Healthy Life Expectancy

Measuring Population Health Based on the Combined Effects of Fatal and Nonfatal Health Outcomes

Speakers

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Summary Measures of Health:

Conceptual Issues and a Bit of History

Jennifer Madans
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Measuring Health

Determining *how* to measure health is a core responsibility:

- Using multiple indicators
  - Healthy People

- Using one or a small number of summary indicators
  - A bigger challenge

Summary Measures: Life Expectancy

- Most frequently used summary measure

- Not affected by the population age distribution

- Believed to be easily interpretable

Summary Measures: Life Expectancy

Relationship between life expectancy and morbidity can vary depending on the cause of the mortality change.

Mortality declines can result from:

- Declines in chronic disease and associated functional limitation

- Extending life after disease/functional limitation onset

Summary Measures: Morbidity

- *Definition* of morbidity
  - Pathology (e.g., disease prevalence)
  - Non-fatal disease outcomes (e.g., functional limitation)
  - Factors associated with future morbidity (e.g., risk factors)
- *Measurement* of morbidity
  - Single vs. composite measures

Summary Measures: Health

- Measures that combine mortality *and* morbidity

  - More completely describe the health of the population

  - Still need to develop a measure of morbidity

# Types of Summary Measures of Health

- Health Expectancies
  - Disability-free life expectancy
  - Healthy life expectancy

- Adjusted Life Expectancy
  - Disability-adjusted life years

The two approaches use different measurement strategies and require different types of data

Healthy Life Expectancy

- Developed in the 1970's (Sullivan)

- Incorporates nominally defined states of health and estimates years of life remaining in these states using life table methods

- Can be used with an index that combines multiple dimensions of health; requires weighting (e.g., health-adjusted life expectancy or HALE)

Using Health State Preference Function (shown as gray shade levels) to Derive Health-Adjusted Life Expectancy
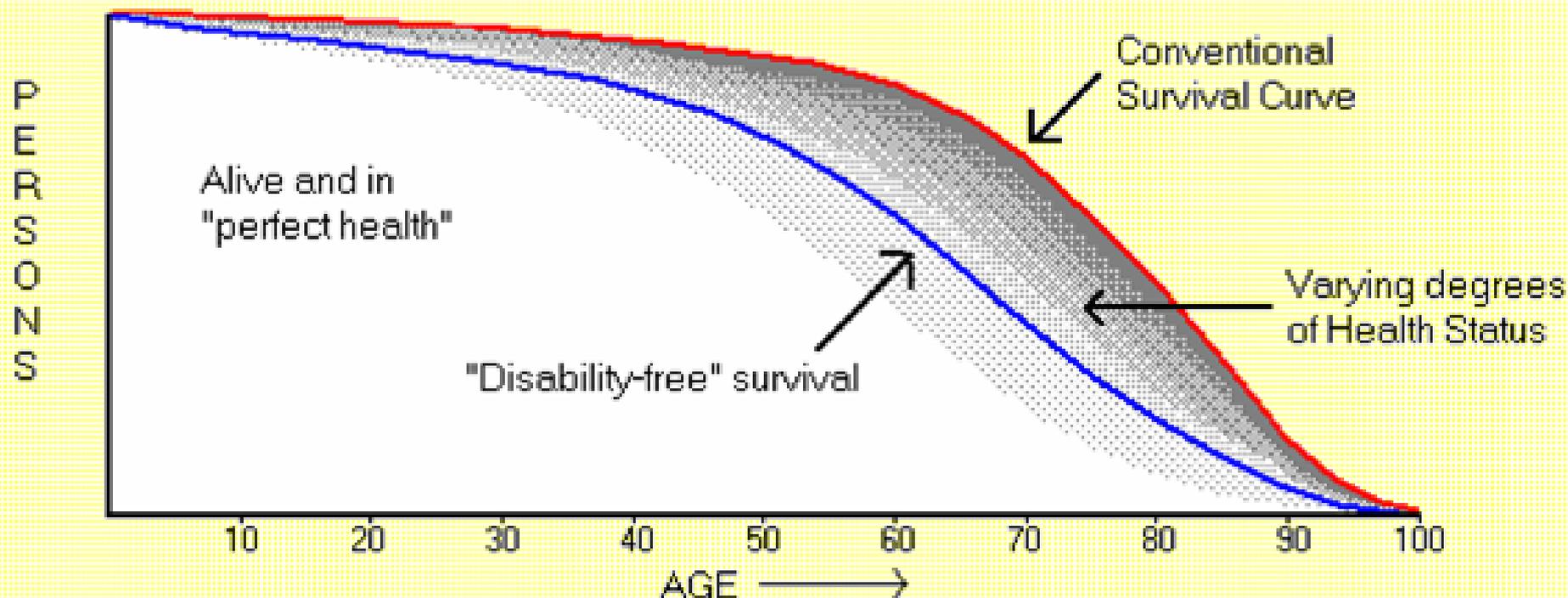
Measurement Challenges

- **Need a good measure of non-fatal health / morbidity**

    - **Choice of measure should meet analytic and policy needs**

- **If a composite measure is used there needs to be a way to combine (weight) the components**

- **There is no agreement on how to do *either* of the above two requirements**

Healthy Life Expectancy in Healthy People

Statistical Notes

Years of Healthy Life

Pennifer Erickson, Ronald Wilson, and Ildy Shannon

Introduction

Increasing the span of healthy life for Americans is one of the three broad goals of *Healthy People 2000*[1] (1). The years of healthy life measure has been selected for monitoring progress toward this goal. The sources and methods used for calculating years of healthy life are described in this issue of *Statistical Notes*. Estimated years of healthy life measures for 1990 for the total U.S. population and for selected subgroups are presented and discussed.

Historically, health has been measured primarily in terms of mortality—infant mortality, life expectancy, age-specific and disease-specific death rates—and morbidity—disability days and prevalence of chronic conditions. On the one hand, measures of mortality may understate the public health importance of conditions that result in proportionately more morbidity and disability. On the other hand, commonly used morbidity measures tend to focus on physical function

and thus may underestimate social and mental dysfunction as well as satisfaction with health. In addition, these traditional indicators do not provide summary information on a population's health status.

A single measure that incorporates health-related quality of life and life expectancy gives a more comprehensive picture of the population's health. Such a summary number would help in monitoring the Nation's health, identifying health priorities, evaluating the effectiveness of interventions, and comparing the effectiveness of different interventions. Several approaches to the development of a comprehensive measure have been taken, including Disability Free Life Years (2,3), Healthy Life Expectancy (4,5), and Disability Adjusted Life Years (6). The years of healthy life (YHL) concept, however, has emerged as one of the more commonly used health status measures that include both mortality and morbidity. Years of healthy life can be sensitive to changes in health among the well and the ill.

Definition of years of healthy life

Health and well-being can be defined and measured in many ways. For example, symptoms usually involve

Values for Health State Defined in Terms of Activity Limitation and Perceived Health Status

Activity limitation	Perceived health status				
	Excellent	Very good	Good	Fair	Poor
Not limited	1.00	0.92	0.84	0.63	0.47
Limited-other	0.87	0.79	0.72	0.52	0.38
Limited-major	0.81	0.74	0.67	0.48	0.34
Unable-major	0.68	0.62	0.55	0.38	0.25
Limited in IADL[1]	0.57	0.51	0.45	0.29	0.17
Limited in ADL[2].	0.47	0.41	0.36	0.21	0.10

[1]IADL is instrumental activities of daily living.

[2]ADL is activities of daily living.

Source: National Health Interview Survey, Centers for Disease Control and Prevention, National Center for Health Statistics.

Healthy People 2010

- **Expected years free of activity limitation**
  - **Any limitation in activity, or need for special equipment due to physical, mental, or emotional problems.**

- **Expected years in good or better health**
  - **Global assessment question: "excellent, very good, good, fair, or poor".**

- **Expected years free of selected chronic diseases**
  - **Arthritis, asthma, cancer, diabetes, heart disease, high blood pressure, kidney disease, or stroke.**

Healthy People 2020 Goals

- Continue to monitor the three HLE measures from HP2010

- Develop additional domains and measures
  - Mental health
  - Health behaviors / determinants
  - Multi-state / transitions

Trends in Expected Years in Good or Better Health and Without Activity Limitations at Birth: the U.S. Population by Sex, 1999 - 2008
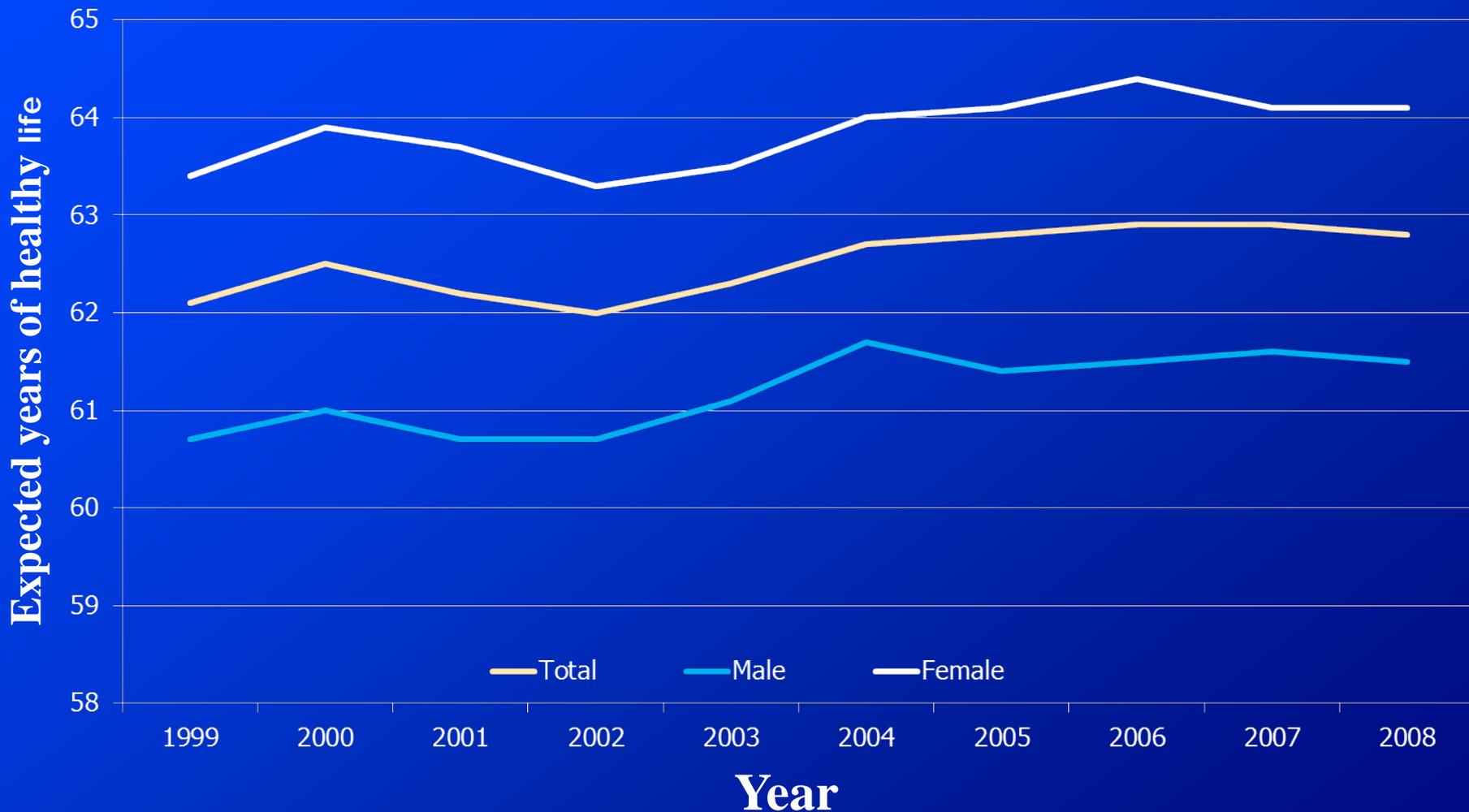
Moving Beyond Self-Rated Health and Limitation of Activity: Measuring 'Health' through Functioning

- Functioning is a critical aspect of health

- Functioning can be seen as the sum/outcome of:
  - Determinants and risk factors
  - Disease states
  - Use of health care
  - Environmental barriers and facilitators

Measuring 'Health' through Functioning

Addresses major policy objectives…

Minimize participation restrictions due to limitations in functioning:

- without accommodation

- with accommodation
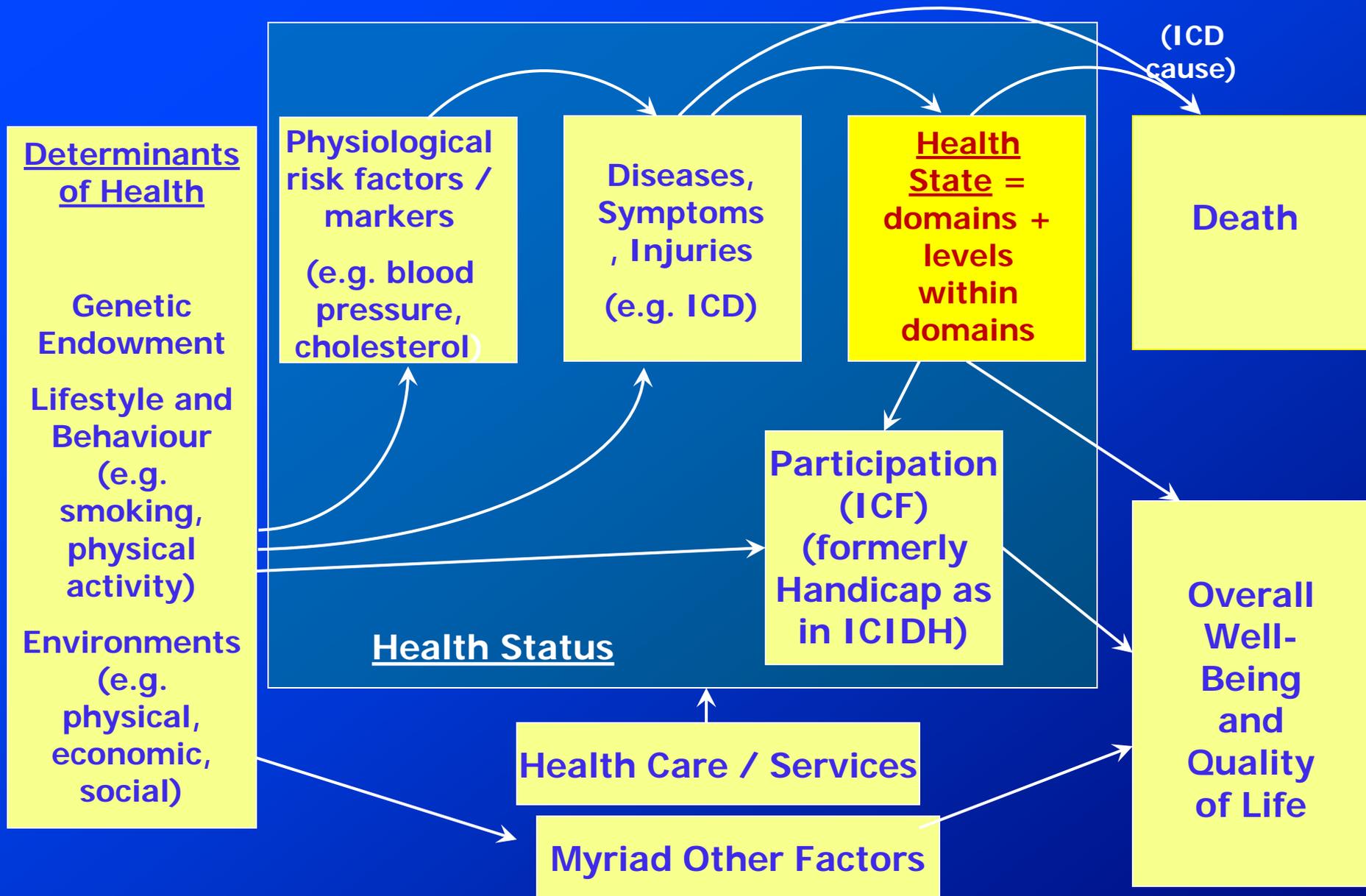
Simplified Conceptual Framework for Measuring Health

International Efforts in the Measurement of Functioning and Disability

- The Budapest Initiative on the Measurement of Health Status

- European Joint Action on Healthy Life Expectancy

The Budapest Initiative: Measuring Health Status for International Comparisons…

The Situation:

- **Complexity of measuring health**

- **No agreed upon set of core health measures or standards for producing the data**

The Solution:

- **A mechanism to define a set of core measures and identify ways of obtaining the needed data within the framework of national official statistics**

Measuring Functioning

- Functional status within seven domains (Vision, Hearing, Walking, Cognition, Affect, Pain, Fatigue) - within and without accommodation

- Functional status by domain with accommodation

- Methodological challenge – creating a summary of functional status 'within the skin' and with accommodation