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Types of Summary Measures

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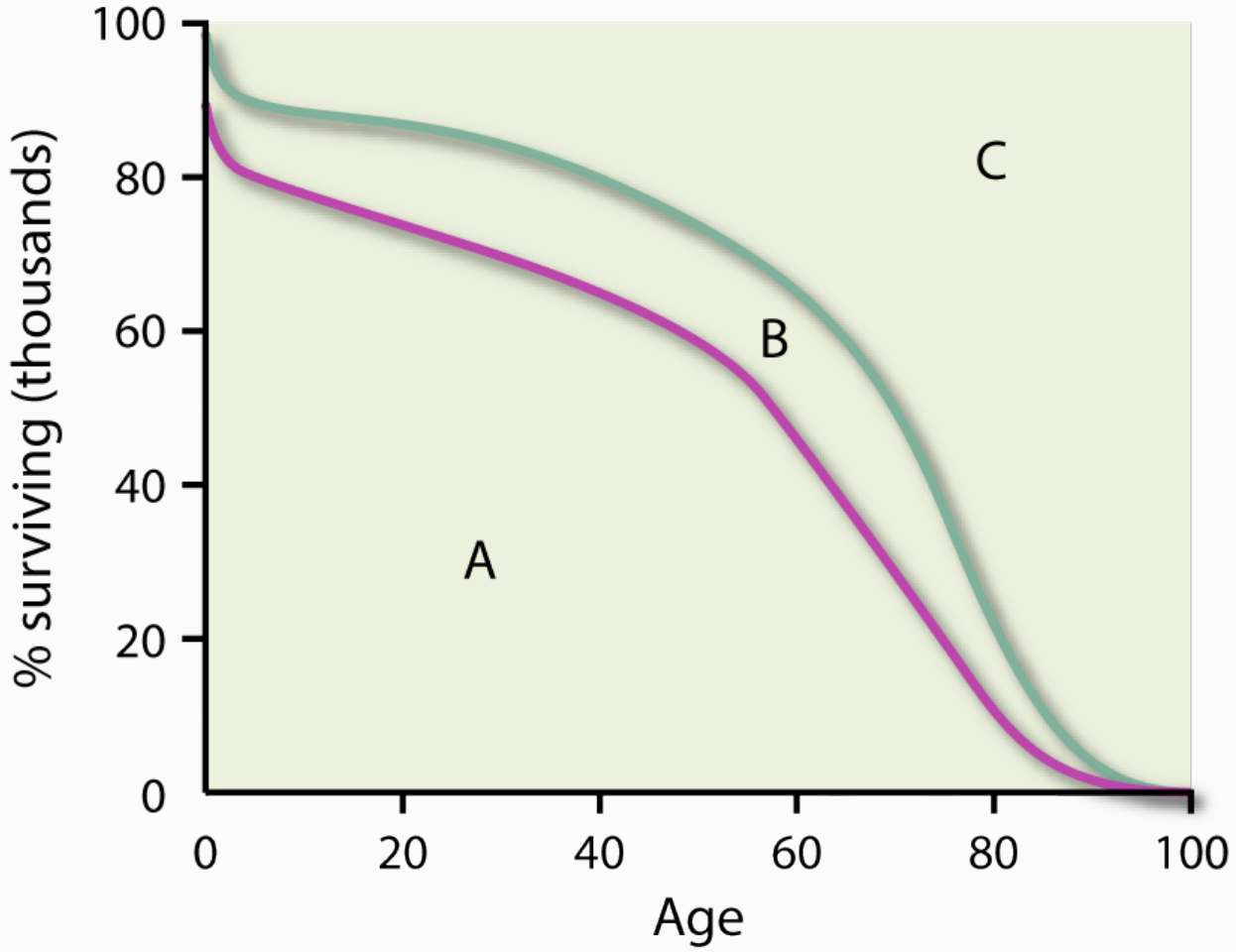
Summary Measures

- Measures of health status that combine mortality and morbidity
- Entails two processes: measurement of life and valuing life
- Estimate the quantitative health benefits from interventions
- Serve as tools to assist in allocation of resources
- Generation of more relevant and useful data for policy makers

A Typology of Summary Measures



Health expectancy = A + f(B)

Health gap = C + g(B)

Learning Objectives

- To introduce a diverse set of complex and composite health indicators
- To assess the principal features (strengths, limitations) of each
- To familiarize students with the options for indicators with a sense of how and where they can be used

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Section A: Background

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Potential Years of Life Lost

- Not really a “true” summary measure!

Potential Years of Life Lost (PYLL)

- Simplest formulation measuring the gap between current and optimal level of mortality
- Introduced by Dempsey (1947) in a classic paper on tuberculosis in the US
- Based on the notion that a death at age five represents a greater loss than a death at age 55
- Concept applied with a pre-defined potential—varies in the literature from 55 to 85 years
- PYLL summates the years of life lost from this potential at each age across the whole population

Potential Years of Life Lost

- Classification of this basic measure depends on the potential limit used
- Use of an arbitrary potential (such as age 65 years) yields the PYLL
- Period expected years use local mortality patterns (PEY)
- Cohort based data can also be used to generate life years (CEY)
- The use of a standard potential yields standard expected years (SEY)

US Death Rates, by Specified Cause (1944)

- Death rates (per 100,000) for each specified cause, US (1944)

Sex and color	Death rate per 100,000 population in 1944		
	Heart diseases	Cancer	Tuberculosis
All groups	315.4	129.1	41.3
Whites	310.1	128.8	33.7
Male	398.6	135.5	45.0
Female	254.2	133.3	23.3
Non-white	239.9	81.9	106.2
Male	274.3	75.6	122.7
Female	220.6	92.2	91.3

Source: Dempsey. (1947).

PYLL, by Specified Cause (1944)

- Potential years of life lost by those who died of a specified cause, US (1944)

Sex and color	Potential years of life lost		
	Heart diseases	Cancer	Tuberculosis
All groups	1,929,953	1,287,245	1,175,500
Whites	1,739,902	1,204,250	830,306
Male	979,107	393,948	422,513
Female	760,795	810,302	407,793
Non-white	190,051	82,995	345,194
Male	76,676	21,878	153,664
Female	113,375	61,117	191,530

Source: Dempsey. (1947).

PYLL among TB Victims, 1943 and 1944

- Potential years of life lost by those who died of tuberculosis in 1943 and 1944

Sex and color	Potential years of life lost		
	1944	1943	Percentage of decline
All groups	1,175,500	1,238,645	5.1
Whites	830,306	868,479	4.4
Male	422,513	442,810	4.6
Female	407,793	425,669	4.2
Non-white	345,194	370,166	6.7
Male	153,664	165,936	7.4
Female	191,530	204,230	6.2

Source: Dempsey. (1947).

Critical Features of Potential Years of Life Lost

- Not counting deaths at or 65 years means that benefit in the 65+ age group will not be counted
- This limitation in turn affects the total years gained from an intervention
- Morbidity and disability are not considered
- Limited type of SMPH

Other Features

- Productivity weights can be added to PYLL
- Conversion to “potential productive years of life lost” (PPYLL)
- Example
  - Productivity losses in Turkey (Naci and Baker. [2008]. *Int J Inj Contr Saf Promot*, *15*, 1, 19–24.)
  - Injury in the Americas (Fraade-Blanar, L., Concha-Eastman, A., and Baker, T. [2008]. Rev Panam Salud Publica, 22, 4, 254–259.)

Man Years of Life Lost

- Productive years

Man Years of Life Lost to Productivity (MYLL)

- Dorothy Rice (1966) introduced a framework for calculating the economic cost of illness
- MYL can be used to combine losses from mortality and morbidity and converted to a dollar value
- A good measure IF there is a focus on the time lost from diseases only as a result of their productivity impact

MYLL: Costs

- The “direct” costs include the costs of prevention, treatment, rehabilitation, and other personal and non-personal services
- Estimated by the application of average earnings to the productive time lost, by sex and age groups, for each major disease category
- Resulting numbers reported in terms of MYLs

MYLL: Costs 2

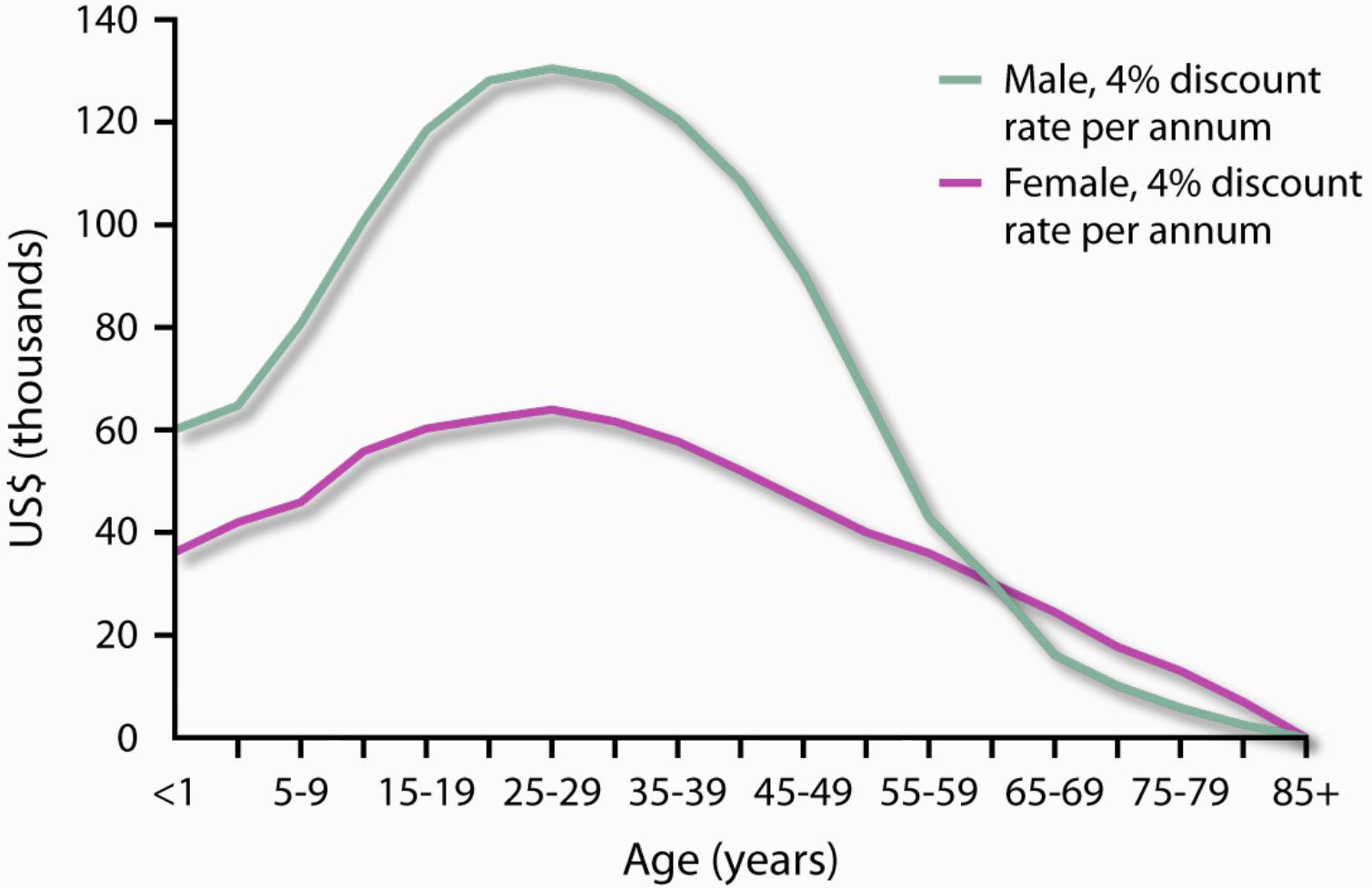
- Discounting, age weighting, and other social choices can be applied
- MYLs are more of an economic measure than a measure of burden of disease
- The “indirect” costs associated with morbidity and mortality are included as the loss to the output of economy
- Since both costs and benefits can be obtained in dollar terms, MYLs can be used for cost-benefit analysis

MYLL: Estimations

- Require information on days missed from work
- Non-working populations are either ignored or factored in using equivalency weights (e.g., homemakers)
- What do we do in the developing world?
- Age weights in proportion to productivity at each age in economic terms

Present Value of Lifetime Earnings

- Present value of life time earnings (discounted), US (1966)



Adapted by CTLT from D. Rice, 1966.