

Justice in COVID-19 vaccine prioritisation: rethinking the approach

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ABSTRACT

Policies for the allocation of COVID-19 vaccine were implemented in early 2021 as soon as vaccine became available. Those responsible for the planning and execution of COVID-19 vaccination had to make choices about who received vaccination first while numerous authors offered their own recommendations. This paper provides an account of how such decisions should be made by focusing on the specifics of the situation at hand. In that light, I offer an argument for prioritising those who are likely vectors of the disease and a criticism of the victim-focused priority proposals put forward by the US Centers for Disease Control and Prevention, the National Academies of Sciences, Engineering, and Medicine, the UK National Health Service, and others. I also offer thoughts on how those authors may have gone astray.

COVID-19, also identified as SARS-CoV-2, is a new coronavirus that emerged first in China in late 2019. It quickly spread around the world, infecting and killing humans in its wake. Doctors were called to treat infected patients, but they knew almost nothing about the disease or treatments that might be effective. What they did know was that the disease appeared to be highly contagious and deadly. Public health officials identified the need for masking and physical distancing in order to 'flatten the curve' of the rising rate of infection and avoid overburdening the healthcare system. At the same time, scientists harnessed their knowledge of immunity and worked rapidly to develop vaccines for preventing serious disease.

Once vaccines were proven safe and effective, their availability introduced a new ethical issue, namely how should the initial limited supply be allocated. This is, primarily, a matter of distributive justice, determining who among the many who want it should receive vaccination before others.

WHAT MAKES A DECISION RIGHT AND JUST?

Martin Luther King maintained that 'It is not possible to be in favor of justice for some people and not be in favor of justice for all people'. This statement captures the essence of Aristotle's formal principle of justice, which requires equal treatment of everyone who is similarly situated. With prescient insight, Aristotle acknowledged the complexity and contextuality of justice. In his lengthy discussion of justice in Book 5 of the *Nicomachean Ethics*,¹ Aristotle equated justice to

ⁱAristotle enumerated three types of justice: distributive, retributive and equity. The discussion of justice in this paper concerns primarily distributive justice, that is, how the limited supply of vaccine should be distributed. Aristotle, *The Nicomachean Ethics of Aristotle*, translated by WD Ross. London: Oxford University Press, 1971.

the entirety of interpersonal ethics and defined justice as giving each his due. He also recognised the difficulty in determining which features of a situation should be taken into account in deciding that individuals are similarly situated and which factors should be given priority in a particular situation. Justice requires moral discernment to identify the factors that are most significant in a particular kind of situation and judgment about how they should be compared.

A long tradition of moral and political philosophers, including Thomas Hobbes and Immanuel Kant, and contemporary contractarian constructivist philosophers, most prominently John Rawls, T.M. Scanlon and Onora O'Neill, follow Aristotle's insights.ⁱⁱ Each of them offers an account of justice that draws on an array of reasons, including both factual matters that should be considered and principles. Similarly minded philosophers recognise that when we have to decide which course to take, every choice may involve sacrificing some cherished principles.

Explaining what makes right acts right in his important book *The Right and the Good*, Sir William David Ross explicitly states what thoughtful people know. He writes, 'It is obvious that any of the acts that we do has countless effects, directly or indirectly, on countless people, and the probability is that any act, however right it may be, will have adverse effects' (p.41).^{1 iii} And as Philippa Foot explained, 'For one for whom moral considerations are reasons to act there are better moral reasons for doing this action than for doing any other' (p.385)¹² and that remains the case even when '[t]he situation may be such that no one can emerge with clean hands

ⁱⁱFor example: Rawls J, *A theory of justice* (Cambridge, MA: Harvard University Press, 1971); Rawls J, *Political liberalism* (New York: Columbia University Press, 1993); Scanlon TM, *What we owe to each other* (Cambridge, MA: Belknap Press of Harvard University Press, 1998); Onora O'Neill, *Towards justice and virtue: A constructive account of practical reasoning*. (Cambridge University Press, 1996); *Acting on principle: an essay on Kantian ethics* (New York: Columbia University Press, 1975); Onora O'Neill, *Constructivism vs contractualism*. *Ratio* 2003; 16 (4):319–331.

ⁱⁱⁱIn the summary chapter at the end of his second book on moral philosophy, *Foundations of Ethics*, (p. 318) Ross makes the same point. There he explains that, 'in deciding what I ought to do, it is evident that I must consider equally all the elements, so far as I can foresee them, in the state of affairs I shall be bringing about. If I see that my act is likely to help M, for instance, and to hurt N, I am not justified in ignoring the bad effect, or even treating it as less important than the good effect, merely because it is the good effect and not the bad one that I wish to bring about. It is the whole nature of that which I set myself to bring about, not that part of it which I happen to desire, that makes my act right or wrong.' (italics in original).



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whatever he does'.^{2iv} Some *prima facie* obligation may be violated even when, all things considered, the chosen action is the right thing to do (p.388).^{4 v} To paraphrase philosopher John Gray, the actions or policy goals we determine to be right or wrong, just or unjust, are *conclusions*, not the dictate of a foundational principle, but 'the end-products of long and complicated chains of reasoning' (p. 84).^{3 5} And as Scanlon puts it, '[j]udgments about what is good or valuable generally express practical conclusions about what would, at least under the right conditions, be reasons for acting or responding in a certain way' (p.96).^{3 vi} (emphasis added)

In contrast to this constructivist approach to ethics, numerous authors who write on justice and healthcare appear to favour a more Platonic approach. Most typically, they articulate a singular principle as the meaning or essence of justice. Today, the most popular essentialist positions on justice in medicine and public health hold that justice is equality (ie, egalitarianism),^{4 6} or that justice is utility (ie, utilitarianism; whatever produces maximum number of life years),⁴⁻⁶ or that justice is priority for the worst off (ie, prioritarianism),^{6 7} or that justice is fair equality of opportunity (ie, progressivism).^{7 8} Even though there are particular situations in which a just allocation should accord with one or another of those principles, I regard these positions and other recently popular essentialist views (eg, justice is reciprocity; justice is correcting structural inequality) as problematic because they fail to recognise that different circumstances require prioritising different considerations and following different principles. By taking a singular idea of justice as the starting point for moral deliberation, well-intentioned people erroneously assume that ethical conclusions follow simply from it, and thereby reach conclusions that are incompatible with what should be done.

Other authors appear to understand justice as upholding several different principles without noticing when different principles point in opposing directions. Others who commit themselves to multiple principles at once fault decisions that violate one or another principle as being unjust even when the choice reflects better moral reasons than other options. Whereas several different principles of justice can direct the same action, there are times when different principles of justice point to inconsistent conclusions. When that occurs, we have to identify the principles that are most appropriate to the situation and have the courage to sacrifice other principles in order to achieve the most pressing goals. Often enough a moral conclusion dictates that we triage our principles to do what justice requires.

In sum, it is important to notice that we rightly employ different principles in making different decisions. We need to recognise that the rightness of an action or policy decision is determined by considering all of the relevant factors and setting aside factors that are irrelevant distractors. And when treasured principles of justice direct us in opposing directions, it is important to choose the course or goal that reasons support as being right under the circumstances. In

those situations, we have to acknowledge that upholding some principle(s) of justice may be inappropriate for making the particular kind of decision at hand. In such circumstances, abiding by principles that are incompatible with a critical goal subverts justice.^{8 vii}

JUSTICE IN COVID-19 VACCINATION PRIORITISATION

As I understand the vaccination priority suggestions offered by policy makers and authors in preparation for vaccine distributions, both sorts of problems infected their thinking. On the one hand, essentialists presumed that their singular conceptions of justice (eg, 'fair equality of opportunity' or 'priority for the worse off') were the meaning of justice and that no other principles for vaccine distribution were legitimate. On the other hand, those who maintained that justice required simultaneously upholding several principles tried to do so without taking all of the relevant factors into account or noticing the incompatibility with critical aims. In what follows, I will explain how the recommendations that resulted from these misunderstandings led to unjust vaccine allocation proposals.

Foreseeing the advent of vaccines in the months that followed the emergence of the COVID-19 pandemic, numerous authors and institutions drafted prioritisation guidance. The policies and documents that were produced represent sincere efforts by individuals and groups to map out the difficult decisions that had to be made in the face of the threat to human life and civil society. The recommendations echoed advice from interdisciplinary groups that wrestled with understanding what justice required. The sincerity of those efforts did not, however, guarantee that they set out the right course.

As I reviewed the prioritising guidance from the US Centers for Disease Control and Prevention (CDC),^{9 7} the National Academies of Sciences, Engineering, and Medicine (NAEM),^{9 10} and the British National Health Service (NHS) interim advice,^{10 11} I noted that they each identified several different goals, and their policies were inconsistent with the single goal that scientists identified as most critical, leaving their proposals without a coherent rationale. I shall proceed by first explaining what I take to be a defensible and coherent rationale for vaccine distributions. I will then raise concerns about the recommendations being offered.

FACTORS TO CONSIDER

The starting point for offering a just allocation policy is identifying which factors are significant considerations for making vaccine allocation decisions. Those factors have to be identified, examined, understood and compared to determine how

^{vii}What makes achieving justice difficult is that often enough it is not easy to identify which principle(s) to employ in making a particular kind of allocation. That difficulty is why contractarian constructivist philosophers offer models for assessing decisions about what to do. Aristotle suggested that we think of what "Pericles and men like him" would do because "they can see what is good ... for men in general." Hobbes offers that we can know what justice requires by considering our decisions in light of the negative Golden Rule, "*Do not that to another, which thou wouldst not have done to thy self.*" (italics in the original) Kant directs us to test our maxims with any of his four formulations of the categorical imperative. Recognizing "the burdens of judgment," Rawls instructs us to think in terms of what an "overlapping consensus" of reasonable and rational representatives of family lines would endorse in the original position behind the veil of ignorance. And Scanlon teaches us to check whether our reason(s) for acting in the particular circumstances "could reasonably be rejected."

^{iv}Foot 1983.

^vIn 20th century moral philosophy, this plain fact was observed and discussed at length by Isaiah Berlin, H.A. Prichard, Bas van Fraassen, Bernard Williams, Ruth Barcan Marcus, and Bernard Baumrin and Peter Lupu, among others. Their point is that the justness or rightness of any particular action will turn on the reasons supporting it, the reasons that count against it, and their saliency.

^{vi}Scanlon (1998), p.96.

those different factors interact and discern which are the most compelling concerns that have to be addressed. In light of that analysis the appropriate principle(s) to guide the just allocations must be chosen. Whereas the solution may not be immediately obvious, the procedure for identifying guiding principles is relatively straightforward.

Without ranking, the relevant factors in this case include at least the following: (1) the degree of vaccine scarcity, (2) facts about disease prevalence and contagion, (3) exposure and transmission risks, (4) feasibility of populations maintaining isolation, (5) feasibility of implementing a distribution scheme, and (6) individual vulnerability. I will briefly discuss each in turn.

Degree of vaccine scarcity

In the autumn of 2020, manufacturers reported that they were producing vaccine as quickly as possible and stocking warehouses in advance of final approval. Nevertheless, production, distribution and storage issues made it impossible for everyone to receive vaccine at once. The expectation was that vaccine allocation would be handled nationally,^{11 12} and that in the most economically developed nations eventually there would be enough for everyone who was willing to accept it. So those responsible for allocation decisions had to decide who to prioritise for vaccination. The more limited the supply relative to the demand, the more draconian and discriminating the allocation scheme would have to be.

Prevalence and contagion

COVID-19 is a highly contagious lethal airborne disease, and new variants (eg, B.1.1.7, B.1.617.2) may be significantly more transmissible than the original strains of the virus. For anyone who sustains any doubts, that truth was made irrefutable by superspreader events, including August's motorcycle rally in Sturgis, South Dakota. In its aftermath, infection numbers climbed in the Dakotas, and cases spread to more than 20 states with more than 300 people infected shortly thereafter.^{12 13} Similarly, the tremendous spike in the number of infected and hospitalised followed the year-end holidays when people celebrated at parties and family gatherings. Accumulating dramatic evidence tells us that victims of the disease become vectors of the disease. It also means that the more prevalent the disease becomes, the more likely it is that people become victims then vectors and radically increase disease spread. Therefore, disease prevalence should be the most critical consideration in determining a just policy for vaccine distribution.

When a disease becomes so widespread that testing and contact tracing are no longer feasible and effective containment options, community spread occurs. The principles for guiding vaccine distribution should be different in community spread situations than when and where the transmission level is low.

Furthermore, the virulence and transmissibility of the virus matter. Each new infection creates another opportunity for the virus to mutate and for more virulent and transmissible variants to evolve and defy our ability to contain the spread. And whether future COVID-19 disease outbreaks are more transmissible or virulent than COVID-19 wild-type should also make a difference in public health approaches. A future virus that is far more deadly than the original would require more draconian measures to protect the population.

Exposure and transmission risks

Because COVID-19 is an airborne disease, people who live, work or interact in close proximity to many others are more likely to become infected than those who live, work or interact with just

a few others. Congested living coupled with interactions outside of the home increases the risk of contagion. Those combined factors increase the chance of contracting and spreading the disease for people who live in homes crowded with many others and people who live in large high-rise apartment buildings where residents crowd together waiting for elevators then squeeze in for the ride. Congregant housing facilities, such as hospitals and dormitories, present a high transmission risk because one person who becomes infected with COVID-19 in their coming and going can easily spread the disease to others. Those who work in close proximity to others (eg, in healthcare, factories, commercial kitchens) are at greater risk of transmission than people who keep themselves relatively isolated. Transmission hazards are also greater for people who rely on public transportation than for those who do not or who work from home.

The risk of transmission in nursing homes and prisons is somewhat different from other congregant living situations. Whereas residents of those facilities could spread the disease to one another, to the extent that their isolation from one another and the rest of society can protect them from contagion, their contracting the disease is unlikely. Excluding visitors eliminates one source of disease transmission. When workers who maintain facility operations are screened and required to follow personal and institutional protective procedures (eg, masking, quarantine), the risk of resident contagion is minimised.^{13 14}

Feasibility of maintaining isolation

Because those vulnerable to contracting COVID-19 will, if infected, expose many others, the feasibility of various populations maintaining isolation has to be taken into account. The spectrum ranges from those who are inevitably most likely to contract and spread the disease to those least likely to become infected and transmit the disease. The work circumstance of first responders and essential workers entails their being on-site; their activities cannot be performed remotely. By maintaining the social functions that they fulfil, their isolation is impossible. Using the CDC definitions,^{14 15} this category comprises nearly 70% of the US workforce.

An intermediate group includes those who have no essential function outside of their home, but who are likely to be adversely affected by isolation, for example young children, adolescents and young adults who benefit significantly from social interaction and who suffer educational, social and psychological harm by being sequestered without inperson teaching, athletics and peer interaction.^{15 16} The increasing incidence of deaths from youth suicide and multisystem inflammatory syndrome in children indicates that for them isolation is possible but costly.^{16 17}

The circumstances of people who can work from home and those not likely to be significantly harmed by continued isolation make their isolation feasible. It may not be pleasant, but it is unlikely to have serious long-term untoward effects.

Feasibility of implementing a distribution scheme

We have learnt that vaccination significantly reduces both the likelihood of contracting COVID-19 and the likelihood of spreading the disease. Also, as more people are quickly vaccinated, the fewer will become infected and the lower the risk of new more lethal and transmissible variants. The more people who can be quickly and efficiently vaccinated in one place in a short time frame the better. Efficient vaccination would, therefore, help control the spread of the virus and thereby save more lives than would be saved by an inefficient approach. An efficient vaccination system allows tracking and enables clinicians,

scientists and manufacturers to learn about complication, duration of immunity and comparative effectiveness of different products.

Identifying large concentrations of people who are likely to be vectors of disease and likely to accept vaccination would contribute to making rapid vaccination feasible. It is time-consuming and often difficult to persuade those who are reluctant to accept vaccination. It is also time-consuming to reach those in remote locations and deliver two vaccination doses given the storage and viability limitations on some of the vaccines themselves.

In selecting institutions and facilities to perform vaccination, the feasibility of collecting data while performing vaccination is critical. Vaccination sites need to have sufficient numbers of personnel, people with relevant experience, staff with medical expertise and the ability to respond to medical emergencies, adequate facilities to allow for social distancing, and other patient needs. Their geographical location is also an important consideration. They should be distributed throughout the region and located where people can have easy access with public or private transportation.

Individual vulnerability

Although most people who develop COVID-19 recover at home from mild and moderate cases, some develop severe symptoms and require hospitalisation. The elderly and those with underlying medical conditions are more likely to develop serious cases than others. Overall, approximately 1%–2% of those hospitalised die from the disease,^{17 18} and a recent CDC estimate has the US death rate down to 0.65% when asymptomatic cases are included.^{18 19} People who have previously been infected with COVID-19 are likely to have antibodies that confer some level of immunity, with a recent study showing that more than 90% of people who had a mild or moderate case of COVID-19 develop immunity that lasts at least 5 months.^{19 20}

At the same time, people who are not elderly and who do not have underlying medical conditions also develop COVID-19 and some die. Some become ‘long-haulers’, that is, they develop long-lasting symptoms, some mild, some serious. At this point, we do not know if those complications will fade over time, or persist or progress.

JUSTICE IN VACCINE DISTRIBUTION DURING COMMUNITY SPREAD

Society trusts public health agencies and government officials to develop and implement policies for justly distributing the vaccine supply. Doing so requires taking all of the relevant facts into consideration and moral discernment for identifying appropriate goals and objective criteria for vaccine prioritisation. Once the standards are chosen, they have to be lucidly explained to the public so they may be acknowledged as the reasonable approach to vaccine allocation. The criteria must be applied equally to all who stand to benefit from vaccination and adhered to with rigorous criteria-based judgments.

In our current circumstance, the disease is still running rampant in many countries. Hospitals around the world are still running short of resources for patients who need treatment. Reducing the number of people who become infected reduces the number of people who they infect and thereby curtails the spread. As a study by Mélodie Monod²¹ and colleagues, ‘Age groups that sustain resurging COVID-19 epidemics in the United States’, published in *Science* on 26 March 2021 showed, those aged 20–49 account for 72.2% of disease spread, and when you

expand the age range to include those aged 20–64 they account for nearly 90% of infections. People in age groups most vulnerable to becoming infected are the source of most infections. Those 65 and over are estimated to be the source of less than 3% of infections, with almost all of those infections being in the age group 65–79.^{20 21}

A paper by Kate M Bubar and colleagues,²² ‘Model-informed COVID-19 vaccine prioritization strategies by age and serostatus’, published on 26 February 2021 in *Science*,^{21 22} focused on minimising mortality and years of life lost, and the authors recommended prioritising the elderly and others at risk of serious complications for vaccination. Their analysis addressed a point of time in October 2020 before vaccination was available. It failed, however, to take into account the accumulating deaths from allowing the pandemic to continue, or the activities of people in different age groups, or the resurgence of epidemics, or the development of more virulent and transmissible variants. When those factors are considered and given appropriate weight, it becomes clear that we should be focused on reducing the incidence of disease rather than reducing mortality among the most vulnerable. Vaccines administered to those circulating in the community would reduce the incidence, quickly cut mortality and thereby save the most lives.

Based on the existing evidence, it is reasonable to hypothesise that far more lives would be saved by prioritising potential disease vectors for vaccination than those who are most likely to die from the disease if infected. Given the situation of uncontrolled disease spread, efforts should focus on containment because, over time, a containment strategy can be expected to save the most lives. It is the appropriate principle for guiding vaccine prioritisation, the reason that people could not reasonably reject. These considerations direct the initial vaccine supply to those areas where community spread is happening and to the age groups that become disease vectors. Containing the spread in regions with community spread limits the spread of the disease to other areas. Containing the spread among the age groups that spread the disease cuts down on future infections and the possibility of more lethal and transmissible variants developing. These measures therefore lead to fewer deaths than would occur when the initial supply is allocated to the elderly, who are unlikely to either become infected or spread the disease. The principle for governing the limited supply of vaccine directs us to choose measures for containing the spread because doing so would save the most lives.

The first doses in regions with community spread should go first to those who are most likely to become vectors of the disease, that is, essential workers who have to circulate in the community. Healthcare workers should be first among them to receive vaccination because it is critically important to protect extremely scarce human medical resources where medical resources are severely overburdened with COVID-19 victims. Beyond the clear need for prioritising healthcare workers, the differences between those employed in different socially valuable inperson work are not significant enough to justify treating any group before another. In directing vaccination to essential workers, local vaccination strategies should be guided by feasibility.²² While community spread situations persist, the next vaccinated group should be those harmed by isolation. They should be followed by those who could maintain isolation without being harmed as well as those with presumed immunity from having been previously infected (see [box 1](#)).

Taken together, these considerations point to a radically different set of priorities than what was suggested by officials. A prioritisation plan focused on containing the spread of the

Box 1 Vaccine allocation in community spread circumstances

Community spread situations: containment to save the most lives.

Essential workers: required to interact outside their residence.

- ▶ Healthcare workers.
- ▶ Other essential workers.

Non-essential workers: can isolate in their residence with some burden and risks.

- ▶ Children and youth under age 20 for whom vaccine is safe and effective.
- ▶ People aged 20–64.
- ▶ People aged 64 and over and those with life expectancy of less than 1 year.

Box 2 Vaccine allocation in low transmission circumstances

Low transmission level situations: triage to avoid avoidable deaths.

- ▶ Healthcare workers and essential workers.
- ▶ Those most vulnerable to death.
 - People with underlying conditions.
 - The elderly.
 - Children?
 - Pregnant women?
- ▶ Everyone else.

disease in order to avoid the most deaths involves vaccinating first those who are most likely to become infected and become disease vectors. It slows down the spread of the disease and reduces the opportunities for variants to evolve. Here, in ranked order, is my prioritisation list for places where the pandemic crisis and community spread persist.

JUSTICE IN VACCINE DISTRIBUTION WHEN CONTACT TRACING IS FEASIBLE

As communities succeed in reducing the spread of SARS-CoV-2 and controlling its transmission, the urgent need for containment will have passed. When and where the disease is significantly contained and the level of transmission is relatively low, the change in circumstances justifies a different allocation plan, one focused on avoiding the most avoidable deaths. Again, healthcare workers, first responders and essential workers should be in the first group to receive the vaccine. We would still need healthcare workers to be functional so their efforts can help to avoid the most avoidable deaths, and we would still need other essential workers to maintain a functioning society. The second group should include those most likely to have serious cases if they contracted the disease, that is, those most vulnerable to significant complications and death. Because we have little information about how infected children and pregnant women^{viii23} fare with COVID-19, and because differences in their physiology may be somehow relevant, and because young survivors who suffer untoward consequences would have to live with them for a long time, our uncertainty justifies extra caution. To the extent that vaccine is found to be safe and effective for them, it may be appropriate to prioritise them with the second group to receive the vaccine. The third group would include everyone else because differences between those outside of the first two groups are neither large enough to justify a distinction nor obvious at this point (see [box 2](#)).

JUSTICE AND CONTEXT

It is informative to compare [box 1](#) and [box 2](#) and notice how they differ. When containment is the goal, those most likely

to spread the disease should be given priority over everyone else, including those most vulnerable to serious complications and death. When contagion is rampant, those most vulnerable to the effects of the disease are typically people who can keep themselves isolated. So long as they isolate, they are less likely than others to acquire and spread the disease. When the virus is significantly contained, people who are particularly vulnerable to serious complication of the disease should, however, be prioritised.

The comparison also reveals that a policy based on saving the most lives leads to different decisions than a policy based on avoiding the most avoidable deaths. To highlight the difference, recall the influenza vaccine shortage in the fall of 2004. When it became clear that there would not be enough influenza vaccine to meet the expected demand, people recognised that it was important to find a better way to allocate the limited supply of influenza vaccine than allowing it to go to the aggressive, the lucky and those with good connections. Communities around the country and finally the US CDC promulgated distribution policies that allotted vaccine to first responders and medical care providers who would be called on to treat influenza-infected individuals and those who were likely to die or suffer serious harm if they contracted the virus. The supply was therefore directed to the elderly, the immunocompromised, the very young and pregnant women.

The principle supporting influenza vaccine allocation was not utilitarian *save the most life years* or *save the most lives*. A utility principle would have disqualified the elderly and the immunocompromised because their vaccination could be expected to provide relatively few life years, a small quality adjusted years (QALY) pay-off. The principle inherent in the vaccine distribution policy was avoid the worst outcome, which, in that context, was taken to mean avoid the most serious illnesses and deaths.

As circumstances change the principles for achieving justice may change. Maximisation principles such as saving the most lives are often appropriate as public health measures when we need to consider the entire population at risk and treat everyone in the same way. During the COVID-19 pandemic, maximising principles justify masking and quarantining. They are justified even though they may impose the greatest burden on the least advantaged members of society. Avoiding the most deaths and similar triage policies are often invoked in clinical settings when the demand for scarce resources outstrips the supply. In such circumstances it is appropriate to pay attention to the relative differences in people's situations.

That said, I recognise that most people have been comfortable with prioritising the elderly and vulnerable for vaccination. Few have voiced objections to prioritising in accordance with those policies. Anticipating resistance to my view, I will offer retorts to objections that I foresee.

^{viii}As other vaccination prioritization plans have done, I painted my recommendations with a broad brush. Equity, however, may require exceptions for particular local circumstances, including, for example, prioritization for people residing in high-occupancy high-rise apartment buildings with crowded multi-generation families, or dormitories, or crowded homeless shelters.

AN OBJECTION: FLATTENING THE CURVE

Early in our COVID-19 experience, public health experts argued for ‘flattening the curve’. They educated us about the importance of slowing the spread of the disease to prevent the rate of infection from overwhelming our resources for treating those with serious disease. When people in the most vulnerable groups contract COVID-19, their medical needs can be tremendous. It seems intuitive that we should, therefore, vaccinate the most vulnerable among the first to keep them from becoming seriously ill and overwhelming our hospital capacity. In other words, it may appear that flattening the curve should be our focus regardless of how widespread the disease becomes.

Most people in vulnerable groups are, however, able to isolate in their residence to prevent their becoming seriously ill. Because they would be at low risk of becoming victims and vectors of COVID-19 during isolation, vaccinating them is not as crucial as vaccinating those who are likely to spread it when the disease is widespread and spreading fast. Furthermore, after nearly a year of learning and practice, medical professionals became far better at making decisions about who required hospitalisation and caring for the seriously ill. They learnt about anticoagulation, proning, avoiding ventilation in favour of high-flow nasal cannulae and therapeutics including antibodies. By the end of October 2020, mortality rates in some New York City hospitals dropped by 75%, the average length of stay decreased from 11 days to 9, and the percentage of patients needing ventilators declined from 17% to 9.5%.^{23 24} Those facts suggest that the need to protect those most vulnerable to serious illness became less critical to flattening the curve than it was at the start of the pandemic. Decisively, the best way to protect those vulnerable to serious complications and death and avoid overwhelming hospital capacity is by encouraging them to stay at home.

ANOTHER OBJECTION: PRIORITY FOR THE ELDERLY

The plight of the elderly and other vulnerable groups has monopolised the attention of policy makers and the bioethics community. They in turn have convinced the public that we should focus resources on saving the elderly and others who are worse off. There are times when such an agenda is appropriate, but there are also times when it is not. In recent decades, esteemed philosophers such as Daniel Callahan^{24 25} and Norman Daniels^{8 25} have mounted powerful arguments based on similarly lofty concepts such as ‘fair equality of opportunity’ and ‘fair innings’ that would actually support the opposite approach, giving elderly the lowest priority.

My conclusion that the elderly should not be prioritised for vaccination while the virus is rapidly spreading is based on two reasons. (1) The urgency of responding to a rapidly spreading and mutating deadly disease justifies measures that contain the spread of the disease. In the long run, whatever halts the spread of COVID-19 serves everyone’s interests, whereas diverting vaccinations to people who are not likely to spread the disease provides only the elderly with a limited short-term benefit. Taking a long view, they and everyone else would be harmed by the disease spreading and mutating and killing more of our loved ones as it keeps on infecting people in our communities.

(2) As I see it, policy makers have turned a blind eye to an obvious but uncomfortable social reality. The reality is that we have a responsibility to acknowledge the comparative harms and burdens produced by the disease. Some people who are not elderly develop COVID-19, and some of them die. Some become ‘long-haulers’, that is, they develop long-lasting symptoms, some mild, some serious, and no one knows if those complications will

fade over time, or endure or be exacerbated. I regard the harm of losing many decades of future life as significantly worse than losing a few months or years of life, and the burden of persisting COVID-19-related disabilities over decades seems worse than enduring them for a brief period. If people open their eyes to those realities they may accept them as powerful reasons for younger people to receive vaccination before the elderly.

AND ANOTHER OBJECTION: ADDRESSING SYSTEMIC BIAS

To the extent that the massive vaccination programmes require broad public support, it is critical to advance a clear, coherent message. People need to be able to comprehend the relevance and importance of the vaccination programme’s goal. On the one hand, a vaccination priority message framed as reparations for systemic bias can stoke the hostility of a wide swath of the population. On the other hand, as we have already seen, a message framed as an effort to address racial inequalities can promote fears of exploitation, experimentation and genocide in the group intended to benefit.^{8 26} When irrelevant and highly controversial goals are introduced without advancing the critical aim, they needlessly undermine success of the vaccination programme. And when containment of the virus is the appropriate goal, policy should focus on the achievement of that end and eschew complications introduced by trying to simultaneously promote other aims that hamper achievement of the immediate, urgent goal.

Although long-standing, systemic health and social inequities are serious social problems, they are best addressed by programmes focused on ameliorating such disparities. Deviating from the goal of disease containment in the face of a run amok pandemic diverts resources to counterproductive agendas and leaves those who are socially and economically disadvantaged most at risk of exposure to the virus. Vaccine allocation is not the means for achieving that important, but different, goal. Furthermore, vaccination priority during the pandemic will hardly impact that issue.

People who have been socially disadvantaged and people in racial and minority groups are however among those who are most vulnerable to contagion. Therefore, they are among those most likely to benefit from disease containment and most likely to suffer when policies deviate from that critical goal.

IMPLICATIONS

I began this discussion by identifying different principles of justice that authors have suggested for making resource allocations during the COVID-19 pandemic. Specifically, I mentioned reciprocity, fair equality of opportunity, utility and prioritising the worse off. You may have noticed that I later did not base my arguments on reciprocity, fair equality of opportunity or prioritising the worse off. Those principles were neither forgotten nor overlooked.

Although those principles are fine considerations in many circumstances, they are not appropriate for making vaccine allocation decisions during this pandemic. **Box 1** allocations give priority to essential workers. Those groups are likely to include primarily people of colour and people who are among the least advantaged. The reason they are prioritised is, however, unrelated to their being victims of systemic racism or among the least advantaged, but the likelihood of their spreading COVID-19. In sum, **box 1** directs us to place those who are likely disease vectors at the head of the vaccination queue.

Boxes 1 and 2 both prioritise healthcare workers. The reason they should be vaccinated first is not related to reciprocity,^{26 27} but because of their crucial roles in saving the most lives (box 1) or avoiding the most avoidable deaths (box 2) and the fact that we do not have an abundance of them and therefore cannot afford to lose them during a health crisis. Medicine is committed to the non-judgmental regard of patients, which means that privileging any group, including their own (ie, healthcare workers), should be anathema to the profession. Furthermore, accepting reciprocity as a legitimate justification for medical allocations would imply that an injured hit-and-run driver or a person who has refused to wear a mask and practise social distancing should be ineligible for medical care or given lower priority than others with similar medical needs who demonstrate their social solidarity. I suggest that medical professionals should avoid making judgments as to patient worthiness for care and continue their long-standing commitment to base treatment decisions solely on medically relevant considerations.^{27 28}

Finally, a critical point about justice guiding the allocation of scarce medical resources is that policy-driven decisions direct medical practitioners and public health officials to treat similarly situated individuals in the same way. Once we identify the appropriate way to make a particular allocation, introducing additional considerations (eg, reciprocity, fair equality of opportunity, prioritising the worse off) is making exceptions to the rule we determined to be just. Doing so would be, and appear to be, irrational and unjust and thereby undermine the trust needed for broad social acceptance of the policy.

COVID-19 VACCINE RECOMMENDATIONS: WHY WE GOT WHAT WE GOT

NASEM's 5 October 2020, 'A Framework for Equitable Allocation of Vaccine for the Novel Coronavirus' states that its aim is 'to achieve the primary goal of maximizing societal benefit by reducing morbidity and mortality caused by the transmission of novel coronavirus'. The guidance from the US CDC published on 23 November 2020, 'The Advisory Committee on Immunization Practices' Ethical Principles for Allocating Initial Supplies of COVID-19 Vaccine', declares in its first sentence 'To reduce the spread of SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19) and its associated impacts on health and society, COVID-19 vaccinations are essential'. In their full elaboration, these statements declare a commitment to several goals at once. Similarly, the NHS advice from the Joint Committee on Vaccination and Immunisation (JCVI) published on 3 December 2020, 'JCVI: updated interim advice on priority groups for COVID-19 vaccination',^{28 29} pronounces that it aims 'to reduce mortality, improve population health by reducing serious disease, and to protect the NHS and social care system'. These statements from the CDC, NASEM and NHS all point to disease containment as one of their several goals. Preventing disease spread should be the policy aim because, as numerous public health experts explained, until the disease is contained, other aims, such as providing societal benefits and reducing COVID-19-related morbidity and mortality, cannot be achieved.

Although it is sometimes the case that we can achieve multiple goals at once when they direct us to the same actions, when principles aim us in opposing directions we have to engage in moral triage. In other words, we have to choose the goal that requires our attention and set aside other agendas, at least for the time being. Trying to achieve multiple aims at once can divert us from accomplishing what we judge most important.

In the case of COVID-19 vaccine prioritisation, I have argued that stopping the spread of the disease effectively and efficiently was our most urgent goal.^{29 ix} Yet the NASEM framework recommended 'higher priority given to individuals who have a greater probability of severe disease or death if they acquire infection'. The CDC guidance prioritised long-term care facility residents (1a) and adults with high-risk medical conditions and adults 65+ (1c). And the NHS JCVI directed that prioritisation should be 'primarily based on age' and that vaccination should first be offered to the most elderly and their caregivers. These criteria have little to do with containing the virus, and prioritising those recommended groups is hardly effective in slowing the spread of the disease.

The authors of those policies primarily focused on those most at risk of death and ignored other important factors that should be considered (eg, prevalence, exposure and transmission risks, feasibility of isolation). As if no other principles merited consideration, and without offering a justification, they adopted an essentialist conception of justice, avoid the deaths of the most vulnerable. They therefore reached a conclusion that was inconsistent with disease containment which they, at the same time, acknowledged as the most pressing goal in the response to the pandemic. Each victim of the virus who was circulating in the community could spread the virus to multiple others, thereby increasing the spread geometrically. Ironically, the JCVI notes that 'Individuals considered extremely clinically vulnerable have been shielding for much of the pandemic'. Those words tell us the authors recognised that the elderly and people with underlying medical condition avoided disease exposure, transmission and death by staying home. For that reason, they should have concluded prioritising them for vaccination would not contribute to COVID-19 containment.

In rethinking the approach to COVID-19 vaccine prioritisation, it is telling to recall the response to the US 2004 influenza vaccine shortage. Even though experts consistently emphasised that COVID-19 (~500 000 deaths in 1 year) was far more transmissible and lethal than influenza (62 000 deaths in 2019), surprisingly the comparison reveals that the prioritisation scheme in 2004 was essentially the same as the COVID-19 vaccine allocation proposals.³⁰ The similarity in response is particularly surprising in light of the fact that in 2004 doctors knew a great deal about influenza, they had multiple effective treatments for influenza victims, and they were not particularly concerned about having adequate resources for dealing with cases. In the fall of 2019, however, they still knew very little about COVID-19, they had no treatments to offer, and they were fully aware of how case load demands had overwhelmed healthcare resources. Doctors were also aware that influenza typically runs its course by spring. In contrast, they learnt that COVID-19 infections diminished somewhat in the summer of 2019, but it certainly did not disappear. It just kept chugging along, mutating rapidly, presumably becoming ever more contagious and less susceptible to existing vaccines. Public health officials argued convincingly that the disease spreads exponentially, yet they astoundingly advocated for the same plan that was followed in response to the 2004 influenza vaccine shortage.

Many of the elderly became ill and died early on in the pandemic. By the time vaccines became available, public health leaders had learnt that isolation, masking and sanitation

^{ix}The CDC Advisory Committee actually notes that, "[a]llocation of limited vaccine supplies is complicated by efforts to address the multiple goals of a vaccine program." The fail to recognize that their "multiple goals" direct them to conflicting responses.

procedures protect the elderly from becoming infected. Where those measures were implemented the rate of nursing home deaths declined dramatically. Asking the elderly to wait a few more months for vaccination would have been a reasonable cost in light of the critical need to contain the spread of the virus.

The available evidence should not have pointed policy makers to prioritise those with the highest chance of dying from the virus. The only rationale that I have seen for their nearly unanimous decision to first vaccinate the elderly and those with underlying medical conditions was offered by Alberto Giubilini, Julian Savulescu and Dominic Wilkinson. They suggested that it was ‘taken for granted that the criterion for prioritizing access to COVID-19 vaccines is vulnerability to COVID-19’.^{30 31} But an assumption is not a justification. And, as Giubilini, Savulescu and Wilkinson also note, the presumption was not based on science³¹ x but taking for granted that justice entailed priority for the elderly.

THE TAIL WAGGING THE DOG

Policy makers were not alone in reaching problematic conclusions on how COVID-19 vaccination should proceed. Philosophers and bioethicists also missed the call.³² Numerous authors, including some of the most esteemed people in their fields, weighed in on vaccination prioritisation before and during the pandemic, but without acknowledging that a policy focused on containment would save the most lives.^{32–38} Instead of starting off by considering the details of the situation, they focused their analyses almost exclusively on abstract principles. In sum, they allowed the tail to wag the dog.

As Giubilini, Savulescu and Wilkinson noted, many accepted the assumption that protecting the most vulnerable should be their priority. But instead of challenging the assumption, they turned their attention to sorting out what protecting the most vulnerable could mean in this instance.

A good many others took a different but similarly problematic turn. They presumed that the solution to the dilemma lay in constructing an amalgam of their favourite principles.^{xi} In other words, they allowed an assortment of principles, rather than the facts, to set the course.

These authors might have avoided their missteps by heeding the advice bioethicists offer in the clinical arena. Good ethics begin by understanding the facts involved in the decisions being considered. Good bioethicists do not offer opinions until they have understood the circumstances, identified the most significant factors involved, compared the likely outcomes of alternative decisions and discerned the appropriate principle(s) to guide the actions to be taken.

CONCLUSION

Taken together, the NHS and CDC advice and the NASEM framework all missed the mark. The advice of philosophers and bioethicists who wrestled with principles without engaging with

the facts also failed to provide the guidance that was needed. Neither the authors of the NHS, CDC and NASEM guidance, nor the philosophers and bioethicists who offered recommendations on vaccination prioritisation, paid sufficient attention to critical pandemic-related factors during the period of rampant COVID-19 spread. Almost all of them offered advice that prioritised those most at risk for serious disease, an approach which was likely to have been counterproductive. Their recommendations diverted the initial limited initial vaccine supply to people who could have been protected by isolation and failed to advance the critical goal of saving the most lives by containing the virus spread.

In this discussion I explained why I found the vaccine prioritisation goals set during the COVID-19 pandemic inappropriate and lacking a compelling justification. I also sketched the kinds of factors that need to be considered in making appropriate vaccine allocation decisions. With still months to go in battling the COVID-19 pandemic, and facing a future that is predicted to bring more outbreaks of novel viral disease, we need to learn from the mistakes that were made in confronting COVID-19 vaccination. Policy makers have to hold the line of justice and resist the influences of both political correctness and politics in their effort to identify the appropriate goal(s) for health policy during a crisis. Public health leaders need to stay focused on the facts before them and eschew the flawed path of presuming that science can dictate choices that evidence alone cannot determine.

Society deserves a coherent explanation of public health policy. Providing a rationale that can be comprehended and endorsed by the population is critical for the success of any public health policy. Therefore, communicating a message that gains public trust and support is closely tied to achieving urgent policy goals. The justification for choosing a plan of action must be carefully thought through and clearly explained to increase the likelihood that allocation procedures will be widely accepted. When a vaccine prioritisation rationale is understood as being clear and compelling, the public can trust that justice is being done.

Correction notice This paper has been updated since first published to correct author details in footnote xi.

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^xI’m not an epidemiologist and I don’t have the ability to generate the numbers. Yet, with nearly 600,000 deaths and over 33,000,000 cases in the US by prioritizing the elderly, it would be instructive to have experts estimate the number of lives that could have been saved by prioritizing essential workers instead of the elderly and people with underlying conditions.

^{xi}For example, Persad *et al.* (2009) advocated for “an amalgam of principles,” and again in Emanuel *et al.* (2020); Gupta and Morain (2021) advocated for “a combination” of prioritization strategies; Liu, Walwi, and Drolet (2020) support a “multivalued ethical framework”; Jecker, Wightman and Diekema (2021) advocate for an assortment of “ethical values.”

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