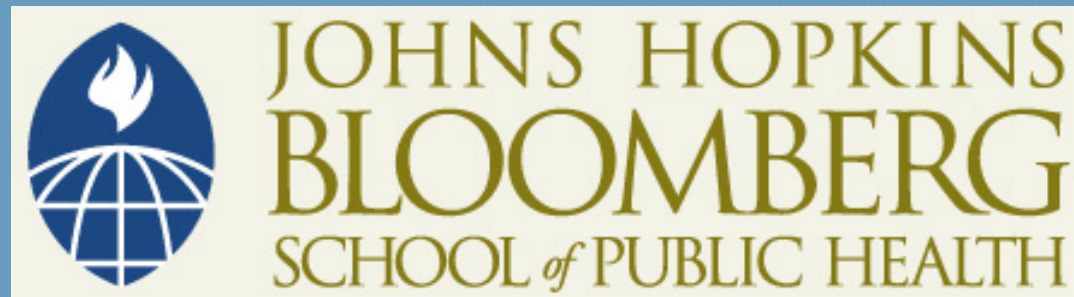


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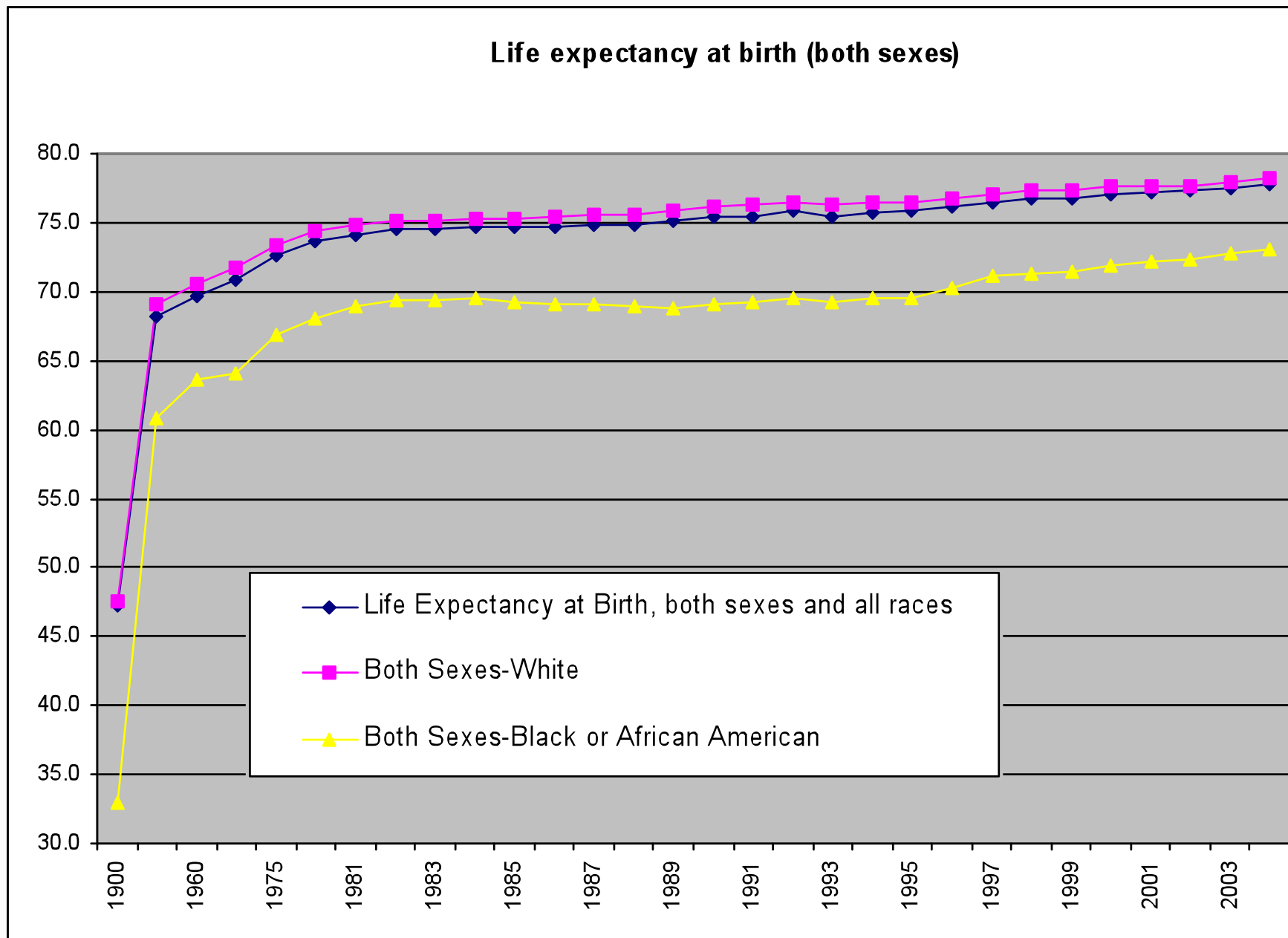


JOHNS HOPKINS
BLOOMBERG
SCHOOL *of* PUBLIC HEALTH

Section C

Two Debates:
Longer Life, Worse Health?
Is the Human Lifespan Finite?

Increasing Life Expectancy in Low-Mortality Societies



Additional Years

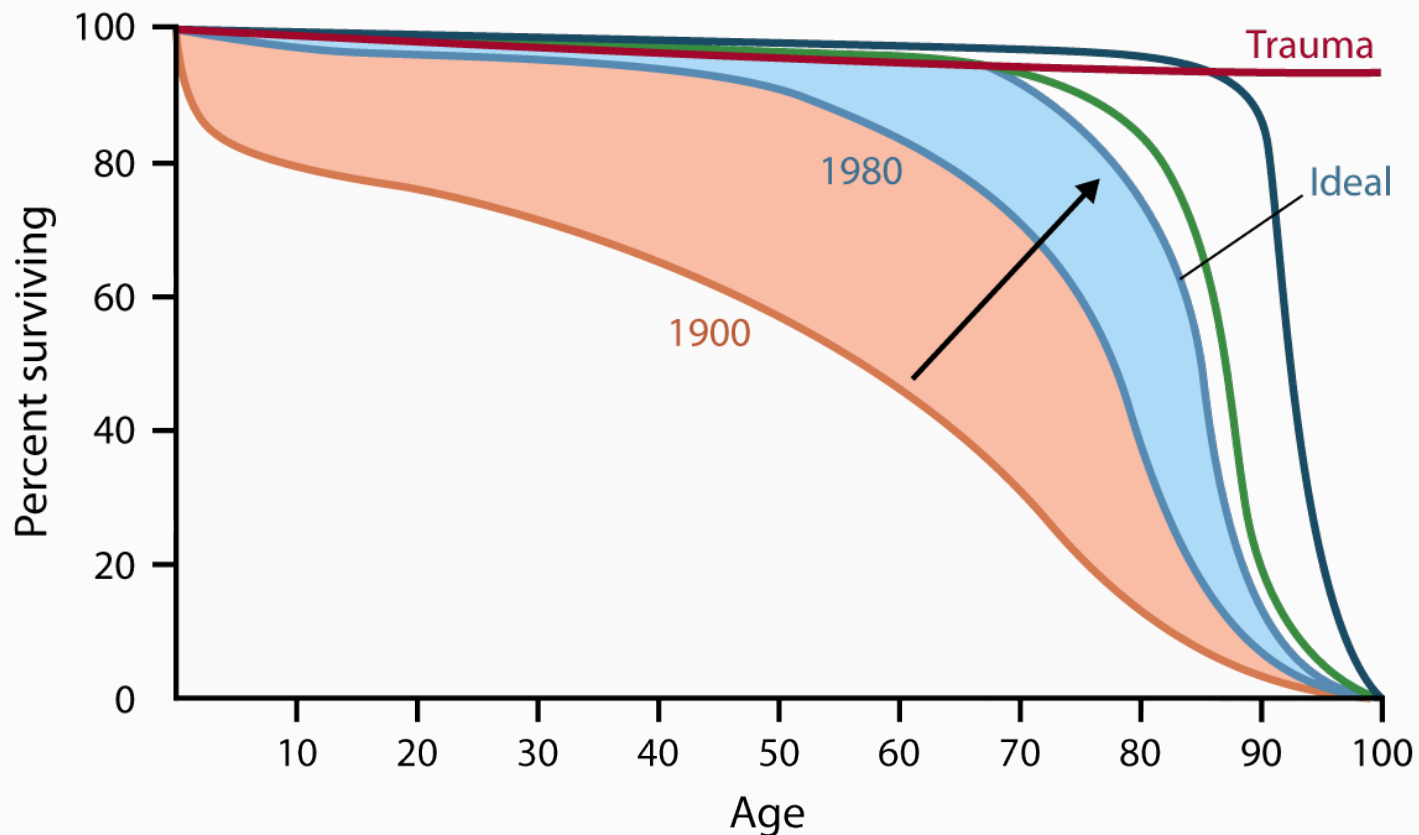
- But are these additional years healthy years?

Alternative Models

- “Morbidity expansion” (Gruenberg, 1977) predicts longer life and increasing prevalence of disease and disability, “failure of success”
- “Compression of morbidity” (Fries, 1980) predicts declines in disability and comorbidity, sandwiched into a smaller and smaller period before (a finite) age of death

Compression of Morbidity

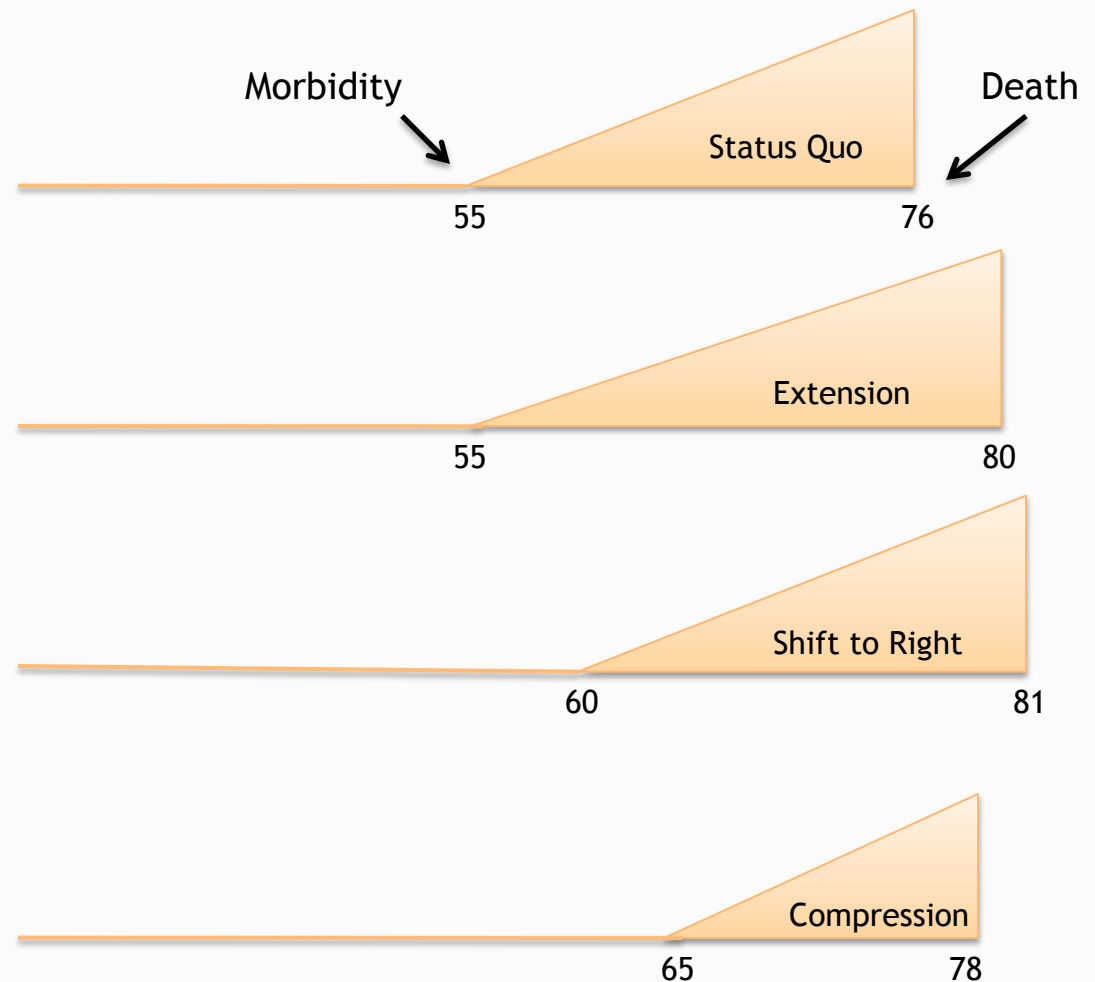
The Increasingly Rectangular Survival Curve



About 80% (orange area) of the difference between the 1900 curve and the ideal curve (blue area plus orange area) had been eliminated by 1980. Trauma is now the dominant cause of death in early life.

More Generally ...

- Compression of morbidity can occur when the rate of improvement in morbidity onset exceeds the rate of improvement in life expectancy



Adapted from: Fries, J. F. (2003, September 2). Measuring and monitoring success in compressing morbidity. *Ann Intern Med*, 139, 455-459.

Evidence

- Research suggests active life expectancy extends along with life expectancy
- Freedman et al. (2004) find broad support for a decline in disability through the late 1990s
- Crimmins et al. (2005) find mixed evidence for improvements in biomarkers of cardiovascular disease risk

In Low Mortality Societies ...

- ... population health is a function of individual length of life, quality of life years, and the timing of morbidity

So ...

- ... length of life is a critical driver of population health

A Debate

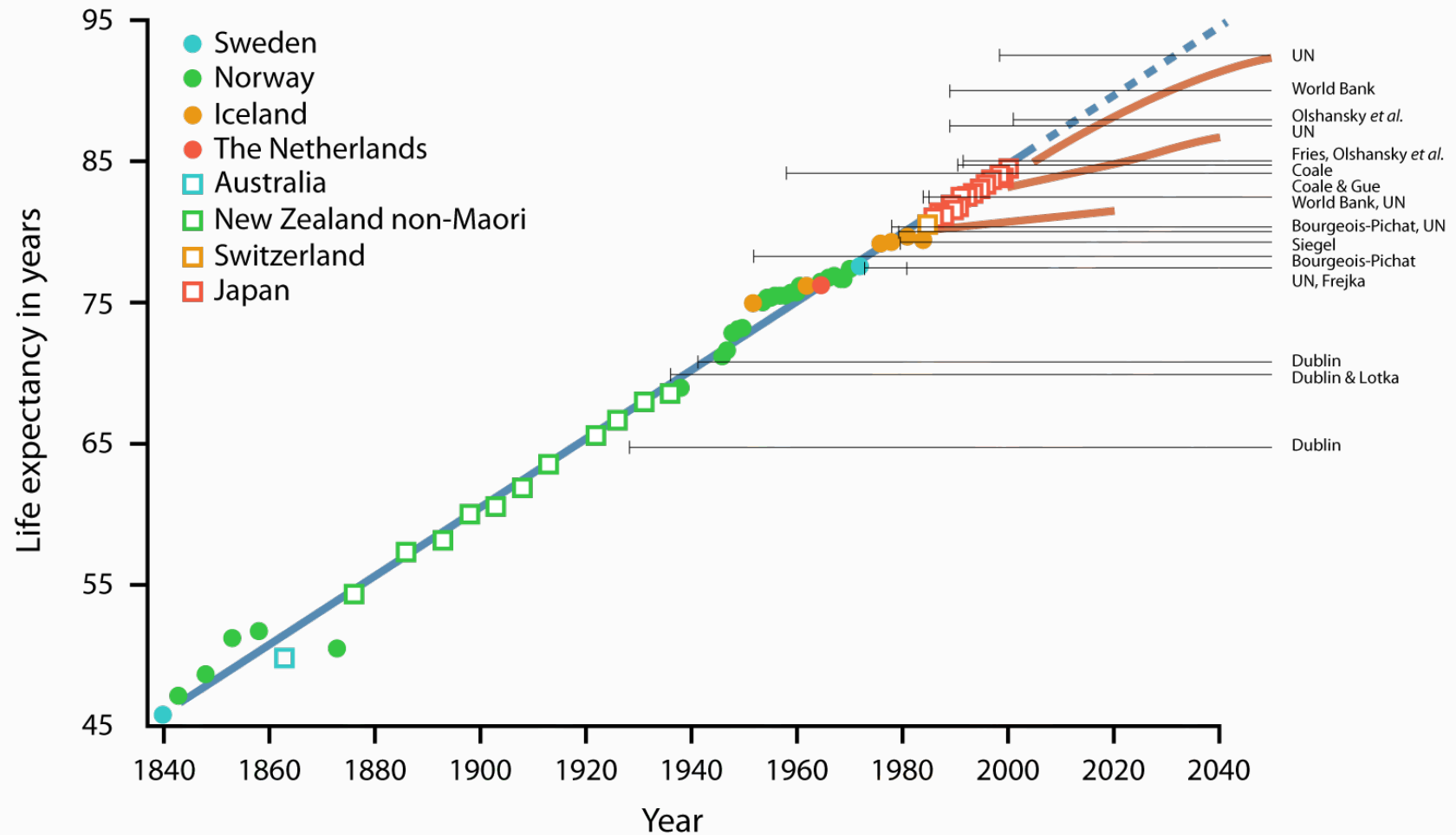
- Is life expectancy finite? If so, what is the limit? Surely we are close?!

vs.

- Do we have evidence to support the hypothesis that length of life is finite?

Is There a Limit to Life Expectancy?

Record Female Life Expectancy from 1840 to the Present



- Linear-regression trend (slope=0.243)
- - - Extrapolated trend
- Asserted ceilings on life expectancy (short vertical line indicates year of publication)
- Projections of female life expectancy in Japan published by UN in 1986, 1999, 2001

Is There a Limit to Life Expectancy?

<u>Source</u>	<u>Limit</u>	<u>Date published</u>	<u>Date exceeded</u>	<u>Exceeded by females in</u>
Dublin	64.8	1928	1921	New Zealand
Dublin and Lotka	69.9	1936	1941	Iceland
Dublin	70.8	1941	1946	Norway
Bourgeois-Pichat	78.2	1952	1974	Iceland
Coale	84.2	1955	2000	Japan
United Nations	77.5	1973	1972	Sweden
Bourgeois-Pichat	80.3	1978	1980	Iceland
United Nations	80.0	1979	1976	Iceland
Siegel	79.4	1980	1976	Iceland
Frejka	77.5	1981	1972	Sweden
World Bank	82.5	1984	1993	Japan
United Nations	82.5	1985	1993	Japan
United Nations	87.5	1989		
World Bank	90.0	1989		
Fries	85.0	1990	1985	Japan
Olshansky <i>et al.</i>	85.0 (all)	1990	1996	Japan
Coale and Guo	84.9	1991		
United Nations	92.5	1998		
Olshansky <i>et al.</i>	88.0	2001		

Source: Oeppen, J., and Vaupel, J. W. (2002, May 10). Broken limits to life expectancy. *Science*, 296, 5570, 1029-1031.