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WHY HAS U.S. LIFE EXPECTANCY FALLEN BELOW OTHER COUNTRIES?

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Introduction

Life expectancy at age 65 in the United States and other high-income countries has increased dramatically over the last 50 years. But progress in the United States on this key health indicator has been slower than its peers during this period, and the U.S. ranking has dropped from near the top of the group to the bottom. How long people live has significant implications not only for their well-being but also for the finances of the Social Security program. Thus, understanding the reasons for the relatively slow pace of improvement is necessary to provide some basis for future projections.

This *brief* compares U.S. life expectancy, separately for men and women, to nine other countries in the Organization for Economic Cooperation and Development (OECD). It focuses on two factors that may have contributed to the U.S.'s relatively poor performance: smoking and obesity. This *brief* is the second of two on mortality; the first explored trends *within* the United States.

The discussion proceeds as follows. The first section looks at trends in life expectancy at age 65 across countries and finds that the major source of the U.S. shortfall rests with women. The second section explores whether the shortfall could be explained by the unique aspects of the U.S. health care system and concludes that these differences probably have had little impact. The third section reports cause-of-death statistics that suggest diseases associated with smoking and obesity are the major sources of the U.S. shortfall. The fourth section compares U.S. smoking and obesity patterns to those of other countries. The fifth section isolates the impact of smoking and obesity on life expectancy using regression analysis. The results show that, if U.S. patterns had matched those of its peer countries, U.S. life expectancy would have exceeded the average until very recently. The final section concludes that the relative performance of U.S. life expectancy in the future depends on controlling obesity.

Trends in Life Expectancy

The United States and other high-income countries have experienced immense gains in life expectancy over the last several decades. Life expectancy improved at birth, at age 50, and at age 65 – an age

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particularly relevant for Social Security and the focus of this analysis. However, U.S. life expectancy gains have not kept pace with those of its peers. In 1960, the United States ranked #3 in life expectancy at age 65 among 10 major countries, but by 2016 its ranking had dropped to #10 (see Table 1).

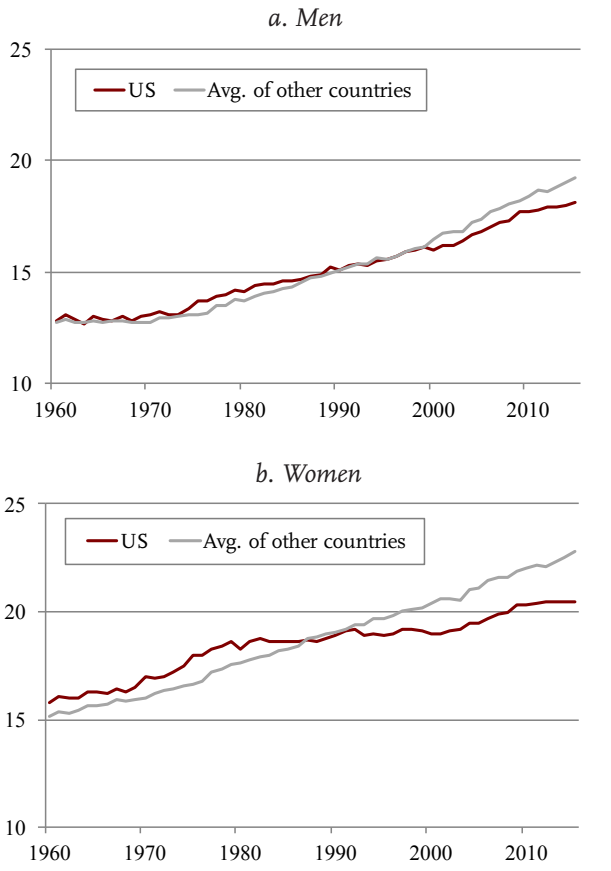
Table 1. Life Expectancy at 65 for Select OECD Countries, 1960 and 2016

Rank	1960		2016	
	Country	LE at 65	Country	LE at 65
1	Canada	14.7	France	22.7
2	Netherlands	14.6	Japan	22.1
3	US	14.3	Spain	21.6
4	Italy	14.3	Italy	21.5
5	Spain	14.2	Australia	21.1
6	Australia	14.1	Canada	20.8
7	France	14.1	UK	20.6
8	UK	13.5	Netherlands	20.6
9	Germany	13.2	Germany	20.1
10	Japan	12.9	US	19.4

Source: Authors' calculations from Organization for Economic Cooperation and Development (OECD) (2017).

While U.S. life expectancy for both men and women is now the lowest among their counterparts in the other high-income nations, the discrepancy is especially stark for women (see Figure 1). Life expectancy for U.S. women in 1960 was among the highest in the world, but this pattern began to reverse in the 1980s. Today, life expectancy for women lags 2.5 years behind other high-income countries. Thus, the overall decline in the U.S. ranking is largely a woman's story, although U.S. men have started to slip in recent years.

Figure 1. Life Expectancy at 65, 1960-2016

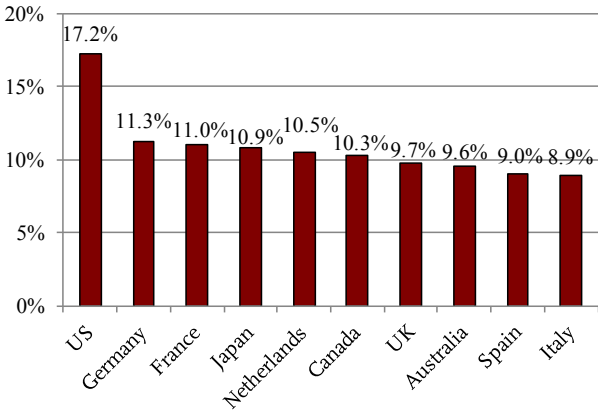


Source: Authors' calculations from OECD (2017).

Role of Health Care System

The life expectancy gap between the United States and other countries is surprising given that this country spends more on health care both absolutely and as a percentage of gross domestic product than any other country in the world (see Figure 2 on the next page). However, the U.S. health care system does differ in a number of ways that could affect health outcomes.

Figure 2. Health Spending as Share of GDP, 2016



Note: Excludes capital expenditures.
Source: OECD (2017).

One characteristic that distinguishes the U.S. system is the lack of universal coverage. The percentage of the population that is uninsured has historically hovered at 16-18 percent, although it has declined to around 10 percent in the wake of the Affordable Care Act. While lack of coverage almost certainly contributes to higher mortality and lower life expectancy, the effect on the *relative* U.S. position is probably small since the coverage patterns among the 10 countries have not changed much over time and U.S. health outcomes for both the uninsured and insured populations trail other high-income countries.[1] Moreover, the focus of this analysis is life expectancy at 65, an age at which virtually everyone in the United States is covered by Medicare.

Another question that often arises is the efficiency of the U.S. health care system. One main contributor to higher U.S. health costs is the greater prevalence of major diseases and, as a result, increased use of medical services.[2] The greater prevalence could, in part, mean that this country is better at screening and detecting major illnesses. Available measures suggest that the United States performs better than other OECD countries on survival rates for cancer as well as better detection for risk factors for cardiovascular diseases – two major causes of death for those 65 and older. The higher survival rates may be because the United States tends to opt for more aggressive treatment, another driver of costs.[3]

While disease detection and survival rates shed light on health care performance after a disease has developed, it might be that the United States does a poor job at preventing illnesses relative to other countries. However, a National Academy of Sciences panel reviewed a number of comparative studies and found the evidence to be inconclusive.[4]

In short, the nature of the U.S. health care system probably explains only a small portion of the life expectancy gap at 65.

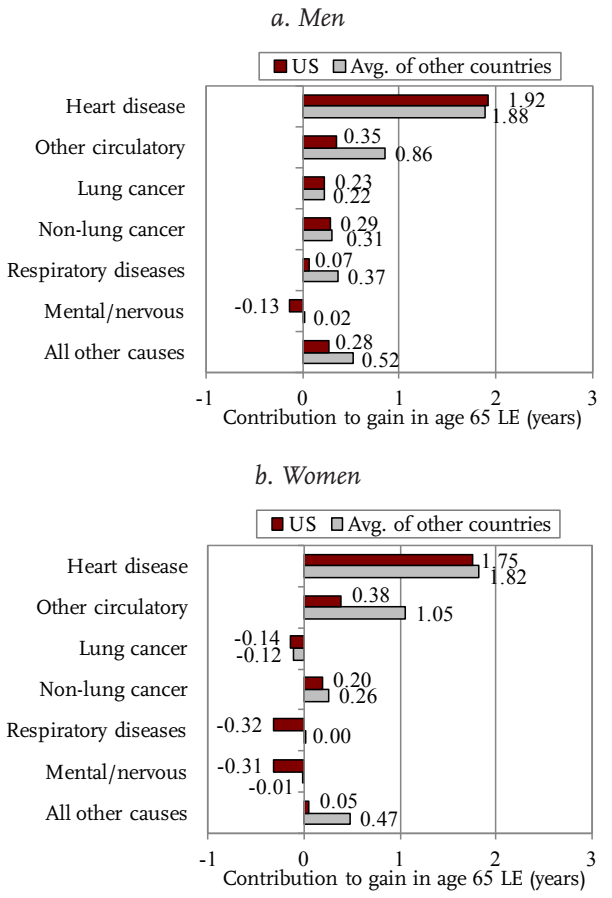
Cause-of-Death Statistics

Perhaps the most direct way to explain the divergence in life-expectancy trends across countries is to look at cause-of-death data. The following analysis groups age-standardized mortality rates for men and women ages 65 and older into seven causes of death: heart diseases, other circulatory diseases (which include stroke), lung cancer, non-lung cancer, respiratory diseases, mental/nervous system diseases, and "all other." It then compares the improvement in these categories for the United States relative to the average for the other nine countries from 1990-2015 – the period for which clean international data are readily available. The metric for comparison is the contribution of the various causes-of-death to gains in life expectancy at age 65 for men and women.[5]

Figure 3 on the next page shows the results. It is clear that heart disease is *not* the reason for the U.S. shortfall, as patterns of improvement were similar across countries. And progress against non-lung cancers was also about the same.

In contrast, the United States fell significantly behind in areas related to obesity and smoking. Both are major risk factors for stroke, and the United States showed much less improvement than its peers in deaths from stroke and other circulatory diseases. The shortfall in this category was the single largest gap between the United States and other countries for both men and women. In terms of smoking, U.S progress in deaths from respiratory diseases fell short of other countries for men, and death rates actually increased for women.[6] Smoking also contributes to the rising number of lung cancer deaths among women.

Figure 3. Contributions of Causes of Death to Gains in Life Expectancy at 65, 1990-2015



Source: Authors' calculations from Institute for Health Metrics and Evaluation (2016).

Mental and nervous system diseases (which include Alzheimer's, Parkinson's, and Huntington's) reduced U.S. gains for both men and women. Experts caution, however, that this pattern might reflect different coding of the diseases across countries and over time, as, for example, Alzheimer's only became a separately coded disease in the early 2000s.[7] The "all other causes" category contributed to increases in life expectancy for all the countries, but the contribution in the United States lagged well behind. Notably, the single largest disease in this category is diabetes, to which obesity is a contributing factor.

The main takeaway from the cause-of-death analysis is that rising obesity rates and women's smoking patterns may have played a major role in the divergence in life expectancy gains between the United States and other high-income countries in recent decades.

Behavioral Risk Factors

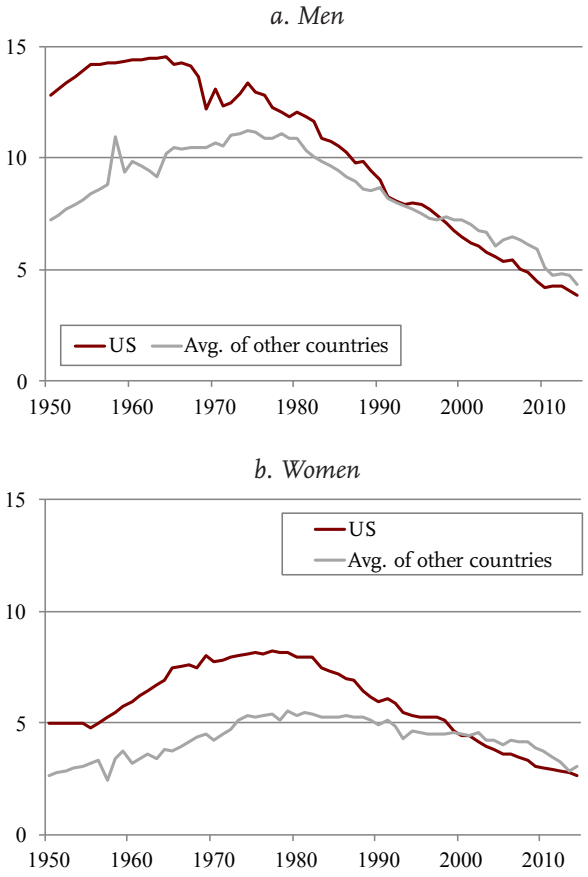
A large body of evidence links smoking, obesity, and physical activity with life expectancy. Physical activity and fitness have been shown to lead to better health and longer lives, but cross-country data linking perceived low U.S. fitness levels to the large divergence in life expectancy are hard to come by. Therefore, the focus here is smoking patterns and obesity.

Smoking

A strong body of epidemiologic studies shows the negative effects of smoking on life expectancy.[8] While the U.S. now has one of the lowest smoking rates of high-income countries for both men and women, it was not the case for much of the 20th century (see Figure 4 on the next page). Historically, Americans consumed more cigarettes per capita than any other country, and the smoking epidemic started earlier and reached a higher peak in the United States, especially for women.[9]

Smoking affects mortality with an average delay of two to three decades. The prevalence of smoking among men peaked at close to 80 percent in the 1940s-1950s and began to decline steadily in the 1960s. The unfavorable impact on mortality for men grew from 1950 to 1990, after which the decline in smoking began to have a favorable effect on life expectancy. Smoking peaked more than a decade later for women, albeit at a much lower level than for men. The unfavorable impact of smoking on life expectancy for women increased from 1980 to 2000, and the favorable effect from decreased smoking is just now beginning to be observed.

Figure 4. Number of Cigarettes Sold per Capita per Day, 1950-2014

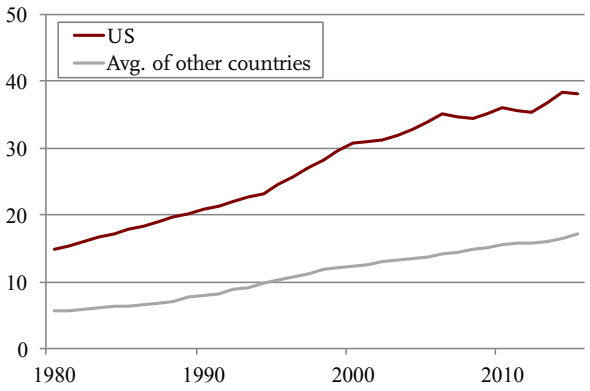


Source: Authors' calculations from Forey et al. (2016).

Obesity

Increasing rates of obesity are observed across almost all high-income countries but the pattern is most pronounced in the United States. Because the U.S. rates are almost identical for men and women, Figure 5 shows the rates for the two groups combined. The direct impact of obesity on mortality is less clear cut than for smoking, but obesity – including the poor diet and physical inactivity associated with it – has been linked to a higher risk of stroke, cardiovascular diseases, cancer, and type-2 diabetes, among other diseases.[10] While the magnitude is debated, the consensus appears to be that the U.S. longevity shortfall would be substantially reduced if U.S. obesity rates matched the lower rates of other countries.[11]

Figure 5. Percentage of Population Obese, Men and Women, 1980-2016



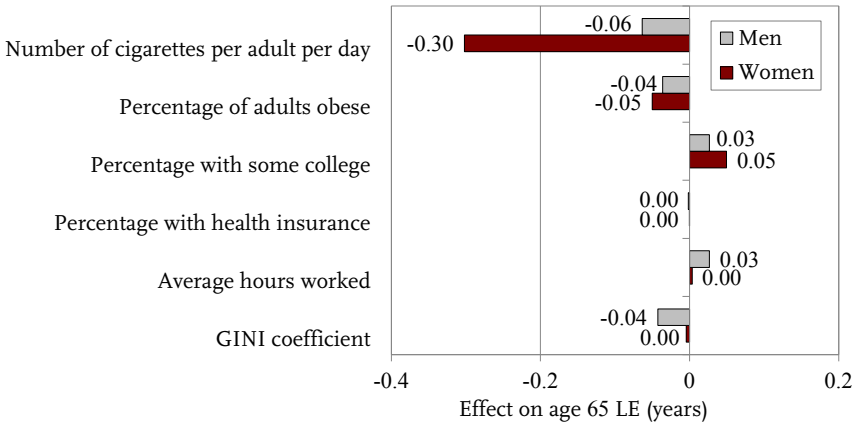
Sources: Fryar, Carroll, and Ogden (2012); Centers for Disease Control and Prevention (2017); and OECD (2017).

Explaining the Gap in U.S. Life Expectancy

In an effort to quantify the role that smoking and obesity have played in the gap between U.S. life expectancy and that of the other countries, the analysis uses a simple linear regression for men and for women. The dependent variable is life expectancy in each country, and the explanatory variables include the per capita number of cigarettes sold daily in each country for each year and the percentage of the population obese in each country for each year. Because it takes two to three decades for smoking to affect mortality, the smoking variable is lagged 25 years. This adjustment means that 1955 smoking data are entered for 1980. The equation is estimated over the period 1980-2016.

The equation also includes variables to control for other ways the United States may differ from the nine countries. These control variables include the

Figure 6. Estimated Effects of Health and Socioeconomic Factors on Life Expectancy at 65 for Select OECD Countries, 1980-2016



Note: The number of cigarettes is lagged 25 years to capture the delay between smoking and its peak effects on mortality.
Source: Authors' calculations.

percentage of the population with some college; the percentage of the population with health insurance; the average hours worked among the working-age population; and a measure of income inequality – a Gini coefficient, which ranges from 0 with no inequality to 1 with full inequality.[12] Finally, the equation includes a time trend to reflect that life expectancy generally increases over time.

The results for both men and women are shown in Figure 6 (see Appendix Table A1 for full results). Both smoking and obesity are negatively related to life expectancy, and the coefficients are statistically significant, meaningful, and larger for women. The control variables show the expected relationship with life expectancy, but their magnitudes are relatively small.

In the case of smoking, each additional cigarette sold to women per capita per day reduced life expectancy two and a half decades later by 0.30 of a year – 3.6 months. In the 1980s, U.S. women purchased 2.4 more cigarettes per capita per day than women in the other nine countries, suggesting a reduction in life expectancy two and a half decades later (2005) of about eight months. The comparable figure for men was six months.

In terms of obesity, each 1-percentage-point increase in the percentage of women who are obese reduces life expectancy by 0.05 of a year – slightly more than half a month. In 2005, the gap in obesity prevalence between the U.S. and the nine other countries was 21.4 percentage points, suggesting that obesity reduced life expectancy by almost 13 months for women. The comparable figure for men was a little over eight months.

Figure 7 (on the next page) shows how the effects of smoking and obesity would have played out over the entire period from 1980-2016. During this period, smoking was never an important factor in the U.S. shortfall for men; they had reduced their smoking substantially and cigarette sales were close to the average for the other countries for most of the earlier period. In contrast, the impact of obesity has increased steadily for men and now explains about 56 percent of their shortfall.[13]

In the case of women, smoking caused a significant reduction in life expectancy in the early part of the period, with its effects gradually petering out as cigarette consumption fell. At the same time, the effects of obesity increased. As of 2016, obesity is estimated to explain about 46 percent of the gap in average life expectancy, controlling for other factors.

Figure 7. Gap in Life Expectancy at 65 Explained by Smoking and Obesity, 1980-2016

Source: Authors' calculations.

Conclusion

Life expectancy in the United States has been lagging behind other high-income countries in recent decades. Historically, smoking played an important role in this difference, especially for women. However, in recent years, the analysis suggests that the negative effects from rising levels of obesity have surpassed the positive effects from cessation of smoking. Whether life expectancy in the United States can catch up to that of other high-income countries may depend on its ability to curb the prevalence of obesity and its harmful effects.

Endnotes

1 National Research Council and Committee on Population (2013).

2 Thorpe, Howard, and Galactionova (2007).

3 Crimmins, Preston, and Cohen (2011).

4 Some studies have suggested that the lack of universal coverage or under-insurance at younger ages allows for voids in preventative care, which could contribute to higher rates of mortality after 65. See Crimmins, Preston, and Cohen (2011) for a detailed discussion.

5 This approach was used by Glei, Meslé, and Vallin (2010) for a slightly different group of countries for 1955-1980 and 1980-2003. The decomposition technique comes from Pollard (1988).

6 Mortality from respiratory diseases is usually the result of chronic pulmonary obstructive disease (COPD), the leading cause of which is smoking – which accounts for as many as eight out of 10 COPD deaths. See U.S. Department of Health and Human Services (2014).

7 Alzheimer's did not become a separate coded cause-of-death until the release of the 10th revision of the WHO International Classification of Diseases in 1999. Some have also noted that coding for other causes may also vary across countries. Doctors in other countries may default to different primary cause-of-deaths if there are multiple causes.

8 U.S. Department of Health and Human Services (2014).

9 Crimmins, Preston, and Cohen (2011) and Avendano and Kawachi (2014) provide thorough comparative analyses of smoking trends in the United States and other high-income countries.

10 Mokdad et al. (2004); and Hu (2008).

11 Preston and Stokes (2011).

12 For two countries with the same average income, the country with greater income inequality could have worse health and, as a result, shorter life expectancy because the health benefits that the wealthy gain from their added income are more than offset by the health benefits that the poor forgo by lost income.

13 This result is consistent with findings in Stokes and Preston (2016).

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APPENDIX

Table A1. Estimated Effects of Health and Socioeconomic Factors on Life Expectancy at Age 65 for Select OECD Countries, 1980-2016

Variable	Men	Women
Number of cigarettes per adult per day	-0.0635***	-0.302***
	(0.022)	(0.028)
Percentage of adults obese	-0.036***	-0.0501***
	(0.005)	(0.006)
Percentage with some college	0.0266***	0.0496***
	(0.005)	(0.005)
Percentage with health insurance	-0.00155	-0.0003
	(0.004)	(0.004)
Average hours worked	0.0267***	0.00356
	(0.003)	(0.004)
GINI coefficient	-0.0426***	-0.0045
	(0.012)	(0.015)
Year	0.172***	0.11***
	(0.006)	(0.006)
Constant	-328.3***	-199***
	(11.72)	(12.640)
Observations	262	260

Note: Since smoking has its peak effects on mortality with a lag of two to three decades, for simplicity, the number of cigarettes smoked per day is lagged 25 years. Years with missing data are interpolated using a linear approximation. Standard errors in parentheses. Coefficients are significant at the 1-percent level (***).
Source: Authors' calculations.

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