Q&A: Examining public health measures and striving for equality among vulnerable communities

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Over the course of the pandemic, COVID-19 hit Black communities and communities of color particularly hard. According to the Centers for Disease Control and Prevention, Black, Hispanic, American Indian, Alaska Native, Native Hawaiian, and other Pacific Islander people are

about twice as likely to die from COVID-19 as white people. Older adults and young children are also more vulnerable to adverse COVID effects.

Policymakers are increasingly using measures of socioeconomic deprivation to inform how to allocate public health resources to communities, including during COVID. Measures aim to identify geographic areas such as communities, counties or zip codes in need of support and resources. Two measures often used are the Area Deprivation Index, or ADI, and the Social Vulnerability Index, or SVI.

A University of Michigan study led by researcher Kimberly Rollings and published in *PLOS ONE* compared these two measures in detail. The study found that the measures differ and that selecting one measure over the other may blur the level of need in certain communities.

"Many studies tell us that deprivation is associated with more adverse health outcomes. We also know that we need to think about concentrated deprivation, which these measures capture, in addition to individual patient- or person-level deprivation," Rollings said. "How we measure concentrated deprivation and select a deprivation measure for a certain situation can be complicated. Unfortunately, we don't yet have a great road map to help decide which measure to use for different situations."

Rollings researches how built and social environments affect health. She is trained in environmental psychology and architecture, and is a research investigator with U-M's Institute for Social Research.

What are the ADI and SVI measures, and what are they used for?

The ADI and the SVI are area-level measures of socioeconomic

deprivation and social vulnerability. By "area level," I mean a county, a zip code or a U.S. Census tract or block group, closer to a neighborhood or community in size. Each index combines multiple socioeconomic dimensions such as income, employment, education and housing. The indices are overall measures of these different factors.

The ADI quantifies neighborhood deprivation at the block group level, which is the smallest spatial scale of the publicly available measures. It measures income, employment, education and housing characteristics.

The SVI was developed to identify communities that are most likely vulnerable before, during and after a natural disaster or disease outbreak. It has a different purpose, and because of that, it includes additional and different factors such as English language proficiency, health insurance, age and more information about housing type. If you're in a group home setting or a mobile home, you might be more vulnerable to certain disasters. SVI also includes race and ethnicity, which can be indicators of the effects of structural racism and resulting higher risks of adverse health outcomes.

The indices are used for several purposes, including in public health and health care research and policy. For example, the SVI, which was created by the CDC, was used by states to identify areas with populations at higher risk for the adverse effects of COVID, or that might need more resources to support COVID response efforts. States could then send more resources or more vaccines to health departments in those areas.

Additionally, the ADI is used by the Centers for Medicare and Medicaid Services in efforts to address health equity through health care payment model design. Health care systems and payers that serve more communities with higher health care needs require more support and resources, so these measures can help them identify those areas.

What is the difference between the ADI and SVI measures?

The ADI quantifies deprivation and is available at the block group level, which is the smallest geography available among publicly available indices. This scale enables us to capture more variability in deprivation, at a more granular level. The SVI assesses vulnerability and is available at tract, county and other areas. Measures include both overlapping and unique socioeconomic dimensions, and can score some areas with opposite deprivation levels.

What did the study examine?

We used each of the two measures to score every Census tract in the U.S. We then compared how much the scores agreed or disagreed.

We also mapped the tracts where ADI and SVI disagreed the most, for example where ADI scored a tract very low and SVI scored a tract very high. We found that those tracts were primarily located in urban areas with both high housing costs (high median home values, high monthly rents, high monthly mortgages) and characteristics associated with high deprivation (lower median income, higher poverty rates, more renters than homeowners). These characteristics are often consistent with a process of gentrification and displacement.

In these areas, the ADI considered some tracts to have low rather than high deprivation. This means that when you're working in these areas to address health equity and relying on these measures, if you're not able to make an informed decision about which index to use, you risk diverting resources away from those tracts. You could potentially maintain or even worsen the health inequities you're trying to address because you might overlook some areas of high deprivation.

Other studies identified this issue with ADI and how it accounts for housing costs. Much of that research focused on specific regions, such as New York. Our study found that the housing cost issue persists across the U.S. Additional areas could be problematic if our analysis was completed again within each state rather than the entire U.S.

What are some main takeaways of this research?

The first important takeaway from this study is that these measures are not the same. They capture different aspects of deprivation and vulnerability. In addition to ADI and SVI including different dimensions, the ADI overemphasizes housing costs. A statistical adjustment is needed to "level the playing field" so that deprivation levels can be appropriately compared across different regions with different costs of living.

Selecting a measure to use can be really complicated and there's unfortunately not a great road map yet to inform our decisions. A user has to think about their goal: What question are they trying to answer? What population are they hoping to serve and at what scale? Are they trying to select the best measure of deprivation or inform policy? They have to consider whether or not a measure includes particular indicators of deprivation relevant to their goal and situation, at a particular scale and time.

Study authors include ISR researchers Grace Noppert, Robert Melendez and Philippa Clarke, and U-M Medical School and School of Public Health researcher Jennifer Griggs.

More information: Kimberly A. Rollings et al, Comparison of two area-level socioeconomic deprivation indices: Implications for public health research, practice, and policy, *PLOS ONE* (2023). DOI: 10.1371/journal.pone.0292281

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