A Reserve System for the Equitable Allocation of a Severe Acute Respiratory Syndrome Coronavirus 2 Vaccine

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Arguably, no scientific discovery in recent memory has been as eagerly awaited as the development of a vaccine for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). With countless lives on standby until a vaccine is available, demand will almost certainly outstrip the initial supply. Furthermore, vaccination will have unprecedented social, economic, and political implications. During this pandemic, we have seen individuals, health-care systems, and governments hoard medical resources, including medications (eg, hydroxychloroquine, remdesivir), personal protective equipment, and life-sustaining equipment (eg, ventilators).1 An ethical framework for SARS-CoV-2 vaccine allocation is clearly necessary to uphold equity and mitigate self-protective behaviors.

Utilitarian frameworks commonly use a priority point system to allocate limited resources. Potential recipients are assigned points according to a set of principles that are then summed to determine allocation priority.2,3 Although point systems are elegant in their simplicity, they scale differing ethical principles into a single dimension and inevitably compare “apples to oranges.” Utilitarian approaches often overlook group considerations, such as whether different ethical principles should apply to different groups (eg, children and adults) and rarely allow disadvantaged groups to receive equitable accommodations as points are assigned based on individual characteristics.

Given the widespread impact of the coronavirus disease 2019 (COVID-19) pandemic, an equitable allocation framework must address the needs of many diverse stakeholders. We therefore propose a reserve allocation system for the allocation of a SARS-CoV-2 vaccine. In this system, total vaccine supply would be partitioned among a number of reserve categories, and a different ethical principle would guide allocation in each category. First described by Pathak et al,4 reserve systems offer needed flexibility by allowing competing ethical principles to act within the same framework. A fair allocation system for vaccine allocation must be structured so that all who are interested have some chance of receiving a vaccine, while also promoting justice for disadvantaged groups and reciprocity for those who support vaccine development.

Reserve systems are not new, nor are they unique to medicine. In 2013, the US Organ Procurement and Transplantation Network added a reserve category to allocate 20% of deceased donor kidneys to the 20% of adults with the highest expected posttransplant survival score. The US immigration visa program includes categories that prioritize skilled worker status, as well as a lottery to promote egalitarianism. In response to the COVID-19 pandemic, Pathak et al4 proposed a reserve system for the allocation of scarce medical resources. In each case, multiple principles exist simultaneously to balance competing interests and maximize equity. To allocate a SARS-CoV-2 vaccine, reserve categories should be designed to balance four key principles: justice, reciprocity, utilitarianism, and egalitarianism.

As a public health measure, a chief priority in vaccine allocation must be to protect the disadvantaged. During a pandemic, health-care disparities are exacerbated by medical supply shortages, inability to social distance, and preexisting medical conditions, all of which disproportionately affect underserved populations. Consequently, US minorities have developed COVID-19
infections more frequently and have had worse outcomes. Among predominantly black US counties, the rate of COVID-19 infection is threefold higher than in predominantly white counties, and the death rate from COVID-19 is sixfold higher. Without an established justice category, individuals with limited socioeconomic capital may lack equitable access to vaccines, and their outcomes will likely be significantly worse.

A reciprocity category should be established to incentivize the discovery and production of a safe, effective vaccine. Participants in clinical vaccine trials assume risk on behalf of others and should be recompensed for their participation. Likewise, nations and corporations that invest resources in vaccine development should receive priority as well. The benefit of reciprocal allocation extends beyond the recipient: it provides a powerful incentive that accelerates research for the benefit of all.

Public health utility should be prioritized through a category aimed at developing herd immunity. This approach may require that groups more likely to spread the virus, such as those living in dormitories and prisons, receive priority over those who are more likely to develop serious disease. Essential workers also belong in this category, as they are required to maintain contact with a greater number of people. Notably, essential jobs are often held by people from disadvantaged groups that have had barriers accessing medical care, further supporting justice.

Lastly, a random selection category for which all are eligible should be created. A lottery operationalizes equality and ensures that no one is unilaterally excluded from the opportunity to receive a vaccine. We are all human, and the SARS-CoV-2 virus makes no distinction. A vaccine allocation framework that excludes a portion of the population lacks dignity and fails to acknowledge that all are at risk for infection.

As with all allocation frameworks, compromises are made that result in inherent limitations. A reserve system is complex, and implementation on a local or international scale would require considerable epidemiologic and stakeholder analyses to determine the appropriate size of each category. Enforcement would require a centralized authority to ensure correct partitioning among categories. In addition, the principles that determine allocation priority within a given category require consideration.

Nonetheless, we believe that a reserve system balances competing ethical principles in ways that a utilitarian approach cannot. By simultaneously upholding justice, reciprocity, utilitarianism, and egalitarianism, a reserve system would allow for the most equitable allocation of a SARS-CoV-2 vaccine. As the scientific community works toward a breakthrough, we hope those responsible for vaccine allocation will consider the potential good of a reserve system.

References