

Paper Category:	Diagnosis and Aetiology
Paper Title: (Arial Font; 14 Pt Size)	Modeling Biological Age Based on Multi-Domain Biomarkers in the Korean Frailty and Aging Cohort Study
Abstract Body: (Arial Font; 12Pt Size)	<ul style="list-style-type: none"> • Background • Objectives • Method • Results • Discussions and Conclusions
<p>(Maximum word limit - 300 words)</p> <p>Background: Biological age (BA) provides valuable information about overall health and the extent to which aging deviates from chronological age (CA). Aging spans multiple domains; yet, the accuracy of BA estimates using multi-domain biomarkers remains uncertain.</p> <p>Objectives: This study derives the sex-specific measures of BA in a population of Korean older adults based on six-domain biomarkers that are commonly available in clinical practice: physical, body composition, cognitive function, psychological and sensory abilities, and blood biomarkers.</p> <p>Method: We used data of 2,400 older adults aged 70–84 years from the Korean Frailty and Aging Cohort Study at baseline. Eighty-two biomarkers from six domains were drawn from blood, physiological tests, physical and cognitive function, and body composition assessed using dual-energy X-ray absorptiometry. We computed the BA estimate using three commonly used algorithms: principal component analysis, multiple linear regression, and the Klemm and Dörmann (KD) method. We also evaluated their effectiveness in predicting frailty for validation of BA.</p> <p>Results: Using elastic net selection procedures, we identified a final selection of 43 biomarkers in men and 58 biomarkers in women that are significantly associated with CA. When considering BA based on the six-domain biomarkers, we observed the most robust correlation with CA (coefficient of determination [R^2] = 0.63 for men; R^2 = 0.47 for women), outperforming of BA estimates derived from individual domains. Of the three BA estimation algorithms, the KDM model of BA based on the six-domain biomarkers demonstrated the best performance and was predictive in frailty for men (AUC 0.934) and women (AUC 0.923). In predicting frailty, three out of the six domains of BA estimates were significantly associated with men (physical, psychological abilities, and cognitive function) and women (physical, psychological, and sensory abilities).</p> <p>Discussions and Conclusions: Our results suggest that a comprehensive panel of biomarkers reflecting a multisystem approach should be considered to improve the accuracy of sex-specific BA models.</p>	