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WILL SURVIVORS OF THE FIRST YEAR OF THE PANDEMIC HAVE LOWER MORTALITY?

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Introduction

The COVID-19 pandemic claimed the lives of 300,000 Americans ages 60 and over from March 2020 to March 2021.[1] The burden was particularly heavy among the oldest adults, racial and ethnic minorities, and those with underlying health conditions who, even in the absence of COVID, have higher mortality rates than others. This *brief,* based on a recent paper, explores the implications of the accelerated deaths among vulnerable groups for the mortality rates of those who survived the initial year of the pandemic.[2] In other words, since higher-mortality groups were more likely to die from COVID, to what extent will survivors have a lower mortality rate? The answer may have implications for determining life insurance and annuity premiums, as well as assessments of the finances of Social Security – if the selection effect is large enough to substantially alter projected survivor mortality.

The discussion proceeds as follows. The first section provides background on mortality and high-risk groups. The second section describes the data and methodology. The third section presents the results. The final section concludes that COVID victims were very concentrated in otherwise high-mortality populations, so the virus was quite selective. However, the number of COVID deaths was low relative to the overall population, so this selection effect leads to only modest reductions in projected mortality for survivors of the early pandemic.

Background

While many Americans have died of COVID, these deaths were not random.[3] Some groups were more likely to be exposed to the virus, and some groups, conditional on exposure, were more likely to suffer severe consequences. In particular, Black and Hispanic individuals were more likely to come in contact with COVID in the early months of the pandemic.[4] Meanwhile, for those who got COVID, the disease was more dangerous to those with certain preexisting conditions and to older individuals.[5] Specifically, the Centers for Disease Control noted seven categories of chronic conditions that are associated with elevated risk from COVID: cancer, cerebrovascular disease, diabetes, heart disease, kidney disease, lung disease, and obesity.[6]

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Generally, those most at risk from COVID were also more likely to die within a given period even in the absence of COVID. For example, mortality is higher among Black than White Americans.[7] Mortality rates also, of course, rise with age and are higher among individuals with the same health problems that lead to increased risk of COVID mortality. The implication of elevated COVID mortality among otherwise high-mortality groups is that those who survived the pandemic's first year are likely to have lower non-COVID mortality.

Such survivor selection might have implications for forecasts of mortality in the coming years, which are important for both policymakers and insurance providers. To be sure, the overwhelming impact of the pandemic has been to increase mortality rates since 2019; however, a *second-order* effect from selection may mitigate mortality increases once the acute phase of the pandemic has passed. The potential impact of survivor selection is particularly important for Social Security. Since the program's payouts for retirement benefits decline when mortality rises, the heavy death toll of the last few years has had a positive impact on program finances. However, the acceleration of deaths of otherwise high-mortality individuals means the surviving population is somewhat healthier and has lower mortality; if so, actuaries and insurance specialists may need to estimate new life tables.

Of course, if COVID continues to account for many deaths in the next few years despite widespread vaccination, future mortality will not decline as much, if at all. Similarly, if survivors of COVID have elevated mortality risk due to further health complications, such as "long COVID," that too would increase mortality.[8] While both these effects would improve Social Security's finances, the analysis here assumes that they are negligible to provide a *conservative* estimate of future improvement in mortality from the perspective of Social Security.

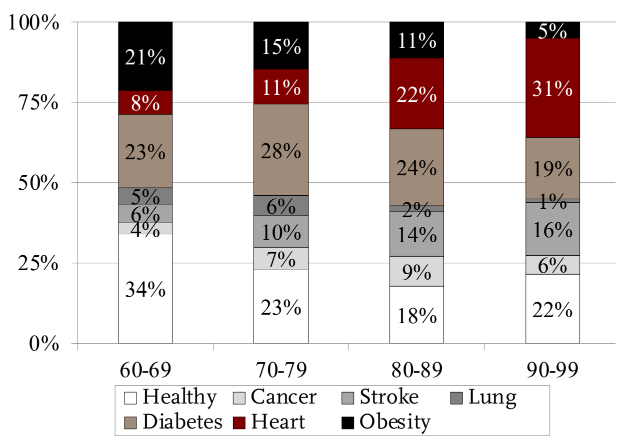
Data and Methodology

The analysis uses three main data sources: the *American Community Survey* (ACS), the *Health and Retirement Study* (HRS), and the *National Vital Statistics System* (NVSS). The ACS is a survey of over 3.5 million households, conducted every year by the U.S. Census, that provides estimates of the size and demographics of the population. The HRS is a biennial survey of over 20,000 individuals over age 50 and their spouses, which captures health characteristics of these older households, among many other factors. The NVSS data record all deaths in the United States, by demographic group and cause of death, based on death certificate records.

Data from the 2019 ACS and the 2018 HRS are combined to estimate the demographic and health distributions, respectively, of the over-60 population in 2019. The 2020 NVSS data are used to analyze deaths by cause in 2020 and, by extrapolation, early 2021. With all these data in hand, it is possible to estimate the distribution of the April 2021 population by gender, race, ethnicity, and health status.

For example, the male population defined by age and health is shown in Figure 1.[9] As expected, the healthy population declines with age – from 34 percent of men in their 60s to 18 percent of men in their 80s. Similarly, the share of men with most impairments rises with age. Overall, these trends toward declining health tend to reverse a bit when looking at those in their 90s, both because the relatively small number of people who live this long are among the healthiest older adults and because small samples at those ages make estimates less precise. The pattern is generally the same for women.

Figure 1. Distribution of Health Conditions by Age Group for Men



Source: University of Michigan, *Health and Retirement Study* (HRS) (2018).

The intuitive approach of the analysis is that the 2019 population is taken as a base, and then adjusted with the 2020 deaths to arrive at an April 2021 population characterized by its demographic and health distribution. Deaths of causes linked to specific health conditions are assigned primarily to those who had that condition. For example, deaths caused by cancer in 2020 are assigned to those who had cancer in 2019. Deaths caused by COVID are assigned to the various health condition groups based on the relative risk of COVID death for people with each condition. For example, a person with diabetes has a 56 percent higher risk of death from COVID than a healthy individual.[10]

Based on this predicted April 2021 population distribution, new life tables by gender are calculated, and compared with the pre-COVID life tables. This step takes as its starting point the life tables from 2019 (by gender, race, and ethnicity) and then adjusts the mortality rate of individuals with the various health conditions relative to their demographic group.

Results

This section first addresses the extent to which COVID deaths occurred among the highest risk groups in the population and the resulting impacts on the mortality rate for the surviving population. It then explains why these impacts are relatively small.

COVID Selection and Mortality Effects

The results focus on how the estimated 10-year mortality rates for men and women, by age group, change when moving from the pre-COVID population to the April 2021 population (see Table 1, columns 3 and 4). The main result is that estimated mortality rates are lower after the first year of the pandemic than what had been expected before the pandemic. The differences are not large, but they are particularly striking in the oldest age groups, where for both men and women a 1-percentage point decline in 10-year mortality is estimated due to the selection effect of mortality during the pandemic's first year.

To put these findings into context, the estimated declines are compared with the maximal possible declines that might have been observed based on overall mortality in 2020-2021 if COVID's *only* victims early in the pandemic were those with the highest risk of death (see Column 5 of Table 1). Naturally, the mortality rates in Column 5 are always lower than Column 4, because COVID deaths were not limited only to the highest-risk individuals.

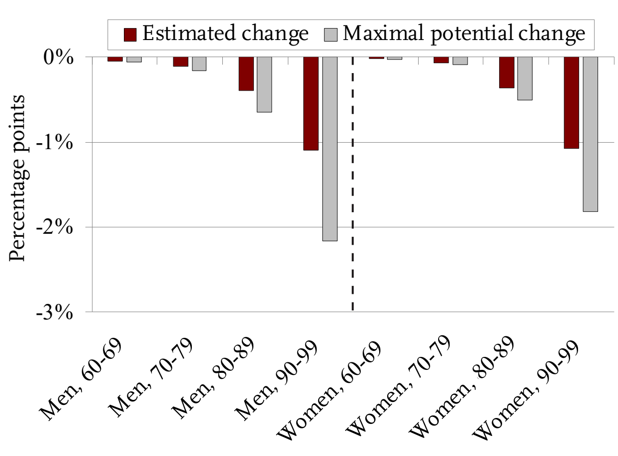
To hone in on the size of the differences between the pre-COVID and April 2021 mortality rates in Table 1, Figure 2 shows the *change* in 10-year mortality rates (in red), and the *maximal potential change* (in gray). As might be expected, absolute declines in mortality rise with age, largely because mortality in general rises sharply with age. Also, pandemic mortality was very selective: mortality declines are more than half of the maximal possible decline at all ages combined. Using women ages 90-99 as an example, the red bar shows that the mortality rate dropped by 1.1 percentage points (91.4 - 90.3) after accounting for COVID. The gray

Table 1. 10-year Mortality Rates, SSA 2019 Life Tables versus April 2021 Adjustments

(1) Gender	(2) Age group	(3) Pre-COVID rate	(4) April 2021 (baseline)	(5) April 2021 rate (if maximal selection effect)
M	60-69	14.6%	14.6%	14.6%
M	70-79	29.2	29.1	29.0
M	80-89	61.9	61.5	61.2
M	90-99	94.9	93.8	92.7
F	60-69	9.2	9.2	9.2
F	70-79	20.8	20.7	20.7
F	80-89	51.4	51.0	50.9
F	90-99	91.4	90.3	89.6

Sources: U.S. Social Security Administration (2019); and authors' calculations.

Figure 2. Estimated Changes in 10-year Mortality Rates After COVID's First Year, and Maximal Potential Change if COVID Were Fully Selective



Source: Authors' calculations.

bar shows that – if COVID had been as selective as possible in its victims – the mortality rate would have fallen by 1.8 percentage points.

However, a more nuanced finding is that the selection effect declines with age: for those in their 60s, around 80 percent of the maximal mortality reduction is forecasted to actually take place. In contrast, for those in their 90s, only about half of the possible decline is likely to be realized. This pattern implies that while COVID was selective in its victims of all ages, it was more selective among younger ages, where the frailest were much more likely to die.

Why the Modest Impact?

Half a million deaths due to COVID were recorded in the first year of the pandemic, of which 300,000 were among those over age 60. The analysis above demonstrated that those deaths were also highly selective: holding the overall number of COVID deaths fixed, more than half the potential decline in mortality due to this selection was realized. However, this selection did not have a large impact on overall life tables. The reason is that 300,000 deaths, though a devastating toll, is not large relative to the U.S. population over age 60 of around 78 million in 2020.[11]

Conclusion

The populations that bore the brunt of mortality from COVID were not random; instead, conditional on infection, older adults and those with certain chronic health conditions were more likely to suffer severe illness and death. A consequence of this selection is that those who lived through the initial pandemic are a slightly different population than those who entered the pandemic. Survivors of the first year of the pandemic are therefore less likely to be members of some of these high-mortality groups.

This analysis shows that while the selection effect is likely to reduce 10-year mortality in the near future, the magnitude of the impact is modest. The reason is that COVID deaths, while very large from the perspective of a single virus, were small relative to the size of the overall population. In addition, the assumptions in the analysis – that COVID will not continue to account for a substantial number of deaths – were designed to minimize any anticipated improvement in Social Security's finances from lower costs going forward. Thus, any impact of selection effects on Social Security costs will likely be swamped by ongoing mortality increases directly attributable to acute and long COVID.

Endnotes

1 Centers for Disease Control and Prevention (2021).

2 Wettstein et al. (2022).

3 Dyer (2020); Alsan, Chandra, and Simon (2021); and Ruhm (2021).

4 Hooper, Nápoles, and Pérez-Stable (2020) and Sarkar et al. (2021).

5 Imam et al. (2020) and Harrison et al. (2020).

6 Since the study was conducted, the CDC has added a few more conditions associated with elevated COVID risk, for which evidence has accumulated over the past few months. Notably, these include mental health and cognitive conditions, such as dementia.

7 Wettstein et al. (2021).

8 For example, see Li et al. (2021).

9 The main analysis uses a finer partition, broken down also by race and ethnicity, and it includes women as well.

10 Williamson et al. (2020). See Wettstein et al. (2022) for the full list of relative COVID mortality risks.

11 ACS (2020).

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