Defining Normal Aging and Health Disparities

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Normal aging carries with it a gradual decline of mental and physical functions. For most people, we can’t run as fast, jump as high, lift as much, or remember things as easily as when we were younger.
The Deaths preceding were caused by Diseases and Casualties as follows, viz.

Causes of death in 1811. Abstract of the Bill of Mortality for the town of Boston

Instructions to fill out a death certificate

- The death certificate should document the immediate cause of death, which can be an event, clinical condition, or disease process, which is unsuitable for the continuation of life.

- Clinicians are discouraged from using terminologies such as "old age"
Prince Philip passed away on April 9, 2021, at the age of 99. Sir Huw Thomas (physician to the Queen) noted that Philip died from “old age.”
Health disparities are preventable differences in the burden of disease, injury, violence, or in opportunities to achieve optimal health experienced by socially disadvantaged racial, ethnic, and other population groups, and communities.

Health disparities exist in all age groups.

Source: https://www.cdc.gov/aging/disparities/index.htm
Defining normal aging is surprisingly difficult

- Normal aging classically refers to a gradual decline of mental and physical functions.
- Normal cognitive aging may mean slower processing speeds and more trouble multitasking, but routine memory, skills, and knowledge are stable and may even improve with age.
- Changes happen across a continuum as the reserve capacity in almost every organ system declines.
Normal aging involves a complex relationship between aging and disease

- Example: Impossible to study a normal aging heart without considering heart disease
  - Age-related artery changes increase the risk of cardiovascular diseases. Cardiovascular diseases, in a catch-22, speed up arterial aging.

- Aging and disease go hand in hand
  - Aging is a key risk factor for human chronic diseases
  - Many treatments and interventions targeting age-related diseases can increase the lifespan, and interventions extending lifespan often delay diseases of aging
  - Core issue is what is considered normal vs. pathological. There is often no right or wrong answer, as the answer is shaped by societal attitudes, political forces, religious issues and business interests, and *not just medicine*
Aging combines all age-related diseases and their preclinical forms, in addition to other pathological changes.

Normal Aging Usually Involves both Developmental and Aging Components

The Human Life Course, Cognitive Capacity & Dementia for Advantaged/Disadvantaged (Red/Blue) Persons

- Developmental Phase of Human Life Course
- Aging Phase of Human Life Course

Cognitive Reserve & Brain Development

threshold for “dementia”

Neurodegeneration and pathology
An example of a pre-clinical form of aging

- **Age-specific level of allostatic load in the U.S. population**
- Allostatic load an indicator of physiological challenge and population frailty
  - the extent to which the body is at risk of adverse health outcomes because of physiologic dysregulation
- Linked to mortality as well as other adverse health outcomes such as cardiovascular disease, physical functioning, and cognitive failure
Examples of disparities in cognitive aging

Race and educational differences in dementia
Normal Aging Can Vary Over Time and Across Groups

Change in Dementia Prevalence in the U.S. by Race and Age Group, 2000-2014

https://doi.org/10.1093/geronb/gbab015
Disparities in cognitive aging have implications for individuals’ lives

Dementia Status Life Expectancy at Age 65 by Race and Education, U.S.

Source: https://doi.org/10.1093/geronb/gbz046
Implied Prevalence of Dementia, Blacks and Whites Aged 65+ by Education Group (Health and Retirement Study)

![Graph showing implied prevalence of dementia by age and education group for whites and blacks.](https://doi.org/10.1093/geronb/gbz046)
Storm clouds on the horizon?

- Americans are falling further behind in e(x)
- Potential rise in CVD risk at younger ages
- Biosocial interactions hard to untangle
- Improvements in e(x) now only occurring among college-educated
- Growing geographic differences in e(x) fueled by state policies, politics and profits
- Epidemics/pandemics exacerbating already large (and historically growing) disparities
A far-reaching and multi-level agenda for future research

- Untangling the influence of developmental and aging parts of “normal aging”
- Toward a better understanding of the connections between aging, disease, and pre-clinical forms of biological risk
- How is “normal aging” changing over time and across groups?
- What are the upstream factors driving changes and disparities in “normal aging?”
Acknowledgements and key sources

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Key sources for figures

Thanks for your kind attention