Racial Disparities in COVID-19 and Excess Mortality in Minnesota

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Abstract

The COVID-19 pandemic has produced vastly disproportionate deaths for communities of color in the United States. Minnesota seemingly stands out as an exception to this national pattern, with white Minnesotans accounting for 80% of the population and 82% of COVID-19 deaths. We examine confirmed COVID mortality alongside deaths indirectly attributable to the pandemic – 'excess mortality' -- in Minnesota. This analysis reveals profound racial disparities: age-adjusted excess mortality rates for whites are exceeded by a factor of 2.8-5.3 for all other racial groups, with the highest rates among Black, Latino, and Native Minnesotans. The seemingly small disparities in COVID deaths in Minnesota reflect the interaction of three factors: the natural history of the disease whose early toll was heavily concentrated in nursing homes; an exceptionally divergent age distribution in the state; and a greatly different proportion of excess mortality captured in confirmed-COVID rates for white Minnesotans compared with most other groups.

Keywords: COVID-19, excess mortality, racial disparities

COVID-19 has disproportionately impacted groups disadvantaged by structural racism in the United States (Pirtle 2020). African Americans, in particular, are dying at higher than expected rates across the country (Yancy 2020, Rossen et al. 2020). At first glance, Minnesota appears to be an exception. Non-Hispanic white Minnesotans account for about 80 percent of the state's population and about 82 percent of its COVID-19 deaths. This seeming lack of disparity may be surprising, especially at a time when Minnesota has received national attention for its deep racial divide following the police killing of George Floyd.

Yet this superficial lack of racial disparity in COVID-19 mortality reflects three key facts about Minnesota's experience of the pandemic, which we illustrate below: an unusually disparate age distribution, a natural history of the disease that exacerbates the consequences of that age divergence, and differences in the extent to which racial groups' mortality during the pandemic is captured in official statistics. Despite this surface equality, measures that best capture unequal risk in the pandemic reveal extremely large disparities in Minnesota.

Figure 1 portrays mortality in the COVID-19 pandemic in Minnesota for five racial/ethnic groups using four different mortality measures. The panels in the left column show "crude" mortality, unadjusted for differences in groups' age distributions, while the panels on the right reflect measures that are statistically adjusted for these age differences. Because the racial groups have substantially different age distributions and

age is a profound risk factor for COVID-19 and other mortality, the age-adjusted measures are superior measures for comparing mortality risk across groups (Dowd et al. 2020). The panels in the top row portray confirmed COVID-19 mortality, reflecting the deaths used in the state's official COVID-19 statistics. The panels on the bottom take a broader view of the pandemic's death toll by capturing "excess" mortality in 2020 compared to the average mortality in the same months during the previous three years. Excess mortality reflects the full set of COVID-19 deaths, including those that are never diagnosed as such, as well as deaths indirectly attributable to the pandemic through pathways like averted medical care (Lange et al. 2020). Age-adjusted excess mortality, shown in the bottom right panel, reflects the overall best measure of mortality risk during the pandemic. (Details of the data, excess mortality estimation, and age adjustment are given in the Methods Appendix.)

The early stages of the Minnesota pandemic reflected high mortality in long-term care facilities, which interacted with an unusual age divergence to concentrate COVID-19 deaths early in the pandemic among older white populations. Through October, more than half of all confirmed COVID-19 deaths in the state have occurred in long-term care facilities, and such facilities accounted for 59% of the state's COVID deaths through May. The state's nursing homes are overwhelmingly white (Shippee et al. 2016: 206), which partly reflects that Minnesota's white population is substantially older than its populations of color: in Minnesota, respective mean age is 41 for white, 29 for Black,

24 for Latino, 31 for Asian-American, and 32 for Native populations. Minnesota's difference in white vs. Black mean age is the fifth largest across U.S. states, driven in part by young ages among the state's large Black immigrant population. The resulting heavy death toll among older white residents early in the pandemic is reflected in Figure 1 in the high COVID-19 crude death mortality among whites in March-May, and the dramatically smaller COVID-19 mortality rates among whites compared to all other racial groups once age is accounted for.

Figure 1 also shows that excess mortality rates are far more unequal across racial groups than confirmed COVID-19 mortality rates: 84% of cumulative age-adjusted excess mortality through October 2020 is accounted for by COVID-19 deaths in the white population, but only 67%, 71%, and 53% in the Black, Latino, and Native populations, respectively. (The Asian-American and Pacific Islander population is similar to the white population, at 83%.) This divergence between COVID-19 rates and excess mortality rates for Black, Latino, and Native populations reflects some combination of two factors: selective diagnosis of COVID-19, such that deaths to the coronavirus in these populations are less likely to be counted in the official statistics, and deaths indirectly attributable to the pandemic (such as deaths associated with averted medical care or material deprivation following loss of work). These results suggest an urgent need to disentangle these factors and also illustrate that the official COVID-19 mortality statistics fail to reflect the inequality in pandemic-associated

mortality in Minnesota.

Three dynamics deserve special mention. First, in the first four months of the pandemic, excess mortality was particularly high among Minnesota's Native Americans and little of that excess mortality is captured in confirmed COVID-19 statistics. An exclusive focus on confirmed COVID-19 mortality has hidden the substantial death toll for this population in particular. Excess mortality in the Native population was notably lower in July-August (and, to a lesser extent, in September-October); further research should examine whether this reflects a true reduction in mortality risk, which may reveal protective contexts that can be built upon, or alternatively, if it partially reflects the aftereffects of selective mortality given the extremely high mortality rates in March-June.

Second, as the pandemic has continued, racial groups whose excess mortality was extremely small in March and April—Latinos and Asian-Americans—have experienced substantially greater mortality. The very high COVID-19 and excess mortality among Latinos in the most recent period is especially concerning.

And third, high COVID-19 and excess mortality has been sustained throughout the pandemic among Black Minnesotans.

In summary, for deaths through October 2020, cumulative age-adjusted excess mortality is far higher for all populations of color than for white populations, by a factor

ranging from 2.8 (for the Asian-American and Pacific Islander population) to 5.3 (for the

Black population). The large racial disparities revealed in this analysis illustrate that an

exclusive focus on official COVID-19 deaths leaves much of the unequal mortality

burden of the pandemic hidden.

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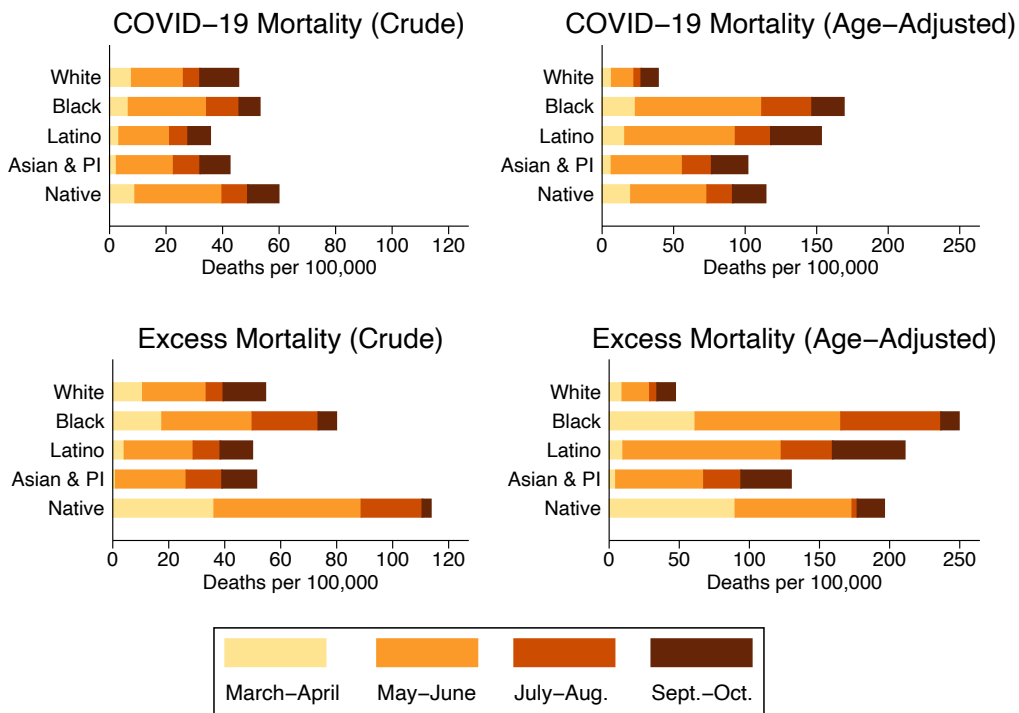
Figure 1. Mortality during the COVID-19 pandemic in Minnesota, by type of mortality, race/ethnicity, and time period. COVID-19 mortality is confirmed by lab test or other official diagnosis. Excess mortality is mortality above and beyond average mortality for the same group in the same months during 2017-2019. Excess mortality excludes external causes of mortality (e.g., accidents and violence) because many of those deaths have delayed reporting, preventing their inclusion for recent time periods. Crude rates are unadjusted for age. Age-adjusted rates are adjusted by re-weighting age-specific mortality using the age distribution of the state of Minnesota. Further details on the data and measurement are given in the Methods Appendix.

Methods Appendix for
"Racial disparities in COVID-19 and excess mortality in Minnesota"

Death count data

Our data are based on a complete set of death certificates for deaths occurring in Minnesota from January 1, 2017 to the present. These were obtained from the Minnesota Department of Health (MDH) Office of Vital Records.

Causes of death are derived from International Classification of Disease (ICD) codes assigned by the National Center for Health Statistics based on the four lines of text assigning multiple causes on the original death certificates. Deaths are recorded as COVID-19 deaths if the ICD-10 code "U07.1 COVID-19, virus identified," appeared in the death record in any cause of death line. This indicates confirmation of COVID by a diagnostic test. These are the same deaths included in MDH's official COVID-19 mortality statistics for the state of Minnesota.

The death certificates also include information on place of death, which we use to calculate the proportion of confirmed COVID-19 deaths that occurred in long-term care facilities.

The time period covered by this study is March 1, 2020 – October 31, 2020 (and the same dates in the 2017-2019 reference years). Death certificate data are updated weekly; those included here are current as of the November 18, 2020 data release. In general, our examination of the data over time suggests that the data are close to complete for deaths occurring at least two weeks before the data release date (in this case, complete up to about November 4), except for deaths that ultimately are assigned external causes of death, as we discuss below. An informal examination of the data as they are updated weekly also suggests that deaths occurring on some Native American reservations are added to the data slightly later, potentially producing some undercount in Native American deaths occurring near the end of our study window.

Population denominators

To generate population denominators, we use the single-year American Community Survey (ACS) (Ruggles et al. 2019) for 2015-2019, a relatively large number of years designed to create stable population estimates even for small cells. We use the same denominators for all years in the excess mortality calculations, which assumes that the

population size and composition has been largely stable for the last three years.

In producing the population denominators, we employ race-bridging algorithms developed by Liebler and Halpern-Manners (2008) to assign multi-racial individuals to a single racial category. This attempts to create a "best guess" about the racial categorizations that are likely to be assigned on death certificates. In both the numerator and denominator, individuals identified as Latino are included in the Latino category; other racial groups are limited to non-Latinos. (We omitted from the analysis records whose race was categorized as Other/Unknown; this included four COVID-19 deaths out of 2,710 total COVID-19 deaths.)

Excess mortality estimation

Excess mortality is measured as the difference between mortality occurring in a period of time in 2020 and the average mortality occurring in the same period in 2017-2019. The 2017-2019 average is an unweighted average over years.

Time intervals are defined by calendar dates. Because 2020 is a Leap Year, and the time periods considered here occur after February 28, this means that the 2020 intervals occur one day later (as time since January 1) than the comparison 2017-2019 intervals, while including the same number of days. Note that our two-month units reflect 61 days for March-April and September-October, 60 days for May-June, and 62 days for July-August.

External mortality estimates exclude external causes of death—deaths due to causes such as accidents, violence, and suicide—which we define as causes of death with ICD codes V01–Y98 in any of cause of death lines 1-3. Many such deaths require investigation before a final cause of death determination is made, which delays them from appearing in our dataset. We therefore exclude external causes from the excess mortality estimation to ensure that these estimates are not biased by the exclusion (due to delay) of deaths for 2020 that are recorded for 2017-2019.

Twenty deaths in our dataset were both COVID-19 deaths and deaths attributed to external causes by our definition. Thirteen of these 20 had a primary cause of death assignment that was some kind of fall (e.g., falling out of bed). These 20 deaths are included in the COVID-19 rates but excluded from the external mortality rates for consistency. Of these deaths, 18 decedents were white and two were Black; the 18 deaths to white decedents are less than one percent of the total white deaths attributed

to COVID-19.

Age adjustment

We conduct a "direct" age standardization (Preston et al. 2001: 24-25) that re-weights each racial group's age-specific death rates using a standard set of weights. We use 10-year age intervals top-coded at age 80 (so that the oldest age category is ages 80+). The standard population weights reflect the age composition of Minnesota as a whole, as derived from the ACS.

Age standardization is useful as a way to make populations with different age distributions comparable to one another, to make an "apples to apples" comparison of mortality risk. The absolute differences in magnitude between age-adjusted and crude measures are less meaningful, since the magnitude of age-adjusted rates reflects the somewhat arbitrary choice of age standard. For this reason, we present Figure 1 using the same horizontal axis scale for COVID-19 and excess mortality measures within, but not across, the crude vs. age-adjusted mortality divide. Reading Figure 1 from top to bottom, both the absolute magnitudes and the relative shapes across racial groups are meaningful; reading from left to right, what is most meaningful is how the relative sizes of the bars change across racial groups, rather than their absolute size.

The result that Minnesota has the fifth-largest difference between mean ages for white and Black residents is based on 2019 ACS data for all states.

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