STAT

To understand who's dying of Covid-19, look to social factors like race more than preexisting diseases

By Sharon Begley @sxbegle

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Reprints

Mortician and funeral director Bryan Clayton inspects names on a row of cardboard caskets, one reading "COVID+," at Maryland Cremation Services in Millersville, Md. *ANDREW CABALLERO-REYNOLDS/AFP via Getty Images*

While early studies of who was dying of Covid-19 identified risks such as obesity and having diabetes, there is a growing realization that those initial conclusions might have been misleading, obscuring a more significant explanation.

As researchers pull back their lens from individuals to population-level risk factors, they're finding that, in the U.S., race may be as important as age in gauging a person's likelihood of dying from the disease.

The higher the percentage of Black residents in a county, the higher its death rate from Covid-19 — even after accounting for income, health insurance coverage, rates of diabetes and obesity, and public transit use, finds a new study by researchers at the MIT Sloan School of Management. With those plausible explanations ruled out, "the causal mechanism has to be something else," said applied economist Chris Knittel, the study's senior author. "If I were a public official, I'd be looking at differences in the quality of insurance, conditions such as chronic stress, and systemic discrimination."

The county-by-county analysis of Covid-19 death rates in the U.S. comes as more and more studies shift from the initial focus on individual-level factors that seem to increase people's risk of dying to population-level ones, too, said experts in public health, demographics, and infectious disease.

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One reason for the new focus is that "we're not learning much more beyond what's been observed from the start of the pandemic: that sex, age, and preexisting conditions put you at greater risk of dying" from Covid-19, said Aaron Glatt, an infectious disease physician at the Icahn School of Medicine at Mount Sinai. In almost every country, for instance, more men than women are dying of Covid-19, an imbalance that likely reflects both biology — women have stronger immune systems — and socialization: They seem to be following social distancing guidelines more than men, which could decrease the viral load they're exposed to.

Also driving the shift in focus is that society-level influences are potentially more "actionable" than individual risk factors; you can't change your blood type. A study posted to the preprint site medRxiv this month reported that type

O is associated with lower risk of respiratory failure from Covid-19 and type A with a higher risk, but the paper hasn't been peer-reviewed and it's not clear how much difference blood type might make. "I wouldn't tell one patient, thank God you have type O, but another, start preparing your will because you're type A," Glatt said.

To investigate population-level factors, MIT's Knittel and graduate student Bora Ozaltun analyzed county-by-county mortality rates — the number of deaths from Covid-19 as a percentage of population, from April 4 to May 27. The mortality rate is more precise than the infection rate or the case fatality rate (the percent of diagnosed cases who die), which are imprecise because of inadequate testing. In contrast, although some Covid-19 deaths were incorrectly attributed to other causes, especially early in the U.S. outbreak, "deaths, sadly, are an absolute," Knittel said.

They then used standard statistical tools to tease out which factors are most strongly correlated with mortality rates. Race stood out. Nationwide, the average county-level death rate from Covid-19 is 12 per 100,000 people. Counties with a Black population above 85% had a death rate up to 10 times higher. For every 10 percentage point increase in a county's Black population, its Covid-19 death rate roughly doubles, Knittel said.

That meshes with other research. A study last month of 1,052 Covid-19 patients treated at Sutter Health hospitals in California, for instance, found that Black patients had 2.7 times the odds of hospitalization as non-Hispanic white patients, indicating more severe disease. And an analysis by scientists at the Harvard T.H. Chan School of Public Health found that the death rate in predominantly non-white areas is six times that in non-Hispanic white areas.

"Black people are dying of Covid-19 at a rate more than twice our share of the population," said Malika Fair, an emergency medicine physician in Washington, D.C., and senior director of health equity programs at the Association of American Medical Colleges.

The MIT researchers' key finding is that the underlying reasons for the link between race and death rate are not the usual suspects.

"Policymakers' natural instinct is to think this correlation is because of income disparities, or having health insurance, or diabetes, obesity rates, smoking rates, or even use of public transit," Knittel said. "It's not. We controlled for all of those. The reason why [Black people] face higher death rates is not because they have higher rates of uninsured, poverty, diabetes, or these other factors."

The Sutter study, too, adjusted for age, sex, comorbidities, and income; the higher hospitalization rate for Black patients wasn't explained by any of those.

That leaves other factors. "If I were a policymaker," Knittel said, "I'd be looking at things like the systemic racism that affects the quality of insurance African Americans have and the quality of the health care they receive."

People with Medicaid or high-deductible plans, for instance, are less likely to have a primary care physician; 34% of Black people and 15% of white individuals are covered by Medicaid and therefore less likely than people with employer-sponsored insurance to have a regular physician.

"People who didn't have a relationship with a primary care provider were much less likely to get tested," said Georges Benjamin, a physician and executive director of the American Public Health Association. "Testing sites were put in affluent communities, or required a car, and testing kits were in short supply. Any time there is a shortage of something, minorities are less likely to get it."

Without a primary care provider, Black people who thought they were infected were also likely to be turned away from hospitals, Benjamin said. "Someone without a primary care doctor doesn't get into the ER as fast as someone whose doctor calls ahead," he said. "At what point were your symptoms severe enough that you got into the health care system?" For people of color, it was likely later, he suggests.

"Black patients presenting with fever and cough were less likely to receive a referral for a Covid-19 test," Fair said. That delayed appropriate care.

And once they do get into the system, research has found, the quality of care Black people receive for a variety of conditions, such as cardiovascular disease, is likely to be lower. Racism "is apparent in how we treat patients," Fair said. "We still see differences in the care [for many conditions] given to Blacks and whites."

Another possible factor in the high death rate among Black Americans is the well-documented health effects, including on the immune system, of chronic stress such as that caused by a lifetime of discrimination.

In the MIT study, the correlation between a county's Covid-19 death rate and its proportion of Black residents was stronger within any given state than between states. "That tells me that there are important state-level differences that drive these deaths," Knittel said. "African Americans are more likely to live in states with poor health care systems."

Commuting via public transportation, relative to telecommuting, is also linked to a higher death rate. When public transit use is 20.6 percentage points higher in one county than another, its death rate is about tenfold higher.

Driving to work was also linked to a higher death rate. Many people working at their place of employment rather than home were in public-facing and therefore risky occupations such as health care, grocery stores, and public safety. "The correlation between death rate and driving to work suggests that just being at work, no matter how you get there, increases your risk of dying," Knittel said.

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Those positions are also filled disproportionately with people of color, likely contributing to the correlation between race and death rates. “Clearly, people who have jobs where they come into contact with others, from health care workers to bus drivers, are more likely to become infected,” the APHA’s Benjamin said. Although much about the pathology of the new coronavirus remains a mystery, the chance of becoming infected is partly a function of how much virus one is exposed to; the more infected people someone encounters, the higher that viral load can be.

The new population-level approach to understanding risk has prompted a rethinking of the role of conditions such as obesity and type 2 diabetes.

“Obesity is a marker of poverty and therefore of access to high-quality health care,” said Nina Schwalbe of the Mailman School of Public Health at Columbia University. Although the physiological consequences of obesity, notably high rates of inflammation, might contribute to Covid-19 severity, “obesity is a signal for so many of the social determinants of health, and we have to ask what this signal is telling us about vulnerabilities,” Schwalbe said.

That holds for type 2 diabetes as well. An analysis of 13 separate studies found that the disease is associated with 3.7 times the risk of having severe Covid-19 or dying from it compared to not having any underlying illness. This, too, is a disease of poverty, which means those who have it are more likely to live in crowded homes where “social distancing” is impossible, more likely not to have a primary care physician, and more likely to have jobs that increase their exposure to infected people.

The Sutter and MIT studies cast doubt on whether individual risk factors are as important as social determinants of health in affecting someone’s chances of contracting severe and even fatal Covid-19. “It should cause us to ask a different set of questions about what puts you at risk of hospitalization or death,” Schwalbe said.

More and more evidence is pointing to social determinants of risk, which puts the role of underlying health conditions in a new light. “Comorbidities are still

used to blame people for how hard they are hit by Covid-19," said Philip Alberti, senior director for health equity research at the AAMC. To reduce the U.S. death toll now that many states are seeing a new surge in cases, he said, "our response to this disease" must look beyond the strictly medical.

About the Author Reprints

Sharon Begley

Senior Writer, Science and Discovery

Sharon covers science and discovery.

sharon.begley@statnews.com
@sxbegle