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Using Disadvantage Indices to Guide State Health Equity Efforts: On-the-Ground Lessons from the COVID-19 Pandemic

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– Meeting Presenter

Summary

Increasingly, policymakers are exploring how disadvantage indices can help guide efforts to dismantle structural discrimination by identifying—and then allocating resources more equitably to—marginalized communities that disproportionately lack equal access to health care, education, safe housing, and other social determinants of health. The COVID-19 pandemic marks a major widespread use of disadvantage indices to guide more equitable resource allocation, providing an opportunity to learn from early state and local experiences using these tools to guide vaccine allocation and distribution. This brief summarizes a June 2021 AcademyHealth workshop where public health officials shared their on-the-ground experiences using disadvantage indices to locate COVID-19 testing sites, allocate vaccines, set up vaccination sites, and conduct community outreach to overcome vaccine hesitancy. While early experiences indicate that indices helped guide more equitable responses to the pandemic, formal evaluation is needed to examine the comparative advantages and effectiveness of various indices. Moreover, the pandemic has highlighted the critical need for greater investment in data infrastructure, especially accurate race and ethnicity data, to both prepare for and respond to future public health emergencies.

Still Separate and Unequal

By any measure—cases, hospitalizations, and deaths—Black, Indigenous, and people of color (BIPOC)[1] across the U.S. have disproportionately borne the burden of the COVID-19 pandemic, laying bare the longstanding and systemic inequities facing disadvantaged communities. In April 2021, the director of the Centers for Disease Control and Prevention (CDC) declared racism a serious public health threat, citing "structural barriers that impact racial and ethnic groups differently to influence where a person lives, where they work, where their children play.… These social determinants of health have life-long negative effects on the mental and physical health of individuals in communities of color. Over generations, these structural inequities have resulted in stark racial and ethnic health disparities that are severe, far-reaching and unacceptable."[2] Moreover, as the CDC has noted, race and ethnicity are risk markers for other underlying circumstances that affect health, including socioeconomic status, access to health care, and occupation.

Disadvantage Indices and Equitable Vaccine Allocation

As COVID-19 vaccines neared emergency approval in the United States, the National Institutes of Health and CDC requested that the National Academies of Sciences, Engineering, and Medicine (NASEM) develop a framework for equitable vaccine allocation. In an unprecedented move, the NASEM framework emphasized that equity matters not only in sequencing priority groups for vaccination but also within each group. For example, older people are at higher risk of COVID-19 infection and worse outcomes because of their age, but older people from disadvantaged groups face even higher risks because they are more likely to experience

worse baseline health and less favorable living conditions. Therefore, NASEM explicitly urged that as various population groups became eligible, "vaccine access should be prioritized for geographic areas identified through CDC's Social Vulnerability Index (SVI) or another more specific index."[3]

A disadvantage index like the SVI is a composite measure linked to a geographic area that weighs the relative average advantages and disadvantages of residents based on income, race and ethnicity, education, housing, health insurance status, transportation access, and other sociodemographic factors. Initially designed to help public health officials better prepare for and respond to emergencies such as hurricanes, disease outbreaks, or chemical spills,[4] disadvantage indices like the SVI also are drawing interest as tools to advance health equity more broadly. AcademyHealth, with support from Blue Shield of California Foundation, held a June 2021 workshop to explore how states are using disadvantage indices to respond to COVID-19. Drawing on the perspectives of policymakers, researchers, and others, the workshop:

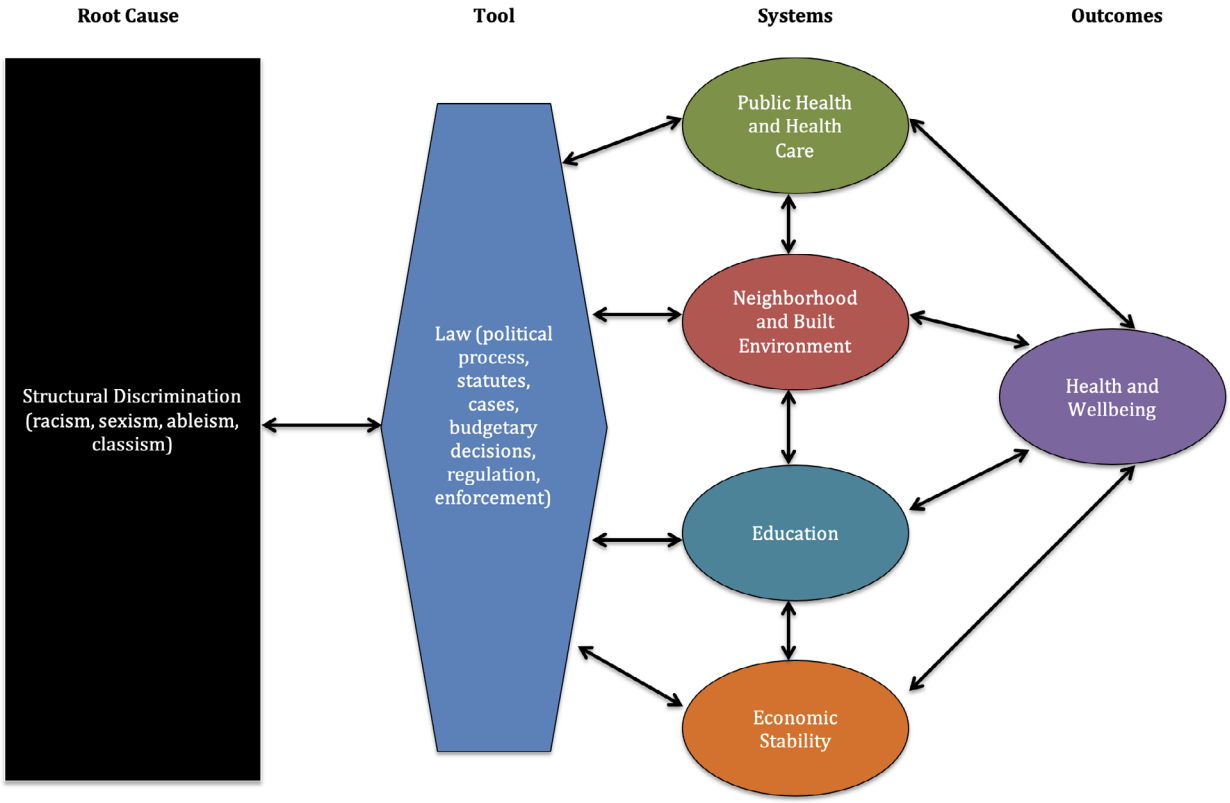
- Provided an overview of disadvantage indices and how diverse states are using these tools to inform equitable COVID-19 vaccine allocation, distribution, and outreach;
- Surfaced emerging best practices, lessons learned, challenges, and other issues from states' use of disadvantage indices to date; and
- Raised possible evaluation and other questions related to use of indices that, if answered, could help inform how states apply these tools going forward to address social determinants of health and inform other activities to advance health equity.

This brief summarizes the workshop's collective presentations and discussion. Because the session was off the record, the brief conveys general workshop content without attributing specific comments to particular participants. The discussion was informed by existing research, though neither the discussion nor this brief incorporates a systematic review of the literature on disadvantage indices. A select bibliography of relevant, current literature is included at the end of the brief.

Structural Discrimination and Health Equity

Rectifying systemic discrimination—be it racism, sexism, ageism, or any other "ism"—requires examination of the root causes of structural discrimination, or the way that laws are used to structure systems, such as education, employment, housing, public health, and health care, to advantage dominant groups, according to a framework developed by the Institute for Healing Justice & Equity at Saint Louis University (see Figure 1).

Figure 1. Framework to Identify Root Causes of Systemic Discrimination



Source: Yearby, R. "Structural Racism and Health Disparities: Reconfiguring the Social Determinants of Health Framework to Include the Root Cause." *J Law Med Ethics.* 2020 Sept;48(3): 518-526.

In the case of COVID-19, for example, paid sick leave can influence whether lower-income essential workers get vaccinated, because those with paid leave won't lose wages to take time off to get the vaccine or recover from possible side effects. Broad access to paid sick leave dates to the rise of unions during the New Deal era, which overlapped with Jim Crow laws that legalized racial segregation. As a result, many people of color, along with women, were excluded from unions and collective bargaining agreements that extended paid sick leave to workers. That structural discrimination remains today, especially for lower-wage workers, erecting a barrier to vaccination for many people with frontline service jobs who face greater risks of contracting COVID-19 and suffering complications if infected.

While disadvantage indices can help identify vulnerable communities, indices alone cannot fix longstanding inequities; they must be paired with effective action to dismantle structural discrimination and remove systemic barriers that keep people from attaining their best possible health and well-being. To that end, the Institute for Healing Justice & Equity at Saint Louis University has devised four principles for policymakers to consider as they work to advance health equity (see Health Justice Framework Principles at right).[5]

Most States Use Indices to Guide Vaccine Allocation

By the end of March 2021, across the CDC's 64 local vaccine allocation jurisdictions—50 states, the District of Columbia, five cities, and eight territories—34 states and three cities had incorporated disadvantage indices into their vaccine allocation plans, according to a recent *Nature Medicine* study.[6] Indices used included the **SVI**, the **Community Vulnerability Index**, the **Area Deprivation Index**, and the **California Healthy Places Index** (see page 5 for more information about the Healthy Places Index). Researchers found that local jurisdictions used indices and other place-based measures to:

- Define priority groups or geographic areas,
- Prioritize disadvantaged groups by increasing shares of vaccines or vaccination appointments,
- Tailor outreach and communication,
- Plan the location of vaccination sites, and
- Monitor vaccination receipt.

Lessons Learned: Real-World Use of Disadvantage Indices

During the workshop, state and municipal public health officials from diverse jurisdictions shared on-the-ground experiences of using indices to help advance equity in locating COVID-19 testing sites, allocating vaccines, setting up vaccination sites, particularly mobile and pop-up clinics, and conducting community outreach to overcome vaccine hesitancy.

Health Justice Framework Principles

- Legal and policy responses must address the impacts of discrimination and poverty on the social determinants of health, which in turn threaten to exacerbate the health, financial, and social impacts of a public health emergency on low-income communities, communities of color, and other marginalized communities.
- Interventions mandating healthy behaviors—such as staying at home from work when sick, mask wearing, and minimizing close contacts outside the home—must be accompanied by legal protections, accommodations, and social supports to enable those behaviors while minimizing economic, social, and cultural harms.
- Because emergencies typically exacerbate longstanding and interconnected crises in low-income communities and communities of color, legal and policy responses must address root problems in addition to immediate needs.
- Historically marginalized communities must be engaged as leaders in the development of any interventions and the attainment of health justice.

States gravitated to the SVI. Most states using disadvantage indices opted for the SVI, according to the *Nature Medicine* study, perhaps in part because of the index's CDC imprimatur. Along with NASEM's recommended use of an index, noting the SVI by name, the Biden administration in January 2021 also urged local officials to use the SVI or another index to get "vaccines to residents at highest risk and in high-vulnerability areas" and "describe how they have or will provide equitable access to COVID-19 resources within highly vulnerable communities."[7]

Availability and ease of use also factored into decisions to use the SVI. "We selected the SVI because we had been exploring this index in areas of preparedness, maternal/child health, and environmental health. But, also the key ingredients of the index, including instructions on how to run it, were publicly available online, so it was very easy to share with others who had questions about it or wanted to run it themselves as well," a state official said. Similarly, another presenter shared, "It's a CDC index—it has a lot of authority. People don't need to explain much to their governor… it makes sense to be risk averse and just say I probably better go with what causes the least friction in the moment."

Practical applications and adaptions. The SVI and other indices often rely on Census tracts as the unit of geographic measure, and several jurisdictions described augmenting or imputing data from other sources to generate ZIP-code-level mapping. In one large metropolitan area, for instance, public health officials adapted the SVI to include employment information from the American Community Survey to monitor variables known to affect health equity, such as people working in high-risk service occupations. To prioritize where to locate testing sites, another state used the SVI in

tandem with mortality rates for comorbidities known to put people at higher risk of negative outcomes if infected with COVID-19.

When vaccines became available but initially were in short supply, one state used an index to help identify and "geofence" disadvantaged neighborhoods by ZIP code and prioritize residents for online vaccination appointments. In another state, where politics hampered vaccine uptake, health officials used risk-based phases and age-based criteria for vaccine distribution at the county level while allocating extra vaccine to counties with the highest risk populations as identified by the SVI. Counties could move through the risk phases and age groups independently of other counties, enabling counties with more disadvantaged residents to rapidly vaccinate all willing people, a state official said. "Equity was a cross-cutting consideration of this plan… and in our conversations with the governor… everyone understood and kept at the front of mind that equity was something that we were very, very invested in." However, the state has lagged in overall vaccination rates, with the official saying, "We have done a wonderful job of equitably distributing and administering vaccines in the state…. The population that we did not plan on having to target is the rural white conservative, and that is the bulk of the hesitancy in the state."

In some states, foundations and community-based organizations used SVI-guided geo-mapping to target outreach to vulnerable communities. States also incorporated monitoring based on the SVI into statewide reopening frameworks, taking both a carrot and a stick approach to encourage counties to focus on disadvantaged communities. "We used health equity to guide how reopening happened county by county. So, for each county to move forward… if your least healthy community… did not also meet the same test positivity—if it was higher, then they could not move forward. We also wanted to develop what we call an accelerant—it was sort of like having your stick but also having a carrot… so they had a way to demonstrate if they were doing more testing and more work in their least healthy communities, that they could actually then move forward" even if other indicators lagged, according to a presenter.

Equity or 'Discrimination'? Using disadvantage indices to identify high-risk communities and target resources accordingly can potentially help the most vulnerable people in those communities as well as the broader community. One presenter stressed the need to highlight how using a disadvantage advantage index "helps everybody… that getting the vaccine to the people who are disadvantaged… helps us all." Nonetheless, some states rejected local efforts to advance health equity. In Texas, for example, Dallas officials reversed course on a plan to prioritize vaccine doses for people living in the most vulnerable ZIP codes, primarily communities of color, after the state threatened to withhold vaccine allocations.[8]

Moreover, public health officials in some jurisdictions faced charges of discrimination for using disadvantage indices. "The attack on—under which some of these indices came… all started with some region where people said vaccine allocation has to be based on science and not on social values. It never occurred to me that the Social Vulnerability Index for some people reads like a critical race theory index, you know—so it's incredible," a presenter said. At the same time, public health officials were mindful that using a disadvantage index might have unintended consequences. "There were a lot of very important discussions around, 'Are we stigmatizing people who live in these communities? Are we scapegoating certain communities?' And those were all very tough conversations…. I do think it really made an impact, and I think brought resources to bear in places that may not have had as many resources."

In one state, a county's SVI score was used as a multiplier against the county's population of people eligible to receive a vaccine. For example, if the eligible vaccination population in a county was people aged 65 years and older and first responders, the state would sum the two populations and then multiply the total by the county's SVI percentile. For some counties, the population used to allocate vaccines would increase, while in other counties, the population would decrease, a presenter said, adding, "Although mathematically this made a lot of sense, this was very difficult to explain to policymakers, media, and members of the general public."

The official continued, "There were many audiences that appreciated the use of SVI allocation and the continued attention to equity. However, there were also objections. Some entities felt that they should be receiving more vaccine than was available to them…. Other entities questioned the use of the SVI because it included race and ethnicity as part of its domains and was therefore seen as discriminatory."

Similarly, in another state, an official said, "There was a lot of pushback from a lot of different kinds of stakeholders around this pandemic…. If you have just as many people upset on both sides, you might have gotten it just right." To help people understand the importance of equity in vaccine allocation and monitoring disparities in vaccination among vulnerable groups, state and local health officials launched public education campaigns and engaged business leaders.

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California Healthy Places Index

Long known as a bellwether state, California is at the forefront in leveraging information about the state's nearly 40 million residents and the communities they live in to guide public policy. Recognizing that the health of Californians is shaped dramatically by "non-health" policies and community conditions related to housing, education, economic, social, and other factors, the **California Healthy Places Index** (HPI) details community conditions that predict life expectancy. Developed by the **Public Health Alliance of Southern California** in partnership with the **Virginia Commonwealth University Center on Society and Health,** the HPI can be used to compare and explore local factors influencing health across the state.

The purpose of the HPI is to prioritize public and private investments, resources, and programs. The tool contains user-friendly mapping and data resources at the census tract level across California. The HPI also provides scores based on community conditions to enable comparisons between areas, as well as deeper dives on conditions in any given area. The tool also includes detailed policy guides to support specific policy interventions that improve community conditions and health.

The HPI combines 25 community characteristics into a single indexed score. In addition to the overall score, the index also contains eight sub-scores for the following policy action areas: economic, education, housing, health care access, neighborhood, clean environment, transportation, and social factors. The index was created using statistical modeling techniques that evaluated the relationship between these policy action areas and life expectancy at birth. The statistics were designed to maximize the ability of the HPI to identify healthy communities and quantify the factors that shape health. The graphic below shows the eight policy action areas, their weights within the index, and the 25 community characteristics that contribute to the overall HPI score. In addition to the characteristics calculated in the HPI, a **mapping tool** includes additional selectable data layers such as: health outcomes, race/ethnicity, climate change effects, and other layers that can inform decisions to advance resilient, equitable communities in California.

Policy Action Area	Economic	Education	Transportation	Social	Neighborhood	Housing	Clean Environment	Healthcare Access
Weighting	32%	19%	16%	10%	8%	5%	5%	5%
Indicators	Employed	In Pre-School	Automobile Access	Two Parent Household	Retail Density	Low-Income Renter Severe Housing Cost Burden	Ozone	Insured Adults
	Income	In High School	Active Commuting	Voting in 2012	Park Access	Low-Income Homeowner Severe Housing Cost Burden	PM 2.5	
	Above Poverty	Bachelor's Education or Higher			Tree Canopy	Housing Habitability	Diesel PM	
					Supermarket Access	Uncrowded Housing	Water Containments	
					Alcohol Outlets	Homeownership		

Source: About the California Healthy Places Index. Accessed at https://healthyplacesindex.org/about/.

The HPI was used to develop the Health Equity Metric that was incorporated in California's approach to assess progress toward reopening safely by reducing disease transmission in all communities. Specifically, the health equity metric focused on the test positivity rates in the most disadvantaged neighborhoods, to ensure that these communities did not significantly lag behind the overall county test positivity rate before moving between tiers of reopening.

In its planning and administration of the COVID-19 vaccine, the state has used the HPI to identify Quartile 1 neighborhoods – where California's most vulnerable communities who have been disproportionately impacted by COVID-19 live – so that the State can focus its ongoing vaccine communications and outreach efforts.

In addition, given that some of the zip codes within the HPI did not contain a score, the California Department of Public Health derived scores for those areas to develop the Vaccine Equity Metric (VEM). This methodology was applied to 351 zip codes. With the goal of health equity always on our mind, California has made great strides in vaccinating Californians and equalizing VEM Quartile 1 (Q1) and Quartile 4 (Q4) vaccination rates.

The HPI is also an important resource used by local health departments to inform their community health assessments, and is used by state programs to identify granular place-based factors impacting health outcomes and life expectancy.

"The more perfect [an index] is sort of scientifically from a data perspective, the more complex it is and therefore challenging to implement and communicate and defend, and so I think officials, policymakers, really have to balance those tensions to get to better than rough but good enough," a presenter said.

Building and sustaining community partnerships. While a disadvantage index can help identify where to deploy resources, an index alone does little to inform how to deploy resources to advance health equity, health officials stressed repeatedly, noting that community partnerships are critical. "Access is not just putting points on a map. It's not just setting up these vans here and there—you really do need to think about how to connect people to vaccines in the way that they would like to be connected to them," a presenter said, adding, "The most important thing is to talk to people and to really engage with communities and understand where they're coming from, what their needs are… trusting communities and community wisdom, I think, is something that we could all do a little bit more."

People in the community—especially those with lived experience of inequities—know the community and understand both what messages and messengers will resonate—for example, recruiting barbershops and churches as trusted information sources in African American communities. "We often talk about community engagement—that is not enough, we need to be true partners with them…. work with barbershops to get out vaccines—that's the kind of partnership we need."

Building and sustaining community partnerships takes both time and ongoing attention, with one official saying, "I think one thing that we should be thinking about going forward—beyond COVID and learning from COVID—is that those relationships have to be well established. We can't in the heat of the moment, at a moment of crisis, try to go into the community and figure out how we're going to actually connect with and engage and empower the community."

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Typically, county health departments are the face of public health in local communities, and too often, those faces don't reflect the diverse communities they serve, with a representative from a nonprofit public health group stressing that the public health workforce "really needs to reflect the communities that are most impacted." Another way to connect with communities is to provide ongoing funding—not piecemeal grants—to support community groups as a resource to tap for advice and referrals to support public health activities and advance equity efforts. Building relationships with community-based primary care clinicians also can help cultivate community connections. One state, for example, awarded grants to help primary care providers meet CDC requirements to provide vaccinations, recognizing that as trusted information sources, community-based clinicians can help overcome vaccine hesitancy. There is also a role for philanthropy—foundations, for example, can often be nimbler than government, especially in a crisis.

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Evaluating Index Effectiveness and Other Research Questions

While anecdotal experiences indicate their usefulness in adding measures of equity to vaccine allocation, there is little, if any, formal evaluation yet of the indices' effectiveness in leveling the playing field for disadvantaged communities. "It seems almost a conceptual truth in the situation where you're allocating vaccines, and you don't have any leftover vaccines, and you offer more to worse-off people then… more disadvantaged people get vaccinated before better-off people, and that is right both in equitable terms and in public health terms because more disadvantaged people are more likely to get and spread the virus," a presenter said.

Nevertheless, participants agreed on the importance of evaluating disadvantage indices, both to determine the relative effectiveness of different indices and how to best deploy them. One participant said the question isn't whether using an index is "more equitable, but how does it make it more equitable. So, it's not yes, no—it's really under what conditions and for whom."

Participants also discussed how granular geographic areas need to be to ensure an index's accuracy. The SVI, for example, aggregated data at either the county or Census tract level—typically, 1,200-8,000 people. But in densely populated urban areas, Census tract-level data can mask wide variation in sociodemographic characteristics. Even ZIP code-level data might not be specific enough, with some participants saying health and other equity work often happens at the neighborhood level. Other questions included whether proxies such as rates of poverty or uninsured people might be good enough to target disadvantaged areas. Responding to a question about whether the indices are more effective than "more commonly used measures," a public health official said, "This is very much still an emergency response, so I have not been able to do that kind of look—I'd be very interested in learning what people find."

Implications: Indices Potentially a Powerful Health Equity Tool

While researchers have long documented significant racial and ethnic health disparities in the United States, the undeniable and glaring inequities laid bare by the pandemic have created new urgency—and an opportunity—to educate policymakers, especially elected officials, about why health equity matters in a real and powerful way. "There's been a change in the lexicon across our state… where every elected official now really understands about the conditions and some of the structural racism and institutions. So, it was and continues to be, I think, an amazing opportunity for us to shift the dialogue as we're starting to think about what does the future look like. How do we start making investments? How do we start really thinking in a new way in our recovery and beyond?" one participant observed.

Throughout the workshop, participants identified opportunities to learn from experiences using disadvantage indices to advance health equity, including investing in the public health data infrastructure, especially improved collection of race and ethnicity data. One participant stressed the importance of "improving the data infrastructure" through a "more sophisticated and souped-up data system that connects these different [equity] pieces, so you can look at all these different factors and do it in a more holistic way. The other thing I will just say… that collection of the race and ethnicity data itself is challenging."

One state health official recounted using vital records to capture race and ethnicity data, saying, "I was pulling literally tape from archives to get race and ethnicity data off of people's birth certificates because… our health care feeds just did not contain information." In the same vein, another official said, "If I can say anything, it's to invest in your infrastructure…. We had to do a lot of workarounds, and at this point, a year and a half later, it's not that sustainable, and so I think we're really looking forward to how can we be more resilient in the next response and really connect our systems a little bit better."

The use of disadvantage indices also has illuminated the potential of unifying health and other equity efforts across state government, including state health departments, Medicaid programs, governors' offices, and other state agencies to address issues ranging from chronic disease to homelessness, food insecurity, behavioral health, and re-entering the community from the juvenile justice/corrections systems. Rather than characterizing communities as disadvantaged, policymakers can change the lexicon to talk about investing in "communities of opportunity," a participant said, and use the SVI or other place-based measures to center health equity discussions on economic development and gain business community buy-in. Other possibilities include using indices to help build data linkages and referral networks among health care providers, health plans, accountable care organizations, and community organizations to work together in addressing the social determinants of health underlying health inequities.

"Disadvantage indices can continue to inform how we allocate resources, whether it's for issues around homelessness, behavioral health issues, food insecurity—there's a whole list… and, ultimately, we want to actually get to those structural discrimination pieces, which are underlying all of this, and that does come down to policy and systems," a presenter said.

And there is little time to waste, as the same presenter observed that capturing policymakers' attention, coupled with generous federal relief and recovery funding, creates a limited window of opportunity to advance both health equity and broader public health initiatives. "We have the attention of governors, of legislators, of the business community in a way that I think we've never had their attention before, as they have seen what a pandemic can do and how integral public health is in a way [to the economy] that I don't think people really ever understood."

About the Author

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