Since the 1980s, the U.S. has declined precipitously in life expectancy and mortality rankings, particularly among other high-income states. This decline has occurred despite life expectancy and mortality improving over the past 40 years; instead we see that while the U.S. has improved, other high-income states have improved much more rapidly. This overall trend is present across almost all mortality causes ranging from mortality from noncommunicable diseases[[1]](#footnote-1), amenable causes[[2]](#footnote-2), traffic fatalities[[3]](#footnote-3), and more. A plurality of the literature concentrates on risk factors and behaviors such as obesity and smoking. The goal of this review is to examine the literature on time trends and causes of mortality among high income countries.

Economic conditions have varying effects on mortality. A large literature supports the assertion that mortality fluctuates procyclically, with some counter-cyclical effects.[[4]](#footnote-4) McLeod et al. followed two working age cohorts in the U.S. and Germany to conduct a discrete-time survival analysis adjusting for potential confounders such as age, gender, other demographics, education, occupation, and previous year’s health status in order to examine the association between unemployment and mortality.[[5]](#footnote-5) They found that minimum and medium skilled unemployed Americans had a higher risk of death but no association among similarly skilled Germans. Paradoxically, high skilled Germans showed a higher risk of death.[[6]](#footnote-6) Deaton and Paxon compare the effects of inequality on mortality in the U.S. and U.K.[[7]](#footnote-7) Both countries share a fairly similar history with regard to inequality growth since WWII with inequality remaining at relatively low levels until the 1970s, after which inequality grew tremendously.[[8]](#footnote-8) The authors first examine, via graphical analysis, and find no clear link between inequality and infant mortality.[[9]](#footnote-9) They then conduct an age specific, time series analysis using survey data from the two countries to examine the effect of income on log odds of dying and find that in the models that do not include a time trend, income exerts a protective effect but when a time trend or time trend + age/trend interaction are added the association weakens or even reverses sign, particularly for older age groups.[[10]](#footnote-10) When the authors include Ginis, they find that the effect is only significant for younger and older American men and that higher income inequality is actually associated with lower mortality.[[11]](#footnote-11)

Alexander et al. use a quantile regression framework to quantify the impact of economic crises on infant mortality in high income OECD countries.[[12]](#footnote-12) They define economic crisis as an annual recession where output in annual national accounts falls and find that the impact of an economic crisis increases in the quantiles of the mortality distribution. A country at the median sees an increase of 2% for every 1% annual recession while a country at the 90th percentile would see a 3.4% increase for the same recession. They argue that while the state can use spending on health to mitigate some of the negative effects of a crisis, spending alone is not likely to completely counteract the effects of a recession.[[13]](#footnote-13)

Fritzell et al. use the Luxembourg Income Study[[14]](#footnote-14) and the Human Mortality Database to examine absolute and relative poverty rates and mortality in 30 countries from 1978-2010.[[15]](#footnote-15) They examine infant, child, and adult mortality separately and use the 60% of median income definition of relative poverty. They also control for per capita GDP, period in the form of Luxembourg Income Study wave, and welfare regime type. They find that when per capita GDP is controlled for, estimates of the effect of absolute poverty drop to zero or close to zero while relative poverty estimates increased.[[16]](#footnote-16)

Van Hendel et al. used Poisson regressions to quantify the association between education and mortality between the U.S. adults and adults in seven European countries, examined individually.[[17]](#footnote-17) They find that the U.S. has a higher overall level of education relative to the European countries studied.[[18]](#footnote-18) Similar to what McLeod et al. observed when comparing the U.S. and Germany, Van Hendel et al. observe larger educational, mortality disparities in the U.S. relative to the European countries; American women with the lowest education had higher mortality than any of the countries studied while American women with at least a tertiary education had comparable mortality with Europeans.[[19]](#footnote-19) These large educational disparities hold when examining cancer, cardiovascular disease, external causes, and other diseases and partly explain why U.S. adults have higher mortality than Europeans.[[20]](#footnote-20)

Mackenbach et al. also use Poisson regressions to examine the relationship between cardiovascular disease mortality and socioeconomic mortality among the Americans and people from 11 western European countries, aged 30 - 59.[[21]](#footnote-21) They use mortality data from large longitudinal studies such as the National Longitudinal Mortality Study in the U.S. They control for, when possible, demographic information such as age (in five year groups), education, occupational title, employment and supervisory status, as well as risk factors such as smoking, overweight status, alcohol consumption, and access to fresh vegetables. Risk factor data were obtained from national health interview or multipurpose surveys. They find higher mortality among people with lower occupational class or educational level across each country, though they find substantial variation in magnitude between countries and a north-south gradient in western Europe. Consistent with other studies, they find that men and women in lower occupational and/or educational groups were more likely to be cigarette smokers and be overweight. Lower status men were also more likely to excessively consume alcohol and a negative correlation between status and moderate alcohol consumption was observed.[[22]](#footnote-22)

Cavelaars et al. examine socioeconomic differences in risk factors of smoking, alcohol, and vegetable consumption and overweight status using data from the Eurobarometer project.[[23]](#footnote-23) They examine 11 European countries for respondents aged 20-74, control for age in five-year groups, and use education as an indicator of SES. They found that lower educated men smoked more, though the size of the inequality varied significantly among the countries studied. Highly educated women in southern European countries smoked more than their less educated counterparts but the reverse is true in the north. Less educated people were also more likely to be overweight and the size of the inequalities was higher in northern countries relative to southern ones. The data on alcohol consumption was less strong, with odds ratios overlapping with one for all countries studied and no significant differences in magnitude. Vegetable consumption was also less frequent among the less educated except for the Netherlands and Greece and the size of the inequality varied between countries. Northern countries exhibited greater inequalities relative to southern countries.[[24]](#footnote-24)

Given that education is often used as a proxy for SES, it is important to examine the effect of education on mortality. Galama et al. conducted a review of the experimental and quasi-experimental evidence on education and mortality, examining RCTs, twin studies, and quasi-experimental studies, though they do not make cross-national comparisons.[[25]](#footnote-25) RCT evidence, though limited, indicates that early childhood education has a stronger effect on males more than females and that it shows statistically significant effects on reducing smoking in adulthood but no obesity.[[26]](#footnote-26) Twin studies are often plagued by power problems, though the largest of them found large effects of education on mortality for both sexes.[[27]](#footnote-27) Many quasi-experimental studies focus on examining changes in compulsory schooling laws, which suffer from the problem of weak instrumentation. These studies suggest that more education leads to lower mortality for men, with larger effects for men born in the early 1900s than recently. The relationship for women is much weaker, with most studies finding small effects or insignificant effects. Education has its strongest effect on mortality, as well as behaviors and risk factors such as smoking and obesity when it changes the peer group of an individual.[[28]](#footnote-28)

Noh examines the relationship between unemployment and suicide via fixed-effects, regression analysis among a panel of 24 OECD countries between 1980-2002.[[29]](#footnote-29) They find a positive and significant relationship between per capita GDP and suicide rates, an inverse relationship between suicide rates and economic growth, and a negative relationship between fertility and suicide.[[30]](#footnote-30)

Fenelon et al. estimated the contribution of the top three causes of injury death (motor vehicle crashes, firearms, and drug poisonings) to life expectancy at birth for the U.S. and 12 comparable countries in 2012.[[31]](#footnote-31) They estimate that the U.S. has an age adjusted, major injury death rate for men of over five times higher than that of Japan, the country with the lowest rate, and over twice as high as Finland, the next highest country studied.[[32]](#footnote-32) Differences in major injury death rate contribute as much as 90% of the life expectancy gap in certain countries. The relative rates for women are even starker, though the absolute rates are much lower than the men.[[33]](#footnote-33) Thakrar et al. examine child mortality in the U.S. and 19 OECD nations between 1961 and 2010 and come to similar conclusions; U.S. mortality for 15-19 YOs was 82 times the rate of the OECD19.[[34]](#footnote-34) They also compare age adjusted childhood mortality rates for infectious diseases, perinatal conditions, cardiovascular diseases, congenital anomalies, malignant neoplasm, neuropsychiatric conditions, intentional and unintentional injuries, and other noncommunicable diseases and find that all of these were higher for the U.S.[[35]](#footnote-35) Grinshteyn and Hemenway examine violent death rates in the U.S. compared to 23 other high income countries, broken down by age and gender.[[36]](#footnote-36) When compared to an average of the 23 countries, the ratio of U.S. to other country total homicide rates ranged from a low of 3.1 for 65+ YOs to a high of 14 for 15-24 YOs, mostly driven by a huge divergence in firearm homicide rates.[[37]](#footnote-37) These comparisons hold when comparing with individual countries.[[38]](#footnote-38)

Preston and Wang examine sex mortality differences for 50-84 year olds in the U.S. between 1948-2003 using data from vital statistics and census. They construct an age-period-cohort model and show that the mortality sex gap fluctuated on a cohort basis and that these fluctuations are consistent with smoking patterns.[[39]](#footnote-39) Janssen et al. examine old age mortality in seven European countries between 1950-1999 using standard age-period-cohort analysis on all cause and cause specific mortality by five year age groups and sex.[[40]](#footnote-40) The specific causes of death examined are infectious diseases, lung, stomach, prostate, and breast cancers, ischemic heart disease, cerebrovascular diseases, and COPD. They find cohort patterns in all of the countries for both sexes and all causes of death.[[41]](#footnote-41) These patterns were stronger for men than women and especially for men in Denmark and Norway. Lung cancer, and to a lesser extent COPD and ischemic heart disease, patterns match changes in smoking behavior during the period.[[42]](#footnote-42)

Ho and Preston compare life expectancy at age 40 and up in five-year increments between the U.S. and 17 other OECD countries.[[43]](#footnote-43) Between 40 and 75, the U.S. is ranked near the bottom of the group but shows rapid improvement at age 70. By age 85, the U.S. is in the top five best age specific death rates.[[44]](#footnote-44) The authors examine Medicare, smoking, and a host of conditions as possible explanations for the U.S. improvements in old ages. They find that Medicare and smoking are not plausible explanations. Glei and Horiuchi examine age patterns in the widening and narrowing of the sex differential in life expectancy among high income countries between 1751-2004, focusing on the period since 1950.[[45]](#footnote-45) They find that from 1950 to 1979, the sex differential widened and was primarily driven by those aged 60-79, followed by those aged 40-59.[[46]](#footnote-46) Between 1975-2004, they observed a narrowing of the sex differential driven by 40-59 year olds followed by 60-79 year olds.[[47]](#footnote-47)

Healy conducts a time series analysis of 14 EU countries to examine the variation in excess winter mortality in these countries.[[48]](#footnote-48) They use data from the monthly mortality data from the UN databank and data on economic and socioeconomic variables from the UN statistics division/World Bank and the European Community Household Panel, respectively. They build a Poisson regression model and find that excess winter mortality is more common in countries with milder winters.[[49]](#footnote-49) Wealthier countries with higher per capita GDP exhibit lower seasonal, mortality variations and higher total health expenditures are associated with lower variations in seasonal mortality; when health expenditures are broken down into public and private, public expenditures are much more strongly associated. Other socioeconomic indicators: inequality, fuel poverty, poverty, and deprivation, are also associated with cross country levels of excess winter mortality. Finally, the author finds a weak association with housing standards and seasonal, mortality variations.[[50]](#footnote-50)

Mortality trends in high income countries are associated with a variety of factors including cohort effects, economic trends, and even weather. Most studies have concentrated their findings on a few easily identifiable sources of mortality such as smoking, certain types of cancers, and obesity. Future studies would do well in examining other potential causes.

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