facilities. J Frailty Aging 2020;9:132–3. https://doi.org/10.14283/jfa.2020.28.
[17] Nordin S, Davis A, Légaré F, Jones A, Meijering L, Elf M. Designing meaningful engagement for older adults: an evaluation of participation in a five-day co-design sprint. Health Expect 2026;29:e70555. https://doi.org/10.1111/hex.70555.
[18] Hoogendijk EO, Afilalo J, Ensrud KE, Kowal P, Onder G, Fried LP. Frailty: implications for clinical practice and public health. Lancet 2019;394:1365–75. https://doi.org/10.1016/S0140-6736(19)31786-6.
[19] Cacciatore S, Mao S, Nuñez MV, Massaro C, Spadafora L, Bernardi M, et al. Urban health inequities and healthy longevity: traditional and emerging risk factors across the cities and policy implications. Aging Clin Exp Res 2025;37:143. https://doi.org/10.1007/s40520-025-03052-1.
[20] Son BK, Imoto T, Inoue T, Nishimura T, Tanaka T, Iijima K. Social detachment influenced muscle mass and strength during the COVID-19 pandemic in Japanese community-dwelling older women. J Frailty Aging 2022;11:231–5. https://doi.org/10.14283/jfa.2022.4.

The Journal of Frailty & Aging 15 (2026) 100161

Emanuele Marzetti[a,b], Anna Picca[b,c,*], Riccardo Calvani[a,b], Hélio José Coelho-Júnior[a,b]

[a] *Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Largo A. Gemelli 8, Rome 00168, Italy*

[b] *Department of Geriatrics, Orthopedics and Rheumatology, Università Cattolica del Sacro Cuore, Largo F. Vito 1, Rome 00168, Italy*

[c] *Department of Medicine and Surgery, Libera Università Mediterranea (LUM) Giuseppe Degennaro, Strada Statale 100 km 18, Casamassima 70010, Italy*

[*] Corresponding author.
E-mail address: picca@lum.it (A. Picca).