

The Hurrider I Go the Behinder I Get: The Deteriorating International Ranking of U.S. Health Status

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Abstract

The health of societies can be measured by a range of mortality indicators, and comparisons of national parameters with those of other societies can be symbolic of health status and progress. Over the past century, health outcomes have been steadily improving almost everywhere in the world, but the rates of improvements have varied. In the 1950s, the United States, having among the lowest mortality and other indicators of good health, ranked well among nations. Since then, the United States has not seen the scale of improvements in health outcomes enjoyed by most other developed countries, despite spending increasing amounts of its economy on health care services. Trends in personal health-related behaviors are only part of the explanation. Structural factors related to inequality and conditions of early life are important reasons for the relative stagnation in health. Reversing this relative decline would require a major national coordinated long-term effort to expose the problem and create the political will to address it.

INTRODUCTION

There is no known biological reason why every population should not be as healthy as the best.
(115)

Populations or nations can be considered a unit of study, and their health trends can be described. Health, as measured by mortality rates, has been improving in most countries worldwide for much of the past century. Profound declines have occurred in infant and child mortality as well as maternal mortality and have resulted in life expectancies exceeding the upper bounds of past projections (101). The scale and range of health gains have been among the great accomplishments of the past century and have resulted in vast increases in populations with attendant social and environmental issues. The reasons for these incredible health gains have received little critical study.

The scale and rate of improvements in health have not been uniform among populations. The United States stands out among developed countries for its relatively slower health improvements over the past half-century. In the 1950s, the United States had some of the lowest mortality rates in the world, but since then, reductions have been outpaced by many other nations. The actual differences in health outcomes in terms of disease burdens between the United States and the longest-lived nation today are substantial.

This review begins by describing various mortality measures that represent the health of populations. We discuss differences in reporting those measures and then consider rankings of countries according to mortality measures and trends. We then present data documenting the relative health decline in the United States and speculate on reasons for this trend.

MEASURES OF THE HEALTH OF POPULATIONS

Infant and child mortality, maternal mortality, life expectancy at birth and at age 50, and

adult mortality represent the spectrum of mortality measures that reflect health over the life course.

Population-level mortality data can be collected through registration of births and deaths, and rates can be estimated through enumeration via census data. Only one-third of deaths that occur globally are actually registered (12), so census and survey data are important sources of information in many countries.

Ascertaining age of death can be problematic, however, and may be responsible for some inaccuracies in age-specific mortality rates, especially among older people. The United States did not have a civil registration system of vital events before 1933 (122), and estimation of ages of death afterward were considered unreliable, especially for older blacks (25, 86). Death rates are thought reliable for whites up to age 100 but not for blacks (76, 79). There may have been earlier undercounting of deaths in older ages in the United States, so life expectancy before the 1980s may have been overestimated (86). In most developed countries, however, age at death is reliably reported.

Trends and levels of infant mortality are considered one of the most important indicators of a nation's health, with declines from high levels indicating a health transition (74). They vary from ~2 deaths per 1,000 births in Iceland, Singapore, Slovenia, and Sweden to more than 130 in Afghanistan (133). The Central Intelligence Agency (CIA) tracks infant mortality trends to predict political instability (26), indicating its sensitivity as a social as well as a health indicator.

Infant mortality rate determination depends on the classification and reporting of live births. In France, for example, infants who die before the event is registered, which can be up to two days after delivery, may be classified as stillbirths. Registration artifacts in classification of deaths as fetal or infant, especially at extremely low birth weights, can make comparisons among nations difficult. Countries such as Sweden may classify tiny preterm infants who die shortly after birth as fetal deaths and hence not be registered, whereas in the United States,

these are more likely to be termed infant deaths (59, 70, 136). Time of death in very-low-birth-weight infants may also be prolonged through medical means in some settings but not in others.

The maternal mortality ratio (MMR; deaths per 100,000 live births) represents deaths related to parturition and is an indicator of provision of medical care as well as socioeconomic deprivation (45). Tracking whether a woman's death is related to childbearing is problematic and may require surveillance efforts rather than relying solely on the death certificate. The definition of a maternal death has varied and was originally defined as a death occurring anytime within one year of the end of a pregnancy. With the adoption of the 1979 ICD-9 (International Classification of Diseases-9) classification, maternal deaths referred to deaths during pregnancy, childbirth, and the puerperium of 42 days. Different previous ICD classifications may have changed the sensitivity of a maternal cause and had some impact on mortality statistics. The ICD-10 includes late maternal obstetric deaths: those that exceeded 42 days but occurred less than one year after termination of pregnancy (44, 49, 150). Maternal mortality ratios vary from 4 deaths in Italy to an estimated 1,500+ in Afghanistan (44).

Another measure of population health status is life expectancy, which can be calculated at any age. There has been a regular temporal increase in life expectancy at birth (e_0) over the past century (106). Life expectancy for females is typically higher than for males with the female-male gap increasing in some countries and declining in others. A male advantage has also been documented in a few countries, likely related to son preference and discrimination against women, in situations with both high fertility and high MMRs (57). The reasons for the female advantage trends are not well understood (57, 129). Life expectancy ranges from 82.3 years in Japan to an estimated 44.6 years in Afghanistan (132).

Adult mortality can be variously estimated. Life expectancy at age 50 (e_{50}) (33) and older

is increasing faster than e_0 (56). As mortality in childhood and parturition has declined to very low levels in developed nations, further progress in increasing life expectancy will come from improving health at older ages. The statistic nqx represents the probability of dying between age x and $x+n$. This represents a useful mid-life health measure for the most economically and socially active segment of society when x is early adulthood and n is such that $x+n$ is close to the end of working age. The World Health Organization (WHO) now reports adult mortality as 45q15, namely the probability of someone at age 15 dying before reaching age 60 (151). Values for women range from 0.038 in Cyprus to an estimated 0.606 in Zambia, and values for men range from 0.065 in Iceland to 0.765 in Swaziland (111).

The above mortality measures provide population averages. Any rate can be stratified for subpopulations on the basis of ethnicity, education levels, occupational classifications, incomes, and other differentiators to identify inequalities within countries. "Health disparity" is used in the United States to reflect differences in health status among different population groups, whereas "health inequality" or "health inequity" are more commonly used in Europe to indicate outcomes that are considered unfair.

Measures other than mortality rates have been proposed as indicators of health and quality of life because longer lives may not translate into healthier lives. Increases in disability at older ages may represent unwanted years. The measure healthy life expectancy, or health-adjusted life expectancy (HALE), formerly disability-adjusted life expectancy (DALE), incorporates qualitative accommodations for time spent in poor health (80, 81). HALE tallies are now made at birth and at age 60 and reported by the WHO at periodic intervals with the aim of maximizing comparability among populations.

No single measure encompasses the health status of a nation, but the span of those measures presented here depicts the most important aspects of health.

INTERNATIONAL RANKINGS OF POPULATION HEALTH MEASURES

The above population health indicators (life expectancy, infant mortality, MMR, nqx , HALE) can be seen as a population's vital signs, similar to an individual's blood pressure, temperature, pulse, respiratory rate, and weight. Normal population health indicators might be considered the best indicators among nations, used to set the standard for a particular point in time. Just as normal vital signs indicate aspects of individual health, position in the ranking of mortality indicators by country can connote societal health. The most commonly used mortality rates collected or estimated internationally for ranking over the past century are infant mortality, maternal mortality, and life expectancy at birth. Childhood mortality, life expectancy at ages other than birth, and nqx can also be compared. Rankings of nations by these indicators became popularized with the United Nations Human Development index, which includes life expectancy at birth as a critical component (130).

In describing country rankings, opinions vary about what should be recognized as a country. The CIA lists 224 national entities, including a variety of questionable entries such as Hong Kong and tiny populations. The United Nations list for 2010 has 168 member countries, a number that changes slightly from year to year (132). The WHO recognizes ~193 member states (149). Here we reference the smaller United Nations lists.

The ranking of the United States for life expectancy at birth has varied dramatically over the past 60 years. Data from Kinsella show the U.S. ranking *circa* 1950 to be ninth for males and fifth for females and seventh when the two were averaged. U.S. women were then close to the longest lived in the world (18, 56). But U.S. ranking for e_0 has been declining since the 1950s and more markedly in recent decades (67). The CIA World Rankings estimate the U.S. standing to be in the high 40s among nations. Excluding the small popula-

tions from the CIA rankings, the U.S. rank currently stands at thirty-fourth for the year 2011, having dropped ~25+ places since the early 1950s. The U.S. life expectancy in 2011 was 78.5 years, and the longest-lived country was Japan at 83.4 years. The U.S. life expectancy in 2010 was 79.6 years, and the longest-lived country was Japan at 83.2 years. The U.S. ranking HALE is similar to that of life expectancy, being thirty-first for 2007 (151). See **Figure 1**.

A gap of 3.6 years of life expectancy at birth between the United States and Japan reflects major differences in health. Eradicating coronary heart disease, the leading cause of death in the United States, would likely not enable the United States to transcend the mortality gap (77). Eliminating cancer deaths would add only about three years to life expectancy (75). Reduction of U.S. mortality in 1986 from the nine major chronic diseases would have increased life expectancy by four years (39). One analysis showed that if the United States had had the highest life expectancy achieved by any nation for each of the past 100 years, another 66 million Americans would be alive today (92). The United States currently has a life expectancy that Japan achieved around 1993, suggesting it lags some 15 calendar years behind in achieving the best health outcomes (131, 132). If present trends continue, by 2026 the United States would finally reach the best health that was possible in 2011.

Japan has had the longest life expectancy globally since about 1978 (11) after its unprecedented health surge. Some of the higher overall life expectancy in Japan is generated by the extremely low mortality among elderly Japanese women (71, 128, 129), but Japanese men also do better than those in almost all other nations, ranking third. There has been some concern about registering deaths of very old people in Japan, but the life expectancy figures are calculated from the census to obviate this difficulty (28, 127).

Although life expectancy for the United States as a whole has generally been increasing over the past three decades, there have been declines in parts of the United States: Life

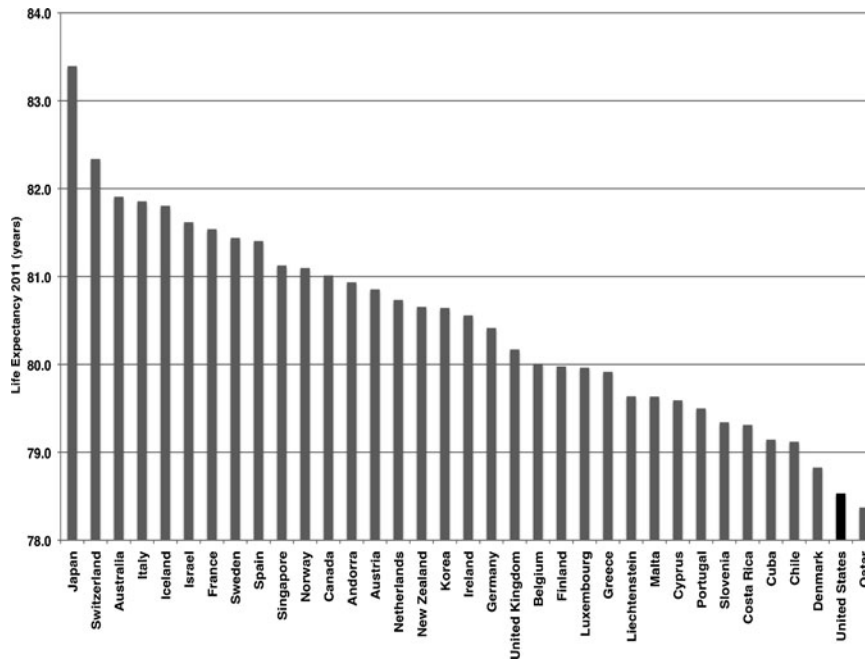


Figure 1

Life expectancy ranking of top 35 countries (132a).

expectancy has been diminishing or stagnating in absolute terms for women in almost 20% of U.S. counties. A 2008 study showed absolute declines in 180 out of 2,068 county units (merged from a total 3,141 to account for small numbers and changing boundaries) over the period of 1983 to 1999, whereas for the period 1961 to 1983 there were no such declines (27). For men, 4% of county units did not experience improvements, and there were absolute declines in 11 county units.

Extending the period from 1981 to 2006 showed women in almost 900 counties experiencing no health improvements or absolute declines (62). This study used a new measure, the international frontier of life expectancy, which represents the average of the ten highest county life expectancies for a given year. U.S. county life expectancy was compared with this international frontier time series to calculate how many calendar years each county is behind. During the period 2000–2007 most U.S. counties fell behind the progress seen in

the leading countries. When life expectancy in U.S. counties is ranked with comparable local areas of other nations, only a very few are at the level of the international frontier, suggesting that even the healthiest U.S. subpopulations suffer from suboptimal health possible. See **Figure 2**.

Declines in life expectancy at the national level are extremely rare events. Substantial declines in life expectancy occurred in countries of the Soviet Union after the breakup in 1991 and in high HIV-prevalent African nations beginning in the 1990s (87, 121, 132). These represent the only consistent declines over the past century.

Infant mortality comparisons are the only international ranking currently presented in the federal Centers for Disease Control and Prevention (CDC) *Health United States* annual series. The ranking for the United States among selected countries listed in the CDC report in 1960 was twelfth, whereas in 2006, it had fallen to twenty-eighth (93). Infant mortality in the

United States has not been declining at the rate of many other countries, and from 2001 to 2002, there was even a small increase and since then only a slight improvement (72, 73, 116). The 2008 National Center for Health Statistics report (72) concludes, “In 2004, the United States ranked 29th in the world in infant mortality, tied with Poland and Slovakia” (p. 2). Varying classifications and reporting of live births are not considered the main reason for the poor U.S. outcomes (136).

Preterm births (PTB, births of infants of less than 37 weeks gestation) are major contributors to U.S. infant mortality. The rate of PTBs increased from 9.5% in 1981 to 12.8% in 2006. There was a nine percent increase in PTBs from 2000 to 2005, and half of all infant deaths during this period accrued to very preterm (less than 32 weeks gestation) infants in the United States. These factors are thought by some to account for much of the lack of decline in the U.S. infant mortality rate from 2000 to 2005. The PTB rate in Western Europe is about half that of the United States, although with increasing trends (7, 74). However, when very early PTBs (before 22 weeks gestation) are removed from consideration, the United States still does poorly in infant mortality in comparison to most European nations, with rates almost twice as high (74). The U.S. National Center for Health Statistics points out that mortality for gestational age-specific (22–36 weeks) preterm infants in the United States compares favorably with those in Europe, but for infants born at 37 weeks or more, the United States has higher mortality (74). Japan has similar PTB rates to those in Europe, much higher rates of low birth weight (considerably higher than in the United States), but better infant mortality outcomes (7, 46, 74, 89, 98, 102, 126).

The childhood mortality rate, defined as deaths from age 1 to 5, avoids issues of live birth reporting differences because it excludes the large number of infant deaths. The U.S. ranking is no better for this indicator either, however, ranking forty-first in the list of nations; the total under five mortality ranking is forty-second (110).

Estimates for 1951–1953 attribute the lowest MMR in the world to the United States (148). Since then, the U.S. MMR ranking has declined substantially, and there have been actual increases in the U.S. MMR in recent decades (44). In 2008, using WHO rankings for MMR, the United States was tied for fifty-first, whereas in Hogan and colleagues’ rankings using a different method of estimation, the United States was tied for 39th. In 1990, the WHO ranked the United States at tied for twenty-second, whereas in the Hogan rankings, it was tied for twentieth (44, 150). Changing classification of maternal deaths and underreporting are only partial explanations for the recent U.S. trends (49).

The United States ranks twenty-ninth for remaining years of life at age 50, e_{50} , using 2006 WHO data (108). U.S. life expectancy improvements at age 50 have been modest since 1980 especially for women, in contrast to many other developed nations. Only Denmark ranks worse than the United States for women in this indicator (33). See **Figure 3**.

Working age mortality comparisons with large rich nations were presented in a 1993 U.S. Congressional publication depicting the chances in 1990 of those aged 25 surviving to age 65 (40q25) (136). Both U.S. men and women had the greatest likelihood among developed nations of dying before reaching retirement age. See **Figure 4**.

The probability for someone aged 15 dying before reaching age 60, 45q15, has been calculated since 1970 (111). For U.S. males aged 15 in 2010, the probability of dying before age 60 was estimated to be 0.013, whereas the probability was 0.0065 for the healthiest nation, meaning American men had twice the chance of dying as did those in the nation with the best outcome. U.S. males ranked forty-fourth in this vital statistic, tied with Algeria and behind Peru (and all developed countries) and barely ahead of Barbados. In 1970, the 45q15 probability for U.S. males was 0.0228, whereas it was 0.0133 for the best country, meaning there was a 71% increased chance of dying during those ages in the United States. The U.S. ranking then

was sixty-second, indicating that there has been some relative improvement since 1970.

Adult mortality ranking for U.S. women is no better than that of men. For females aged 15 in 2010, the probability of dying in the United States before reaching age 60 was 0.0077, while it was 0.0038 for the best country, a twofold difference. U.S. adult female mortality that year ranked forty-eighth, tied with Macedonia and Armenia, behind Maldives and ahead of Poland. In 1970, the probability that U.S. girls aged 15 would not reach age 60 was 0.126, whereas it was 0.076 for the healthiest nation, meaning U.S. girls had a 66% higher chance of dying than did girls in the best nation. U.S. girls had a comparable ranking in 1970 of forty-ninth. These data are consistent with the e_{50} results above, indicating that female health improvement in the United States relative to other nations has been lagging over the past few decades.

Health inequalities within the United States have not been improving over time either (10). Life-expectancy distributions for the United States appear to be more skewed than in other nations, with a long tail of poorer health reflecting continued health inequities (24, 90). We have no standardized way to measure such health differences within a society, however, making comparisons among nations problematic (10). The OECD (Organisation for Economic Co-operation and Development) has graphed trends in the spread or variances in death rates for ages 10 and older among nations that show the United States again with the widest dispersion (96). These variances relate to different means, so the U.S. position with a higher death rate indicates an even greater health inequality (30). In rich nations, there appears to be convergence of death toward older ages, but the United States fares worse than others (24, 147). See **Figure 5**.

A dispersion measure of diversity in age at death equal to a weighted average of interindividual differences in age at death (e^\dagger) has been proposed as a standard way to measure health inequalities across nations (120). This measure covers all ages, not just those 10 years and

older. Plots of trajectories of life expectancy at birth (e_0) and dispersion at age of death (e^\dagger) for England and Wales, Japan, Sweden, and the United States show striking divergence for both men and women in the United States compared with those nations. See **Figure 6**.

In summary, the health rankings of the United States have declined substantially when compared with other nations. In absolute terms, health has improved for the nation as a whole, but the gains have faltered and mortality is actually increasing in a portion of the country, especially for women. Given the preponderance of evidence on so many indicators, despite inaccuracies in individual population health measures, it is clear that the best health status has evaded the residents of the United States.

Published health comparisons of subgroups within the United States are fairly common (91), but studies comparing U.S. subgroups with other nations are infrequent (37, 82). A number of studies compare health in the United States and neighboring Canada (2, 23, 29, 63, 83, 123, 146). Some studies from nations healthier than the United States, such as Australia, ask what it might take to further improve that country's relative health status (112). The Government of Australia has laid out a plan to become the world's healthiest nation (94). Benchmarking international performance and creating awareness of population health among citizens could be a useful tool for advancing health.

Other nations, such as Denmark and Scotland, that have experienced relative health declines and have not seen the health improvements enjoyed by other European nations have held national commissions to investigate and report on the situation (4, 13, 143). Denmark is making progress. Scotland is known as the "sick man of Europe" because its health outcomes are the worst of that region. Studies comparing health in parts of Scotland with that in comparable regions in the rest of Europe have attracted public awareness (142).

Health comparisons with other nations have received some U.S. federal agency attention. Previous national reports highlighted the

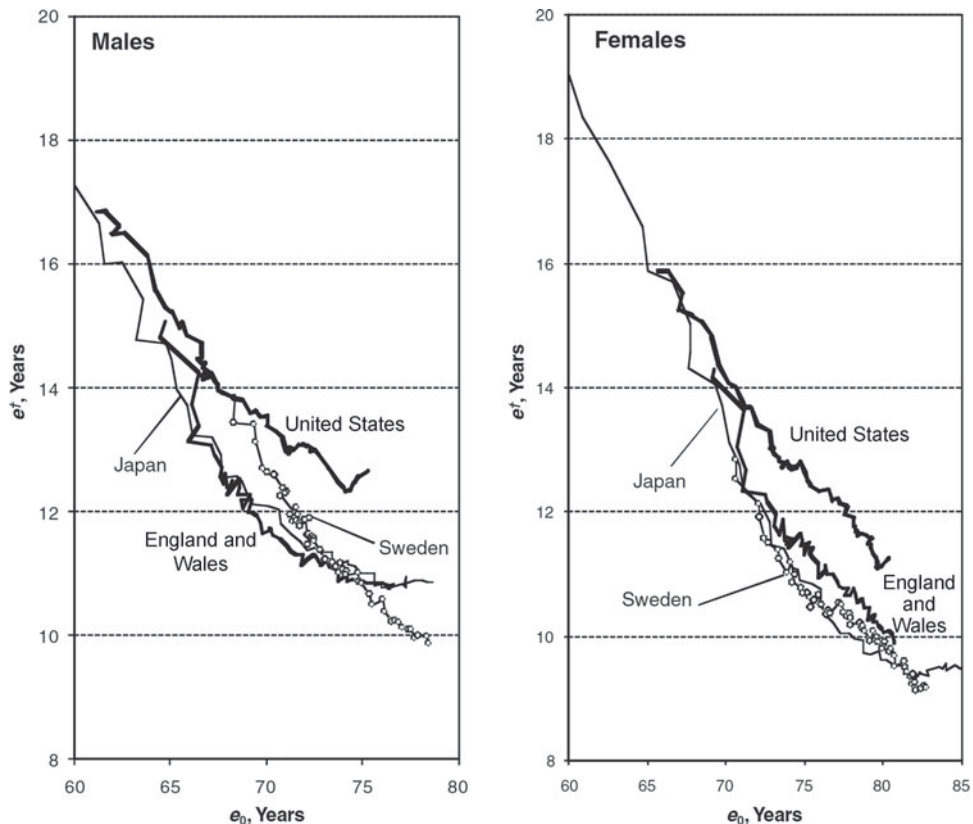


Figure 6

Trajectories of life expectancy at birth (e_0) and dispersion in age of death (e^\dagger) (interindividual differences in age of death or average life-expectancy losses attributable to death) for England and Wales, Japan, Sweden, and the United States (120).

health ranking situation in comparison with other nations, but the last appears to have been in 1979 at a time when the situation had not deteriorated to today's levels (137). The Institute of Medicine in its 2003 report (52) highlighted the situation for life expectancy: "For years, the life expectancies of both men and women in the United States have lagged behind those of their counterparts in most other industrialized nations" (p. 20).

Evidence of the declining U.S. ranking is cursorily mentioned in the CDC *Health United States* for the years 2003 through 2010, including rankings for infant mortality rate for selected countries in 1960 and the current year. For several years, the document had rankings of "selected" countries in the life expectancy table

for males and females, at birth and at age 65 only for the most recent year. Unlike the IMR display, investigators had to tally the rank by hand for the earlier period to demonstrate the relative decline for life expectancy at birth and especially for women at age 65. In subsequent years, even the ranking of life expectancy for the latest years is absent.

Besides the various mortality measures described above, there are a variety of other measures for which national-level data exist. These include health-related behaviors and outcomes such as smoking rates, teen birth rates, and obesity as well as self-assessed health. Many others relate to the economy, education, and consumption. These can be aggregated into indices for comparative purposes.

The August 23, 2010, issue of *Newsweek* devoted an entire issue to “The Best Country in the World is . . .” It used an index to compile rankings for education, health, quality of life, economic dynamism, and political environment. The United States was not in the top ten (43). *Time* did something similar in their March 11, 2011, issue (152). Monographs looking at human development in the United States mostly make comparisons among U.S. states and sideline the international comparisons (69). Studies have compared U.S. health status with other countries on measures of self-reported disease or health as well as biomarker surrogates of health. One showed U.S. white male residents faring worse than England at every level of the socioeconomic spectrum. Europeans ranked higher than those in the United States for those age 50 to 74 years using self-report survey data, at all levels of wealth (5, 6). Another, comparing the United States to England, found health inequalities at all levels of socioeconomic status that begin early in life (78). According to a wide range of credible sources, the United States is not a very healthy country.

Public health agencies across the United States, from the federal to the state and local level, almost never provide the health status of other nations or parts of other nations in their organizations’ reports. In the CDC *Health United States* series documents, any maps presenting data stop at national borders, avoiding international comparisons; for example, similar results for our healthier neighbor, Canada, are never shown. State and local health departments that neighbor Canada do not compare their health indicators with nearby provinces or city regions. One annual publication on America’s health rankings uses an index to grade the performance of U.S. states (135). They devote some space to comparisons of the United States with other nations showing the relative decline in health status, but media reports mostly do not discuss those aspects of the report.

We have found no surveys of the U.S. public’s understanding of how their health compares with that of other nations. There are few surveys of health disparities within the United

States (15). One survey of U.S. medical students in 2002 found that nearly one-third of respondents thought that the United States was the longest lived nation in the world or had the lowest infant mortality (1). Doctors in practice are not likely to be better informed, although there have been a few reports in leading medical journals of the poor U.S. health status compared with other nations (54, 118, 124). Those who speak with a range of audiences of public health workers around the nation find a large fraction of these groups are similarly unaware of the U.S. ranking in health. There are very few reports in the popular media (8).

REASONS FOR THE RELATIVELY POOR U.S. RANKINGS

The reasons for the poor health status of people in the United States are complex and multifaceted. Factors that produce health in a nation may not simply be aggregations of factors that affect the health of individuals, but rather involve social and other conditions of living (9).

Medical care is the most often-stated factor believed to affect health. Studies attest to medical care being an important aspect of health improvements (21). The terms health and health care are often used synonymously in the United States with terms such as “health services,” “health plan,” “health insurance,” “health spending,” “purchasing health,” “paying for health,” and “accessing health.” Such language does a disservice to the cause of producing health because the evidence for the positive role of health and medical care in producing population health is limited at best. Other nations have publicly acknowledged the limited role of medical care in advancing population health, with Canada among the first in 1974 (64).

A publication by the American Enterprise Institute suggested that if deaths from intentional or unintentional injuries (homicides, motor vehicle crash deaths, suicides, falls etc.) are removed from the analysis and if per-capita GDP is included in the regression, the so-called standardized mean life expectancy for the

United States would not be that different from other OECD countries (103). They argue that the results of adjusting for characteristics of the country “unrelated to health systems” suggest that the rankings are not the fault of health care (103, p. 23).

The United States spends an enormous amount of money on medical care: For 2009, the estimate is \$2.5 trillion, or close to 18% of GDP. Using the WHO statistics for 2007, the proportion of the entire world’s health care budget spent in the United States is ~42%. Most of the healthier nations spend 12% or less of GDP on health care (22, 100). That the health ranking of the United States is far behind that of other developed nations points out the limitations of health care spending in producing health (151). A study that assumed that health care produces health and compared the cost-effectiveness of 19 nations’ health care systems in reducing mortality rates found the U.S. system among the least effective (109).

The limited impact on health of medical care is presented in a variety of reputable sources from reviews (48) to public health textbooks (53) and various analyses (16, 17, 50, 60, 84, 85, 108). The benefits of universal health care coverage in advancing population health are similarly of limited effect (114). A study in the United Kingdom, for example, a nation with universal access to health care, suggested that population variations in coronary heart disease mortality were not attributed to differences in primary health care but to factors such as multiple deprivations, smoking, diabetes, and white ethnicity as well as detection of hypertension (68).

Several compelling reasons explain why medical care cannot by itself produce health. Our current understanding of the developmental origins of health and disease and a life course perspective explain much of chronic illness at older ages. As much as half of our health as adults is determined before we go to school. The period –9 to 24 months, that is during pregnancy and the first two years after birth considered as the first 1000 days, is highlighted as the critical period for programming

health in adulthood (20, 34–36, 40, 61, 95, 105). Medicine cannot by its nature intervene to affect those issues at their origin; it mainly treats disease manifestations later in life.

The heterogeneity of the U.S. population is often given as a reason that the United States lags behind others in mortality indicators of health. This argument suggests that migration of unhealthy people to United States (in contrast to Australia, for example) could account for poorer health in the United States (104). However, a substantial proportion of immigrants to the United States are of Latino or Hispanic origin. These groups in the United States have better health status than do non-Hispanic whites, as attested by lower infant mortality rates and longer life expectancy (3, 93). The U.S. foreign-born percentage is that of Sweden, close to 14%, whereas Canada has 20.2% (99, 100). Both are considerably healthier nations than the United States. Similarly, ethnic homogeneity in Japan appears not to be a factor for Japan’s good health status (139).

Personal behaviors are also not credible as key reasons for determining health among countries despite strong beliefs in the United States (113). Studies suggest that individual health-related behaviors, although important, are not a significant determinant of health in the United States (65, 66). The nature of social relations appears to be an important risk factor in producing health outcomes, exceeding a range of others including smoking, alcohol, and physical activity (31, 47). European studies suggest that context for health-related behaviors is important (125). Rates of smoking in the United States, for example, are typically lower than those in longer-lived nations (119). It is possible, however, that the evolution of the smoking epidemic in the United States is a partial explanation of the poor rank of the nation for e_{50} (107). The effect of smoking on U.S. women’s health, especially at older ages, may have had a greater impact than men’s smoking because the latter have higher nonsmoking causes of death. In all, however, it is unlikely that the relatively poor health ranking of the United States is the result of smoking.

An explanation of the relative health decline may come from a population health approach that highlights the importance of structural, economic, and political factors that govern the level of inequality tolerated in society. Early life may be when these factors matter most. The United States demonstrates among the worst inequalities in outcomes for children of all rich nations (134). Income and economic inequality are important factors in a wide range of social and health outcomes (144, 145). One meta-analysis suggests that one-third of all deaths in the United States can be linked to inequality (58). Chronic stress beginning in pregnancy may be a biological mechanism through which these factors begin to operate (117, 141). The United States does not provide paid maternity leave nor paid prenatal leave, which may be important factors in affecting health outcomes (14, 38, 41, 42, 88, 97, 140). Reported stress in the United States is among the highest of all nations (55). Chronic stress may be the twenty-first-century tobacco. Addressing these issues is a major challenge and requires a level of understanding that does not exist in today's corporatized medical environment. European policies addressing social and economic safety nets may help present some direction for improving health in the United States (138).

Health rankings among nations depend on both the health of a nation in question and on the health of other nations. Changes in relative

health rankings are thus dependent not only on what a specific nation does but also on other nations' health trajectories. People in the United States have suffered a relative health decline for the past few decades; other nations have achieved levels of health status that the United States is realistically not in a position to reach in the next few decades, even if the best population health policies were put into place. It would be a reasonable target, however, for the nation to stop further relative declines and begin to make some progress in the rankings. Such a goal would require major policy changes that the country may not be willing to make, but the residents and leaders of the nation should be aware of the state of their health so that their decision is an informed one. Communicating to the American public their dismal health status ranking is a first step toward improving population health.

There are novel methods of presenting health status data for the United States in comparison with other nations and in county differentiations within the country (32, 51). How to use these and other techniques to inform the U.S. public and work for changes is the challenge.

The primary determinants of disease are mainly economic and social, and therefore its remedies must also be economic and social. Medicine and politics cannot and should not be kept apart. (115)

SUMMARY POINTS

1. Around 1950, the United States had among the best health outcomes measured by mortality indicators, but 60 years later, it ranked behind the other rich countries and a number of poorer ones.
2. The differences in mortality outcomes between the United States and the healthiest nations today represent substantial inequalities in health.
3. Reasons for this relative decline are likely due to structural changes related to societal determinants of population health stemming from high economic inequality and lack of attention to early life issues.
4. Public awareness of deteriorating health rankings in the United States is limited, so the next steps to improving health require major communication strategies.

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LITERATURE CITED

1. Agrawal JR, Huebner J, Hedgecock J, Sehgal AR, Jung P, Simon SR. 2005. Medical students' knowledge of the US health care system and their preferences for curricular change: a national survey. *Acad. Med.* 80:484–88
2. Ananth CV, Liu S, Joseph K, Kramer MS, and for the Fetal Infant Health Study Group Can. Perinat. Surveill. Syst. 2009. A comparison of foetal and infant mortality in the United States and Canada. *Int. J. Epidemiol.* 38:480–89
3. Arias E. 2010. United States life tables by Hispanic origin. *Vital Health Stat.* 2:1–33
4. Armstrong EM. 2001. *Health in Scotland 2000*. Edinburgh: Scott. Exec.
5. Avendano M, Glymour MM, Banks J, Mackenbach JP. 2009. Health disadvantage in US adults aged 50 to 74 years: a comparison of the health of rich and poor Americans with that of Europeans. *Am. J. Public Health* 99:540–48
6. Banks J, Marmot M, Oldfield Z, Smith JP. 2006. Disease and disadvantage in the United States and in England. *JAMA* 295:2037–45
7. Beck S, Wojdyla D, Say L, Betran AP, Merialdi M, et al. 2010. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. *Bull. World Health Organ.* 88:31–38
8. Bezruchka S. 2001. Is our society making you sick? America's health lags behind that of more egalitarian nations. *Newsweek*, Feb. 26. p. 14
9. Bezruchka S. 2010. Epidemiological approaches to population health. In *Staying Alive: Critical Perspectives on Health, Illness, and Health Care*, ed. T Bryant, D Raphael, MH Rioux, pp. 13–40. Toronto: CSPI
10. Bezruchka S. 2010. Health equity in the USA. *Soc. Altern.* 29:50–56
11. Bezruchka S, Namekata T, Siström MG. 2008. Improving economic equality and health: the case of postwar Japan. *Am. J. Public Health* 98:589–94
12. Birn A-E, Pillay Y, Holtz TH, Basch PF. 2009. *Textbook of International Health: Global Health in a Dynamic World*. New York: Oxford Univ. Press
13. Bjerregaard P, Hermann N. 1994. *Lifetime in Denmark: Second Report from the Life Expectancy Committee of the Ministry of Health, Denmark*. Copenhagen: Minist. Health, Life Expect. Comm. 115 pp.
14. Bonzini M, Coggon D, Palmer KT. 2007. Risk of prematurity, low birthweight and pre-eclampsia in relation to working hours and physical activities: a systematic review. *Occup. Environ. Med.* 64:228–43
15. Booske BC, Robert SA, Rohan AM. 2011. Awareness of racial and socioeconomic health disparities in the United States: the national opinion survey on health and health disparities, 2008–2009. *Prev. Chronic Dis.* 8:A73
16. Bunker JP. 2001. The role of medical care in contributing to health improvements within societies. *Int. J. Epidemiol.* 30:1260–63
17. Bunker JP, Frazier HS, Mosteller F. 1994. Improving health: measuring effects of health care. *Milbank Q.* 72:225–58
18. Christensen K, Doblhammer G, Rau R, Vaupel JW. 2009. Ageing populations: the challenges ahead. *Lancet* 374:1196–208
19. Crimmins EM, Preston SH, Cohen B, eds. 2010. *International Differences in Mortality at Older Ages: Dimensions and Sources*. Washington, DC: Natl. Acad. Press

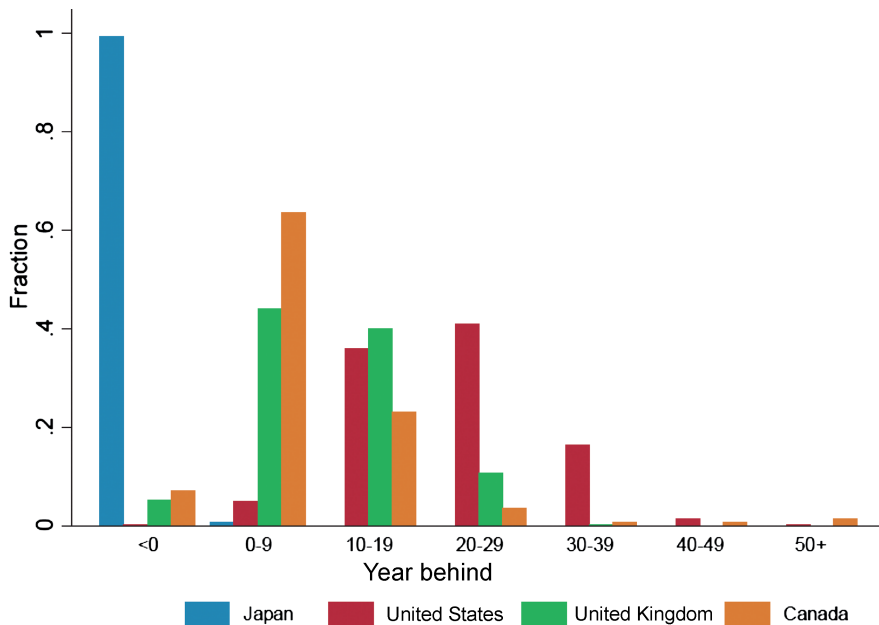
20. Currie J. 2011. *Inequality at birth: some causes and consequences*. Natl. Bur. Econ. Res. Work. Pap. Ser. No. 16798. <http://www.nber.org/papers/w16798.pdf>
21. Cutler DM, Rosen AB, Vijan S. 2006. The value of medical spending in the United States, 1960–2000. *N. Engl. J. Med.* 355:920–27
22. Davis K, Schoen C, Stremikis K. 2010. *Mirror, Mirror on the Wall: How the Performance of the US Health Care System Compares Internationally, 2010 Update*, Commonwealth Fund, New York. <http://www.commonwealthfund.org/Publications/Fund-Reports/2010/Jun/Mirror-Mirror-Update.aspx?page=all>
23. Dow WH, Rehkopf DH. 2010. Socioeconomic gradients in health in international and historical context. *Ann. N. Y. Acad. Sci.* 1186:24–36
24. Edwards RD, Tuljapurkar S. 2005. Inequality in life spans and a new perspective on mortality convergence across industrialized countries. *Popul. Dev. Rev.* 31:645–74
25. Elo IT, Preston SH. 1994. Estimating African-American mortality from inaccurate data. *Demography* 31:427–58
26. Esty D, Goldstone J, Gurr TR, Harff B, Levy M, et al. 1998. *State Failure Task Force Report: Phase II Findings*. McLean, VA: Sci. Appl. Int. Corp.
27. Ezzati M, Friedman AB, Kulkarni SC, Murray CJL. 2008. The reversal of fortunes: trends in county mortality and cross-county mortality disparities in the United States. *PLoS Med.* 5:e66
28. Fackler M. 2010. Japan's elderly count was off by 234,000. *New York Times*, Sept. 11, p. A4
29. Feeny D, Kaplan MS, Huguet N, McFarland BH. 2010. Comparing population health in the United States and Canada. *Popul. Health Metr.* 8:8
30. Gakidou EE, Murray CJ, Frenk J. 2000. Defining and measuring health inequality: an approach based on the distribution of health expectancy. *Bull. World Health Organ.* 78:42–54
31. Galea S, Tracy M, Hoggatt KJ, DiMaggio C, Karpati A. 2011. Estimated deaths attributable to social factors in the United States. *Am. J. Public Health* 101:1456–65
32. Gapminder Found. 2006. *Gapminder: for a fact-based world view*. <http://www.gapminder.org/>
33. Gleit DA, Meslé F, Vallin J. 2010. Diverging trends in life expectancy at age 50: a look at causes of death. See Ref. 19, pp. 17–67
34. Gluckman PD, Beedle A, Hanson MA. 2009. *Principles of Evolutionary Medicine*. Oxford/New York: Oxford Univ. Press
35. Gluckman PD, Hanson MA. 2006. *Developmental Origins of Health and Disease*. Cambridge, UK: Cambridge Univ. Press
36. Gluckman PD, Hanson MA, Cooper C, Thornburg KL. 2008. Effect of in utero and early-life conditions on adult health and disease. *N. Engl. J. Med.* 359:61–73
37. Godson SL. 2006. The third world health status of black American males. *J. Natl. Med. Assoc.* 98:488–91
38. Guendelman S, Hubbard A, Hosang N, Pearl M, Graham S, Kharrazi M. 2009. Maternity leave in the ninth month of pregnancy and birth outcomes among working women. *Women's Health Issues* 19:30–37
39. Hahn RA, Teutsch SM, Rothenberg RB, Marks JS. 1990. Excess deaths from nine chronic diseases in the United States, 1986. *JAMA* 264:2654–59
40. Hertzman C, Boyce T. 2010. How experience gets under the skin to create gradients in developmental health. *Annu. Rev. Public Health* 31:329–47
41. Heymann J. 2009. *Raising the Global Floor: Dismantling the Myth that We Can't Afford Good Working Conditions for Everyone*. Stanford, CA: Stanford Univ. Press
42. Heymann J, Raub A, Earle A. 2011. Creating and using new data sources to analyze the relationship between social policy and global health: the case of maternal leave. *Public Health Rep.* 126(Suppl. 3):127–34
43. Hirsch M. 2010. We're No. 11! *Newsweek*, Aug. 23–30, p. 40
44. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, et al. 2010. Maternal mortality for 181 countries, 1980–2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet* 375:1609–23
45. Högberg U, Joëlsson I. 1985. The decline in maternal mortality in Sweden, 1931–1980. *Acta Obstet. Gynecol. Scand.* 64:583–92

46. Hokama T, Binns C. 2008. Trends in the prevalence of low birth weight in Okinawa, Japan: a public health perspective. *Acta Paediatr.* 98:242–46
47. Holt-Lunstad J, Smith TB, Layton JB. 2010. Social relationships and mortality risk: a meta-analytic review. *PLoS Med.* 7:e1000316
48. House JS, Schoeni RF, Kaplan GA, Pollack H. 2008. The health effects of social and economic policy: the promise and challenge for research and policy. In *Making Americans Healthier: Social and Economic Policy as Health Policy*, ed. RF Schoeni, JS House, GA Kaplan, H Pollack, pp. 3–26. New York: Russell Sage Found.
49. Hoyert DL. 2007. Maternal mortality and related concepts. *Vital. Health Stat.* 3:1–13
50. Illich I. 1976. *Medical Nemesis*. New York: Pantheon
51. Inst. Health Metr. Eval. (IHME). 2010. *Data visualizations*. <http://www.healthmetricsandevaluation.org/tools/data-visualizations>
52. Inst. Med. 2003. *The Future of the Public's Health in the 21st Century*. Washington, DC: Natl. Acad. Press
53. Jamrozik K, Hobbs MST. 2002. Medical care and public health. In *Oxford Textbook of Public Health*, ed. R Detels, J McEwen, R Beaglehole, H Tanaka, 2.8:215–42. Oxford: Oxford Univ. Press
54. Jenkins CD, Runyan DK. 2005. What's killing Americans in the prime of life? *Int. J. Health Serv.* 35:291–311
55. Kahneman D, Deaton A. 2010. High income improves evaluation of life but not emotional well-being. *Proc. Natl. Acad. Sci. USA* 107:16489–93
56. Kinsella K. 1992. Changes in life expectancy 1900–1990. *Am. J. Clin. Nutr.* 55:1196S–202S
57. Kinsella K, He W. 2009. *An Aging World: 2008*. Int. Popul. Rep. P95/09-1. Washington, DC: US Dep. Health Hum. Serv., Natl. Inst. Aging. <http://www.census.gov/prod/2009pubs/p95-09-1.pdf>
58. Kondo N, Sembajwe G, Kawachi I, van Dam RM, Subramanian SV, Yamagata Z. 2009. Income inequality, mortality, and self rated health: meta-analysis of multilevel studies. *BMJ* 339:b4471–79
59. Kramer MS, Platt RW, Yang H, Haglund B, Cnattingius S, Bergsjö P. 2002. Registration artifacts in international comparisons of infant mortality. *Paediatr. Perinat. Epidemiol.* 16:16–22
60. Kronick R. 2009. Health insurance coverage and mortality revisited. *Health Serv. Res.* 44:1211–31
61. Kuh D. 2004. *A Life Course Approach to Chronic Disease Epidemiology*. Oxford: Oxford Univ. Press
62. Kulkarni SC, Levin-Rector A, Ezzati M, Murray CJ. 2011. Falling behind: life expectancy in US counties from 2000 to 2007 in an international context. *Popul. Health Metr.* 9:16
63. Kunitz SJ, Pesis-Katz I. 2005. Mortality of white Americans, African Americans, and Canadians: the causes and consequences for health of welfare state institutions and policies. *Milbank Q.* 83:5–39
64. Lalonde M. 1974. *A New Perspective on the Health of Canadians*. Ottawa: Dep. Natl. Health Welfare
65. Lantz PM, Golberstein E, House JS, Morenoff J. 2010. Socioeconomic and behavioral risk factors for mortality in a national 19-year prospective study of US adults. *Soc. Sci. Med.* 70:1558–66
66. Lantz PM, House JS, Lepkowski JM, Williams DR, Mero RP, Chen J. 1998. Socioeconomic factors, health behaviors, and mortality: results from a nationally representative prospective study of US adults. *JAMA* 279:1703–8
67. Leon DA. 2011. Trends in European life expectancy: a salutary view. *Int. J. Epidemiol.* 40:271–77
68. Levene LS, Baker R, Bankart MJG, Khunti K. 2010. Association of features of primary health care with coronary heart disease mortality. *JAMA* 304:2028–34
69. Lewis K, Burd-Sharps S. 2010. *The Measure of America 2010–2011: Mapping Risks and Resilience*. New York: Soc. Sci. Res. Council./N.Y. Univ. Press
70. Liu K, Moon M, Sulvetta M, Chawla J. 1992. International infant mortality rankings: a look behind the numbers. *Health Care Financ. Rev.* 13:105–18
71. Lundberg O, Yngwe Mb, Stjärne MK, Elstad JI, Ferrarini T, et al. 2008. The role of welfare state principles and generosity in social policy programmes for public health: an international comparative study. *Lancet* 372:1633–40
72. MacDorman M, Mathews T. 2008. *Recent Trends in Infant Mortality in the United States*. Rep. NCHS Data Brief No 9. Hyattsville, MD: Natl. Cent. Health Stat.

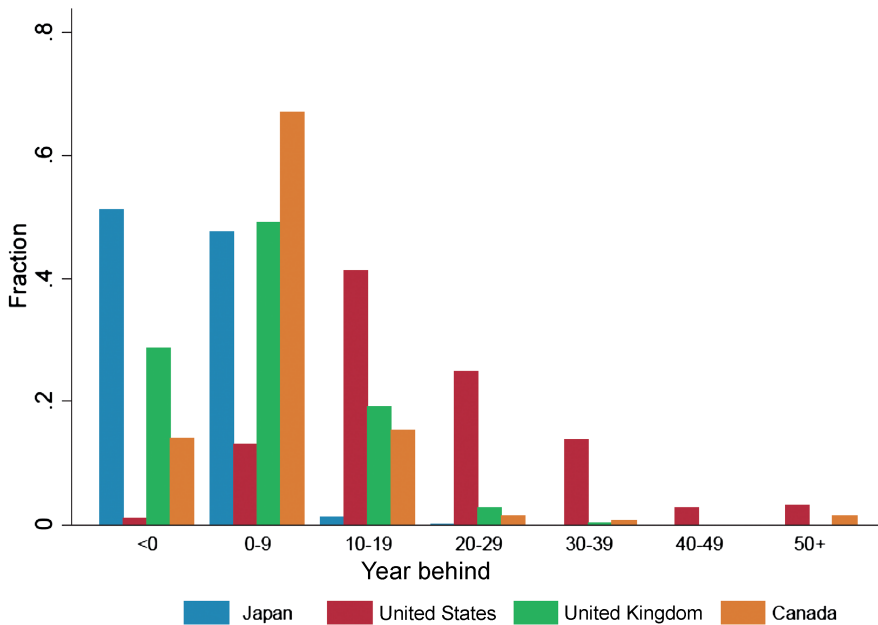
73. MacDorman MF, Martin JA, Mathews TJ, Hoyert DL, Ventura SJ. 2005. Explaining the 2001–2002 infant mortality increase in the United States: data from the linked birth/infant death data set. *Int. J. Health Serv.* 35:415–42
74. MacDorman MF, Mathews T. 2009. *Behind International Rankings of Infant Mortality: How the United States Compares with Europe*. Hyattsville, MD: Natl. Cent. Health Stat.
75. Manton KG. 1991. The dynamics of population aging: demography and policy analysis. *Milbank Q.* 69:309–38
76. Manton KG, Vaupel JW. 1995. Survival after the age of 80 in the United States, Sweden, France, England, and Japan. *N. Engl. J. Med.* 333:1232–35
77. Marmot M. 2004. *Status Syndrome—How Our Position on the Social Gradient Affects Longevity and Health*. London: Bloomsbury
78. Martinson ML, Teitler JO, Reichman NE. 2011. Health across the life span in the United States and England. *Am. J. Epidemiol.* 173:858–65
79. Mathers CD, Fat DM, Inoue M, Rao C, Lopez AD. 2005. Counting the dead and what they died from: an assessment of the global status of cause of death data. *Bull. World Health Organ.* 83:171–77
80. Mathers CD, Murray CJ, Salomon JA, Sadana R, Tandon A, et al. 2003. Healthy life expectancy: comparison of OECD countries in 2001. *Aust. N. Z. J. Public Health* 27:5–11
81. Mathers CD, Sadana R, Salomon JA, Murray CJ, Lopez AD. 2001. Healthy life expectancy in 191 countries, 1999. *Lancet* 357:1685–91
82. McCord C, Freeman HP. 1990. Excess mortality in Harlem. *N. Engl. J. Med.* 322:173–77
83. McGrail KM, van Doorslaer E, Ross NA, Sanmartin C. 2009. Income-related health inequalities in Canada and the United States: a decomposition analysis. *Am. J. Public Health* 99:1856–63
84. McKeown T. 1979. *The Role of Medicine: Dream, Mirage or Nemesis?* Princeton, NJ: Princeton Univ. Press
85. McKinlay JB, McKinlay SM. 1977. The questionable contribution of medical measures to the decline of mortality in the United States in the twentieth century. *Milbank Mem. Fund Q. Health Soc.* 55:405–28
86. Mesle F, Vallin J. 2006. Diverging trends in female old-age mortality: the United States and the Netherlands versus France and Japan. *Popul. Dev. Rev.* 32:123–45
87. Moser K, Shkolnikov V, Leon DA. 2005. World mortality 1950–2000: divergence replaces convergence from the late 1980s. *Bull. World Health Organ.* 83:202–9
88. Mozurkewich EL, Luke B, Avni M, Wolf FM. 2000. Working conditions and adverse pregnancy outcome: a meta-analysis. *Obstet. Gynecol.* 95:623–35
89. Muglia LJ, Katz M. 2010. The enigma of spontaneous preterm birth. *N. Engl. J. Med.* 362:529–35
90. Murray CJL, Frenk J, Gakidou EE. 2001. Measuring health inequality: challenges and new directions. In *Poverty, Inequality and Health: An International Perspective*, ed. DA Leon, G Walt, pp. 194–216. Oxford: Oxford Univ. Press
91. Murray CJL, Kulkarni SC, Michaud C, Tomijima N, Bulzacchelli MT, et al. 2006. Eight Americas: investigating mortality disparities across races, counties, and race-counties in the United States. *PLoS Med.* 3:e260
92. Muszynska MM, Rau R. 2009. Falling short of highest life expectancy: How many Americans might have been alive in the twentieth century? *Popul. Dev. Rev.* 35:585–603
93. Natl. Cent. Health Stat. 2009. *Health, United States, 2009: With Special Feature on Medical Technology*. Hyattsville, MD: US Health Hum. Serv., Cent. Dis. Control Prev. [http://www.cdc.gov/nchs/data/09.pdf](http://www.cdc.gov/nchs/data/hus/09.pdf)
94. Natl. Prev. Health Taskforce. 2010. *Taking Preventative Action—A Response to Australia: The Healthiest Country by 2020—The Report of the National Preventative Health Taskforce*. Canberra: Commonw. Aust.
95. Newnham JP, Ross MG, eds. 2009. *Early Life Origins of Human Health and Disease*. Basel/New York: Karger
96. OECD (Organ. Econ. Co-op. Dev.). 2006. *Society at a Glance: OECD Social Indicators*. Paris: OECD
97. OECD (Organ. Econ. Co-op. Dev.). 2009. *Doing Better for Children*. Paris: OECD
98. OECD (Organ. Econ. Co-op. Dev.). 2009. *Health at a Glance 2009: OECD Indicators*. Paris: OECD
99. OECD (Organ. Econ. Co-op. Dev.). 2010. *OECD Factbook 2010: Immigrant Population*. Paris: OECD

100. OECD (Organ. Econ. Co-op. Dev.). 2011. *Society at a Glance: OECD Social Indicators*. Paris: OECD
101. Oeppen J, Vaupel JW. 2002. Demography: enhanced: broken limits to life expectancy. *Science* 296:1029–31
102. Ohmi H, Hirooka K, Hata A, Mochizuki Y. 2001. Recent trend of increase in proportion of low birthweight infants in Japan. *Int. J. Epidemiol.* 30:1269–71
103. Ohsfeldt RL, Schneider JE. 2006. *The Business of Health: The Role of Competition, Markets, and Regulation*. Washington, DC/Blue Ridge Summit, PA: AEI
104. Page A, Begg S, Taylor R, Lopez AD. 2007. Global comparative assessments of life expectancy: the impact of migration with reference to Australia. *Bull. World Health Organ.* 85:474–81
105. Paul AM. 2010. *Origins: How the Nine Months Before Birth Shape the Rest of our Lives*. New York: Free Press
106. Preston SH. 1975. The changing relation between mortality and level of economic development. *Popul. Stud.* 29:231–48
107. Preston SH, Gleit DA, Wilmoth JR. 2010. Contribution of smoking to international differences in life expectancy. See Ref. 19, pp. 105–31
108. Preston SH, Ho J. 2010. Low life expectancy in the United States: Is the health care system at fault? See Ref. 19, pp. 259–98
109. Pritchard C, Wallace MS. 2011. Comparing the USA, UK and 17 Western countries' efficiency and effectiveness in reducing mortality. *JRSM Short Rep.* 2:1–10
110. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, et al. 2010. Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970–2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet* 375:1988–2008
111. Rajaratnam JK, Marcus JR, Levin-Rector A, Chalupka AN, Wang H, et al. 2010. Worldwide mortality in men and women aged 15–59 years from 1970 to 2010: a systematic analysis. *Lancet* 375:1704–20
112. Ring IT, O'Brien JF. 2007. Our hearts and minds—What would it take for Australia to become the healthiest country in the world? *Med. J. Aust.* 187:447–51
113. Robert SA, Booske BC. 2011. US opinions on health determinants and social policy as health policy. *Am. J. Public Health* 101:1655–63
114. Roos NP, Brownell M, Menev V. 2006. Universal medical care and health inequalities: right objectives, insufficient tools. In *Healthier Societies: From Analysis to Action*, ed. J Heymann, C Hertzman, ML Barer, RG Evans, pp. 107–31. New York: Oxford Univ. Press
115. Rose GA. 1992. *The Strategy of Preventive Medicine*. New York: Oxford Univ. Press
116. Sachs BP, Fretts RC, Gardner R, Hellestein S, Wampler NS, Wise PH. 1995. The impact of extreme prematurity and congenital anomalies on the interpretation of international comparisons of infant-mortality. *Obstet. Gynecol.* 85:941–46
117. Sandman CA, Wadhwa PD, Chicz-DeMet A, Dunkel-Schetter C, Porto M. 1997. Maternal stress, HPA activity, and fetal/infant outcome. *Ann. N. Y. Acad. Sci.* 814:266–75
118. Schroeder SA. 2007. We can do better—improving the health of the American people. *N. Engl. J. Med.* 357:1221–28
119. Shafey O, Dolwick S, Guindon G, eds. 2003. *Tobacco Control Country Profiles 2003*. Atlanta, GA: Am. Cancer Soc.
120. Shkolnikov V, Andreev E, Zhang Z, Oeppen J, Vaupel J. 2011. Losses of expected lifetime in the United States and other developed countries: methods and empirical analyses. *Demography* 48:211–39
121. Shkolnikov V, McKee M, Leon DA. 2001. Changes in life expectancy in Russia in the mid-1990s. *Lancet* 357:917–21
122. Shryock HS, Siegel JS, Larmon EA, U.S. Bur. Census. 1980. *The Methods and Materials of Demography*. Washington, DC: US Gov. Print. Offi.
123. Siddiqi A, Hertzman C. 2007. Towards an epidemiological understanding of the effects of long-term institutional changes on population health: a case study of Canada versus the USA. *Soc. Sci. Med.* 64:589–603
124. Starfield B. 2000. Is US health really the best in the world? *JAMA* 284:483–85

125. Stringhini S, Dugravot A, Shipley M, Goldberg M, Zins M, et al. 2011. Health behaviours, socioeconomic status, and mortality: further analyses of the British Whitehall II and the French GAZEL prospective cohorts. *PLoS Med.* 8:e1000419
126. Takayama JI, Matsuo N. 2010. The enigma of spontaneous preterm birth (letter). *N. Engl. J. Med.* 362:2032–34
127. Talmadge E. 2010. *Where are Japan's missing centenarians?* Associated Press, Tokyo. http://www.msnbc.msn.com/id/38678356/ns/world_news-asia-pacific#
128. Trovato F, Heyen NB. 2003. A divergent pattern of the sex difference in life expectancy: Sweden and Japan, early 1970s–late 1990s. *Soc. Biol.* 50:238–58
129. Trovato F, Heyen NB. 2006. A varied pattern of change of the sex differential in survival in the G7 countries. *J. Biosoc. Sci.* 38:391–401
130. U. N. Dev. Prog. (UNDP). 1990. *Human Development Report 1990*. New York: Oxford Univ. Press
131. U. N. Dev. Prog. (UNDP). 1996. *Human Development Report 1996*. New York: Oxford Univ. Press
132. U. N. Dev. Prog. (UNDP). 2010. *Human Development Report 2010: The Real Wealth of Nations: Pathways to Human Development*. New York: Palgrave Macmillan
- 132a. U. N. Dev. Prog. (UNDP). 2011. *Human Development Report 2011: Sustainability and Equity: A Better Future for All*. New York: Palgrave Macmillan
133. UNICEF. 2011. *State of the World's Children 2011: Adolescence: An Age of Opportunity*. New York: UNICEF
134. UNICEF Innocenti Res. Cent. 2010. *Innocenti Report Card No. 9, December 2010. The Children Left Behind: A League Table of Inequality in Child Well-Being in the World's Rich Countries*. Florence: UNICEF
135. United Health Found., Am. Public Health Assoc., Partnersh. Prev. 2010. *America's Health Rankings: A Call to Action for Individuals and Their Communities*. Minnetonka, MN: United Health Found.
136. U.S. Congr.: Off. Technol. Assess. 1993. *International Health Statistics: What the Numbers Mean for the United States*. Washington, DC: Off. Technol. Assess, US Congr.
137. U.S. Dep. Health Educ. Welfare. 1979. *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*. DHEW Publ. No. 79-55071. Washington: US Gov. Print. Off.
138. Vallgarda S. 2001. Governing people's lives—strategies for improving the health of the nations in England, Denmark, Norway and Sweden. *Eur. J. Public Health* 11:386–92
139. Vaupel JW, Rau R, Camarda CG, von Kistowski K. 2006. *Can heterogeneity of populations explain differences in mortality?* Work. Pap. 2006-10, Cent. Retire. Res., Boston Coll. <http://ssrn.com/paper=1313832>
140. Vrijkotte TGM, van Der Wal MF, Eijdsen Mv. 2009. First-trimester working conditions and birth-weight: a prospective cohort study. *Am. J. Public Health* 99:1409–16
141. Wadhwa PD. 2005. Psychoneuroendocrine processes in human pregnancy influence fetal development and health. *Psychoneuroendocrinology* 30:724–43
142. Walsh D, Taulbut M, Hanlon P. 2008. *The Aftersbcock of Deindustrialisation: Trends in Mortality in Scotland and Other Parts of Post-Industrial Europe*. Glasgow: Glasgow Cent. Popul. Health/NHS Health Scotland
143. Whyte B. 2007. *Scottish Mortality in a European Context 1950–2000: An Analysis of Comparative Mortality Trends*. Edinburgh: Scott. Public Health Obs.
144. Wilkinson R, Pickett KE. 2010. *The Spirit Level: Why Equality Is Better for Everyone*. London: Penguin
145. Wilkinson RG, Pickett KE. 2009. Income inequality and social dysfunction. *Annu. Rev. Sociol.* 35:493–511
146. Willson AE. 2009. 'Fundamental causes' of health disparities: a comparative analysis of Canada and the United States. *Int. Sociol.* 24:93–113
147. Wilmoth J, Boe C, Barbieri M. 2011. Geographic differences in life expectancy at age 50 in the United States compared with other high-income countries. See Ref. 19, pp. 333–66
148. World Health Organ. (WHO). 1969. Maternal mortality. *World Health Stat. Rep.* 22:335–36
149. World Health Organ. (WHO). 2008. *World Health Report 2008: Primary Health Care Now More Than Ever*. Geneva: WHO
150. World Health Organ. (WHO). 2010. *Trends in Maternal Mortality: 1990 to 2008*. Geneva: WHO
151. World Health Organ. (WHO). 2010. *World Health Statistics 2010*. Geneva: WHO
152. Zakaria F. 2011. Are America's best days behind us? *Time*, March 14, pp. 28–33



Females



Males

Figure 2

Fraction of local areas in Japan, Canada, United Kingdom, and the United States falling into bins of calendar years behind or ahead of the international frontier (62).

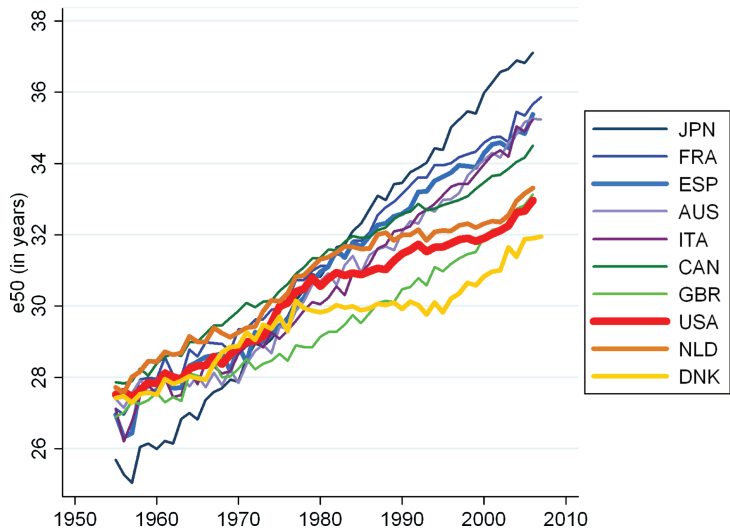


Figure 3
Female life expectancy at age 50, trends from 1955 to 2007 (33).

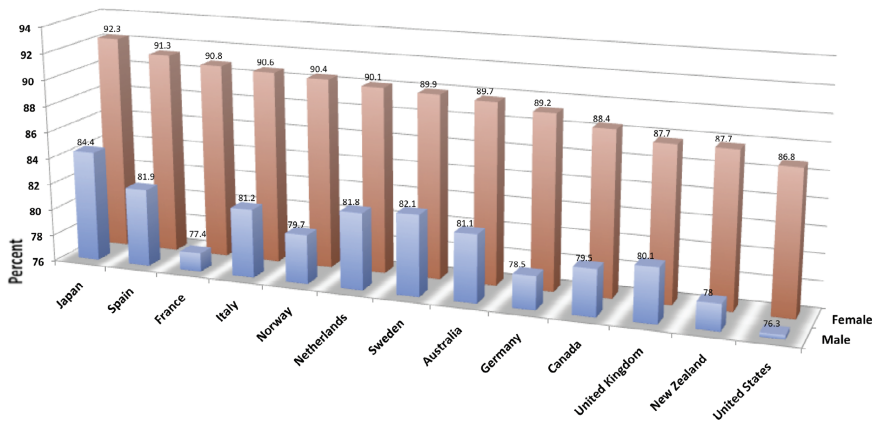


Figure 4
Probability of survival to age 65 for those surviving to age 25, United States and selected countries, in 1990. From Reference 136.

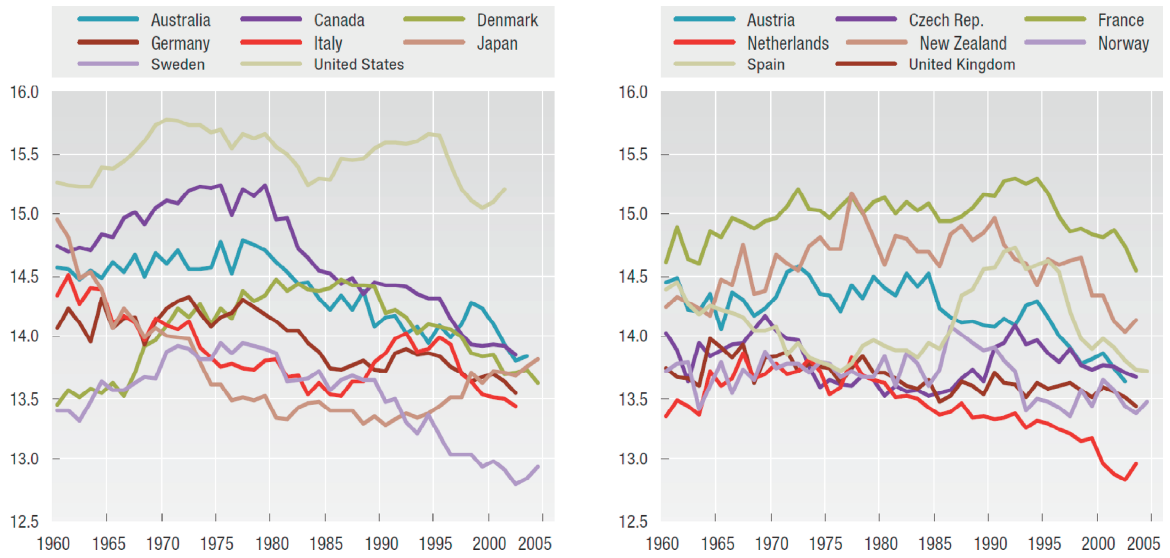


Figure 5

Standard deviation in age of death above 10 for men and women combined (96).



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