Measuring Functional Decline in Population Aging in a Changing World and an Evolving Biology

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A plethora of papers has accumulated reporting changes in the rates of disability among older people within the United States and around the world. It is an important time to integrate these diverse studies into the broader theoretical discussions of population aging in order to improve our understanding of changes in functioning among this age group. Indeed, Lee’s recent paper incorporating intergenerational and intragroup transfers of resources as a modification of the classic theories of aging is a case in point of the implications of expanding the factors considered in a model of aging that can make it possible to account for postreproductive aging (1). Robine and Michel (2) attempt to account for variation in estimates and trends in the compression of morbidity and functional decline that have been observed in the literature over the past decade or so. They place their explanation of these findings in the context of the demographic and epidemiologic transition, explicitly noting that reductions and delays in cardiovascular disease can be accompanied either by an expansion or a compression of morbidity. Expansion occurs because individuals avoiding death are still sick and compression because improved treatment and behavioral changes are associated with a reduction in cardiovascular disease incidence. To explain cross-national variation in the observed data on disability decline, the authors propose that different countries may be at different stages of the demographic transition since, sooner or later, reductions in old age mortality will increase the prevalence of disability.

We applaud the authors’ important insights and efforts to create a unifying theoretical model. We offer several cautionary notes that should be further considered as part of their broad call for additional study. First, we note that morbidity and disability and impairment are quite different concepts that have routinely been intermixed in the literature. Second, we note that differences in the measurement of impairment and disability across the different surveys used could be responsible for the differences in findings. Third, we note that reductions in mortality and functional decline in low-mortality countries have been accompanied by a technological revolution, making everyday tasks that much easier to perform. Finally, we point out the need to consider the critical roles of adaptive capacity, functional reserve, and decreased susceptibility to age-related diseases that are biologically inherent characteristics of achieving extreme old age.

Since Fries initially coined the term “compression of morbidity” in his seminal paper, and Katz articulated and empirically measured the rate of decline in “active life expectancy,” the gerontological literature has been replete with reference to these interrelated ideas (3,4). Indeed, the 1984 World Health Organization framework on Healthy Active Life Expectancy irrevocably intertwined morbidity and disability, even though there is considerable evidence to suggest that, while correlated, the notions are orthogonal (5). Using morbidity and disability interchangeably ignores the evidence that the presence of different diseases may have quite different effects on mortality, hospitalization (a health services use-based marker of real morbidity), and disability and functional impairment (6). It is important to note that cardiovascular disease mortality declined due to improved treatment and some behavior changes but that this success also led to earlier identification of individuals with earlier stage disease. Earlier detection of disease is one reason why increases in the prevalence of chronic illness may not necessarily translate into increases in disability and impaired function. Individuals labeled and managed with chronic disease clearly constitute a growing percentage of the entire aged population now, but that does not mean that they are functionally impaired. Research in this area could clearly benefit from some greater clarification of the underlying determinants of functional impairment. It may be useful to incorporate some of the conceptual and empirical research that has emerged from clinicians’ explorations of the meaning of “frailty” into discussions of the measurement and conceptualization of population changes in disability (7,8).

Measurement of instrumental and personal activities of daily living (IADL, ADL, respectively) as well as physical mobility, strength, and stamina has varied widely across surveys with some surveys asking whether respondents receive help, others asking how “difficult” it is to perform tasks (worse yet, getting the task done, which could imply getting help in performing it), while still others actually asking about performance of the task. While Freedman and colleagues’ systematic review tried to classify the quality of “evidence” for a change in disability among older people, the real issue is the comparability of studies across countries (languages, social mores, resources, stigma, and so forth) and over time within a country (9). We know that the interrater and test–test reliability on most measures of physical functioning is quite high (Kappa > .85), however, even this level of measurement error can bias estimates of the rate of change in functional status over the period of a decade from cohort to cohort. We therefore applaud the goal of creating common measures that could be routinely monitored in aging populations. This was the rationale behind the establishment of interRAI, an international consortium of geriatricians and long-term care researchers seeking to promulgate a common approach to measuring older people’s function and receipt of various long-term care services (10,11).

Over the last several decades, technological advances and increases in the distributions of household innovations (e.g., washing machines, elevators) have altered the environment.
We too believe that the time is right to push for the development of an integrated theory of population aging that considers not only mortality rates and maximum life expectancy, but also disability incidence and prevalence in older ages. We encourage gerontologists to collaborate with evolutionary biologists and demographers who are grappling with the social and biological rationale for reduced mortality and improved functioning at advanced ages. While Robine and Michel were stimulated by disparities observed in the empirical record cross-nationally, their work should stimulate others to elaborate the inductive process needed to propose a model that is consistent with the data.

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REFERENCES

