

## Deathless models of aging and the importance of acknowledging the dying process

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In medicine, as in life, only death is certain. Despite the proliferation of research into positive states of aging, the processes of death and dying have not been incorporated into models of successful aging.

Conceptualizations of successful aging generally posit the maintenance of high levels of functioning across various biomedical and psychosocial domains — a rare phenomenon, unless death is sudden or unexpected. Most people do not have a happy and healthy life only to die unexpectedly at 100 years of age; death is a process usually preceded by decline. Although there has been a great deal of research into successful aging and end of life as separate concepts, these processes have not been studied in a single integrated model. Excluding death and dying from models of successful aging is a substantial oversight, inhibiting research into events preceding death and the prediction and accommodation of terminal decline, as well as the opportunity to facilitate more positive experiences of death and dying.

Models of successful aging were first conceived to acknowledge the heterogeneity of health trajectories, identifying people who maintained particularly high levels of functioning across a number of domains. The first and most popular model of successful aging suggests high levels of physical and cognitive function, low probability of disease and active engagement.<sup>1</sup> A systematic review of operational definitions of successful aging shows the strong emphasis on biomedical components in the practical application of such models.<sup>2</sup> Healthy Active Life Expectancy<sup>3</sup> addresses health trajectories with a similar biomedical focus. According to these models, once a person starts to decline physiologically, as in the processes of dying, he or she cannot be deemed to be aging successfully. Thus, these models fail to capture the heterogeneity of health trajectories and the psychosocial strengths exhibited by people who are dying.

Multiple models for successful aging exist, but without a framework for studying the processes in the context of death and dying. Fries and colleagues' compression of morbidity

suggests that although the human lifespan remains finite, the onset of morbidity can be delayed to closer to death.<sup>4</sup> When a person is no longer identified as successfully aging because of disease, as in most models, the identification and examination of "better" trajectories of illness are not possible.

It is important to examine people's trajectories throughout the course of life to identify predictors and possible areas for intervention in the dying process. Selective optimization with compensation is described as a model of successful aging,<sup>5</sup> but it is really more of a strategy for successful aging (e.g., mechanisms with which to facilitate aging well). The combination of delaying illness and implementing strategies to age well provides insight into ways in which people can age successfully. However, when people are followed until the point at which they become ill, the granularity of the trajectories is lost.

Failing to incorporate death in studies of successful aging presents a substantial methodological gap. From a statistical standpoint, the exclusion of the deceased impedes interpretability and generalizability with misleading data.<sup>6</sup> Longitudinal studies of aging are inherently predisposed to attrition via death, which can result in an optimistic bias.<sup>6</sup> Some methods do account for death, such as survival analysis; however, many longitudinal studies fail to incorporate compensatory methods in their analyses. Two possible methods to account for death are creating a category or value for death as a longitudinal health variable and measuring time in years before death.<sup>6</sup> To

**Competing interests:** None declared.

This article has been peer reviewed.

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**CMAJ 2013, DOI:10.1503/cmaj.121720**

### KEY POINTS

- As the proportion of older adults in the population increases, research into positive states of aging has also increased.
- Current models of successful aging neglect the realities of the lived life, notably failing to include the processes of death and dying.
- This exclusion results in missed opportunities to study the heterogeneity of health trajectories among people who are dying, which impedes the ability to examine predictors and possible interventions for successful aging throughout the course of life.
- We need to include the processes of death and dying in models of successful aging.

avoid these biases, it is important for medical researchers to incorporate death in their analyses.

The inclusion of death and dying in models of successful aging provides the opportunity to identify patients who experience these processes in the least aversive fashion and to facilitate more positive experiences among prospective patients. Research into successful aging is an opportunity to examine the health trajectories of people who age well. Ceasing to follow these people as they begin to decline is a missed opportunity to study and invoke interventions, strategies and policies. As shown in Figure 1, studies of successful aging often capture data from people up until the point that they begin to decline toward death. In this example, 3 trajectories of successful aging are captured, up until the point at which they cross below the minimum functioning threshold and are no longer deemed to represent successful aging. The functional trajectories are markedly heterogeneous beyond the limitations of studies of successful aging, providing opportunity for research into how and why these differences occur. Aging is a lifelong process; thus, it seems counterintuitive to keep the processes of aging well and dying well disparate areas of study.

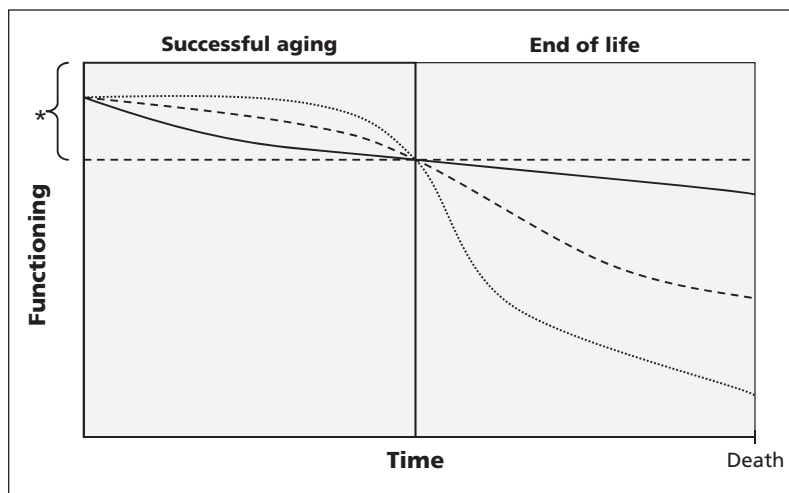


Figure 1: Health trajectories as captured by studies of successful aging and end of life. \*Range of functioning deemed successful aging.

By omitting death and dying from positive models of aging, the opportunity to make the processes of dying as “successful” as possible is missed. Making the best of dying does not necessarily mean staving off death at all costs, but finding the means through which positive mental and physical states can be fostered. For older adults, decisions made in the absence of acknowledging trajectories of death and dying can be misguided and unrealistic. The inevitability of death and its associated trajectories must be considered to facilitate successful aging throughout the life course.

To make more informed research and care decisions, longitudinal studies must examine the heterogeneity of health trajectories as they extend through to death, and models of successful aging must incorporate death and dying. Analysis of these trajectories will provide invaluable information to policy-makers and clinicians on how to facilitate the best course of action for dying patients. Without the incorporation of death and dying, addressing aging well across the life course and implementing appropriate health care practices and policies to this end will be extremely difficult.

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**Contributors:** All of the authors conceived the idea for the article. Theodore Cosco drafted the article. All of the authors revised the article for important intellectual content and approved the final version submitted for publication.