Ethical Challenges in the Middle Tier of Covid-19 Vaccine Allocation: *Guidance for Organizational Decision-Making*

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Supplement to
Ethical Framework for Health Care Institutions Responding to Novel Coronavirus SARS-CoV-2 (Covid-19), with Guidelines for Institutional Ethics Services Responding to Covid-19: Managing Uncertainty, Safeguarding Communities, Guiding Practice
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Background and Scope of This Guidance Document

This supplement to The Hastings Center's "Ethical Framework" aims to help structure time-sensitive discussion of significant, foreseeable ethical concerns in responding to Covid-19 and to support collaboration across institutions throughout pandemic response and recovery. It is designed for use by county health systems and by hospitals, community health centers, and other health care organizations responsible for patient care or preventive health, including vaccine education, vaccine distribution, and vaccination. This document aims to support formal and informal convening and policy work within the same geographic region, such as a municipality, county, metropolitan area, state, or multistate area, led by public health authorities, health care institutions, or other groups involved in vaccine allocation. The document's scope is limited to the ethics of vaccine distribution within the United States; it does not address the ethics of international cooperation and sharing vaccines versus focusing solely on ensuring vaccine access in one's own nation ("vaccine nationalism").

The focus of this document is the middle tier of vaccine allocation and the ethical challenges arising in the U.S. in the first half of 2021. This focus reflects general consensus and ongoing implementation concerning highest-priority vaccination of two populations: frontline health care workers and residents of long-term care facilities (the groups constituting "Phase 1a"

in recommendations from the Advisory Committee on Immunization Practices [ACIP]).[1] The ethical justification for prioritizing these populations was their high risk of contracting the virus, of passing it to others at high risk of severe disease, and, in the case of long-term care residents, of dying of severe Covid-19. Additional justifications include the relatively small size of these initial cohorts, the relative ease of locating them and providing the vaccine, and the value of public trust created by witnessing health professionals receiving the vaccine. There is also broad consensus that vaccine allocation to the general public—people without major risk factors and who can reasonably protect themselves through masking and physical distancing—should occur only after the vaccination of groups at high risk of infection or at high risk of severe illness or death if infected. This document therefore does not address the final stages of vaccine distribution to lower-risk members of the public.

This document assumes that states, organizations, and other localities will aim to follow the general guidance provided by the ACIP. The purpose of this document is to provide more detailed ethical guidance supporting allocation after phase 1a of the ACIP guidance and before widespread availability of the vaccine to the general public. This document positions equity—fairness in how benefits and burdens are distributed across a society—as a cross-cutting consideration at all phases of allocation. Equity in vaccine allocation helps to mitigate the consequences of underlying socioeconomic and racial inequalities that create higher risk.

For example, we have offered an alternative approach to the ACIP's use of blunt age cutoffs as a sole criterion for vaccine allocation. Our alternative approach is grounded in data, aims at greater effectiveness, and supports equitable allocation to minority populations who experience Covid-19 mortality and morbidity at earlier ages than the majority population.

We have also extended the ACIP's attention to "high-risk settings" to include neighborhoods with high infection rates. We suggest evidence-based tools for use in prioritizing vaccine allocation by neighborhood using local public health data. This population-health approach supports equitable and efficient use of a limited vaccine supply by targeting areas where many residents live in overcrowded housing or face other risk factors associated with socioeconomic inequalities.

Vaccine hesitancy—avoidance or refusal of a vaccine when it is offered—is more prevalent in historically marginalized populations. These populations are often at greater risk of contracting or transmitting the virus due to environmental working or living conditions and may be at greater risk of severe Covid-19 illness. Inequity results if lower-risk populations are vaccinated ahead of higher-risk populations due to vaccine hesitancy. This document therefore recommends proactive response to vaccine skepticism and hesitancy as part of ethical and effective vaccine allocation. Ongoing outreach to and engagement of higher-risk populations, within prioritized groups and subsequently among the general public, is crucial to preventing inequities in uptake of the vaccine and in protection from Covid-19.

The middle tier of vaccine allocation (designated "Phase 1b" and "Phase 1c" in ACIP recommendations and referred to in various ways by states, organizations, and other localities) comprises people with a high risk of severe disease or death if they become infected, based on their personal medical and social factors; people who live or work in high-risk settings outside of health care facilities, and certain "essential" workers beyond frontline health care workers. The ethics of allocating and distributing vaccines within and between these groups will be a major challenge in months ahead, when vaccine supplies will continue to fall short of demand and as the logistics of vaccinating groups outside of health care or long-term care settings becomes more complex.

This document also briefly considers the role of vaccination in health justice. Ethical deliberation includes the extent to which vaccine prioritization, vaccine education, and vaccination can help to mitigate the consequences of historical and continuing socio-

[1] In October 2020, the National Academy of Medicine (NASEM) released a framework for equitable coronavirus vaccine allocation that aims to mitigate health inequities evident in Covid-19 epidemiological data by giving higher priority to communities with more medical and social vulnerabilities associated with greater risk of severe Covid-19 (NASEM, 2020; Kolata, 2020). Interim recommendations from CDC's Advisory Committee on Immunization Practices (ACIP) released in early December to guide initial vaccine allocation placed health care workers and residents of long-term care facilities in the first tier (Dooling et al., 2020a). Further ACIP recommendations were released on December 20, covering the middle tiers of prioritization— after phase 1a and before the general public (Dooling et al., 2020b). Vaccination of health care workers in the U.S. began on December 14, 2020.

economic and racial inequalities that produce health disparities.

This document is not intended to be, and should not be considered, a substitute for clinical ethics consultation or other medical, legal, or other professional advice on individual cases or for particular institutions. It reflects an evolving public health emergency and the rapid development and updating of public health and clinical practice guidance and institutional protocols; references are current as of January 15, 2021. This rapid-response work is made possible by The Hastings Center Impact Fund.

Summary of Ethical Framework

(updated January 2021, based on March 2020 Ethical Framework and April 2020 and July 2020 Supplements; see end of document for citations)

Public health and health care leaders have a duty to plan for the management of foreseeable ethical challenges during a public health emergency.

- Ethical challenges arise when there is uncertainty about how to "do the right thing" when duties or values conflict. These challenges affect current and prospective patients, the health care workforce, health care operations, and a health care institution's communication with the public.

- The duty to plan for the management of foreseeable ethical challenges arising in middle-tier Covid-19 vaccine allocation encompasses how health care institutions and larger organizations should distribute periodic shipments of vaccines that will be in short supply relative to demand among prioritized populations. The duty to plan also encompasses the logistics of vaccine allocation, vaccine education, and vaccination to groups and sites beyond health care personnel and long-term care facility residents.

- The duty to plan entails developing contingency plans for foreseeable challenges during the allocation process. Contingency plans should cover these allocation challenges:
  - People in a prioritized group initially decline the vaccine.
    - Contingency plans should describe how communication should be targeted to achieve greater uptake among people who are initially hesitant to be vaccinated, including ensuring that these individuals have opportunities to discuss their concerns and have further opportunities to be vaccinated.
    - The plans should also indicate at what point vaccine allocation should move or extend to the next prioritized group.
  - There are not enough vaccine doses to complete vaccination of a prioritized group.
    - When feasible, the group should be prioritized by subgroups, determined based on factors such as risk of severe Covid 19, risk of infection and transmission, and efficacy.
    - If subgroups are essentially tied in terms of their potential for benefit, a random allocation protocol (lottery) should be used.
    - First come, first served is not usually an ethically defensible allocation approach because it tends to work to the advantage of people with greater health and resources. This approach could be used within a subgroup if it is the only feasible strategy after steps have been taken to mitigate disparities in access. For example, a mobile vaccination clinic that provides on-site access to vaccination for residents of a homeless shelter—a congregate setting where all residents face high risk of infection and transmission—might use a first-come, first-served approach if vaccine supplies are insufficient to vaccinate all residents and devising a lottery in the time available is not feasible.

Public health and health care leaders have a duty to safeguard the health care workforce and vulnerable populations in the community.

- The health care workforce includes clinicians caring for Covid-19 patients, such as physicians, nurses, and respiratory technicians, and other essential frontline workers, including janitors and housekeeping staff, who have face-to-face patient contact or work within six feet of patients. These groups, and long-term care facility staff, were prioritized in phase 1a of vaccination. Limited vaccine supplies mean that not all frontline health care workers have had early access to vaccination.

- A community's frontline health care workforce is not limited to the employees of a single institution or system nor to those working in hospitals, clinics, or

long-term care facilities. Home health aides, for example, are members of the frontline health care workforce who may be employed by health systems, home health agencies, or directly by clients.

- Vulnerable populations include people at risk for severe Covid-19 illness due to factors such as age or underlying health conditions, people facing barriers to health care access, and people at increased risk of infection or illness due to environmental risks, such as occupational hazards, risks posed by congregate housing or carceral or detention settings, or the inability to practice social distancing or use personal protective equipment. Persons who live in the same household as a member of the health care workforce or another person at risk of workplace infection may also make up a vulnerable population.

- Public health duties to vulnerable populations extend to noncitizens and do not depend on immigration status. These duties derive from the core ethical principle that all humans have equal intrinsic moral worth, and they are reflected in health-related rights such as the right to emergency medical treatment. Effective distribution of vaccines to neighborhoods with high infection rates should reach all individuals, including undocumented immigrants, who work or live in high-risk environments associated with viral transmission.

- Social inequality creates vulnerable populations. Examples of health vulnerabilities derived from racism and prevalent among racialized minority populations include experiences of bias in health care, disproportionately high rates of comorbid conditions, elevated rates of incarceration, hazardous work conditions, and overcrowded housing, among others. Clinical and epidemiological data indicate that these vulnerabilities are associated with higher risk of severe Covid-19 illness and mortality among racialized minority populations (Kolata, 2020b). Data also show that racialized minority populations are vulnerable to Covid-19 illness and mortality earlier in life compared to white populations (Bassett et al., 2020).

- Research suggests that vaccination is highly effective in protecting most vaccinated individuals from Covid-19. Prioritizing populations at highest risk of developing severe Covid-19 illness or populations at high risk of infection who are unable to protect themselves through physical distancing and other measures is consistent with the duty to safeguard vulnerable populations. Preventing viral spread, including among vaccinated persons, will continue to rely on preventive measures such as masks and physical distancing until it is clear whether and to what extent vaccination prevents viral spread through preventing infection or until a sufficient percent of the population is vaccinated to achieve the goal of community ("herd") immunity.

Public health and health care leaders have a duty to guide health care workers, administrators, and others experiencing demanding work conditions, ethical uncertainty, and moral distress during a public health emergency.

- States, organizations, and other localities are charged with carrying out federal vaccine allocation guidance that is not as detailed or operationally complete as is needed for real-world implementation, especially for the middle tier of allocation, which involves multiple populations and settings. This situation places ethical, logistical, and communication stresses on public health leaders and administrators in states, organizations, or other localities that will be allocated vaccines to distribute in the coming weeks and months.

- State health departments have a responsibility to provide clear, actionable guidance to county health systems and to health care organizations responsible for vaccine education, vaccine distribution, and vaccination. Guidance provided by ACIP and NASEM, while useful and important, leaves much to the discretion of policy makers and organizational leadership, with the potential for wide variation in how vaccines are distributed in different states and organizations. For example, the power of interest groups representing workers at relatively low risk of infection could potentially direct vaccine allocation away from more vulnerable populations. Health care workers responsible for Covid-19 patient care and for supporting the rollout of vaccine campaigns should feel confident that limited vaccine supplies are reaching the most vulnerable populations, rather than those with the greatest political power.

- Stigma associated with incarceration could delay vaccination of people in jails and prisons despite their vulnerability in these environments. As yet, it is unclear who will have authority to make decisions about who gets vaccinated in immigration detention

facilities, where delayed or denied medical care has long been a major problem.

- Anti-immigrant policies and rhetoric at the federal and state levels that have blocked or had chilling effects on health care access for immigrant populations could delay vaccination of immigrants who work or live in high-risk environments associated with viral transmission (Page and Flores-Miller, 2020).

These duties apply *across* public health and health care institutions as well as within institutions.

(See: Responding to Covid-19 as a Regional Public Health Challenge: Preliminary Guidelines for Regional Collaboration Involving Hospitals, https://www.thehastingscenter.org/covid19-regional-ethics-guidelines/.)

- **Regional collaboration can support the duty to plan** by clarifying regional challenges, sharing resources, identifying consensus, and reducing duplication and unilateral approaches in the development of policies and processes.
- **Regional collaboration can support the duty to safeguard** workers and vulnerable populations by identifying trustworthy ways to communicate with vulnerable populations within a region. Communication about vaccine availability and safety and in response to skepticism and hesitancy concerning vaccination will be a key regional challenge.
- **Regional collaboration can support the duty to guide** through joint workforce training reflecting regional public health priorities, processes for consultation and referrals across institutions, and focused work on mitigating social inequalities reflected in regional data on health vulnerabilities.

Emerging Ethical Challenges in Middle-Tier Covid-19 Vaccine Allocation

The U.S. and global effort to develop and deliver safe and effective vaccines against the novel coronavirus SARS-CoV-2 is occurring at unprecedented speed in a highly charged political context. Health care leaders, such as senior administrators of hospital systems, long-term care facilities, county public health systems, and community health centers such as Federally Qualified Health Centers (FQHCs), are responsible for allocating shipments of vaccine in accordance with state-level allocation plans. These state plans are not uniform, and many leave considerable discretion to local organizations and health systems about how to allocate vaccines within and between prioritized groups. As vaccine allocation moves from hospitals and long-term care facilities into communities, health care leaders should participate in regional collaboration to facilitate the vaccination of at-risk populations in the communities they serve, using prioritization criteria that reflect shared values and goals.

The following sections build on The Hastings Center's "Ethical Framework" (Berlinger et al., March 2020) to suggest how health care leaders can develop ethically sound vaccine allocation plans, respond to vaccine skepticism and hesitancy, and integrate health justice considerations into vaccine allocation. These sections broadly reflect the NASEM's vaccine allocation framework, which is grounded in principles of "maximum benefit," "equal concern," and "mitigation of health inequities" and prioritizes four groups: those at high risk of viral infection, those at high risk of transmitting the virus to others, those at high risk of severe illness, and those whose loss to illness would immediately harm others. People who fall into multiple categories get higher priority.

Responding to Vaccine Skepticism and Hesitancy

Vaccine skepticism and hesitancy, including behaviors such as avoiding or refusing vaccination, are signal challenges to the public health goal of ending the pandemic by attaining community immunity through vaccination. The NASEM framework notes that vaccine hesitancy is common and increasing in the U.S. and that, "[p]articularly for minority communities, histories of medical research exploitation fuel understandable skepticism of vaccination" (NASEM, 2020).

Fulfilling the duties outlined in this document requires health care leaders to understand why some members of groups prioritized for vaccination may be hesitant to be vaccinated, to learn how to respond to vaccine hesitancy, and to draw on emerging knowledge concerning effective communication about Covid-19 vaccines, including public education campaigns now being developed.

Research from medical anthropology and sociology suggests that vaccine skepticism and hesitancy are best understood as part of a community's attempt to solve problems of risk, trustworthiness, and doubt and to elicit guidance and attention in a context of un-

certainty (Larson, 2020). From this perspective, skepticism and hesitancy are, in effect, efforts to "talk back to science" about unaddressed concerns, rather than a hard "antiscience" stance or evidence of scientific ignorance (Benjamin, 2016; Goldenberg, 2016). Rumors about risks associated with vaccines, which may spread through communities (including via social media) whose members share ideas and values concerning health, should be interpreted as a form of communication about risk and harm in a context of distrust (often well justified) of authorities (Larson, 2020).

One strategy for addressing distrust is to demonstrate the value of vaccination among traditionally highly valued groups and individuals, such as health care professionals. Vaccination is underway for frontline health care workers, many of whom are sharing their experiences on social media and in other ways. In months ahead, the growing likelihood that Americans will know someone who has been vaccinated is expected to contribute to public understanding and acceptance of the new vaccines. Many frontline health care workers have been eager to receive the vaccine; some have hesitated (Kaiser Family Foundation, 2020; Forbes, 2021). Vaccine hesitancy may be most common among minority health care workers, reflecting direct experience and observation of racial bias in health care, as well as well-documented historical examples of abuse (Watkins, 2020).

The task of responding effectively to vaccine skepticism and hesitancy should be recognized as part of the duty to plan and should be embedded in every phase of vaccine distribution, including vaccine allocation to prioritized groups. Listening to and engaging with individuals who may hesitate to be vaccinated; clarifying misinformation that contributes to vaccine hesitancy; maintaining a pathway to vaccination for people who may need more information, discussion, or time; and investigating gaps in uptake by prioritized groups are crucial activities to ensure that vaccine distribution fairly protects different sectors of our society and contributes to greater health justice. The involvement of trusted community leaders who represent local populations supports effective distribution and vaccine uptake in neighborhoods with high rates of infection.

Prioritizing Home Health Workers as Frontline Health Care Workers

Going forward, vaccine allocation should prioritize home health workers as frontline health care workers.

Home health workers include home health aides, visiting nurses, hospice staff and trained volunteers, and physical therapists and occupational therapists who make home visits. Plans for vaccine allocation, education, and distribution by county health systems and by hospitals, community health centers, and other health care organizations should ensure access to vaccination for these frontline health care workers.

Prioritizing home health workers also reaches certain low-wage minority workforces, such as home health aides, whose members are less visible and less protected compared to health care workers employed in hospitals, clinics, and long-term care facilities. Home health aides' risk of infection and transmission may be significant due to shift work, multiple clients and work settings, and residence in neighborhoods with high infection rates.

Ethical Allocation within and between Prioritized Groups in the Middle Tier

Considerations for effective vaccine allocation in the middle tier

The middle tier of Covid-19 vaccine allocation focuses on community-dwelling populations as distinct from the much smaller number of people who live in long-term care facilities and were prioritized in initial allocation. The middle tier also includes congregate facilities, such as prisons, jails, immigration detention facilities, shelters, and transitional housing, that constitute high-risk environments for infections and include populations with special vulnerabilities.

Vaccine distribution to the middle tier should reflect planning for vaccine education and vaccination in different sites in the same timeframe. See Duty to Plan, discussed above, for recommendations concerning vaccine allocation by subgroup when there is insufficient supply to complete vaccination of a prioritized group.

Vaccine distribution to the middle tier should anticipate the potential for vaccine hesitancy and incorporate effective strategies to respond to this hesitancy among populations prioritized for vaccination.

In the following discussion, we offer considerations for middle-tier vaccine allocation that draw on the duties described in this document, with attention to foreseeable challenges in ensuring ethical and effective vaccine distribution to different high-risk popula-

tions in a county, or a region served by a hospital or community health system. These considerations reflect epidemiological findings and are aligned with the use of public health data to effectively aim vaccines toward high-risk populations and toward environments associated with viral outbreaks and transmission.

People at high risk of severe Covid-19

Covid-19 is perilous to older adults, with the highest mortality rates in patients ages 85 and older, followed by patients ages 75-84. However, age alone is a blunt predictor of risk; Covid-19 is also perilous to people with multiple comorbidities. Data show significant racial variation in Covid-19 mortality rates by age, with minority populations frequently experiencing greater mortality at younger ages. Allocation based on age alone would work against efficacy and equity, because primarily white populations would receive vaccines ahead of equally at-risk minority populations who are somewhat younger.

In short, **age alone should not be used to represent medical risk**. Effective vaccine allocation to individuals at high risk of severe Covid-19 will need to rely on age when information documenting personalized medical risk is unavailable at vaccine distribution points.

The use of proxies for age, such as eligibility for Medicare or other "senior" services, raises similar effectiveness and equity concerns. People ages 65-74 who do not have multiple comorbidities or other risk factors should not be conflated with people at highest risk.

People who live or work in high-risk environments

Initial recommendations for vaccine allocation by ACIP recognized long-term care facilities as high-risk environments by prioritizing vaccination of residents and staff. Going forward, ethical approaches to vaccine allocation in a county or similar region should account for other high-risk environments and consider how limited vaccine supplies should be allocated to and within them. Reducing outbreaks within these settings and reducing community spread via people who travel to or from high-risk environments are key public health goals. Prioritization of vaccination in high-risk environments also protects people who have little or no ability to protect themselves in the places where they live or work, including people at risk of severe Covid-19.

Essential work and high-risk work environments overlap but are not the same. "Essential" occupations are those necessary for the functioning of a society. In the context of a pandemic and viral transmission, some essential workers face much higher risks than others. For example, the high risk of frontline health care work is evident and borne out by data. Essential workers in high-risk environments—typically, congregate indoor sites—who are employed outside of health systems need explicit attention in vaccine allocation plans. Some essential jobs involve lower risk of infection or can be done remotely and do not call for special prioritization. The word "essential" should not be used to broadly indicate risk associated with work environments.

In short, **prioritizing vaccines for people who live or work in high-risk environments represents an effective approach to controlling the pandemic. Overlooking populations known to be at high risk of infection is a failure of public health duties.**

Vulnerable populations in high-risk environments

Congregate indoor sites such as long-term care facilities; jails, prisons, and immigration detention facilities; meatpacking facilities, and overcrowded housing are strongly associated with high risk of viral transmission, often producing severe Covid-19 illness due to the medical and social vulnerabilities of populations in these settings. Carceral systems, including immigration detention facilities, are associated with poor quality health care and high risk of Covid-19 (Marshall Project, 2020; Chotiner, 2020); 90 of the 100 largest clusters of Covid-19 cases in the U.S. have arisen in jails and prisons (Siva, 2020). Clusters of infection and severe Covid-19 have been associated with meatpacking facilities, which often employ immigrants vulnerable to exploitation. Infection and severe Covid-19 have also been associated with overcrowded housing in urban, suburban, and rural counties (Ahmad et al., 2020; Emeruwa et al., 2020).

Public health officials have special legal and ethical duties to ensure that people in custody receive appropriate health care, including preventative health care such as vaccinations, because they are prevented from seeking health care on their own. For example, the U.S. Supreme Court has recognized (Estelle v Gamble, 1976) that deliberate indifference to the serious medical needs of incarcerated people violates the Constitution.

Applying ethical principles and public health data to vaccine allocation in high-risk environments

After ensuring access to vaccination for people at highest risk of severe Covid-19—namely, people 75 and older and people with multiple comorbidities—an ethical approach to vaccine allocation, guided by data, would prioritize people who live or work in three high-risk environments featuring enclosed spaces, close contact with other people, and vulnerable populations. (A county or region may not include all three settings.)

People who live or work in carceral and immigration detention environments

- These high-risk environments are associated with viral outbreaks.
  - Incarcerated and detained populations are vulnerable populations with little or no ability to protect themselves or demand safer conditions.
  - Incarcerated and detained populations may include people at high risk of severe Covid-19 due to age or comorbidities.
  - Stigma and disempowerment associated with being in custody increases incarcerated and detained populations' vulnerability to being overlooked or demoted in vaccine prioritization despite high risks.
  - Corrections officers and guards in immigration detention facilities work in high-risk environments.
- Frequent movement of people within or between facilities creates further opportunities for infection and transmission.
  - Corrections officers and detention facility guards may be vectors of viral transmission to or from households.
  - People held in jail for brief periods may be vectors of viral transmission to or from households.
  - Transfer of noncitizens between detention facilities in different states has contributed to viral outbreaks in several states.

Food supply workers in meatpacking facilities

- These high-risk environments are associated with viral outbreaks.
  - The workers are a vulnerable population with limited ability to protect themselves and with few advocates, e.g., union representatives, for their occupational health and safety.
  - This low-wage population is likely to live in overcrowded households, which are often associated with viral transmission and severe Covid-19 illness.
  - The workers may be vectors of viral transmission to or from households.

Residents of neighborhoods with high infection rates

- These people are likely to live in overcrowded households associated with viral transmission and severe Covid-19 illness.
  - Residents may include people at high risk of severe Covid-19 due to age or comorbidities.
  - Vaccine prioritization by neighborhood should include residents and staff in public housing.
  - Prioritization by neighborhood should include residents and staff in shelters and transitional housing and clients and frontline workers in programs serving unhoused populations.
    - Neighborhood-level data may reflect outbreaks associated with college students living in dormitories or other congregate settings. Students who live away from home can take steps, including remote learning, to protect themselves and others from infection. As long as vaccine supplies are limited, vaccinating students who live away from home should be a lower priority.
- Collaboration among county health departments and clinics serving neighborhoods with high infection rates is recommended to refine prioritization plans, develop and implement effective vaccine education campaigns, and ensure accessible vaccination sites.
  - Tools such as the Pandemic Vulnerability Index (PVI) or Social Vulnerability Index (SVI) may aid in prioritizing vaccine allocation by neighborhood.
  - Local public health data could also be used to prioritize vaccine allocation for neighborhoods experiencing high rates of Covid-19 transmission.

- Prioritization by neighborhood may also include bus drivers and other transit workers who interact with the public in neighborhoods with high infection rates and who work in enclosed spaces.

The following occupations constitute *examples* of essential work in high-risk and moderate-risk environments without the special vulnerabilities of the populations described above. Individuals in these occupations may have medical or other risk factors, such as comorbidities or residence in a neighborhood with high infection rates, that would warrant earlier access to a vaccine:

- clerks in essential public-facing businesses such as grocery stores, pharmacies, and post offices;
- food and medical supply workers who interact with the public, e.g., takeout and delivery workers;
- food and medical supply workers who do not interact with the public, e.g., kitchen and warehouse workers;
- teachers working in classrooms and other frontline education workers; and
- teachers preparing to work in classrooms and other frontline education workers.
    - Vaccination is crucial to reopening schools and repairing the negative social impacts of interrupted education, which have fallen most heavily on minority and low-income populations.

A large range of nonessential businesses are likely to remain closed or restricted until the general public is vaccinated and community immunity is achieved. Workers in nonessential businesses should be vaccinated with the general public unless they have medical or environmental risks justifying prioritization, as outlined above.

The Role of Vaccination in Health Justice

Data on the disproportionate impact of Covid-19 on racialized populations have informed the development and critical review of proposals for allocating scarce resources. Equity in the allocation of scarce, potentially beneficial drugs or vaccines should be connected to larger clinical, organizational, and public policy initiatives to uproot social inequalities that produce health inequities; heightened access alone will not mitigate inequalities and resulting inequities. Approaches to vaccine allocation should be reviewed and refined in light of emerging data on safety and efficacy to safeguard vulnerable populations from undue risks and burdens.

This document describes population health approaches to vaccine allocation that use epidemiological data and tools to identify vulnerable populations and respond proactively to vaccine hesitancy in a community. These approaches offer ways to integrate health justice considerations into vaccine allocation plans in the U.S. Access to vaccination is also crucial to population health globally. Because vaccine supplies have been reserved by wealthy nations, residents of low- and middle-income nations (LMICs) are facing long waits for vaccine access. Detailed guidance on this topic is beyond the scope of this document. Going forward, federal-level participation by the U.S. and other wealthy nations in global initiatives to ensure that vaccine supplies are shared with LMICs and with vulnerable populations such as refugees should be part of ethical and effective pandemic response (Bollyky et al., 2020).

Additional Recommendations Supporting Ethical Allocation

- Involve hospital and system bioethicists and community partners in deliberations concerning regional allocation to prioritized settings and groups.
- Share promising practices via professional associations of public health and health care organizations.
- Conduct rapid-response research to understand and effectively respond to vaccine skepticism and hesitancy in workforce, community, and cultural contexts.

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