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Vaccination Equity by Design

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ABSTRACT. This Essay examines how states' initial COVID-19 vaccine-distribution strategies tended to disadvantage populations of color, including Black, Latinx, and Native American communities. These dynamics resonate with "inverse equity" effects of other public-health innovations. We argue for a federal regulatory framework to reduce inequity-forcing effects during initial vaccine rollout.

INTRODUCTION

Racial disparities in COVID-19 exposure, cases, and outcomes have been a salient feature of the U.S. pandemic. From its earliest days in 2020, COVID-19 transmission skyrocketed in Black, Latinx, and Native American communities. Members of these populations have been two to three times more likely to be hospitalized and more than twice as likely to die from COVID-19 as white, non-Hispanic people.[1]

As 2020 came to an end, the Food and Drug Administration (FDA) began to approve vaccine candidates for emergency use.[2] Plans for vaccination rollout sparked optimism that the pandemic—and the disproportionate burdens it had

1. *See Hospitalization and Death by Race/Ethnicity*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 26, 2021), https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html [https://perma.cc/P8A9-X4B9].

2. *See FDA Takes Key Action in Fight Against COVID-19 by Issuing Emergency Use Authorization for First COVID-19 Vaccine: Action Follows Thorough Evaluation of Available Safety, Effectiveness, and Manufacturing Quality Information by FDA Career Scientists, Input from Independent Experts*, U.S. FOOD & DRUG ADMIN. (Dec. 11, 2020), https://www.fda.gov/news-events/press-announcements/fda-takes-key-action-fight-against-covid-19-issuing-emergency-use-authorization-first-covid-19 [https://perma.cc/3KZC-7YNF] (announcing issuance of emergency-use authorization for Pfizer-BioNTech COVID-19 Vaccine).

placed on communities of color—was coming to an end. In the short term, however, optimism about the equity-promoting effects of COVID-19 vaccination was misplaced. In mid-March 2021, surveillance data from forty-four states revealed "a consistent pattern" of lower vaccination rates in communities of color.[3] At the national level, data trends showed much of the same: by July 2021, the Centers for Disease Control and Prevention (CDC) reported that of the fifty-seven percent of vaccine recipients for whom race was known, sixty-one percent were white, fifteen percent were Latinx, and just nine percent were Black.[4] For Black populations nationwide and in most reporting states,[5] rates of vaccination during the initial vaccine-rollout period were lower than the rates of adverse effects from the disease.

These data were no surprise to public-health scholars of the "inverse equity hypothesis."[6] This theory predicts that when health innovations emerge, they are initially adopted by wealthy and connected segments of the population, thereby amplifying rather than reducing inequality.[7] COVID-19 vaccination is a case study, characterized by greater uptake in U.S. counties with higher socioeconomic status, lower proportions of racial and ethnic minorities or limited-Eng-

3. Nambi Ndugga, Latoya Hill & Samantha Artiga, *Latest Data on COVID-19 Vaccinations by Race/Ethnicity*, KAISER FAM. FOUND. (Sept. 9, 2021), https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-on-covid-19-vaccinations-race-ethnicity [https://perma.cc/L4GG-SNBF].

4. *See COVID Data Tracker*, CTRS. FOR DISEASE CONTROL & PREVENTION (June 30, 2021), https://covid.cdc.gov/covid-data-tracker/#vaccination-demographic [https://perma.cc/CHE3-98LQ] (reporting raw data on known characteristics of vaccine recipients). Many jurisdictions have only limited data on the distribution of vaccines by recipient race and ethnicity. *See* Elizabeth M. Painter et al., *Demographic Characteristics of Persons Vaccinated During the First Month of the COVID-19 Vaccination Program*, 70 MORBIDITY & MORTALITY WKLY. REP. 174 (2021), https://www.cdc.gov/mmwr/volumes/70/wr/mm7005e1.htm [https://perma.cc/PL8D-CA6J]. But where data exist, they are consistent in showing a disproportionate flow of vaccines to white people despite a lower share of COVID-19 cases and deaths in this group. Ndugga et al., *supra* note 3.

5. Ndugga et al., *supra* note 3.

6. Cesar Gomes Victoria, Gary Joseph, Inacio C.M. Silva, Fatima S. Maia, J. Patrick Vaughan, Fernando C. Barros & Aluisio J.D. Barros, *The Inverse Equity Hypothesis: Analyses of Institutional Deliveries, 286 National Surveys*, 108 AM. J. PUB. HEALTH 464 (2018). For an early application of this idea to COVID-19 vaccination, see Adam Todd & Clare Bambra, *Learning from Past Mistakes? The COVID-19 Vaccine and the Inverse Equity Hypothesis*, 31 EUR. J. PUB. HEALTH 2 (2021).

7. Victoria et al., *supra* note 6, at 464 ("We postulate that new interventions will initially reach those of higher socioeconomic status and only later affect the poor.").

lish-proficiency residents, and greater access to quality housing and transportation.[8] These dynamics are part of a familiar pattern, in which socially vulnerable communities—particularly communities of color—already carry a larger proportion of illness and death.[9] Vaccines are like other health innovations: they initially widen the gap between the rich and poor. And although these inequality-exacerbating effects tend to abate once there is near-universal access,[10] this is no consolation for the communities who experience greater morbidity and mortality in the meantime.

The inverse equity effect of COVID-19 vaccination is predictable, but not inevitable: early vaccine access depends on the design of distribution systems, and these systems can (and should) account for equity concerns early on. Indeed, designers of distribution systems like the CDC and state departments of health had tools to mitigate inverse equity effects from the beginning of the vaccine-rollout period. The progress of vaccination in the United States has been complex, with heterogeneous state distribution programs prioritizing equity, including racial equity, differently.[11] At the federal level, regulatory efforts to promote vaccination equity have been incomplete,[12] which contributes to the haphazard and often belated efforts to expand vaccine access to the racial groups most at risk.

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8. *See* Michelle M. Hughes et al., *County-Level COVID-19 Vaccination Coverage and Social Vulnerability—United States, December 14, 2020-March 1, 2021*, 70 MORBIDITY & MORTALITY WKLY. REP. 431 (2021) (reporting vaccination rates by the social vulnerability index, which includes poverty rates, income, unemployment, household density, and disability).

9. There are important qualifications to this racial- and ethnic-disparity data. States collect data differently, and a February 2021 analysis found that racial and ethnic data were absent for nearly half of those vaccinated. *See* Rebecca Cooper, Ariella Levisohn & Jill Rosenthal, *States Identify and Address COVID-19 Vaccine Disparities Through Targeted Rollout and Outreach*, NAT'L ACAD. FOR STATE HEALTH POL'Y (Feb. 8, 2021), https://www.nashp.org/states-identify-and-address-covid-19-vaccine-disparities-through-targeted-rollout-and-outreach [https://perma.cc/6DAM-NND4].

10. Todd & Bambra, *supra* note 6.

11. *See State Plans for Vaccinating Their Populations Against COVID-19*, NAT'L ACAD. FOR STATE HEALTH POL'Y (Apr. 19, 2021), https://www.nashp.org/each-states-plan-for-vaccinating-its-populations-against-covid-19 [https://perma.cc/GGM5-25Z4] (identifying how different states prioritized particular populations in each phase of vaccine distribution); Harald Schmidt, Rebecca Weintraub, Michelle A. Williams, Kate Miller, Alison Buttenheim, Emily Sadecki, Helen Wu, Aditi Doiphode, Neha Nagpal, Lawrence O. Gostin & Angela A. Shen, *Equitable Allocation of COVID-19 Vaccines in the United States*, 27 NATURE MED. 1298 (2021) (mapping states' use of different metrics and allocation strategies to promote equity in vaccine distribution).

12. *See infra* Part II (describing state and federal policy choices in vaccine distribution).

In this Essay, we identify policy drivers of racial inequity in early access to the COVID-19 vaccine, including health-system infrastructure, physical distribution channels, opt-in and demand-based signups, access to information and distribution platforms, and justified medical mistrust. We then offer a regulatory framework for addressing inequity in vaccine allocation and distribution. Building on literature from behavioral economics, public health, and civil rights, this Essay advocates for the use of federal regulatory tools to counter inverse equity effects from the start of vaccine rollouts. These tools are designed to encourage delivery mechanisms involving trusted local organizations, opt-out systems to supplement or replace demand-based enrollment strategies, and "targeted universalism"[13] priorities that broaden access to more disadvantaged individuals within priority populations. Although state governments take the lead in designing U.S. vaccine-distribution strategies, we prioritize federal regulatory tools because they have nationwide applicability and have not been used to their fullest in the COVID-19 vaccine rollout.

We focus on vaccine equity on the basis of race and ethnicity in the United States. In a pandemic context, equitable or "fair" distribution of vaccines could be defined in multiple ways. Most conceptions of equitable distribution suggest that vaccine allocation should track the epidemiological burdens of the COVID-19 disease: vaccines should be distributed in proportions that correspond to each community's COVID-19-related morbidity and mortality.[14] In its weekly *Morbidity and Mortality* reports, the CDC has defined "vaccine equity" along these lines: "preferential access and administration to those who have been most affected by COVID-19 disease."[15] This differs from what the CDC has called "vaccine equality," which is characterized by a "similar allocation of vaccine supply proportional to . . . [the] population."[16] Other equity concepts—such as anti-

13. *See* John A. Powell, Stephen Menendian & Wendy Ake, *Targeted Universalism: Policy & Practice*, HAAS INST. (May 2019), https://belonging.berkeley.edu/targeteduniversalism [https://perma.cc/9MHC-ARU4].

14. *See* Ndugga et al., *supra* note 3.

15. Hughes, *supra* note 8, at 431. Other commentators have focused on the need to prioritize zip codes most affected by COVID-19. *See, e.g.*, Muriel Jean-Jacques & Howard Bauchner, *Vaccine Distribution—Equity Left Behind?*, 325 J. AM. MED. ASS'N 829, 829 (2021); Daniel Salmon, Douglas J. Opel, Matthew Z. Dudley, Janesse Brewer & Robert Breiman, *Reflections on Governance, Communication, and Equity: Challenges and Opportunities in COVID-19 Vaccination*, 40 HEALTH AFFS. 419, 422 (2021); Kai Kupferschmidt, *Global Plan Seeks to Promote Vaccine Equity, Spread Risks*, 369 SCIENCE 489 (2020).

16. Hughes et al., *supra* note 8, at 431. Some vaccine-distribution programs have used this definition instead. Maryland, for example, has proposed using the Vaccine Equity Index to track equity, computed as "the percentage of a racial/ethnic group that has received at least a first

subordination (avoiding "practices that enforce the inferior social status of historically oppressed groups"[17]) and anticlassification (avoiding any practices that "classify on the basis of race"[18]) — can provide useful shorthand in discussions of vaccine equity, but are less responsive (or unresponsive, in the case of anticlassification) to the immediate allocation of disease burden.[19] We will use "equity" to refer to vaccine allocation in proportion to the burden of COVID-19 morbidity and mortality, with a particular focus on racial equity.[20]

Part I of this Essay introduces the inverse equity hypothesis (IEH) and identifies patterns in early COVID-19 vaccination that appear to show inverse equity effects. Part II examines the factors driving vaccine disparity and shows how key design elements of current vaccine-distribution efforts contributed to or failed to mitigate inequities, relative to alternative designs. Part III draws on civil rights, behavioral economics, and public-health scholarship to propose federal regulatory mechanisms to advance equity.

I. COVID-19 VACCINATION AND THE INVERSE EQUITY HYPOTHESIS

The origins of the inverse equity hypothesis lie in a 1971 *Lancet* article, in which British physician Julian Tudor Hart introduced the "inverse care law."[21] The "inverse care law" captures the idea that, in a market-based system, "the availability of good medical care tends to vary inversely with the need for it in

dose divided by the percentage of that racial/ethnic group in the total population." Andrew Maul, Kavitha Reddy & Maulik Joshi, *Vaccine Equity Index Showed Reduction in Maryland COVID-19 Vaccination Disparity in Less than Two Months*, NEW ENG. J. MED. CATALYST (Apr. 23, 2021), https://catalyst.nejm.org/doi/pdf/10.1056/CAT.21.0126 [https://perma.cc/5UWN-4YUS].

17. Reva B. Siegel, *Equality Talk: Antisubordination and Anticlassification Values in Constitutional Struggles over Brown*, 117 HARV. L. REV. 1470, 1472 (2004).

18. *Id.* at 1470.

19. *See, e.g.*, Govind Persad, Monica E. Peek & Ezekiel J. Emanuel, *Fairly Prioritizing Groups for Access to COVID-19 Vaccines*, 324 J. AM. MED. ASS'N 1601 (2020) ("[A] misperception is that equal concern requires a lottery that gives all recipients identical chances, or chances more similar than preventing harm and prioritizing the disadvantaged would require. Lotteries are preferable to first-come, first-served or ability-to-pay allocation, which unacceptably exacerbate disadvantage. But lotteries are only acceptable when other considerations are approximately equal, which is vanishingly unlikely with a COVID-19 vaccine.").

20. We note here that our concerns and many of our regulatory suggestions may apply well to other populations at structural disadvantage in the United States. We focus here on racial equity as one dimension of urgent disparities in health-care access and outcomes, and we include statutes that explicitly target race-based inequities, such as Title VI of the 1964 Civil Rights Act. *See infra* Section III.A.

21. Julian Tudor Hart, *The Inverse Care Law*, 297 LANCET 405, 405 (1971).

the population served."[22] Universal health care through the National Health Service mitigated but did not eliminate this imbalance.[23] Hart's insight has been duplicated across decades, nations, and health-care sectors.[24]

The IEH is an unhappy corollary to Hart's inverse care law. Given inequality in the use of *existing* health-care resources, optimists might hope that *new* health-care technologies would be allocated in ways that reduce disparities. But this is rarely achieved.[25] Studies of innovations as varied as heart surgeries,[26] immunizations, HIV treatment, dental-cavity prevention, hospital births, vitamin supplements, and safe water have demonstrated that advances in health-care flow first to wealthy people, exacerbating rather than reducing disparities.[27]

According to the IEH, new interventions amplify inequality in a predictable pattern. Early in the diffusion of a new technology, such as a vaccine, wealthy people are early adopters.[28] As diffusion expands, demand among wealthier and middle-income people becomes saturated, while the poorest people slowly begin to gain access. Eventually, this delay in access drives persistent disparities to the

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22. *Id*. Hart described variations in all-cause and infant mortality by social class throughout the United Kingdom, demonstrating striking disparities favoring wealthier groups.

23. Michael Marmot, *An Inverse Care Law for Our Time*, 362 BRIT. MED. J. k3216 (2018); Graham Watt, *The Inverse Care Law Today*, 360 LANCET 252, 252 (2002).

24. Marmot, *supra* note 23, at k3216; *see also* Richard Cookson, Tim Doran, Miqdad Asaria, Indrani Gupta & Fiorella Parra Mujica, *The Inverse Care Law Re-Examined: A Global Perspective*, 397 LANCET 828, 828 (2021) (finding that the inverse care law "persists in almost all low-income and middle-income countries, whereby socially disadvantaged people receive less, and lower-quality, health care despite having greater need"). Cookson et al. extend this idea to the "disproportionate care law" prevalent in richer countries, in which disadvantaged people may receive *more* care than the wealthy, but that this care is lower quality and insufficient to meet poor people's heightened burden of illness. Cookson et al., *supra*, at 828-29.

25. *See* Cesar G. Victoria, J.P. Vaughan, F.C. Barros, A.C. Silva & E. Tomasi, *Explaining Trends in Inequalities: Evidence from Brazilian Child Health Studies*, 356 LANCET 1093, 1093 (2000).

26. *See* Rosemary J. Korda, Mark S. Clements & Jane Dixon, *Socioeconomic Inequalities in the Diffusion of Health Technology: Uptake of Coronary Procedures as an Example*, 72 SOC. SCI. & MED. 224, 224 (2011).

27. *See* Victoria et al., *supra* note 6; *see also* Cesar G. Victoria, Bridget Fenn, Jennifer Bryce & Betty R. Kirkwood, *Co-Coverage of Preventive Interventions and Implications for Child-Survival Strategies: Evidence from National Surveys*, 366 LANCET 1460, 1460, 1463-64 (2005) (reviewing primary sources showing the distribution of other innovations mentioned above).

28. This produces what is called "top inequality," where the wealthiest gain more rapidly than all other groups. Victoria et al., *supra* note 6, at 464. Some of the more fascinating demonstrations of the inverse equity hypothesis (IEH) are where a health-care practice is initially *thought* to be helpful (and is taken up quickly by the wealthy), but where subsequent research shows that it is in fact harmful, such as using C-sections without medical need or refusing the MMR vaccine. *Id.*

detriment of the most disadvantaged.[29] Vaccines and other innovations thus aggravate inequality when they are first introduced. It is only later, when coverage is widespread and the wealthy have extracted their full benefit, that expanding access to the innovation can narrow health-status gaps between the rich and the poor.[30]

In the United States, the health gap between the rich and poor tracks longstanding racial disparities in wealth and health care that disadvantage people of color.[31] Racial disparities in health care reflect not only structural racism (e.g., socioeconomic exclusion, unequal insurance availability, residential segregation, inaccessibility of health-care facilities, and exposure to incarceration[32]), but also explicit and implicit racial biases among care providers.[33] As applied to the United States, the dynamics of the IEH reflect not only rapid demand for new innovations among wealthier and whiter patients, but also inadequate supply of new innovations among patients of color due to institutional and interpersonal racism, even when socioeconomic status is held constant.

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29. *Id.* at 467 ("[A]bsolute inequalities in population coverage . . . tend to increase as national coverage rises to about 50%, and to decline at higher levels of coverage, resulting in an inverted U-shaped pattern . . . . [I]nequalities will necessarily be small when national coverage is either very low or very high."); *see also* John Tayu Lee, Zhilian Huang, Sanjay Basu & Christopher Millett, *The Inverse Equity Hypothesis: Does It Apply to Coverage of Cancer Screening in Middle-Income Countries?*, 69 J. EPIDEMIOLOGY CMTY. HEALTH 149, 151 (2015) (finding continued lack of access to cancer screening in the poorest quintiles of low-income and middle-income countries).

30. Victoria et al., *supra* note 6, at 1093 ("We postulate that new interventions will initially reach those of higher socioeconomic status and only later affect the poor. This results in an early increase in inequity ratios for coverage, morbidity, and mortality indicators, followed later by a reduction when the poor gain greater access to the interventions and the rich reach minimum achievable levels for morbidity and mortality, beyond which there are unlikely to be substantial further improvements."). *But see, e.g.*, Martin White, Jean Adams & Peter Heywood, *How and Why Do Interventions that Increase Health Overall Widen Inequalities Within Populations?*, SOC. INEQ. & PUB. HEALTH 65, 75 (Salvatore J. Babones ed., 2009) (criticizing the IEH as overbroad and presenting theoretical alternatives).

31. *See, e.g.*, Zinzi D. Bailey, Nancy Krieger, Madina Agénor, Jasmine Graves, Natalia Linos & Mary T. Bassett, *Structural Racism and Health Inequities in the USA: Evidence and Interventions*, 389 LANCET 1453 (2017) (describing drivers of structural racism in health-care access); Ruqaiijah Yearby, *Racial Disparities in Health Status and Access to Healthcare: The Continuation of Inequality in the United States Due to Structural Racism*, 77 AM. J. ECON. & SOC. 1113 (2018).

32. *See* Bailey et al., *supra* note 31 (reviewing pathways between structural racism and adverse health outcomes for people of color).

33. *Id.* at 1456; William J. Hall, Mimi V. Chapman, Kent M. Lee, Yesenia M. Merino, Tainayah W. Thomas, B. Keith Payne, Eugenia Eng, Steven H. Day & Tamera Coyne-Beasley, *Implicit Racial/Ethnic Bias Among Health Care Professionals and Its Influence on Health Care Outcomes: A Systematic Review*, 105 AM. J. PUB. HEALTH 60 (2015).

Pre-exposure prophylaxis medication, which prevents HIV infection among people who are HIV-negative, provides a case study. Access has lagged among Black individuals despite the elevated burden of HIV infection among people of color,[34] and implicit racial bias likely contributes to this effect.[35] Many other studies show lagging access among people of color to health-care technologies, including cancer screenings,[36] seasonal flu vaccination,[37] pediatric care,[38] and organ transplantation.[39]

Experiences with racism in health care have also prompted justified mistrust among populations of color in the United States,[40] particularly given the exploitation of Black people by the medical system since slavery.[41] Much of the scholarship on medical mistrust cites to awareness of the Tuskegee Syphilis Study, which withheld penicillin from low-income Black men until as late as 1972 in order to observe the long-term effects of syphilis infection.[42] But medical exploitation and neglect of Black communities long predates the events of Tuskegee, and ongoing experiences of discrimination reinforce the view that the health-

34. *See* Bisola O. Ojikutu, Laura M. Bogart, Molly Higgins-Biddle, Sannisha K. Dale, Wanda Allen, Tiffany Dominique & Kenneth H. Mayer, *Facilitators and Barriers to Pre-Exposure Prophylaxis (PrEP) Use Among Black Individuals in the United States: Results from the National Survey on HIV in the Black Community*, 22 AIDS & BEHAV. 3576 (2018).

35. Sarah K. Calabrese, Valerie A. Earnshaw, Kristen Underhill, Nathan B. Hansen & John F. Dovidio, *The Impact of Patient Race on Clinical Decisions Related to Prescribing HIV Pre-Exposure Prophylaxis (PrEP)*, 18 AIDS & BEHAV. 226 (2014).

36. Arica White, Trevor D. Thompson, Mary C. White, Susan A. Sabatino, Janet de Moor, Paul V. Doria-Rose, Ann M. Geiger & Lisa C. Richardson, *Cancer Screening Test Use — United States, 2015*, 66 MORBIDITY & MORTALITY WKLY. REP. 201 (2017).

37. *See* Anna Rouw, Adam Wexler, Lindsey Dawson, Jennifer Kates & Samantha Artiga, *State Variation in Seasonal Flu Vaccination: Implications for a COVID-19 Vaccine*, KAISER FAM. FOUND. (Nov. 2, 2020), https://www.kff.org/coronavirus-covid-19/issue-brief/state-variation-in-seasonal-flu-vaccination-implications-for-a-covid-19-vaccine [https://perma.cc/33GV-WAMP].

38. *See* Glenn Flores, *Racial and Ethnic Disparities in the Health and Health Care of Children*, 125 PEDIATRICS 979 (2010).

39. *See* Rhiannon D. Reed & Jayme E. Locke, *Social Determinants of Health: Going Beyond the Basics to Explore Racial Disparities in Kidney Transplantation*, 104 TRANSPLANTATION 1324 (2020).

40. *See* Jessica Jaiswal & Perry N. Halkitis, *Towards a More Inclusive and Dynamic Understanding of Medical Mistrust Informed by Science*, 45 BEHAV. MED. 79 (2019); Kimberly D. Manning, *The Art of Medicine: More than Medical Mistrust*, 396 LANCET 1481 (2020); Lillie D. Williamson, Marisa A. Smith & Cabral A. Bigman, *Does Discrimination Breed Mistrust?*, 24 J. HEALTH COMMC'N 791 (2019).

41. *See generally* HARRIET A. WASHINGTON, MEDICAL APARTHEID: THE DARK HISTORY OF MEDICAL EXPERIMENTATION ON BLACK AMERICANS FROM COLONIAL TIMES TO THE PRESENT (2008) (documenting centuries of medical exploitation of Black people in the United States).

42. *Id.* at 80.

care system acts against the health interests of Black people.[43] Prior work has found that mistrust can cause delays in seeking care and reduced adherence to treatment, and that experiences of health-care discrimination can augment this mistrust.[44] In these ways, justified medical mistrust can present an additional access barrier to new health-care technologies among people of color, and it is likely to affect vaccination access in the COVID-19 context.[45]

The COVID-19 pandemic has generated novel medical interventions, including tests, treatments, and vaccines. With many of these innovations, patterns of uptake in the United States and elsewhere have been consistent with the IEH.[46] In some countries, and on a global scale, this manifests in socioeconomic disparities driven by early access for the wealthy, followed by lagging access for the most disadvantaged.[47] In the United States, the IEH also reflects racial disparities, demonstrated by early access for whiter (and wealthier) communities,

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43. *Id.*

44. Dayna Bowen Matthew, *Legal Battles Against Discrimination in Healthcare*, *in* THE OXFORD HANDBOOK OF U.S. HEALTH LAW 167, 172 (I. Glenn Cohen, Allison K. Hoffman & William M. Sage eds., 2017).

45. *See* Hayley S. Thompson et al., *Factors Associated with Racial/Ethnic Group-Based Medical Mistrust and Perceptions on COVID-19 Vaccine Trial Participation and Vaccine Uptake in the US*, 4 J. AM. MED. ASS'N NETWORK OPEN (May 27, 2021), https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2780402 [https://perma.cc/VEX9-M2Q8]. We use the phrase "justified medical mistrust" to emphasize that the institutions that create or reinforce mistrust should bear the burden of correcting these barriers, rather than the communities that experience discrimination. *See* Jaiswal & Halkitis, *supra* note 40, at 81 ("Medical mistrust, and conspiracy beliefs in particular, have been conceptualized as a 'cultural barrier,' insinuating that such mistrust is a characteristic of populations of color in the United States. This framing is problematic and likely racist in that it situates the onus to overcome medical mistrust on the population experiencing structural, social, political, and economic exclusion and marginalization, rather than the institutions and entities that have created environments that engender mistrust and sustain institutionalized inequalities.").

46. *See* Ndugga et al., *supra* note 3, fig.4 (reporting vaccination by race in the United States from March through September 2021, and showing the predictable IEH pattern of initially small inequalities at the moment of first rollout, followed by increased disparities between the proportions of white and Black recipients, followed by narrowing disparities in later phases of rollout); Anna Rouw, Adam Wexler, Jennifer Kates & Josh Michaud, *Tracking Global COVID-19 Vaccine Equity*, KAISER FAM. FOUND. figs.1 & 5 (July 21, 2021), https://www.kff.org/coronavirus-covid-19/issue-brief/tracking-global-covid-19-vaccine-equity [https://perma.cc/RQ72-QWGT] (demonstrating inequality in vaccine distribution on the basis of country-level income, with sharp rises in equality driven by high-income country behavior in the months after vaccine approval).

47. This is true in other countries as well as globally. *See, e.g.*, Julien Riou, Radoslaw Panczak, Christian L. Althaus, Christoph Junker, Damir Perisa, Katrin Schneider, Nicola G Criscuolo, Nicola Low & Matthias Egger, *Socioeconomic Position and the COVID-19 Care Cascade from Testing to Mortality in Switzerland: A Population-Based Analysis*, LANCET (July 9, 2021), https://

with lagging access for communities of color. From the start, racial disparities in infection have been striking, as have disparities in hospitalization, with people of color more likely to be exposed, infected, and hospitalized.[48] Among hospitalized patients, several U.S. studies have shown no racial disparities in mortality, suggesting similar outcomes once patients access hospital care.[49] But these findings focus exclusively "on individuals able to access hospital care,"[50] and racial disparities persist for access to many hospital services.[51]

Overall, U.S. data have shown that white individuals have accessed COVID-19 vaccination at rates that exceed their share of cases, while Black and Latinx individuals have been vaccinated at lower rates.[52] In the first month of vaccine

www.thelancet.com/journals/lanpub/article/PIIS2468-2667(21)00160-2/fulltext [https://perma.cc/8Z49-4EYV]; Julien Riou, Radoslaw Panczak, Christian L. Althaus, Christoph Junker, Damir Perisa, Katrin Schneider, Nicola G. Criscuolo, Nicola Low & Matthias Egger, *Socioeconomic Position and the Cascade from SARS-CoV-2 Testing to COVID-19 Morality: Analysis of Nationwide Surveillance Data* (2021) (unpublished manuscript), https://osf.io/m75vp [https://perma.cc/42F8-AEDQ] (finding disparities in testing based on socioeconomic status); Anna Rouw, Adam Wexler, Jennifer Kates & Josh Michaud, *Global COVID-19 Vaccine Access: A Snapshot of Inequality*, KAISER FAM. FOUND. (Mar. 17, 2021), https://www.kff.org/policy-watch/global-covid-19-vaccine-access-snapshot-of-inequality [https://perma.cc/V9EY-GLAZ] (documenting access to COVID-19 vaccination on the basis of national income).

48. Clyde W. Yancy, *COVID-19 and African Americans*, 323 J. AM. MED. ASS'N 1891 (2020); Don Bambino Geno Tai, Aditya Shah, Chyke A. Doubeni, Irene G. Sia & Mark L. Wieland, *The Disproportionate Impact of COVID-19 on Racial and Ethnic Minorities in the United States*, 72 CLINICAL INFECTIOUS DISEASES 703 (2021); *COVID-19 Racial and Ethnic Health Disparities*, CTRS. FOR DISEASE CONTROL & PREVENTION (Dec. 10, 2020), https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/racial-ethnic-disparities/index.html [https://perma.cc/T86F-VM5W].

49. *See, e.g.*, Baligh R. Yehia, Angela Winegar, Richard Fogel, Mohamad Fakih, Allison Ottenbacher, Christine Jesser, Angelo Bufalino, Ren-Huai Huang & Joseph Cacchione, *Association of Race with Mortality Among Patients Hospitalized with Coronavirus Disease 2019 (COVID-19) at 92 US Hospitals*, 3 J. AM. MED. ASS'N NETWORK OPEN (2020).

50. *Id.* at 8.

51. *See, e.g.*, Ben Harder, Ronan Corgel & Tavia Binger, *Analysis of Racial Gaps in Hospital Care*, U.S. NEWS & WORLD REP. (July 27, 2021), https://health.usnews.com/health-news/blogs/second-opinion/articles/2021-07-27/analysis-of-racial-gaps-in-hospital-care [https://perma.cc/Z5EH-5MA3] (describing results of an equity analysis of the publication's best-ranked hospitals during 2015-2019; noting that "racial and ethnic minorities are underrepresented among patients who access many common services" at approximately four out of five hospitals, and that fewer than one-third of hospitals "treated a proportion of Black patients that was comparable to or higher than the proportion of Black residents in the community").

52. Ndugga et al., *supra* note 3.

availability, sixty percent of recipients were white, in part due to overall demographics in the prioritized population of health-care personnel.[53] But inequitable burdens persist *within* priority populations. For example, among health-care personnel, a majority of deaths were among people of color, including Black, Latinx, and Asian care workers.[54] Some studies have documented higher rates of vaccine hesitancy among Black populations, linked to justifiable medical mistrust.[55] However, disparities are present even among people who reported that they were willing to be vaccinated,[56] which is an important note given many other differences between people willing and unwilling to receive the vaccine in the United States.[57] Racial disparities are one part of overall disparities on the basis of social vulnerability and community disadvantage,[58] and findings from December 2020 through April 2021 show that disparities on the basis of social vulnerability increased as vaccine eligibility expanded to include more categories of people.[59]

These findings are discouraging. But not all health-care diffusion follows the inverse equity path. Governments, health-care systems, and providers can roll out innovations in ways that deliberately reduce inequality from the earliest

53. Painter et al., *supra* note 4, at 174.

54. *See* Samantha Artiga, Matthew Rae, Olivia Pham, Liz Hamel & Cailey Muñana, *COVID-19 Risks and Impacts Among Health Care Workers by Race/Ethnicity*, KAISER FAM. FOUND. (Nov. 11, 2020), https://www.kff.org/racial-equity-and-health-policy/issue-brief/covid-19-risks-impacts-health-care-workers-race-ethnicity [https://perma.cc/KD85-RYMN]; *see also Our Key Findings About US Healthcare Worker Deaths in the Pandemic's First Year*, GUARDIAN (Apr. 8, 2021), https://www.theguardian.com/us-news/ng-interactive/2020/dec/22/lost-on-the-frontline-our-findings-to-date [https://perma.cc/SJ89-MP2Z] (finding that nearly sixty-four percent of health-care worker deaths in the United States were among people of color).

55. *See* Lauren Bunch, *A Tale of Two Crises: Addressing COVID-19 Vaccine Hesitancy as Promoting Racial Justice*, 33 HEC F. 143, 146-49 (2021); Amyn A. Malik, SarahAnn M. McFadden, Jad Elharake & Saad B. Omer, *Determinants of COVID-19 Vaccine Acceptance in the US*, 26 ECLINICAL MED. 100495, 100497-99 (2020).

56. *See* Long H. Nguyen et al., Racial and Ethnic Differences in COVID-19 Vaccine Hesitancy and Uptake (Feb. 28, 2021) (unpublished manuscript) (on file with authors).

57. *See, e.g.*, Paul L. Reiter, Michael L. Pennell & Mira L. Katz, *Acceptability of a COVID-19 Vaccine Among Adults in the United States: How Many People Would Get Vaccinated?*, 38 VACCINE 6500 (2020); Cheryl Lin, Pikuei Tu & Leslie M. Beitsch, *Confidence and Receptivity for COVID-19 Vaccines: A Rapid Systematic Review*, 9 VACCINES 16 (2021).

58. *See* Hughes et al., *supra* note 8, at 431.

59. Vaughan Barry et al., *Patterns in COVID-19 Vaccination Coverage, by Social Vulnerability and Urbanicity, United States*, 70 MORBIDITY & MORTALITY WKLY. REP. 818, 818 (2021).

stages.[60] Researchers have sought to identify the features of health-care innovations that lead to inequality-amplifying initial effects. For example, systems using voluntary opt-in approaches can increase inequality, as opposed to opt-out or mandatory policies.[61] This is true for COVID-19 vaccination distribution, which requires individuals to actively seek out the vaccine, rather than defaulting to vaccination (i.e., requiring opt-outs). In contrast, interventions that specifically target vulnerable populations — or the use of multiple delivery options — can mitigate inverse equity effects.[62] These include, for example, offering financial incentives, reducing financial or access barriers, or specifically tailoring interventions to disadvantaged groups.[63]

COVID-19 has revealed continuing sources of race-based disadvantage in access to health-care innovations. We now turn to the distribution choices that shaped inverse equity effects in U.S. vaccine distribution.

II. CHOOSING INEQUITABLE VACCINE DISTRIBUTION

Key elements of the early design and distribution of the COVID-19 vaccines contributed to racial, ethnic, and socioeconomic disparities in initial access. As

60. Cesar Victoria et al., who originally generated the IEH, have also noted early successes in equitable distribution of vitamin A treatment for children, HIV treatment, institutional birth support, and flu vaccination prioritizing high-mortality populations. Victoria et al., *supra* note 6, at 464-65.

61. *See* White et al., *supra* note 30, at 71 ("A common attribute of interventions that lead to increased socio-economic inequalities in health appears to be a reliance on voluntary behaviour change." (citing David Mechanic, *Disadvantage, Inequality, and Social Policy*, 21 HEALTH AFFS. 48, 48-59 (2002))).

62. Victoria et al., *supra* note 6, at 464-65.

63. *Id.* at 469 (offering strategies such as providing free services in needy areas, adjusting some interventions to allow for preferred local practices, and planning rollout such that "all interventions should be initially deployed in the neediest areas"). Financial incentives for individual vaccine uptake may be part of the solution, but it will not solve access problems more generally. *See, e.g.*, Kevin G. Volpp & Carolyn C. Cannuscio, *Incentives for Immunity – Strategies for Incentivizing Covid-19 Vaccine Uptake*, 385 NEW. ENG. J. MED. 381 (2021) (aggregating examples of state financial-incentives programs for vaccination and emphasizing that "though a well-designed incentive program could boost vaccination rates in the short term, there are likely to be significant hiccups in implementation"); Rebeca Carmo de Souza Cruz, Leides Barroso Azevedo de Moura & Joaquim José Soares Neto, *Conditional Cash Transfers and the Creation of Equal Opportunities for Health for Children in Low and Middle-Income Countries: A Literature Review*, 167 INT'L J. EQUITY HEALTH 161 (reviewing studies finding that cash financial incentives can improve childhood vaccination but noting that "cash transfers alone . . . may not be able to mitigate poverty and health inequalities in the presence of poor health services").

the IEH predicts, as supply of the vaccine has expanded, disparities have narrowed.[64] Yet early differences in vaccination meant that illness and hospitalization rates remained higher in communities of color and low-income communities well after vaccines became available.[65] In addition, racial and ethnic disparities in vaccination rates have persisted months after the initial authorization of the vaccine, particularly as measured against COVID-19 deaths.[66] These disparities will reverberate beyond the current pandemic because they are missed opportunities to strengthen public-health systems and to increase trust within underserved communities.

After emergency-use authorization of the Pfizer and Moderna vaccines in late 2020, federal regulators needed to tackle the difficult logistical, health, and ethical dimensions of providing access to what was still then a scarce resource. From the outset, federal regulators built in equity considerations when planning for vaccine rollout. The CDC announced its initial guidelines (developed by its Advisory Committee on Immunization Practice (ACIP)) in late 2020 and early 2021. The ACIP was explicit about its goal of reducing disparities given the extensive data on the racial and ethnic distribution of those most affected by COVID-19, as well "inequities in social determinants of health that are linked to COVID-19 risk."[67] Accordingly, an announced goal of the vaccine-allocation framework was to reduce and not exacerbate disparities.[68] The guidelines therefore recommended prioritizing access to individuals at high risk because of their age, nature of employment, confinement in long-term care facilities, and medical risk.[69] Although this phasing-in system indirectly prioritized many individuals of color by

64. *See* Ndugga et al., *supra* note 3 ("CDC data also show that recent vaccinations are reaching larger shares of Hispanic and Black populations compared to overall vaccinations."); sources cited *supra* note 46.

65. *See, e.g.*, Carla K. Johnson, Olga R. Rodriguez & Angeliki Kastanis, *As US COVID-19 Death Toll Nears 600,000, Racial Gaps Persist*, AP NEWS (June 14, 2021), https://apnews.com/article/baltimore-california-coronavirus-pandemic-race-and-ethnicity-health-341950a902affc651dc268dba6d83264 [https://perma.cc/YFZ4-25EV] (reporting in June 2021—six months after vaccines received authorization—that Black and Latinx populations continued to experience greater mortality from COVID-19 compared to other groups, and noting lower rates of vaccination as a possible contributing cause).

66. *See* Ndugga et al., *supra* note 3.

67. Nancy McClung et al., *The Advisory Committee on Immunization Practices' Ethical Principles for Allocating Initial Supplies of COVID-19 Vaccine—United States, 2020*, 69 MORBIDITY & MORTALITY WKLY. REP. 1782, 1783 (Nov. 27, 2020) ("Efforts should be made to identify and remove obstacles and barriers to receiving COVID-19 vaccine, including limited access to health care or residence in rural, hard-to-reach areas.").

68. *Id*.

69. On December 1, 2020, the Advisory Committee on Immunization Practice (ACIP) recommended that health-care personnel and residents of long-term care facilities be offered

listing high-risk workers, essential workers,[70] and those at high medical risk, the guidelines did not explicitly list race, ethnic, or socioeconomic considerations in their allocation plans.[71] These guidelines were not binding on states, though most states used key aspects of the CDC framework in designing their own distribution systems.[72]

Despite this early attention to equity considerations at the federal level and in many states, the first phase of vaccine distribution efforts did not avoid the inverse equity trap. Instead, ambiguity in the CDC guidance and the initial distribution decisions made by many states likely contributed to race- and ethnicity-based inverse equity effects. Governments rightly sought to distribute the vaccine rapidly, but they missed opportunities to mitigate racial, ethnic, and socioeconomic inequities.[73] The tendency by most jurisdictions in the initial distribution stages to rely heavily on opt-in, demand-based vaccine sign-ups, which depended on information and technology infrastructures that were already inequitably distributed, was a critical mistake. These systems interacted detrimentally with longstanding disparities in access to health care and technology like

COVID-19 vaccination first, in Phase 1a of the vaccination program. Then, on December 20, 2020, ACIP recommended that in Phase 1b, the vaccine should be offered to individuals over seventy-five years of age, and an expanded set of frontline essential workers. In Phase 1c, individuals sixty-five to seventy-four years of age, those with high-risk medical conditions, and other essential workers should be offered the vaccine. *See* Kathleen Dooling, Mona Marin, Megan Wallace, Nancy McClung, Mary Chamberland, Grace M. Lee, H. Keipp Talbot, José R. Romero, Beth P. Bell & Sara E. Oliver, *The Advisory Committee on Immunization Practices' Updated Interim Recommendation for Allocation of COVID-19 Vaccine — United States, December 2020*, 69 MORBIDITY & MORTALITY WKLY. REP. 1657 (Jan. 1, 2021).

70. People of color are overrepresented in essential occupations (frontline industries) in the United States; a 2020 analysis found that before the pandemic, Black people constituted 12% of all workers but 17% of workers in frontline industries. Hye Jin Rho, Hayley Brown & Shawn Fremstad, *A Basic Demographic Profile of Workers in Frontline Industries*, CTR. FOR ECON. & POL'Y RSCH. tbl.1 (Apr. 2020), https://cepr.net/wp-content/uploads/2020/04/2020-04-Frontline-Workers.pdf [https://perma.cc/WY79-P6M7].

71. *See* Dooling et al., *supra* note 69.

72. *See id.* (describing guidelines as "guidance" and "recommendations" for jurisdictions); *State Covid-19 Vaccine Priority Populations*, KAISER FAM. FOUND. (Apr. 19, 2021), https://www.kff.org/other/state-indicator/state-covid-19-vaccine-priority-populations [https://perma.cc/5LUZ-MP7T]; *see also* Dep't Health, *Plan Announced for Next Phase of Covid-19 Vaccine Distribution*, R.I. GOV'T (Jan. 28, 2021), https://www.ri.gov/press/view/40307 [https://perma.cc/M8GN-S26Y] (listing states that following ACIP guidance and those instances in which states deviated).

73. *See* Cooper et al., *supra* note 9 (noting that federal and state officials sought to balance quick vaccination with the need to vaccinate the most vulnerable communities, and that "[s]tate officials note that balancing speed and equity is one of the biggest challenges they face").

broadband internet.[74] The heavy reliance on online opt-in systems predictably increased barriers to accessing the vaccine for communities of color, adding to the obstacles already posed by justified mistrust in health-care systems.[75]

The remainder of this Part will consider three categories of choices that contributed to inverse equity effects: (A) decisions about the specificity of federal regulatory guidance, (B) state and local decisions to use demand-based and sometimes resource-intensive sign-up systems, and (C) decisions to centralize vaccine distribution in particular geographical locations and institutions.

A. Gaps in the CDC Guidance

First, the CDC prioritization guidelines excluded certain high-risk categories. By relying on broad categories of age, work status, and medical risk for initial prioritization, the guidelines effectively excluded additional ways of measuring social and health vulnerability that might have diminished racial and ethnic impact.[76] For instance, the initial guidelines chose not to prioritize communities at high risk or who had suffered high rates of COVID-19 infection and adverse consequences, many of which were communities of color or low-income communities.[77]

Subsequently, several states adopted prioritization strategies that diverged from the ACIP guidelines. Some states chose to prioritize social vulnerability differently: by high-risk neighborhoods in Rhode Island,[78] by multigenerational

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74. *See, e.g.*, *Internet/Broadband Fact Sheet*, PEW RSCH. CTR. (Apr. 7, 2021), https://www.pewresearch.org/internet/fact-sheet/internet-broadband/?menuItem=3109350c-8dba-4b7f-ad52-a3e976ab8c8f [https://perma.cc/5XHQ-9MV2] (finding persistent racial gaps in access to a broadband connection at home, although percentages of adults who say that they use the internet differed little by race in recent years).

75. *See* Hayley S. Thompson et al., *supra* note 45, at 6-9 (finding that elevated rates of rejection of COVID-19 vaccine-trial participation and uptake were attributable in part to group-based medical mistrust).

76. *See supra* note 69 and accompanying text.

77. *See id.*

78. *See* KAISER FAM. FOUND., *supra* note 72 (describing the then-forthcoming Phase 2 shift away from occupation to "age, geography, and high-risk conditions").

households in Oregon and Washington,[79] and by communities of color (particularly Native American communities) in Montana.[80] By the late winter and early spring, as vaccine supply increased, some states targeted particular neighborhoods to reach communities that were most affected by the pandemic, but that had lower vaccination rates relative to the general population.[81] This response, while likely helpful, has made visible the initial design choice not to incorporate more direct targeting into early-stage guidelines.

With more specific guidance, the CDC may have prompted more equitable allocation priorities in state vaccination plans. This guidance could have taken several forms. One strategy would have been to keep ACIP's priority categories

79. *Id.* National data show that households of color are significantly more likely to be multigenerational. ACIP provided data showing that Black and Latino individuals over the age of seventy-five were more likely to live in multigenerational households. *See* Dooling et al., *supra* note 69.

80. KAISER FAM. FOUND., *supra* note 72. On April 1, two weeks before vaccinations were open to all adults in the state, Vermont indicated that it would prioritize Black, Indigenous, and People of Color (BIPOC) communities for receipt of the vaccine. *See* Phil Galewitz, *Vermont to Give Minority Residents Vaccine Priority*, KHN (Apr. 5, 2021), https://khn.org/news/article/vermont-gives-blacks-and-other-minority-residents-vaccine-priority [https://perma.cc/G4S9-Q6J6]. The explicit use of race as a sole factor raised some criticism. *Vermont's Race-Base Vaccine Policy Raises Legal Questions*, ECONOMIST (Apr. 11, 2021), https://www.economist.com/united-states/2021/04/11/vermonts-race-based-vaccine-policy-raises-legal-questions [https://perma.cc/VES8-KZD4]. Below, we suggest a more cautious approach toward considering race as a factor for outreach and targeting, alongside other indicia of social vulnerability. *See infra* note 96 and accompanying text.

81. *See* Nambi Ndugga, Samantha Artiga & Olivia Pham, *How Are States Addressing Racial Equity in COVID-19 Vaccine Efforts?*, KAISER FAM. FOUND. (Mar. 10, 2021), https://www.kff.org/racial-equity-and-health-policy/issue-brief/how-are-states-addressing-racial-equity-in-covid-19-vaccine-efforts [https://perma.cc/P8ZZ-8DMA] (describing a range of efforts adopted in February 2021 to address racial disparities, including opening clinics in high-risk neighborhoods, allowing residents of heavily impacted neighborhoods to have the priority in appointment scheduling, and establishing partnerships with trusted community-based organizations). As an example, in March 2021, New York State moved away from exclusive reliance on opt-in systems and mass-distribution sites and adopted a range of strategies to address racial and socioeconomic inequities in vaccine distribution, including developing "pop-up clinics" in low-income and hard-hit communities, partnering with faith-based institutions, and establishing vaccination centers in public housing projects and senior centers. *See Governor Cuomo Announces 12 Community-Based Pop-Up Vaccination Sites Coming on Line this Week to Vaccinate 4,000 New Yorkers*, N.Y. STATE (Mar. 4. 2021), https://www.governor.ny.gov/news/governor-cuomo-announces-12-community-based-pop-vaccination-sites-coming-line-week-vaccinate [https://perma.cc/RJJ7-YKCT] (detailing outreach and targeted efforts to enhance equity and fairness in vaccine distribution).

(e.g., employment categories[82]), but to further prioritize the hardest-hit communities *within* those groups—a strategy that might be thought of as "nested" priorities. Several public-health researchers advocated for this strategy early on,[83] based on findings showing racial and ethnic disparities within priority categories. For example, there has been greater mortality among Black health-care workers due to workplace conditions, including the shortage of personal protective equipment (PPE).[84] A subcommittee of the National Academies of Science, Engineering, and Medicine (NASEM) recommended designs that embedded priorities even within priority groups—for instance, prioritizing health-care workers of color or workers operating in high-risk communities.[85] These designs, however, were not specifically recommended by the CDC.[86] A survey of U.S. adults suggests that most people supported approaches tailored to age, mortality risk, and employment, but the survey did not give participants the option to weigh in on race-based prioritization criteria.[87] An allocation mechanism that maintains universalist priority groups but also targets vulnerabilities *within* those groups may be publicly acceptable.

Another more specific strategy—one also recommended by NASEM in response to a request from the National Institutes of Health (NIH) and the CDC to develop a vaccine-allocation strategy for the initial stages of short supply[88]—

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82. The CDC guidelines suggested that selecting the right employment categories, including occupations disproportionately held by people of color, could address disparate impact. *See* Dooling et al., *supra* note 69 (noting that "certain essential worker groups have high proportions of some racial and ethnic minority groups who have experienced disproportionate COVID-19 incidence, morbidity, and mortality").

83. *See* Samantha Artiga & Jennifer Kates, *Addressing Racial Equity in Vaccine Distribution*, KAISER FAM. FOUND. (Dec. 3, 2020), https://www.kff.org/racial-equity-and-health-policy/issue-brief/addressing-racial-equity-vaccine-distribution [https://perma.cc/2ABR-C6KE].

84. *See* Artiga et al., *supra* note 54 (showing differential mortality of health-care workers by race).

85. *See* Helene D. Gayle & James F. Childress, *Race, Racism, and Structural Injustice: Equitable Allocation and Distribution of Vaccines for the COVID-19*, 21 AM. J. BIOETHICS 4-7 (2021) (recommending embedding equity in "each phase of the vaccination process" and recommending "when prioritizing vaccination among health care workers, our efforts must specifically avoid prioritizing only highly paid physicians and nurses, but also all others involved in patient care, such as the other front-line workers who are responsible for transporting patients, providing therapies, and other roles that require close contact with patients with COVID-19").

86. *See Framework for Equitable Allocation of COVID-19 Vaccine*, NAT'L ACADS. SCI., ENG'G & MED. (2020), https://www.ncbi.nlm.nih.gov/books/NBK562672/pdf/Bookshelf_NBK562672.pdf [https://perma.cc/4ZPB-BJA].

87. *See* Sarah E. Gollust, Brendan Saloner, Robert Hest & Lynn A. Blewett, *US Adults' Preferences for Public Allocation of a Vaccine for Coronavirus Disease 2019*, J. AM. MED. ASS'N NETWORK OPEN (Sept. 29, 2020), https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2770976 [https://perma.cc/8GLS-6LTD].

88. *See* NAT'L ACADS. SCI., ENG'G & MED., *supra* note 86, at 2.

would have been to allocate vaccine priority based on measures of social vulnerability. Elsewhere, the CDC has used the Social Vulnerability Index, a measure that has predicted disparities in COVID-19 risk, hospitalization, and death and correlates with race-based disparities.[89] NASEM agreed with this measure and recommended prioritizing geographic areas "identified as vulnerable through CDC's Social Vulnerability Index or another more specific index" for vaccine access.[90] Some states approximated measures of social vulnerability in other ways. Rhode Island, for example, incorporated measures of hospitalization, death, and cases to allocate vaccines geographically.[91] The state pinpointed these locations, and then made vaccines accessible locally via community clinics, housing, and pharmacies.[92]

In addition to these strategies, the CDC could have prompted more equitable vaccine distribution by explicitly invoking race and ethnicity alongside other indicators of vulnerability, using a more targeted approach. The faith that employment and age-based priority categories would capture the racially disproportionate impact of COVID-19 ignores the lessons of past universalist approaches that fail to respond to specific mechanisms of subordination or disadvantage.[93] Uni-

89. *See id.* at 8-9. For an investigation of the relationship between social vulnerability and COVID-19 deaths, see Sage J. Kim & Wendy Bostwick, *Social Vulnerability and Racial Inequality in Covid-19 Deaths in Chicago*, 47 HEALTH EDUC. & BEHAV. 509, 509 (2020), which found "significant spatial clusters of social vulnerability and risk factors, both of which are significantly associated with the increased COVID-19-related death rates."

90. NAT'L ACADS. SCI., ENG'G & MED., *supra* note 86, at 8-9. Some have also advocated for the use of the Area Deprivation Index, which uses similar criteria to the Social Vulnerability Index but does not explicitly factor in race. Harald Schmidt, Lawrence O. Gostin & Michelle A. Williams, Opinion, *Is It Lawful and Ethnical to Prioritize Racial Minorities for COVID-19 Vaccines?*, J. AM. MED. ASS'N (Oct. 14, 2020), https://jamanetwork.com/journals/jama/fullarticle/2771874 [https://perma.cc/YS9M-6X3M].

91. Cooper et al., *supra* note 9.

92. *Id.*

93. *See* Samuel R. Bagenstos, *Universalism and Civil Rights (with Notes on Voting Rights After* Shelby), 123 YALE L.J. 2838, 2842 (2014) (defining a universalist approach to civil-rights law "as one that either guarantees a uniform floor of rights or benefits for all persons or, at least, guarantees a set of rights or benefits to a broad group of people not defined according to the identity axes (e.g., race, sex) highlighted by our antidiscrimination laws"); *id.* at 2859 (noting that a limitation of universalist approaches is that they "will often address broader problems of inequality and injustice only by taking for granted, and indeed entrenching, pre-existing group-based inequalities"); Powell et al., *supra* note 13, at 5, 10 (providing the example of Massachusetts's universal health-insurance programs, which faced an initial exacerbation of health-insurance disparities, but advanced a framework of "targeted universalism," in which "universal goals are established for all groups concerned [and the] strategies developed to achieve those goals are targeted, based upon how different groups are situated within structures, culture, and across geographies to obtain the universal goal").

versalist approaches that are nonspecific to race will also miss intersectional categories of greater vulnerability—including race and disability or health risk, race and density, race and place, race and limited English proficiency, and others. When many states moved to age-based categorizations, some commentators[94] and state governments realized that these priority groups were not responsive to the racial disparities in disease burden.[95]

State or federal allocation plans that use race as the sole factor for prioritizing access for individuals could draw constitutional challenges.[96] And yet, the use of formally race-neutral criteria, which ignore the distinct role that race and ethnicity has played in disease burden, risks reinforcing disparities in who has access to vaccines, and fails to acknowledge or address vaccine hesitancy linked to justified medical mistrust and histories of racial exploitation by the U.S. medical system. To address this issue, the CDC could explicitly encourage states to attend to racial inequities and barriers to access faced by communities of color. This approach would encourage states to address the ways in which trust, language, insurance, and other factors affect access by people of color. Specific strategies should include partnering with neighborhood and nonprofit groups, community medical- and social-service providers, or faith-based organizations. As Govind Persad has argued, these community-level strategies that consider the specific needs of high-risk communities of color are likely to withstand judicial scrutiny.[97] Given the strong correlation between race and COVID-19 disease burden in the United States, issuing CDC guidelines explicitly identifying race as one of multiple indicators of increased vulnerability (and therefore priority) could prompt states to attend to racial equity as an important aspect of distribution mechanisms.

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94. *See* Jean-Jacques & Bauchner, *supra* note 15.

95. For example, Rhode Island's guidelines specified, "[d]isparities also exist by race/ethnicity, highlighting the importance of a targeted approach that considers underlying factors in communities, such as population density, income, and healthcare access, that create higher risks for exposure, hospitalization, and death." *See* Dep't Health, *supra* note 72.

96. *See* Govind Persad, *Allocating Medicine Fairly in an Unfair Pandemic*, 2021 U. ILL. L. REV. 1085 (2021) (identifying legal precedents that may complicate the use of race as an explicit factor in vaccine distribution); Michael Conklin, *Racial Preferences in COVID-19 Vaccination: Legal and Practical Implications*, 5 HOW. HUM. & C.R.L. REV. 141 (2021) (considering equal-protection challenges to vaccination-distribution systems); Schmidt et al., *supra* note 90 (describing strategies for prioritizing racial minority groups in vaccine distribution).

97. *See* Persad, *supra* note 96, at 1097 (arguing that "uses of individual race in medical resource allocation are . . . much more vulnerable than, policies aiming to increase vaccine access at the community level in minority communities through targeted outreach, delivery of additional doses, or geographic priority").

Identifying race would also allow the CDC to make more tailored suggestions to address instances where race gives rise to unique access barriers. For example, a universalist approach does not acknowledge or address vaccine hesitancy linked to justified medical mistrust and histories of racial exploitation by the U.S. medical system.[98] This particular barrier will require access strategies that explicitly seek to build trust by partnering with neighborhood and nonprofit groups, community medical and social-service providers, or faith-based organizations. A recommendation by the CDC to include race among multiple indicators of vulnerability would prompt states to adopt frameworks that recognize and address race-specific barriers to access.

B. Demand-Based Distribution

A second key design choice made at the subnational level by many jurisdictions in the initial stages of vaccine distribution was to use opt-in, demand-based approaches to distribute vaccine doses. Individuals seeking a vaccine generally had to register and find appointments themselves; the default was no vaccination, and opting in required up-to-date information and access to opt-in systems. In many jurisdictions, individuals had to schedule appointments using the Internet, rather than via telephone or in-person scheduling or registration, or walk-in appointments.[99] This design choice reflected a balance of important con-

98. In March 2021, a Pew Research survey found racial disparities in intent to vaccinate. *See* Cary Funk & Alec Tyson, *Growing Share of Americans Say They Plan to Get a COVID-19 Vaccine—or Already Have*, PEW RSCH. CTR. (Mar. 5, 2021), https://www.pewresearch.org/science/2021/03/05/growing-share-of-americans-say-they-plan-to-get-a-covid-19-vaccine-or-already-have [https://perma.cc/9QAS-YKMG] (finding that in November 2020, 83% of Asian-Americans, 63% of Latinx, 61% of white people, and 42% of Black Americans indicated that they would take a COVID-19 vaccine, but that gaps had narrowed with new estimates of 91% of Asian-Americans, 70% of Latinx people, 69% of white people, and 60% of Black Americans).

99. *See* Valerie G. Press, Megan Huisingh-Scheetz & Vineet M. Arora, *Inequities in Technology Contribute to Disparities in COVID-19 Vaccine Distribution*, JAMA HEALTH F. (Mar. 19, 2021), https://jamanetwork.com/journals/jama-health-forum/fullarticle/2777888 [https://perma.cc/Y6J8-3C3R] ("[V]accine scheduling has predominantly relied on technology such as mobile apps and internet portals. Despite ongoing efforts to ensure equity, longstanding systemic disparities in technology access and literacy are hindering equitable vaccine distribution and raising bigger questions about how technology disparities may be affecting social and health disparities."); Laura Moy & Yael Cannon, *How to Build a More Equitable Vaccine Distribution Technology*, BROOKINGS INST. (Feb. 23, 2021), https://www.brookings.edu/techstream/how-to-build-more-equitable-vaccine-distribution-technology [https://perma.cc/G6RJ-E4MH] (noting that "the digital infrastructure used to set up vaccine appointments has created significant obstacles for individuals without certain technical resources" and that "[t]he online registration processes rolled out state by state are tragically too difficult for most people to

siderations, including the need for preregistration to verify compliance with narrow eligibility categories, the need to provide formally neutral and transparent sign-up systems (e.g., a first-come first-serve system within priority groups), and the need to ensure that vaccine registration was not imposed in a way that restricted individual autonomy and choice. But in many jurisdictions, this sign-up system created access barriers for communities of color.

Many sign-up platforms were complicated for all groups to use, but wealthier and whiter residents had many advantages, including the necessary equipment, broadband infrastructure, knowledge, and time.[100] Communities of color, low-income communities, and rural communities are less likely to have Internet and broadband, putting them at a fundamental disadvantage.[101] Even widely publicized voluntarist efforts to increase vaccine access through Twitter and scheduling bots could not fully address the problem, given that low-income individuals (and those over the age of sixty-five) are less likely to use social media platforms.[102] As some researchers have pointed out, the vaccine-rollout process was marked by a sad irony: obtaining a vaccine often required access to technology, rendering lower-income individuals who lacked the necessary technological infrastructure even more vulnerable to COVID-19.[103]

Alternative or additional systems such as telephone scheduling, in-person scheduling, and the deliberate integration of community partners or health systems in distribution could have mitigated some of this disadvantage. In the initial stages of rollout, many jurisdictions did not rely extensively on community-based organizations or trusted health systems (namely, sources of care that are

handle on their own," and recommending a range of alternatives including simpler and more accessible websites, setting aside appointments for high-risk communities, creating walk-in sites in vulnerable communities, and allowing sign-ups by telephone).

100. *See, e.g.*, Cooper et al., *supra* note 9 (recounting that officials in Washington, D.C. noticed racial, income, and neighborhood disparities in who was signing up for the vaccine once eligibility was expanded to all those over the age of sixty-five).

101. *See Internet/Broadband Fact Sheet*, PEW RSCH. CTR. (Apr. 7, 2021), https://www.pewresearch.org/internet/fact-sheet/internet-broadband [https://perma.cc/KE3U-7LX2].

102. *See* Sharon Otterman, *N.Y.'s Vaccine Websites Weren't Working. He Built a New One for $50*, N.Y. TIMES (Feb. 9, 2021), https://www.nytimes.com/2021/02/09/nyregion/vaccine-website-appointment-nyc.html [https://perma.cc/XUV2-8ZN5] (recounting that free websites and vaccine bots that find available appointments diminish scheduling difficulties for those who can access, but still require computer literacy).

103. *See* Natalie C. Benda, Tiffany C. Veinot, Cynthia J. Sieck & Jessica S. Ancker, *Broadband Internet Access Is a Social Determinant of Health!*, AM. J. PUB. HEALTH (July 8, 2020), https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2020.305784?journalCode=ajph& [https://perma.cc/MH54-UED4].

less likely to draw medical mistrust, particularly institutions embedded in or operated by local communities, such as neighborhood health centers[104]) to reach out to potential patients to assist with preregistration and appointment scheduling. Essentially, these strategies would shift from opt-in to opt-out distribution, and from state- or city-run platforms to platforms run by organizations with preexisting credibility and community buy-in.

C. Centralized (Mass) Distribution

A third inequality-amplifying strategy was the overreliance by many states and localities on centralized vaccination sites for initial vaccine distribution. We acknowledge that mass vaccination campaigns can and should be an important part of the pandemic response, but we align with commentators who have noted that mass vaccination should be carried out with attention to "community acceptance, accessibility, and equity," including communicating with community leaders, using call centers to address language barriers, and making transportation and physical access a priority.[105] Locating access to COVID-19 vaccination in large, centralized sites simplifies and speeds up vaccine administration, but also creates distance and travel barriers for at-risk communities, including communities of color.[106] Alternative or additional strategies for distribution could have mitigated these impacts, as demonstrated by states and localities that adopted more decentralized or place-based distribution strategies.[107] Decentralized distribution strategies that are sensitive to neighborhood characteristics have the dual advantages of reducing logistical access barriers and potentially reducing justified medical mistrust.

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104. *See infra* notes 108-111 (detailing the role community health partners might play in decreasing vaccine hesitancy).

105. *See* Eric Goralnick, Christoph Kaufmann & Atul A. Gawande, *Mass Vaccination Sites—An Essential Innovation to Curb the Covid-19 Pandemic*, 384 NEW ENG. J. MED e67(1), e67(2) (2021).

106. *See* Benjamin Rader, Christina M. Astley, Karla Therese L. Sy, Kara Sewalk, Yulin Hswen, John S. Brownstein & Moritz U. G. Kraemer, *Geographic Access to United States SARS-CoV-2 Testing Sites Highlights Healthcare Disparities and May Bias Transmission Estimates*, 27 J. TRAVEL MED. 1, 1 (2020).

107. *See* Maul et al., *supra* note 16 (describing Maryland's efforts to decentralize vaccine distribution by using mobile clinics). Commentators have suggested particular types of organizations, retail locations, and geographic locations in vaccine-distribution strategies. *See, e.g.*, Judith A. Chevalier, Jason L. Schwartz, Yihua Su & Kevin R. Williams, *Distributional Impacts of Retail Vaccine Availability* (Nat'l Bureau of Econ. Rsch., Working Paper No. 28835, 2021), https://www.nber.org/papers/w28835 [https://perma.cc/LNT4-ZN84].

Distributing the vaccine through decentralized networks of primary-care providers[108]—such as community health centers or pharmacies—or in collaboration with trusted community partners could have addressed many place-based and resource-based access barriers, while simultaneously reducing justified medical mistrust.[109] Community partners with high social capital, formal and informal resources, and social networks—such as housing providers, faith-based organizations, neighborhood health centers, libraries, pharmacies, and family doctors—can play a crucial role in building trust.[110] Peer-reviewed literature supports these distribution mechanisms; for example, a recent systematic review of efforts to reduce vaccine hesitancy has identified logistical and decentralized mechanisms that improve uptake of influenza shots and childhood vaccinations.[111] "Dialogue-based interventions"—interventions that work with community and religious leaders, connect with social mobilization efforts, use social or mass media, give local care providers communication tools and training, or push reminders directly to individuals in at-risk areas—showed particular promise, as each of these intervention types was found to increase vaccine uptake.[112] Centralized, demand-based distribution systems cannot serve these purposes, and many were discontinued as early vaccine demand was satisfied and the distribution focus shifted to underserved communities.[113]

The other advantage of decentralized distribution networks, either alongside or in lieu of mass vaccination sites, is that they build capacity. States that initiate and strengthen these efforts, particularly actions involving community partners and care providers (such as community clinics, pharmacies, and health centers),

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108. *See* Scott Ratzan, Eric C. Schneider, Hilary Hatch & Joseph Cacchione, *Missing the Point—How Primary Care Can Overcome COVID-19 Vaccine "Hesitancy,"* 384 NEW ENG. J. MED. e100(1), e100(1)-(3) (2021).

109. *Id.*

110. Partnering with local leadership and trusted community authorities (trusted messengers) can build credibility, help tailor messages for local audiences, and develop buy-in. *See* Emily K. Brunson, Alison Buttenheim, Saad Omer & Sandra Crouse Quinn, *Strategies for Building Confidence in the COVID-19 Vaccines*, NAT'L ACADS. SCI., ENG'G & MED. 7 (Feb. 2021), https://www.nap.edu/read/26068/chapter/1 [https://perma.cc/6K8B-MQ52].

111. Caitlin Jarrett, Rose Wilson, Maureen O'Leary, Elisabeth Eckersberger, Heidi J. Larson & the SAGE Working Group on Vaccine Hesitancy, *Strategies for Addressing Vaccine Hesitancy—A Systematic Review*, 33 VACCINE 4180, 4185-87 (2015).

112. *Id.* at 4185.

113. Sheryl Gay Stolberg, *With Mass Vaccination Sites Winding Down, It's All About the 'Ground Game,'* N.Y. TIMES (June 22, 2021), https://www.nytimes.com/2021/06/22/us/politics/mass-vaccination-sites-coronavirus.html [https://perma.cc/3TWJ-RTUL] (describing closing of federal- and state-run mass vaccination sites as demand waned and efforts shifted to harder to reach populations).

will increase the capacity of these networks to deliver other preventive-care interventions (such as influenza vaccinations and testing for current and future diseases). These benefits can outlast the immediate crisis and contribute to lasting increases in health-care access.

III. EQUITY BY DESIGN: REGULATORY TOOLS TO AVOID INVERSE EQUITY EFFECTS IN TIMES OF CRISIS

The prior Part identified alternatives or additions to the strategies that the federal government, states, and localities used to distribute COVID-19 vaccines. The omission of these elements has broader implications for strengthening the regulatory infrastructure and advancing public-health equity. State and local flexibility is essential for a decentralized and tailored approach, given differences in disease burdens, variation in available resources, and the legitimate advantage to be gained from experimentation across jurisdictions.

In this Part, we turn to federal law to identify how federal regulators can encourage (or mandate) vaccine-allocation strategies that would be most effective at reducing inverse equity effects. Federal systems have a comparative advantage in collecting and rapidly analyzing data, publicizing information with credibility, disseminating expertise through guidance, enforcing civil-rights violations, and supporting information networks. In what follows, we suggest a mix of hard and soft federal regulatory approaches to avoid inverse equity effects from the outset.

Throughout this Part, we note that traditional regulatory pacing and deliberation processes are less appropriate in times of widespread infectious disease. Indeed, this is a key reason why emergency statutes temporarily accord greater authority to the executive branch, which enables more nimble responses to emerging threats.[114] Some scholars have proposed rapid policy evaluations, which would be useful for informing future emergency responses.[115] As a practical matter, however, there is very little time to build in an evaluation ex ante in times of crisis. As an ethical matter, there may be insufficient equipoise—the equal likelihood that a new intervention will help or harm its target population compared to the current standard—to use randomized or controlled evaluations. And as an administrative matter, it may be difficult (or inadvisable) to supply

114. *See* Lawrence O. Gostin, Jason W. Sapsin, Stephen P. Teret, Scott Burris, Julie Samia Mair, James G. Hodge, Jr & Jon S. Vernick, *The Model State Emergency Health Powers Act*, 288 J. AM. MED. ASS'N 622 (2002); *see also* Cali Curley & Peter Stanley Federman, *State Executive Orders: Nuance in Restrictions, Revealing Suspensions, and Decisions to Enforce*, 80 PUB. ADMIN. REV. 623 (2020) (chronicling executive orders in the early stage of the COVID-19 pandemic).

115. Colleen V. Chien, *Rigorous Policy Pilots: Experimentation in the Administration of the Law*, 104 IOWA L. REV. 2313 (2019).

different messaging or rules for intervention and control conditions during an emergency.

But other evaluation designs are possible[116] and have contributed much to the COVID-19 response. We urge federal, state, and local governments to use these designs to evaluate the equity outcomes of their responses, including inverse equity effects when new preventive or treatment innovations are rolled out.

We now consider five categories of federal regulatory options that could increase equity from the outset of vaccine rollout, even in times of crisis: (1) providing specific guidance regarding equity goals and obligations, (2) providing default equity plans for state adoption, (3) collecting equity outcome data, (4) publicly disseminating and ranking state equity outcomes, and (5) facilitating information sharing among states.

The framework we suggest below is well within the power of federal authorities. Undoubtedly, the pandemic raised fundamental questions about the role of federal, state, local governments in regulating public health. The early days of the pandemic were marked by sharp contestations over distribution of PPE, stay-at-home orders, and mask mandates that implicated federalism and localism. And some have argued that the pandemic demonstrates the need for a more centralized federal authority over public-health emergencies.[117] While states have police power over public health,[118] the specific recommendations below flow from the CDC's and the Department of Health and Human Services' (HHS) current statutory and regulatory power over vaccine distribution, interstate disease transmission, data collection, and the conditioning of federal funds to prohibit discrimination.[119]

A. Equity Directives

Federal systems designers should have attended to race, ethnicity, and social vulnerability more explicitly in the initial guidance that they issued to states and localities. There are at least two points in the regulatory framework where federal agencies might have advanced racial and ethnic equity in the distribution of

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116. These alternatives could include pre-post assessments, regression-discontinuity designs, or difference-in-difference analyses of jurisdictions that vary due to different states' policy choices.

117. *See, e.g.*, Rebecca L. Haffajee & Michelle M. Mello, *Thinking Globally, Acting Locally—The U.S. Response to COVID-19*, 382 NEW ENG. J. MED. e75(1), e75(2)-(3) (2020).

118. *Id.*

119. *See, e.g.*, *infra* notes 120-122 (detailing agencies' Title VI authority); *see also* 42 U.S.C. § 264 (2018) (stating the Surgeon General's authority to "make and enforce such regulations as . . . are necessary to prevent the introduction, transmission, or spread of communicable diseases" from foreign countries or across states).

COVID-19 vaccines. First, as suggested in Part II, the CDC's allocation guidance could have recommended that jurisdictions attend to racial and ethnic disparities within priority groups, and they could have encouraged jurisdictions to prioritize counties or neighborhoods that were socially vulnerable and most affected by the pandemic.

Second, HHS and the Department of Justice (DOJ) should have issued clear directives under Title VI of the 1964 Civil Rights Act and other relevant civil-rights statutes to require states to adopt practices that would have promoted equitable vaccine access.[120] Title VI extends to federally funded programs,[121] and the applicability of Title VI and other civil-rights statutes to funding in health care was recently reinforced by the Affordable Care Act.[122] Federal assistance for the COVID-19 response, including the funds made available to support testing, vaccination, and treatment, likely would have qualified as "health program[s] or activit[ies]," enabling the DOJ or the HHS Office for Civil Rights to enforce Title VI in state COVID-19 vaccination rollouts.[123] Title VI also imposes duties of in-

120. *See* Civil Rights Act of 1964, 42 U.S.C. § 2000d (2018) (prohibiting discrimination on the basis of race, color, or national origin in federally funded programs). The DOJ is responsible for coordinating and implementing federal civil-rights laws "prohibiting discriminatory practices in Federal programs and programs receiving federal financial assistance." *See* Exec. Order No. 12250, 28 C.F.R. § 41 (2012).

121. *See, e.g.*, *Guidance to Federal Financial Assistance Recipients Regarding Title VI Prohibition Against National Origin Discrimination Affecting Limited English Proficient Persons*, U.S. DEP'T HEALTH & HUM. SERVS., https://www.hhs.gov/civil-rights/for-individuals/special-topics/limited-english-proficiency/guidance-federal-financial-assistance-recipients-title-vi/index.html [https://perma.cc/3ZHA-ULKP].

122. *See* 42 U.S.C. § 18116(a) (2018) (stating that individuals "shall not, on the ground prohibited under [Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, or the Federal Rehabilitation Act of 1973] be denied the benefits of, or be subjected to discrimination under, any health program or activity, any part of which is receiving Federal financial assistance"). The Affordable Care Act (ACA) also expanded the range and number of entities receiving federal financial assistance via large increases in federal spending, such as the advance premium tax credits for marketplace insurance.

123. Title VI, 42 U.S.C. § 2000d (2018), and other relevant civil rights laws that prohibit discrimination by recipients of federal funds such as section 504 of the Rehabilitation Act of 1973, 29 U.S.C. § 794 (2018), and Title IX of the Education Amendments Act of 1972, 20 U.S.C. § 1681 (2018), are also enforceable post hoc in court or by the agency. In the case of Title VI and Title IX, the Supreme Court has found that the disparate-impact regulations are only enforceable through administrative complaints. *See* Alexander v. Sandoval, 532 U.S. 275, 293 (2001) (holding that plaintiffs could not bring private judicial actions to enforce Title VI's disparate-impact regulations). Section 1557 guidance under the Obama Administration attempted to restore private rights of action for disparate-impact claims. *See* Nondiscrimination in Health Programs & Activities, 81 Fed. Reg. 31,376, 31,439-440 (May 18, 2016). But some courts declined

clusion that go beyond nondiscrimination to require the elimination of unjustified barriers.[124] And in other contexts, federal agencies have used their power under Title VI and federal civil-rights statutes to ensure that federal spending operates to diminish inequality and promote fair access to federally subsidized programs.[125] Indeed, HHS issued affirmative inclusionary guidance on the location and accessibility of COVID-19-testing sites on the basis of race, ethnicity, and language.[126] The agency also issued disability guidance requiring accommodation and standards of accessibility in the physical structure, location, and aspects of vaccination programs.[127]

Similar affirmative guidance from HHS and the DOJ might have directed states to avoid COVID-19 vaccine-distribution mechanisms that exacerbate racial and ethnic inequities, while instructing them on how to improve access. This could include advising grant recipients to locate vaccination sites in neighborhoods of color most affected by the pandemic or in decentralized accessible sites

to follow this aspect of the guidance, *see, e.g.*, Doe v. BlueCross Blue Shield of Tenn., 926 F.3d. 235, 240-41 (2019), and the issue remains unsettled.

124. *See, e.g.*, U.S. DEP'T HEALTH & HUM. SERVS., *supra* note 121 (requiring access to non-English speakers); FTA Regulation on Nondiscrimination in Federally-Assisted Programs of the Department of Transportation, 49 C.F.R. § 21 (2020) (imposing requirements of nondiscrimination and proactive inclusion on federal grantees). This duty of inclusion builds on the Title VI disparate impact regulations adopted by twenty-six federal agencies. *See* 41 C.F.R. § 101-6.204-2(a)(2) to (3) (2020) (GSA); 45 C.F.R. § 80.3(b)(2)-(3) (2020) (HHS regulations prohibiting recipients of federal funds from using "criteria or methods of administration which have the effect of subjecting individuals to discrimination because of their race, color, or national origin"); *see also Title VI Legal Manual*, U.S. DEP'T JUSTICE (Feb. 3, 2021), https://www.justice.gov/crt/fcs/T6Manual7#103 [https://perma.cc/FL6R-Z9TM] (providing examples of agency rulemaking and guidance to inform grant recipients how to avoid adverse disparate impacts).

125. For an account of this phenomenon, see Olatunde C.A. Johnson, *Beyond the Private Attorney General: Equality Directives in American Law*, 87 N.Y.U. L. REV. 1339, 1339 (2012), which describes "equality directives" adopted pursuant to Title VI, 42 U.S.C. § 2000d (2018), and the Fair Housing Act, 42 U.S.C. § 3608 (2018).

126. *See Bulletin: Civil Rights Protections Prohibiting Race, Color and National Origin Discrimination During COVID-19; Application of Title VI of the Civil Rights Act of 1964*, U.S. DEP'T HEALTH & HUM. SERVS. (July 20, 2020), https://www.hhs.gov/sites/default/files/title-vi-bulletin.pdf [https://perma.cc/DS4T-LCLV] (requiring that grantees ensure that "testing sites are accessible to racial and ethnic minority populations" and specifying that "recipients may consider making walk-in testing sites available in urban areas where racial and ethnic minority populations may not have access to vehicle transportation, or providing home visitation testing in rural areas where transportation is a challenge for racial and ethnic minorities").

127. *See* Off. for Civ. Rts., *HHS Office for Civil Rights Guidance on Federal Legal Standards Prohibiting Disability Discrimination in Covid-19 Vaccination Programs*, U.S. DEP'T HEALTH & HUM. SERVS. 1 (Apr. 13, 2021), https://www.hhs.gov/sites/default/files/federal-legal-standards-prohibiting-disability-discrimination-covid-19-vaccination.pdf [https://perma.cc/Q79X-8HSU].

such as pharmacies or large housing providers, to provide transportation or ensure accessibility via public transit, to prioritize residents from particular census tracts for sign-ups, to allow walk-in or telephone scheduling as an alternative to internet-based registration, to ensure that registration and outreach materials are available in multiple languages, and to partner with community groups for outreach to particularly hard-to-reach populations.[128]

In addition to guiding states and localities in their vaccination plans, federal agencies can implement these strategies directly in vaccination centers that are federally funded and operated. COVID-19 federal vaccination efforts have included a retail pharmacy program and direct provision of vaccine doses and funding to community health centers in key areas.[129] Numbers released by the White House suggest that as of March 2021, federal vaccination sites and federally funded community health centers provided sixty to sixty-five percent of their allocated COVID-19 vaccines to people of color.[130] These federal distribution programs have been funded by the CDC and by the Health Resources and Services Administration (HRSA), another section of HHS.[131] Mass vaccination programs implemented by the Federal Emergency Management Authority (FEMA) have been part of these efforts, and commentators have suggested ways to make these programs more equity focused by adjusting allocation processes to prioritize underserved groups.[132]

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128. *See supra* notes 66-95 and accompanying text (suggesting specific strategies for increasing vaccine equity).

129. *See, e.g.*, *FACT SHEET: Biden Administration Announces Historic $10 Billion Investment to Expand Access to COVID-19 Vaccines and Build Vaccine Confidence in Hardest-Hit and Highest-Risk Communities*, WHITE HOUSE (Mar. 25, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/25/fact-sheet-biden-administration-announces-historic-10-billion-investment-to-expand-access-to-covid-19-vaccines-and-build-vaccine-confidence-in-hardest-hit-and-highest-risk-communities [https://perma.cc/XT2D-KC44].

130. *See id.* (announcing further investments in federal community health centers); *see also Federally Supported Community Vaccination Centers*, FED. EMERGENCY MGMT. AUTH. (July 6, 2021), https://www.fema.gov/disaster/coronavirus/vaccine-support/vaccine-center [https://perma.cc/NW2M-D4RH] (delineating types of federally run vaccination facilities, including distribution at stadiums, hospitals, schools, religious institutions, and mobile vaccination centers).

131. WHITE HOUSE, *supra* note 129; *see also* Bureau of Primary Health Care, *American Rescue Plan Act Awards*, HEALTH RES. & SERV. ADMIN. (Apr. 2021), https://bphc.hrsa.gov/program-opportunities/american-rescue-plan/awards [https://perma.cc/WT7V-5M6B] (showing allocations of more than $6 billion in funds for health centers serving key populations).

132. *See* William F. Parker, Govind Persad & Monica E. Peek, *Fair Allocation at COVID-19 Mass Vaccination Sites*, 2 JAMA HEALTH F. e210464(1), e210464(1) (2021) (proposing four equity-advancing measures at mass vaccination sites: "(1) preregistration using existing information, (2) eligibility rules that recognize the greater burden of COVID-19 in underserved neighborhoods, (3) appointment assignment that prioritizes those with disadvantage, and (4) socioculturally informed outreach to lottery selectees").

B. Default Equity Plans

One means of inducing states to attend to racial equity is to require them to file a vaccine-equity plan with an agency, like the CDC, that employs scientific experts with the skills to evaluate such plans and make recommendations. As part of the CDC's response to racial disparities in COVID-19 burdens, the agency appointed a Chief Health Equity Officer and began specifically collecting and reporting data on COVID-19 outcomes by race and ethnicity.[133] The agency did not, however, require grant recipients to commit to specific equity-enhancing strategies. To enforce such a requirement, Congress could draw on its Spending Clause authority to attach conditions to financial assistance, such as federal aid to vaccination programs.[134] When Congress delegates authority to HHS or the CDC to administer state funding, the agency might also possess implied (or explicit) statutory authority to set application requirements. The congressional acts addressing COVID-19[135] have allocated more than $67 billion to the CDC for its COVID-19 response,[136] including more than $20 billion to support the distribution and tracking of coronavirus-vaccine distribution.[137] The CDC has now distributed over $55 billion to states, tribal governments, local governments, and territories in grants and assistance, including more than $7 billion earmarked for vaccination efforts.[138] This includes a series of grants specifically

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133. U.S. DEP'T HEALTH & HUM. SERV., *supra* note 126.

134. *See* U.S. CONST. art. I, § 8, cl. 1. Congress can condition federal spending as long as the condition is "germane" to the underlying legislation and the amount of money to which the conditions are attached is not so large as to be unduly "coercive." *See* Nat. Fed'n Indep. Bus. v. Sebelius, 567 U.S. 519, 581 (2012) (finding that provisions of the ACA that require states to expand Medicaid programs to cover all individuals below the age of 65 with incomes below 113% of the federal poverty line constituted a "gun to the head" of states, violating the Spending Clause); South Dakota v. Dole, 483 U.S. 203, 211-12 (1987) (upholding Congress's conditioning of 5 of federal-highway funds on states' raising the drinking age as a "relatively mild encouragement").

135. *See, e.g.*, Coronavirus Preparedness and Response Supplemental Appropriations Act of 2020, Pub. L. No. 116-123, 134 Stat. 146; Coronavirus Aid, Relief, and Economic Security (CARES) Act, Pub. L. No. 116-136, 134 Stat. 281 (2020); Paycheck Protection Program and Health Care Enhancement Act, Pub. L. No. 116-139, 134 Stat. 620 (2020); Coronavirus Response and Relief Supplemental Appropriations Act of 2021, Pub. L. No. 116-260, 114 Stat. 600; American Rescue Plan Act of 2021, Pub. L. No. 117-2, 135 Stat. 4.

136. *Budget: Novel Coronavirus (COVID-19)*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/budget/fact-sheets/covid-19/index.html [https://perma.cc/DU3D-YU7T].

137. *Id.*

138. *Budget: CDC COVID-19 Funding*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/budget/fact-sheets/covid-19/funding/index.html [https://perma.cc/B6P5-NGBP] (showing grant funds per state for COVID-19 purposes, including a breakout for the purpose of vaccine preparedness).

intended to promote equity, for which "75% of the total funding must focus on . . . vaccine access, acceptance, and uptake among racial and ethnic minority communities; and 60% must go to support local health departments, community-based organizations, and community health centers."[139] If the CDC had required an equity plan as part of the application or reporting for funding, states would have incentives ex ante to build racial equity concerns into their vaccine rollout plans.

We propose, however, that the CDC go further than simply asking for an upfront equity plan, and instead propose a default plan that states can choose or modify. Although some state-by-state tailoring will be important, the CDC could offer states a default equity strategy as a starting point. States could then select the parts of the strategy that they wished to pursue or adopt the default plan wholesale. The creation of a default plan could save states time as they seek federal funds, and ensure that states at least consider implementing strategies that promoted equity effectively in the past. This strategy would not entail withdrawing funds if states departed from their plans. But identifying and publishing states' equity strategies would ensure that states at least consider equity issues, and it would harness reputational incentives for states to follow through with their selected strategies.[140]

C. Data Collection

Data are key to understanding disparities and advancing equity. A core function of the CDC is to conduct surveillance of infectious diseases at the federal level.[141] The process of surveillance, however, relies on voluntary participation by states. All states require reporting of reportable disease cases, with reportable

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139. *CDC Awards $3 Billion to Expand COVID-19 Vaccine Programs*, CTRS. FOR DISEASE CONTROL & PREVENTION (Apr. 6, 2021), https://www.cdc.gov/media/releases/2021/p0407-covid-19-vaccine-programs.html [https://perma.cc/NK7E-LGSQ].

140. Visible plans can help community-based stakeholders hold states and localities accountable for progress. *Cf.* Olatunde C. A. Johnson, *Overreach and Innovation in Equality Regulation*, 66 DUKE L.J. 1771, 1804 (2017) (describing how nongovernmental groups contribute to the implementation of civil-rights goals by monitoring states and localities and engaging with regulatory processes).

141. *See What Is Case Surveillance?*, CTRS. FOR DISEASE CONTROL & PREVENTION (June 11, 2021), https://www.cdc.gov/nndss/about/index.html [https://perma.cc/9DUY-EWNM] ("CDC monitors about 120 of these notifiable diseases and conditions at the national level.").

diseases identified by the state itself.[142] Further, the CDC provides states and localities guidance and resources to aid them in their reporting.[143] Where the CDC has also designated a particular disease or infection as notifiable,[144] states then provide these reports voluntarily to the CDC, which collects information via the National Notifiable Disease Surveillance System.[145] In times of emergency, the Public Health Services Act allows the CDC to waive the need for additional approvals to *request* state information.[146] Therefore, although state data reporting to the CDC is still voluntary in emergency circumstances, the agency has more flexibility in determining what information to request.[147]

Congressional responses to COVID-19 have allocated additional funding to the CDC to support the agency's Data Modernization Initiative, an effort to improve disease surveillance in collaboration with state, local, and territorial governments.[148] The Coronavirus Aid, Relief, and Economic Security (CARES) Act allocated $500 million to the CDC to improve data infrastructure,[149] with particular efforts to support automated data reporting and electronic transmission of data.[150] If these systems succeed in streamlining the administrative burdens that may deter states from reporting notifiable diseases by race, this will be a critical public-health investment for monitoring equity in future pandemics.

The CDC has also made efforts to use its grant authority to secure improved reporting of vaccination data by race and ethnicity. In its 2020 Interim Playbook

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142. *See id.* ("Each state or territory sets local laws and rules for which diseases and conditions must be reported.").

143. *National Notifiable Diseases Surveillance System*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/nndss/docs/NNDSS-Infographic-508.pdf [https://perma.cc/Z4U2-38HC].

144. There are currently about 120 diseases designated as federally notifiable. *Id.*

145. *Id.*

146. 42 U.S.C. § 247d(f) (2018).

147. *See* Memorandum from Brenda Destro, Deputy Assistant, Sec'y for Plan. & Evaluation on the Paperwork Reduction Act Waiver During a Public Health Emergency: Distribution of Traceable Opioid Material Kits Across U.S. Laboratories to Alex M. Azar II, Sec'y for Dep't of Health & Hum. Servs. (Mar. 20, 2019), https://www.reginfo.gov/public/do/DownloadDocument?objectID=91342001 [https://perma.cc/8QQ4-3KEB]; *see also* Public Health Service Act, Pub. L. No. 78-410, 58 Stat. 682 (1944), *amended by* Pub. L. No. 114-255, § 3087, 130 Stat. 1033, 1147 (2016) (adding § 319(f) to the Public Health Service Act, thereby allowing the Secretary of the Department of Health and Human Services to waive requirements of the Paperwork Reduction Act for voluntary data collection during times of public-health emergency).

148. *Public Health Data Modernization Initiative*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/budget/documents/covid-19/COVID-19-Data-Modernization-Initiative-Fact-Sheet.pdf [https://perma.cc/J2LT-YPES].

149. *Id.* at 1.

150. *Id.* at 2.

for Jurisdiction Operations for the COVID-19 Vaccination Program, the CDC directs funding recipients to "address all requirements outlined in the playbook and clearly describe their responsibility for ensuring activities are implemented."[151] In order to receive or administer vaccinations, provider facilities supported by CDC funds must enroll in the federal COVID-19 Vaccination Program, which requires an agreement to "record and report required information" for every vaccine dose administered.[152] This required information, in turn, includes a record of the recipient's race and ethnicity.[153] These types of reporting requirements are a useful avenue for collecting race-specific data. Although this current arrangement extends only to COVID-19 vaccine distribution in CDC-funded programs, regulators could use this strategy more broadly to routinely mandate demographically disaggregated data on infections and deaths.

The CDC should routinely request information from states that disaggregates both process and outcome data by race and ethnicity.[154] When President Biden took office, his administration placed an increased focus on health equity with regard to COVID-19. This included establishing a COVID-19 health equity taskforce, making recommendations to increase data collection that reflected race and ethnicity, and improving responses tailored to the COVID-19 needs and challenges of particular populations.[155] An additional and clarifying step would be for Congress to authorize the CDC to mandate that states report on diseases and vaccination explicitly by race or neighborhood, even if the agency could only exercise that power during an active public-health crisis.

D. Dissemination and Ranking Equity Outcomes

In addition to collecting data on equity-related outcomes, we would also urge the CDC to report these data publicly on a state-by-state level, allowing for the

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151. *COVID-19 Vaccination Program Interim Operational Guidance Jurisdiction Operations*, CTRS. FOR DISEASE CONTROL & PREVENTION 2 (Oct. 29, 2020), https://www.cdc.gov/vaccines/imz-managers/downloads/COVID-19-Vaccination-Program-Interim_Playbook.pdf [https://perma.cc/TPH6-VZ9B].

152. *Id.* at 21.

153. *Id.* at 64.

154. Process data, for example, could include numbers of communities or people reached by outreach efforts, while outcome data in this instance would consist of numbers of people receiving vaccinations.

155. *See National Strategy for Covid-19 Response and Pandemic Preparedness*, WHITE HOUSE (Jan. 2021), https://www.whitehouse.gov/wp-content/uploads/2021/01/National-Strategy-for-the-COVID-19-Response-and-Pandemic-Preparedness.pdf [https://perma.cc/HY4A-5XWE].

comparison and ranking of states. Multiple metrics could be used to accommodate different equity definitions, such as vaccination rates as a proportion of overall disease burden, as a proportion of population share, or as a proportion of mortality. Disclosures employing these metrics would increase public focus and reputational motivations for states to improve the equity outcomes of vaccine rollout, and it would give community-based advocates the information needed to encourage improvements. At the start of the rollout, a number of states were not sharing vaccination data disaggregated by race.[156] Efforts to track equity outcomes relied on private actors such as the Kaiser Family Foundation[157] or news outlets.[158] As of June 2021, however, most states have included race and ethnicity information on their public COVID-19 dashboards, though states vary in the categories they collect and highlight.[159] Routine CDC reporting could encourage states to post their own data by race and ethnicity categories, which would increase transparency. The CDC reporting of state data would be highly visible, and it would boost the legitimacy, utility, and accuracy of state information. The CDC does, in fact, report these data for the United States in aggregate (rather than by state or county, at the time of this writing), but it is limited by variability and incompleteness in state reporting.[160]

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156. *See, e.g.*, *COVID-19 Vaccinations by Race/Ethnicity*, KAISER FAM. FOUND. (Aug. 17, 2021), https://www.kff.org/other/state-indicator/covid-19-vaccinations-by-race-ethnicity [https://perma.cc/74QG-MV7P] (showing that at least ten states were not reporting vaccination by race or ethnicity as of March 1, 2021); *see also How States Collect, Report, and Act on COVID-19 Race and Ethnicity Data*, NAT'L ACAD. FOR STATE HEALTH POL'Y (July 2, 2021), https://www.nashp.org/how-states-report-covid-19-data-by-race-and-ethnicity [https://perma.cc/W7FX-CXDM] (showing states that report vaccine data disaggregated by race and ethnicity); Caitlin Antonios, Mohar Chatterjee, Georgia Gee, Derek Kravitz, & Kyra Senese, *Why Some States Won't Share Race and Ethnicity Data on Vaccinations with the CDC—and Why That's a Problem*, COVID TRACKING PROJECT (Feb. 16, 2021), https://covidtracking.com/analysis-updates/why-some-states-wont-share-race-and-ethnicity-data-on-vaccinations-with-the-cdc-and-why-thats-a-problem [https://perma.cc/EQS4-BTJB].

157. Ndugga et al., *supra* note 3.

158. *15 States and DC Have Closed at Least Half Their Black Vaccine Gap: Covid-19 Tracker*, BLOOMBERG (May 26, 2021), https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/us-vaccine-demographics.html [https://perma.cc/9GAG-PBKQ].

159. *See* Emily Zylla, Sydney Bernard & Elizabeth Lukanen, *State Health & Value Strategies, Ensuring Equity: State Strategies for Monitoring Covid-19 Vaccination Rates by Race and Other Priority Populations*, STATE HEALTH & VALUE STRATEGIES (June 3, 2021), https://www.shvs.org/ensuring-equity-state-strategies-for-monitoring-covid-19-vaccination-rates-by-race-and-other-priority-populations [https://perma.cc/C8SA-BPSE] ("Almost all states (47), with the exception of Montana, New Hampshire, Oklahoma and Wyoming, are now reporting vaccine doses administered by race; and 44 states are reporting doses administered by ethnicity. Thirty states report information about how the administration of vaccine doses by race and ethnicity compares to the state's underlying population distribution.").

160. CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 4.

This recommendation would be particularly powerful in conjunction with state-provided equity plans, as described above. Alongside each state's equity outcomes, the CDC could also post the state's equity plan. If many states adopt similar strategies or select options from the default plan, the agency could check off each state's choices from a list of common strategies. This would facilitate comparisons between states, and it would give advocates more insight into the types of equity-promoting strategies that states themselves have planned. It may also help track which strategies are more effective in promoting equity across states, which can inform evaluations and ongoing adjustments.

Transparency in reporting is necessary, but insufficient. Experimental studies suggest that adults in the United States are accustomed to racial disparities, such that publicizing even gross disparities does not draw sustained engagement or public outrage. Worse, it can invite people to rationalize disparities.[161] Still, even though transparency cannot remedy racial inequity by itself, it is an important complement to all other equity-promoting strategies.

E. Facilitating Information Sharing

Just as the CDC can be a credible hub for vaccine-equity outcome data, it can also provide a platform for states and localities to share strategies that may be equity promoting (or that turn out to be equity inhibiting). The CDC has long run a program identifying "effective behavioral interventions (EBIs)"—programs that have demonstrated effectiveness for preventing HIV.[162] The agency actively identifies programs for different population groups, designates them as EBIs, and posts information that helps public-health actors identify and adopt those programs in practice.[163] The agency also provides technical assistance to new program implementers.[164]

Although the full measure of this approach may not be feasible in pandemic times, the CDC can provide web space for states and localities to offer equity-

161. *See, e.g.*, Rebecca C. Hetey & Jennifer L. Eberhardt, *The Numbers Don't Speak for Themselves: Racial Disparities and the Persistence of Inequality in the Criminal Justice System*, 27 CURRENT DIRECTIONS PSYCH. SCI. 183 (2018) (finding that data about racial disparities in the criminal-justice system often promote stereotypes and justify and rationalize the disparities within that system).

162. *Effective Interventions*, CTRS. FOR DISEASE CONTROL & PREVENTION (Mar. 5, 2021), https://www.cdc.gov/hiv/effective-interventions/index.html [https://perma.cc/ST4L-5MKY].

163. *See id.*

164. *See Capacity Building Assistance*, CTRS. FOR DISEASE CONTROL & PREVENTION (Mar. 3, 2021), https://www.cdc.gov/hiv/capacity-building-assistance/index.html [https://perma.cc/PK3X-EUSS].

promoting strategy ideas, create a forum for the public to suggest ways to increase equitable distribution, or facilitate information sharing among states (such as through webinars or discussion groups).[165] The CDC could publicize best or promising vaccine-equity practices for localities, states, and the public, similar to the efforts the agency has made to identify evidence-based HIV prevention programs. Encouraging the diffusion of best practices could reduce duplicative efforts, increase problem solving, and ultimately promote equitable vaccine distribution.

CONCLUSION

Improving racial equity in vaccine access is a legal, ethical, and practical obligation, particularly in a crisis. In this Essay, we have identified the tendency for initial vaccine rollout to be inequality-forcing, rather than equity-building, drawing on a large body of public-health research documenting the inverse equity hypothesis. COVID-19 vaccination has fallen into this familiar pattern of early access by the wealthy and white, followed by lagging access by people of color and the most disadvantaged. We have analyzed ways in which federal agency guidance and states' own choices have contributed to exacerbating vaccine inequity, which in turn translates into disparities in COVID-19 disease burden. And we have demonstrated that these choices were not inevitable at the outset and are not unchangeable now. Federal regulatory tools are available to increase equitable vaccine distribution, many of which leverage existing authorities that have gone untapped in the COVID-19 response.

Our focus in this Essay has been racial and ethnic equity, which is critical given the distribution of COVID-19's burdens. But these strategies can also promote equity along other axes, such as disability, which is already the subject of specific CDC guidance.[166] For any underserved group, it would be helpful to conceptualize equity as measured by vaccine access in relation to the burden of disease, rather than alternatives such as equal lottery chances of vaccination or access in relation to population proportion.

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165. The CDC is already providing these venues for some COVID-19 issues. *See COVID-19 Webinars and Partner Calls*, CTRS. FOR DISEASE CONTROL & PREVENTION (Aug. 17, 2021), https://www.cdc.gov/coronavirus/2019-ncov/communication/videos-webinars-calls.html?Sort=Date%3A%3Adesc [https://perma.cc/JA3X-RS8Z] (identifying at least twelve CDC-led webinars intended for federal and state governmental officials since the start of the pandemic).

166. *See Vaccines and Immunizations, Jurisdictions: Vaccinating Older Adults and People with Disabilities*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 14, 2021), https://www.cdc.gov/vaccines/covid-19/clinical-considerations/older-adults-and-disability/access.html [https://perma.cc/8XRD-KZAS].

For many of our proposals, an enduring benefit of promoting equitable COVID-19 vaccine distribution is the development of systems and capacity to deliver health care more equitably in nonpandemic times. Building trust through community partnerships, local health infrastructure, transparent reporting, and mobile or decentralized vaccine delivery can provide lasting benefits for access to other types of health care.

As COVID-19 and other infectious diseases persist, we will continue to learn what works (and what doesn't) for rolling out new interventions equitably. By using regulatory tools and systems designs that build in equity from the start, we have a much better chance of mitigating inverse equity effects now and in the next crisis.

Professor of Law, Cornell Law School (Underhill); Jerome B. Sherman Professor of Law, Columbia Law School (Johnson). *We are grateful to I. Glenn Cohen, Govind Persad, Bill Sage, and participants in the Cornell Faculty Workshop (including Sara Bronin, Kevin Clermont, Sherry Colb, Deborah Dinner, Michael Dorf, Maggie Gardner, Valerie Hans, George Hay, Jaclyn Kelley-Widmer, Odette Lienau, Jeff Rachlinski, Aziz Rana, Jed Stiglitz, Nelson Tebbe, and Ezra Young) for helpful comments on this work. We note that COVID-19 vaccine-distribution strategies and outcomes will change over time; we focus here on the early stages of rollout, where inverse equity effects should be most visible. Professor Johnson's research for this Essay was funded in part by the David J. Greenwald Faculty Research Fund.*