Reductions in 2020 US life expectancy due to COVID-19 and the disproportionate impact on the Black and Latino populations

Theresa Andrasfay and Noreen Goldman

The number of deaths from COVID-19 in the United States is staggering: As of mid-October 2020, more than 215,000 COVID-19 deaths had occurred, and over 100,000 additional deaths were projected by the end of year (1, 2). An important but as of yet unanswered question concerns the impact of this exceptional number of deaths on life expectancy for the entire nation as well as the consequences for marginalized groups. Despite concerns about inadequate testing and unreliable data, there is convincing evidence that Black and Latino Americans experience a disproportionate burden of COVID-19 morbidity and mortality.* Of the deaths for which race and ethnicity have been reported to the National Center for Health Statistics (NCHS), 21% were Black and 22% were Latino (3).† A plethora of factors likely contribute to these disparities, many of which reflect enduring structural inequities for the Black and Latino populations that increase both risk of exposure to COVID-19 and risk of death for those infected. Taken together, the high death toll and the racial and ethnic inequities in COVID-19 mortality suggest that COVID-19 will have a major impact on 2020 life expectancy, especially for the Black and Latino populations.

Life expectancy, a frequently used metric of population health that is typically measured as of birth, is an informative tool for examining the differential impact of COVID-19 on survival, as it is unaffected by the age distribution of the underlying populations. In contrast, for example, comparisons of overall (crude) death rates or proportions of deaths by race and ethnicity are biased by the fact that the Black and Latino populations in the United States are younger than the White population and, all else being equal, would have fewer deaths (4, 5).

In the period preceding the COVID-19 pandemic, annual improvements in US life expectancy had been small—for example, an increase from 76.8 y to 78.9 y or an average annual increase of 0.15 y between 2000 and 2014—but overall life expectancy has rarely declined (6). The recent declines that have taken place have attracted enormous attention from researchers and the media. Annual reductions of 0.1 y for each of three consecutive years (2015, 2016, and 2017) (7–9), attributed partly to increases in “deaths of despair” (6), made repeated headlines as the longest period of decrease since the 1918 influenza pandemic. Conversely, a 0.1-y recovery in life expectancy in 2018 was greeted with substantial relief (10).

Black Americans have consistently had lower life expectancy than Whites, but relative gains in life expectancy over the past two decades have been greater in the Black population than among Whites, thereby narrowing the Black mortality disadvantage (11, 12). The life expectancy gap has widened to over 5 y, and the relative gap is around 3 y, an increase from 3.6 y to over 5 y, thereby eliminating progress made in reducing this differential since 2006. Latinos, who have consistently experienced lower mortality than Whites (a phenomenon known as the Latino or Hispanic paradox), would see their more than 3-y survival advantage reduced to less than 1 y.

COVID-19 | life expectancy | mortality | race and ethnicity | disparities

COVID-19 has resulted in a staggering death toll in the United States: over 215,000 by mid-October 2020, according to the Centers for Disease Control and Prevention. Black and Latino Americans have experienced a disproportionate burden of COVID-19 morbidity and mortality, reflecting persistent structural inequalities that increase risk of exposure to COVID-19 and mortality risk for those infected. We estimate life expectancy at birth and at age 65 y for 2020, for the total US population and by race and ethnicity, using four scenarios of deaths—one in which the COVID-19 pandemic had not occurred and three including COVID-19 mortality projections produced by the Institute for Health Metrics and Evaluation. Our medium estimate indicates a reduction in US life expectancy at birth of 1.13 y to 77.48 y, lower than any year since 2003. We also project a 0.87-y reduction in life expectancy at age 65 y. The Black and Latino populations are estimated to experience declines in life expectancy at birth of 2.10 and 3.05 y, respectively, both of which are several times the 0.68-y reduction for Whites. These projections imply an increase of nearly 40% in the Black–White life expectancy gap, from 3.6 y to over 5 y, thereby eliminating progress made in reducing this differential since 2006.

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Significance

COVID-19 has generated a huge mortality toll in the United States, with a disproportionate number of deaths occurring among the Black and Latino populations. Measures of life expectancy quantify these disparities in an easily interpretable way. We project that COVID-19 will reduce US life expectancy in 2020 by 1.13 y. Estimated reductions for the Black and Latino populations are 3 to 4 times that for Whites. Consequently, COVID-19 is expected to reverse over 10 y of progress made in closing the Black–White gap in life expectancy and reduce the previous Latino mortality advantage by over 70%. Some reduction in life expectancy may persist beyond 2020 because of continued COVID-19 mortality and long-term health, social, and economic impacts of the pandemic.
12). In contrast, because Latinos have consistently had higher life expectancy than Whites, a phenomenon referred to as the Latino or Hispanic epidemiological paradox, larger improvements in life expectancy in the Latino population widened the gap between Whites and Latinos in recent years, further increasing the Latino mortality advantage (13).

The COVID-19 pandemic has the potential to bring about a greater decline in annual life expectancy than the United States has experienced in many years, perhaps since the 1918 influenza pandemic, which is estimated to have reduced US life expectancy between 7 and 12 y (14). However, the concentration of COVID-19 deaths among the elderly, in contrast to the preponderance of young adult deaths in the previous influenza pandemic (15), may reduce the impact of COVID-19 on life expectancy at birth. The exceptionally high COVID-19 death rates borne by Black and Latino individuals are likely to bring about larger reductions in life expectancy for these populations than for Whites, but the pressing question is by how much. In the present analysis, we address this issue by using ongoing data collection of COVID-19 deaths and projections of future deaths under different policy scenarios to estimate how COVID-19 mortality will affect life expectancy at birth and at age 65 y for the total population as well as separately by race and ethnicity. We also assess the implications of these projections for the Black disadvantage and the Latino advantage relative to Whites.

Results

We present estimated life expectancy values under four projection scenarios in Table 1. These include one in which the COVID-19 pandemic had not occurred and three projections for the cumulative number of COVID-19 deaths through December 31, 2020 produced by the Institute for Health Metrics and Evaluation (IHME): 1) ~321,000 deaths under the current projection scenario, which is the medium scenario issued by IHME; 2) ~348,000 deaths under a higher mortality scenario assuming continued easing of mandates; and 3) ~276,000 deaths under a lower mortality scenario assuming universal mask usage in the population (1). We estimate that US life expectancy at birth would have been 78.61 y in 2020 had the COVID-19 pandemic not occurred, but all three mortality scenarios imply huge reductions in life expectancy at birth for the United States in 2020. The medium scenario would bring about a decline of 1.13 y, whereas the higher and lower mortality scenarios project declines of 1.22 and 0.98 y, respectively. Life expectancy at age 65 y, which is estimated to have been 19.40 y in the absence of COVID-19, is projected to decline by 0.87 y under the medium scenario, 0.94 y under the higher mortality scenario, and 0.75 y under the lower mortality scenario.

Estimated life expectancy values in the absence of COVID-19 compared with those under the medium scenario are displayed in Fig. 1, which underscores the much larger reductions in life expectancy anticipated for the Black and Latino populations than for Whites or the total United States. Under the medium scenario, White life expectancy is projected to decline by 0.68 y, while the corresponding declines for Black and Latino life expectancies are 2.10 and 3.05 y, respectively. We also observe racial and ethnic disparities in the projected impact of COVID-19 on remaining life expectancy at age 65 y, which is estimated to decline by 0.63 y for the White population, 1.73 y for the Black population, and 2.24 y for the Latino population.

For Whites, the projected effect of COVID-19 is similar for life expectancy at birth and at age 65 y; however, for the Black and Latino populations, the effect on life expectancy at birth is notably smaller than the corresponding decline in life expectancy at age 65 y.

Table 1. Life expectancy projections for the United States in 2020 by race and ethnicity under different COVID-19 mortality scenarios

<table>
<thead>
<tr>
<th>Race and ethnicity</th>
<th>Total population life expectancy</th>
<th>Non-Latino White life expectancy</th>
<th>Non-Latino Black life expectancy</th>
<th>Latino life expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At birth (e0)</td>
<td>At age 65 y (e65)</td>
<td>At birth (e0)</td>
<td>At age 65 y (e65)</td>
</tr>
<tr>
<td>Absent COVID-19 (referent)</td>
<td>78.61</td>
<td>19.40</td>
<td>78.52</td>
<td>19.32</td>
</tr>
<tr>
<td>IHME current projection (medium scenario)</td>
<td>77.48</td>
<td>18.53</td>
<td>77.84</td>
<td>18.69</td>
</tr>
<tr>
<td>Difference (years)</td>
<td>−1.13</td>
<td>−0.87</td>
<td>−0.68</td>
<td>−0.63</td>
</tr>
<tr>
<td>IHME mandates easing scenario (higher mortality scenario)</td>
<td>77.39</td>
<td>18.46</td>
<td>77.79</td>
<td>18.64</td>
</tr>
<tr>
<td>Difference (years)</td>
<td>−1.22</td>
<td>−0.94</td>
<td>−0.73</td>
<td>−0.68</td>
</tr>
<tr>
<td>IHME universal masks scenario (lower mortality scenario)</td>
<td>77.63</td>
<td>18.65</td>
<td>77.93</td>
<td>18.78</td>
</tr>
<tr>
<td>Difference (years)</td>
<td>−0.98</td>
<td>−0.75</td>
<td>−0.59</td>
<td>−0.54</td>
</tr>
</tbody>
</table>

Source is authors’ calculations of life expectancy projections in 2020. Difference refers to the difference between the projection and the absent COVID-19 scenario. Calculations are based on IHME projections that were updated October 9, 2020.
larger than for life expectancy at age 65 y, reflecting the higher burden of COVID-19 mortality at younger ages among these groups. These racial and ethnic differences are also revealed by identifying the age groups showing the largest proportional increases in mortality rates in the presence of COVID-19: 75 y to 85 y and 85 y and over in the White population, 65 y to 75 y and 75 y to 85 y in the Black population, and 55 y to 65 y and 65 y to 75 y in the Latino population (SI Appendix).

Notable racial and ethnic disparities in life expectancy declines are projected under both of the alternative COVID-19 mortality scenarios. Under the higher mortality scenario, life expectancy is projected to be 0.73 y lower for the White population, 2.26 y lower for the Black population, and 3.28 y lower for the Latino population. Under the lower mortality scenario, life expectancy at birth is projected to decline by 0.59 y for the White population, 1.83 y for the Black population, and 2.66 y for the Latino population.

To put these projected life expectancy declines in perspective, trends in life expectancy at birth from 1980 to 2020 are presented in Fig. 2 by race and ethnicity. The projected decline in life expectancy due to COVID-19 for the United States, under the medium scenario, is larger than any other single-year decline during this time period and would return US life expectancy to a value (77.48 y) lower than that observed in any year since 2003. To illustrate the effect of COVID-19 on the racial and ethnic differences in life expectancy at birth, Fig. 3 displays the difference in life expectancy for the Black and Latino populations relative to the White population. Following a widening in the late 1980s, the Black–White life expectancy gap has narrowed from 7.1 y in 1993 to 3.6 y in 2017. Under the medium scenario, this Black disadvantage is projected to widen to 5.17 y under the higher mortality scenario and 4.88 y under the lower mortality scenario. The Latino advantage would narrow to 0.75 y under the higher mortality scenario and 1.23 y under the lower mortality scenario (see Table 1 for projected life expectancy values under alternative scenarios).

Discussion

Our findings reveal that, according to the medium scenario of COVID-19 mortality, the pandemic is projected to result in an enormous decline in 2020 US period life expectancy of 1.13 y. This estimate is similar to that calculated by Heuveline and Tzen (16) in August 2020. This impact is about 10 times as large as the worrisome annual decreases several years ago that were attributed largely to drug overdoses, other external causes, and respiratory and cardiovascular diseases (6, 17). The US reduction in 2020 life expectancy is projected to exceed that of most other high-income developed nations prior to the pandemic (17)—will see its life expectancy fall even farther behind its peers. Although the majority of COVID-19 deaths in 2020 have likely already occurred, our projections under different mortality scenarios underscore the potential for policy interventions and public behavior to either mitigate or exacerbate the ultimate effect of COVID-19 on 2020 life expectancy. In particular, estimated declines in life expectancy for all racial and ethnic groups under the lower mortality universal mask scenario are reduced by over 12%, in contrast to an increase of over 7% under the higher mortality scenario that assumes continued easing of mandates.

In addition, we estimate that the pandemic will result in reductions in life expectancy for the Black (2.10 y) and Latino (3.05 y) populations that are 3 to 4 times as large as the reduction for Whites (0.68 y). The greater toll for the Black and Latino populations, this advantage is estimated to decline to 0.93 y in 2020, smaller than ever recorded nationally. The Black–White gap would widen to 5.17 y under the higher mortality scenario and 4.88 y under the lower mortality scenario. The Latino advantage would narrow to 0.75 y under the higher mortality scenario and 1.23 y under the lower mortality scenario (see Table 1 for projected life expectancy values under alternative scenarios).
The risk of COVID-19 mortality is also heightened by several chronic conditions that are prevalent at older ages, such as hypertension, obesity, diabetes, cancer, and heart disease (32–34). Black adults generally have higher rates of these comorbidities, as well as higher death rates from these conditions, than Whites or Latinos, often developing these conditions at much younger ages (33, 35–37). In contrast, Latinos report lower rates of cancer and heart disease (33, 38) compared with both White and Black adults, although they experience relatively high rates of both obesity and diabetes (33, 35, 36, 38).

One of many very distressing consequences of the COVID-19 pandemic is an estimated 59% increase in the Black–White life expectancy gap, reversing progress made in reducing the disparity since 2006. Since the US government began compiling relatively complete death registration data nationally in 1929, mortality risks documented for the Black population have relatively complete death registration data nationally in 1929, and every mortality scenario, the disparities would remain immense. Our medium estimate of the impact of COVID-19 mortality suggests that deaths attributed to COVID-19 in 2020 will increase again to over 5 y in 2020. At the same time, however, a rapid return to pre–COVID-19 life expectancy is unlikely, due to the anticipated continued presence of the severe acute respiratory syndrome coronavirus 2, long-term detrimental health impacts for those who recovered from the virus, deaths from other health conditions that were precipitated by COVID-19, and social and economic losses resulting from the pandemic (49).

**Materials and Methods**

**Data.** We draw on data from multiple sources to calculate projections of period life expectancy in 2020 for the entire population and the non-Latino White, non-Latino Black, and Latino populations in the United States, excluding Puerto Rico. Counts of deaths involving COVID-19 by race, ethnicity,
and age group are obtained from the NCHS for deaths through October 3, 2020 (3). The projected total numbers of COVID-19 deaths by December 31, 2020, under these three policy and behavioral scenarios are obtained from the IHME; the projections used in our calculations were updated on October 9, 2020 (1).

Midyear population counts by race, ethnicity, and age are obtained from the US Census Bureau’s estimates for 2019, the most recent year for which these population counts are available (50). Estimates of age-specific mortality rates and other life table measures are taken from life tables published by the National Vital Statistics System for the year 2017, the most recent year for which these life tables are available; separate life tables are obtained for each of the racial and ethnic groups in our study (39). We assume that the 2020 population counts are equivalent to the 2019 population estimates and that the mortality rates for 2020 in the absence of COVID-19 would be equivalent to those observed in 2017.

Methods. We estimate 2020 life expectancy under four scenarios, including one in which the COVID-19 pandemic had not occurred and three IHME projections based on different levels of COVID-19 mortality: the current projection scenario, which we refer to as the medium mortality scenario; and the universal mask scenario, which we refer to as the lower mortality scenario in which the COVID-19 pandemic had not occurred and three IHME Methods.

We estimate 2020 life expectancy under four scenarios, including that the mortality rates for 2020 in the absence of COVID-19 would be equivalent to those observed in 2017.

Data Availability. All study data are included in Dataset S1.

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