The Ethics of Deliberate Exposure to SARS-CoV-2 to Induce Immunity

We explore the ethics of deliberately exposing consenting adults to SARS-CoV-2 to induce immunity to the virus (“DEI” for short). We explain what a DEI program might look like and how it differs from the status quo. We consider a consequentialist argument for DEI according to which DEI is a viable harm-reduction strategy. Then we consider a non-consequentialist argument for DEI that draws on the moral significance of consent. Additionally, we consider arguments for the view that DEI is unethical on the grounds that, given that large-scale DEI would be highly likely to result in some severe illnesses and deaths, DEI amounts to a form of killing. Our main focus throughout the paper is on a question of public policy: whether governments should allow DEI. We also discuss the separable question of whether medical doctors can participate in DEI consistently with their professional norms.

Keywords: public health ethics, pandemic ethics, SARS-CoV-2; COVID-19; Coronavirus

1. Introduction

During the current pandemic, many people—perhaps billions—will eventually be exposed to SARS-CoV-2. In most cases, these exposures will be unintentional and decidedly unwanted. However, it is possible for someone to be exposed on purpose and with informed consent. Should governments allow and perhaps even support procedures in which consenting adults are deliberately exposed to SARS-CoV-2 to induce immunity to the virus? Might that have been a better response than some of the policies that governments have actually chosen? Is deliberate exposure something we should be prepared to consider the next time a pandemic strikes?

In this paper, we’ll discuss a range of arguments for affirmative answers to these questions, but our aim is to inspire discussion rather than to provide definitive conclusions. We’ll also discuss a separable question: whether doctors’ participation in these activities is consistent with norms of the medical profession.
As we argue below, deliberately exposing consenting adults to SARS-CoV-2 to induce immunity to the virus (“DEI” for short) has several attractions. One is that DEI can increase population immunity. Population immunity is a social good, protecting the health of those not yet immune and allowing more social and economic freedom than would be possible without it. Importantly, if DEI were administered strategically, it could dramatically reduce infection rates even with low participation numbers. (See our discussion of ring immunity in Section 3.1.) This means that even small-scale DEI could produce significant benefits for society as a whole. Other attractions are more individualistic: immunity might enable an individual to acquire an “immunity certificate” which would exempt them from restrictions on travel, work, etc., or to interact with friends or loved ones without fear of transmitting or contracting the virus. Additionally, DEI can (somewhat paradoxically) reduce individuals’ risk of serious COVID-19 disease, for reasons we explain below (Section 3). Also, we’ll explore arguments from a non-consequentialist perspective that consensually exposing individuals who seek immunity has a moral advantage when the alternative is accidental and hence non-consensual exposure (Section 4).

Although DEI might sound like science fiction, a crude form is already occurring. There have been numerous reports of “COVID parties,” where groups of people intermingle in hope of catching the virus. In at least one case, someone died of the virus after attending such a party (Coleman 2020; Peednia 2020; Pietsch 2020). Such parties are manifestly unethical: steps are not taken to minimize risks and attendees typically take no precautions to prevent the virus from spreading beyond party-goers. But in this paper we will outline a much more sophisticated type of DEI program that does include such precautions. It turns out to be surprisingly difficult to show that DEI carried out responsibly is unjustifiable, or so we’ll argue.
Before continuing, a brief note about the timing of this paper. Because the currently unfolding pandemic is rapidly evolving, the strength of the case for DEI varies over time. The case for DEI may have been stronger at an earlier stage of the pandemic, when vaccine development was less advanced than it is today. After all, the nearer we are to an effective vaccine, the less costly it is to simply wait for a vaccine rather than consider unconventional ways of inducing immunity such as DEI. Alternatively, the case for DEI might be stronger today than it was at the outset of the current crisis if our now improved understanding of the virus allows the development of better tools for minimizing harm in a DEI program (see Section 2.1 below). Yet again, if vaccine development eventually stalls or hits unsurmountable roadblocks, then the case for DEI may become stronger in the future than it is today and it is important to begin preparing for that possibility now by, among other things, having a robust bioethics discussion about alternatives, including DEI.

If it turns out that DEI was more defensible in past months than it is today, DEI still continues to merit ethical reflection: SARS-CoV-2 is not the last deadly virus that will afflict humanity. When the next one appears, the arguments of this paper can serve as useful groundwork for future ethicists and policymakers who may be well-advised to consider whether some form of DEI is justifiable in their circumstances.

Further, although our focus in this paper is on time-sensitive practical issues, our arguments address themes of broader and more permanent interest. As will become clear, whether people should be allowed to deliberately expose themselves or others to a deadly virus raises deep questions about the moral significance of consent, the amount of harm we can justifiably inflict on one another in an effort to prevent even greater harms, and the compatibility of certain kinds of harm with reasonable professional norms that apply to medical doctors.
1.1 Deliberate exposure and human challenge trials

Many would reject DEI out of hand on the grounds that deliberately exposing people to a deadly virus is obviously unethical. But a different form of deliberate exposure, namely that involved in human challenge trials of SARS-CoV-2 vaccines, is already being discussed by scientists, ethicists, and policymakers in respectable venues as a serious and defensible possibility.

In normal phase 3 trials for vaccines, subjects are given either an experimental vaccine or a placebo. Researchers then wait for subjects to be exposed to the virus in the course of their normal lives and compare the rates of infection in the two groups to determine whether the vaccine is effective. Because of the lengthy waiting period, such trials are expected to take six months or more (Morrison and Rose 2020; Lane 2020; Murdoch Children’s Research Institute n.d.).

To shorten this timeline, some have proposed that these trials be replaced with human challenge trials, in which the lengthy waiting period required for “natural” exposure to SARS-CoV-2 is replaced with the administration of a controlled, deliberate exposure to the virus. (Eyal, Lipsitch, and Smith 2020). It is possible that conducting SARS-CoV-2 human challenge studies would make a vaccine available many months ahead of schedule. Such an acceleration could prevent thousands or millions of deaths and could benefit billions of people by shortening the duration of the present public health, economic, and social crisis.

Although some of the most criticized human subjects research in history involved intentionally exposing people to disease agents (Arras 2013; Robinson and Unruh 2008), carefully conducted, consensual human challenge studies have been accepted as an ethical way to investigate a variety of pathogens, including influenza, malaria, shigella, tuberculosis, cholera, typhoid, dengue fever, and others (Cohen 2016; Morrison and Rose 2020; Baay et al. 2019). There is now growing support for SARS-CoV-2 human challenge studies (Morrison and Rose
2020; Shah et al. 2020; WHO Working Group for Guidance on Human Challenge Studies in COVID-19 2020; Eyal, Lipsitch, and Smith 2020; Steel, Buchak, and Eyal 2020), and over 15,000 people from over 100 countries have expressed willingness to volunteer for such studies (“1 Day Sooner” n.d.).

DEI and human challenge studies are similar in that both involve deliberately exposing people to a deadly virus; the possibility of ethical human challenge studies with SARS-CoV-2 thus shows that DEI cannot be rejected merely because it involves deliberate exposure to a deadly disease.

1.2 Human challenge trials vs. DEI

It is important, though, to acknowledge that there are important differences between DEI and human challenge trials. There’s a difference in scale. A human challenge vaccine study may involve only a few hundred subjects. Given these low numbers and the expected safety even of vaccines not yet proven effective, it is likely that such studies would cause zero deaths. By contrast, for a large society (such as the United States) to make appreciable progress with population immunity via DEI, a large-scale public health initiative could involve many thousands or even millions of participants. Therefore, even with careful screening to exclude older individuals and others who are at high risk of severe COVID-19 disease and with careful management of COVID-19 sequelae, it is all but certain that large-scale DEI would result in a significant death, serious illness, and permanent injury.

Another difference is that, at the outset of a human challenge study, each participant has a high chance of receiving a vaccine that has shown promise in phase 2 trials, and thus each participant’s ex ante odds of serious illness or death are diminished. No such protection would be available for DEI participants.
Also, uncertainties about immunity complicate the ethics of DEI. It is known that recovery from other coronaviruses typically results in immunity for some duration of time. Because of this, many experts believe with good reason that those who recover from SARS-CoV-2 will be immune for some period of time thereafter (Wajnberg et al. 2020). However, as the World Health Organization has stressed, there is (as of this writing) no experimental confirmation that exposure to SARS-CoV-2 confers immunity (World Health Organization 2020). There also seems to be significant uncertainty as to the likely duration of any conferred immunity. So, were we to embark on a DEI program to further population immunity, we might be infecting a large number of people with a deadly virus while failing to achieve the main aim. By contrast, the main aim of a human challenge study would be to determine whether a vaccine is effective, and the study would likely settle that question.3

Our first task is to explain a possible DEI program and to compare it to the status quo (Section 2). Then we will lay out tentative consequentialist and non-consequentialist arguments for a public policy involving DEI (Sections 3 and 4). We then turn to an objection to DEI based on the doing/allowing distinction (Section 5). Finally, we’ll consider whether doctors can perform DEI compatibly with their professional norms (Section 6).

2 Deliberate Exposure for the Purpose of Immunity (DEI)
To have a specific proposal to discuss, we’ll outline a possible DEI program (2.1). Then we’ll explain the idea of “calibrating the curve” and argue that calibrating the curve policies are already being implemented in many countries (2.2). This will set the stage for our arguments in favor of supplementing policies that calibrate the curve with a DEI program.


2.1 A possible DEI program

The DEI program we’ll outline involves four stages: a design stage; a recruitment stage; a dose-finding stage; and an implementation stage.

The main task for the design stage is to develop a standardized delivery method for exposing volunteers to SARS-CoV-2. As noted by Hanson (2020) and Chappell and Singer (Forthcoming), because there is reason to believe that lower viral doses cause less severe disease (Liu et al. 2020; Rabinowitz and Bartman 2020), the delivery method should be able to reliably deliver low doses of SARS-CoV-2. Also, the dosage level needs to be adjustable as needed in the dose-finding stage.

In the recruitment stage, a small group of research volunteers for the dose-finding stage are recruited and carefully screened. To reduce risks, those above a certain age and those with various comorbidities are excluded (Du et al. 2020; Zhou et al. 2020). Also, the selection process preferentially includes volunteers already at higher-than-average risk of natural exposure to the virus (e.g., emergency room doctors and grocery store employees) (Eyal, Lipsitch, and Smith 2020). As with other research which exposes individuals to significant risk, rigorous informed consent procedures are used to help subjects understand the nature of the program, its risks and benefits, alternatives, and other relevant information.

In the dose-finding stage, recruited volunteers are used to determine the safest dose sufficient to provoke a robust immune response—call this the *optimal dose*. After exposure, volunteers are housed in “hero hotels” (Hanson 2020) where they are isolated to prevent transmission to others and provided medical care. After the volunteers recover, they are given the option of participating in immunity experiments in which they are re-exposed to the virus and monitored to determine if the dose was sufficient to produce immunity.
At the implementation stage, procedures developed and refined during the dose-finding stage are applied in a public health initiative to a large number of consenting volunteers. Again, those above a certain age and those with various comorbidities are excluded and preference is given to those with higher-than-average risk of natural exposure. As with other medical procedures that expose individuals to significant risk, rigorous informed consent procedures are used to help ensure volunteers understand relevant information. Again, volunteers exposed to the virus will be quarantined and provided with medical care.

The contours of the implementation stage depend heavily on findings from the dose-finding stage. In an optimistic scenario, the dose-finding stage reveals that (i) optimal-dose exposures result in much less severe disease than natural exposure and (ii) exposure induces robust, long-lasting immunity. In the optimistic scenario, DEI may be attractive to a very large number of volunteers and it may be reasonable to expand the public health program to include hundreds of thousands or millions. In the most pessimistic scenario, the dose-finding stage reveals that (iii) disease severity resulting from optimal-dose exposures is not appreciably different from disease severity resulting from natural exposure and (iv) exposure does not confer any lasting immunity. In the pessimistic scenario, the program would be discontinued before reaching the implementation stage. A number of middle scenarios are more likely than either of those two scenarios. The scale and design of the implementation stage should be adjustable in light of observations from the dose-finding stage.

We fully acknowledge that this is only a bare outline of a DEI program, but it will be sufficient for our purposes.

2.2 Calibrating the curve

Would public policy involving DEI be the best way of responding to the threat posed by SARS-
CoV-2? To answer that definitively would require surveying all possible approaches, a task beyond the scope of this paper. We will focus on the more tractable question of whether incorporating DEI into our pandemic response might represent an improvement on the status quo. Before addressing that question, it’s necessary to sketch the main type of public policy currently in effect in many countries. Then, we’ll consider whether that type of policy could be improved by incorporating DEI.

Many public policies being implemented today are advertised as having the aim of flattening the curve. However, there’s an often-overlooked distinction between two different types of curve-flattening policies. Policies that aim to smash the curve (STC) aim to reduce infection rates as low as can be achieved, ideally to zero. An STC policy is successful on its own terms only when the infection rate cannot be reduced any lower. In contrast, policies that aim to calibrate the curve (CTC) aim to reduce the infection rate below what it would be with no interventions at all but nonetheless aim at a target range of infection rates that is higher than the lowest that can be achieved. A CTC policy is successful on its own terms as long as the infection rate in the population covered by the policy is within the targeted range.

At the outset of the SARS-CoV-2 pandemic, some governments announced STC policies. Officials in the United States appeared to believe that the virus could be eradicated: U.S. President Donald Trump repeatedly contradicted public health experts by predicting a quick disappearance of the virus from the U.S. (Goldberg 2020). However, although eradication is probably achievable for some countries (e.g., New Zealand and Australia), it currently seems unachievable (in the absence of a vaccine) in most countries because it would require extreme measures that are likely politically impossible to implement.
CTC policies are far more common than STC policies. Any government policy that imposes behavioral restrictions (e.g., physical distancing, hand-washing and face-mask requirements, school closings, bans on large gatherings) until an infection rate target is reached that is perceived as sufficiently low (even though it could be made lower), and which then relaxes the restrictions until a higher infection rate threshold is reached, counts as a CTC policy. Kissler, et al. (2020) discuss such a policy when they consider “intermittent social distancing scenarios” in which social distancing measures would be turned “on” when infection prevalence rises above a certain threshold and turned “off” when it falls below a certain threshold. The Imperial College COVID-19 Response Team (2020, 11–14) discusses a CTC policy which they describe as using “adaptive triggering of suppression strategies.” Tomas Pueyo’s (2020) influential article, “Coronavirus: The Hammer and the Dance,” recommends a CTC policy.

Different CTC policies involve different triggers—threshold conditions in which behavioral restrictions are imposed or lifted—which will result in different numbers and distributions of infections and deaths. We can also distinguish different CTC policies in terms of the further aims that accompany them. All CTC policies by definition aim to calibrate the infection rate, i.e., to keep the infection rate within a specified target range, but this calibration is never an end in itself; rather, it is instrumental to some further aim.

Sometimes, a CTC policy’s further aim is to achieve population immunity as quickly as possible without overwhelming the medical system with cases of severe disease. For example, population immunity was originally the explicit aim of CTC policies pursued in the UK and the Netherlands, although they have backed away from that now (Holligan 2020; Hanage 2020; Johnston 2020; Hancock 2020).
In other cases, CTC policy does not aim at increasing population immunity, but instead aims to strike the right balance between reducing citizens’ risk of exposure to the virus and other values, say, the value of preserving and enhancing citizens’ personal and economic freedoms.

A CTC policy may still be in effect even if it has not been explicitly endorsed. If a government is disposed to impose behavioral restrictions when infections are above an upper threshold and to relax those restrictions when infections fall below a lower threshold, then that government has a CTC policy. It is reasonable to think that the majority of governments in the world today have such dispositions.

All CTC policies have a common morally significant feature: they all allow preventable infections in order to pursue some other aim. When behavioral restrictions are lifted in accordance with a CTC policy, this foreseeably results in an increase in infections that could have been prevented had the restrictions not been lifted. This is never because policymakers believe that infections are good; it is because policymakers believe that some other outcomes—population immunity, or increased social and economic freedoms, or whatever the policy’s further aims may be—are good.

We next consider arguments for the view that incorporating DEI in public policy might improve on status quo CTC policies. We consider consequentialist arguments based on DEI’s potential for harm-reduction in Section 3 and non-consequentialist arguments grounded in the moral significance of consent in Section 4.

3 Consequentialist arguments for DEIs
There are at least two sets of reasons to think that a DEI program of the sort sketched in Section 2.1 could reduce overall harm. We focus on the United States, but our points likely generalize to other countries where infection prevalence is high and growing.
3.1 DEI allows infections to be shifted from the vulnerable to the more resilient

Assume for the moment that, during the course of the pandemic, a high level of population immunity will be achieved before the virus is brought under control by a vaccine or effective treatment. Once this high level is achieved, suppose the virus will cease to spread and thus a significant fraction of the population will be protected from the virus. Although the level of population immunity required for this varies, classic estimates suggest that about 60-70% of the U.S. population would need to be infected to reach this point (Gomes et al. 2020; Kwok et al. 2020). The latest research on COVID-19 in particular suggests a much smaller proportion, about 43%, would be needed to reach that threshold (Britton, Ball, and Trapman 2020). We will use 60% in our example.

To achieve this level of population immunity in the U.S., then, 60% of the U.S. population, or about 200 million people, will eventually be infected. However, crucially, who gets infected remains an open question. This level of population immunity could be achieved by infecting a mix of people that predominantly includes older, more vulnerable Americans; but it could equally be achieved by infecting a younger, less vulnerable mix of Americans. It’s unknowable in advance what the rate of severe disease would be in each of these scenarios, but we can be all but certain that hospitalization rates and death rates would be dramatically higher in the first scenario, given that age is the most important risk factor for severe COVID-19 disease (Jordan, Adab, and Cheng 2020). It is possible that hundreds of thousands more deaths would occur in the first scenario than in the second.

A DEI program would not enable us to precisely determine the mix of exposed individuals, given that uncontrolled spread would continue to occur alongside any DEI program that might be implemented, and given that participation in any such program would be voluntary. However, a DEI program would be a way for a society to guide its future in a direction that is more like the
second scenario than the first scenario. That’s because a DEI program enables policymakers to shift the spread toward those who are more capable of withstanding infection: individuals who are relatively young (though old enough to give consent), free of known comorbidities, and otherwise well-positioned to survive infection without serious complications.

Consider a very ambitious scenario. Suppose a DEI program were able to recruit half of the top 25% most resilient citizens of the United States; this would mean a program involving 41 million volunteers. The result would be that 41 million individuals who are less resilient, and more vulnerable to serious disease and death, might be spared infection before a high level of population immunity is achieved. We cannot know in advance how many lives would be spared by such a shift, but it seems reasonable to think that this would spare many more lives than it would cost.

Further, and perhaps more importantly, even a significantly less ambitious approach could save lives. This can be seen by considering “ring vaccination,” where the close contacts of newly discovered cases are vaccinated. This approach has been used to control the spread of many contagious diseases including smallpox. A similar approach could be used with DEI. A DEI program that is targeted toward individuals who work or live in close proximity to recent outbreaks could create a “ring” of immunity that prevents or reduces spread beyond outbreaks, and might be able to do so with relatively few participants in the DEI program.

A salient example for many academics and students involves college campuses. As many universities plan for in-person classes this fall, there is widespread belief that students will socialize in ways that result in major outbreaks within campus communities. Most such students are at low risk of severe health impacts from Covid, but others in the community—including lecturers, staff, and their families—may be at much higher risk. A DEI program targeted at low-
risk college students, to provide immunity before the semester begins, could serve to protect the broader community, potentially saving many lives.

It is important to emphasize here that the scenarios we have just sketched are possible only if recovery from infection results in significant immunity. If infection does not result in any significant immunity, not even partial or temporary immunity, then population immunity is not possible without an effective vaccine; and in that case a DEI program would not be justified. In the absence of certain knowledge that recovery results in immunity, the case for a DEI program rests largely on the probability that recovery results in significant immunity. Determining this probability is a task for epidemiologists and other experts (Kirkcaudly, King, and Brooks 2020)—though early evidence suggests that infection in mild to moderate cases produce antibody responses that are “robust, neutralizing and are stable for at least 3 months” (Wajnberg et al. 2020, 1).

3.2 DEI allows control over the circumstances of infection

In addition to the fact that DEI allows policymakers to redirect viral spread toward more resilient people and away from more vulnerable people, DEI also has a number of advantages deriving from the level of control that it affords in managing the initial infection and subsequent disease.

We’ve already mentioned one advantage of that type of control: DEI allows adjustment of the viral dose involved in exposure, which may reduce the severity of the resulting infection. Scientists have suggested that the viral dose received in one’s initial exposure to SARS-CoV-2 is a major factor in determining the severity of the infection (Rabinowitz and Bartman 2020). We cannot know the magnitude of this effect specifically for SARS-CoV-2 without further research, but the potential significance is immense: In the case of smallpox, inoculation via deliberate low-dose ‘variolation’ reduced the case fatality rate from 20-30% to 0.5-2% (Fenner et al. 1988, 245–
If DEI turned out to be anywhere near that effective for SARS-CoV-2, it could save a great many lives.

Hanson (2020) draws on a wider array of historical data (including, most relevantly, studies showing how natural variation in initial viral dose significantly affected fatality rates from SARS-CoV-1) to support his estimate that inoculation could cut COVID-19 deaths by a factor of three or more. Again, this is a highly uncertain estimate, and direct research on SARS-CoV-2 inoculation is needed to ground a more robust verdict. Given the immense (but uncertain) potential to save lives, there may be a strong case to undertake such research (Chappell and Singer Forthcoming). If inoculation lives up to its potential, the ability to discover and reliably deliver an optimal viral dose would be a major factor in the consequentialist case for DEI.

On the assumption that infection confers substantial immunity and thus any given individual is unlikely to be infected twice, it may be reasonable for individuals to seek intentional low-dose exposures to immunize themselves against the risk that they will have an accidental high-dose exposure. This prudential case is enhanced because, as discussed above, DEI programs will be targeted to people with a higher risk of natural exposure. Thus, the advisability of enrolling in a DEI program will depend on, for example, whether one lives in New York City, where an estimated 40%-80% of the population will be exposed (Tarkazikis 2020), or in New Zealand, which has virtually eradicated the virus (New Zealand Ministry of Health n.d.).

Additionally, giving individuals control over the time at which they are infected can reduce the harm caused by infection for the simple reason that illness can be more intrusive at different times. It is worse to become ill when one is in the ninth month of a pregnancy, undergoing chemotherapy, or starting a new business. Because participation in a DEI program would be
voluntary, we can expect that the individuals involved would be submitting to exposure at a time that is, comparatively speaking, not extremely inconvenient for them, and (assuming population immunity can be achieved through controlled spread) this can be expected to reduce the number of accidental infections experienced by those for whom the timing of the illness would be particularly damaging because of their life circumstances.7

Moreover, in a DEI program, everyone who is exposed would know that they have been exposed whereas accidental exposures are typically unnoticed until symptomatic. This can be likely to aid in harm reduction for two reasons.

First, even though there is currently no FDA approved or recommended treatment for asymptomatic or pre-symptomatic individuals (U.S. Centers for Disease Control and Prevention n.d.), this could change in the future, as earlier anti-viral treatment could prove more effective at preventing severe illness (Asadollahi-Amin et al. 2020) and transmission (Torneri et al. 2020).

Second, knowledge of infection is crucial for reducing the risk one’s infection poses to others. Such knowledge ensures less risk of accidental spread from asymptomatic individuals who fail to self-isolate because they do not realize that they’ve been infected. Together, these factors suggest that, if DEI confers immunity on someone that prevents them from subsequently acquiring an uncontrolled infection, this substitution is likely to be beneficial for both the individual and others.

A final benefit of DEI has to do with what might be called infection overshoot. If a high level of population immunity is achieved through uncontrolled viral spread, high levels of uncontrolled spread would continue for a time even after that level of population immunity is achieved (Bowman 2020; Handel, Longini, and Antia 2007). DEI would have a significantly reduced chance of such overshoot because participants would be isolated while they are
contagious, whereas people with non-deliberate infections are typically contagious for days before they are aware they have been infected.8

4 DEI and consent
In the previous section, we considered reasons to think that a policy that incorporates DEI could reduce overall harm caused by SARS-CoV-2. However, there are further reasons to support a DEI program that do not depend on considerations about overall harm. Even assuming that the total harm that results from a policy that includes a DEI program is the same as the total harm that results from the status quo, a case for DEI is still possible.

4.1 DEI and the Morally Transformative Power of Consent
To give some specificity to our discussion, consider two concrete scenarios:

DEI scenario
A DEI program is implemented. 30% of the U.S. population participates and is infected deliberately and with their consent. An additional 30% of the population is infected accidentally through natural exposure and without their consent. Sadly, some number of individuals in each group become very ill and die. Then a level of population immunity is achieved sufficient to prevent viral spread.

CTC scenario
No DEI program is implemented. Rather, a CTC policy is followed in which infections are allowed to occur through natural exposure. Accidental infections continue to occur at a low but non-zero rate until 60% of the U.S. population is eventually infected. Sadly, some number of these individuals become very ill and die. Then a level of population immunity is achieved sufficient to prevent viral spread.

From many standard non-consequentialist perspectives, the CTC scenario, where the number of unintended, non-consensual exposures is higher, is morally worse than the DEI scenario even if
total harm in each scenario is the same. Swapping non-consensual exposures for consensual exposures is morally sound policy according to standard non-consequentialist views because, other things equal, *non-*consensual exposures are morally worse than consensual exposures.

Non-consequentialists typically believe that consent can be morally transformative (Wertheimer 2003, 119–21; Fletcher 1998, 112; Kleinig 2010; Miller and Wertheimer 2010; Wertheimer 2011, 45–116). Within limits, consent can reduce how morally problematic a harm is and can make permissible an action that would have been wrong: compare kidnapping to giving someone a ride and battery to a medical exam. We submit that, just as the harms resulting from voluntary participation in a sport are less morally problematic than the same harms resulting from assault, harms resulting from consensual exposure to SARS-CoV-2 are less morally problematic than the same level of harm resulting from non-consensual exposure.

According to this line of argument, a government ought not allow 60% of its citizens to be infected against their will if it could replace half of those infections with consensual infections through a DEI program.

4.2 DEI and governments’ special obligations

One common view is that governments have morally significant relationships to their citizens, grounding special responsibilities to protect their lives and interests. But these responsibilities have a different shape if a citizen voluntarily chooses to risk their own lives or interests. In the case of DEI, people would be voluntarily undertaking risks with knowledge of what they are agreeing to. Those who tragically die in the course of voluntary participation in a DEI program may be seen as similar to those who accept short-term risks for themselves in order to promote their long-term interests or those who engage in noble acts of self-sacrifice for the good of others. Although all reasonable steps should be taken to mitigate the necessity and magnitude of
such sacrifices, the government may justifiably adopt policies and public health programs that allow and even encourage such actions. Thus, although the government arguably has a special obligation to its citizens to protect them from being infected against their will, it has at most only a weaker (and thus more easily overridden) obligation to prevent its citizens from taking well-informed risks to their lives in reasonable pursuit of other valuable aims. If so, then the government can reduce the extent to which it violates its special obligations to its citizens if it adopts or allows a DEI program that reduces non-consensual infections by increasing consensual infections.

We have here (in 4.1 and 4.2) considered two compatible ways of defending a DEI program in non-consequentialist terms: one drawing on the moral preferability of consensual harm over non-consensual harm; the other drawing on the role that consent plays in shaping the special obligations that a government has to its citizens. The core insight shared by arguments is that, if a DEI program can replace non-consensual infections with consensual infections, this can be defensible in non-consequentialist terms because of the moral significance of consent.

These non-consequentialist, consent-based arguments can be significantly strengthened when combined with some of the consequentialist harm-reduction considerations adduced in section 3. If a particular individual is in circumstances where they will likely have a non-consensual, extremely harmful high-dose exposure in an uncontrolled setting, and can instead choose to have what will likely be a consensual, significantly less harmful low-dose exposure in a controlled setting, it seems eminently justifiable to allow them that choice, even if, tragically, they end up suffering a worse outcome as a result.
5 DEI and the Doing/Allowing Distinction

According to what we’ll call the *doing/allowing objection* to DEI, the CTC scenario considered above is morally preferable to the DEI scenario above because the DEI scenario involves *causing* people to become infected whereas the CTC scenario merely involves *allowing* people to be infected. The objection continues: when volunteers in a DEI program are deliberately infected and some die as a result, those who die are thereby killed. By contrast, when a CTC policy is implemented, this only results in accidental infections and deaths; it does not involve killing. Other things being equal, killing is always far worse than letting die; therefore, the DEI scenario is far worse than the CTC scenario.

In response, the DEI defender can observe that in some cases, letting die seems morally similar to killing. Consider James Rachels’ widely discussed Smith and Jones cases (Rachels 1975). Smith drowns his six-year-old cousin in order to secure a large inheritance. Jones watches and does nothing as his six-year-old cousin drowns in order to secure a large inheritance. Many people believe that Jones’s allowing of his cousin to die is as seriously wrong, or almost as seriously wrong, as Smith’s killing of his cousin. If this is correct, then, the doing/allowing objection’s claim that, other things equal, killing is always far worse than letting die, is false.

Of course, even if CTC policies involve something as bad as killing and so don’t differ from a DEI program on that score, that leaves open whether, other things equal, both are permissible or both are impermissible. Assuming, as we and many think, the aims of population immunity or increased social and economic freedom can justify a CTC policy which allows some people to die avoidable deaths, it is arguable that these aims can also justify a DEI program even if it causes some people’s deaths.⁹

More provocatively, one can take issue with the claim made by the doing/allowing objection that CTC policies *merely* involve letting citizens die (Kaufman 2020). Many have argued that
allowing someone to die can be a way of killing them. If allowings can be killings, it’s possible to argue that when—in accordance with a CTC policy—a government calibrates infections in such a way as to allow some number of its citizens to be infected, knowing that some number of those who are consequently infected will die, it thereby *kills* the citizens who die as a result. That is, it is possible to endorse the following principle:

**Virus Killing Principle:** If (i) a citizen is infected with SARS-CoV-2 and subsequently dies, and (ii) that citizen’s government could have prevented them from being infected in the first place but instead relaxed behavioral restrictions which resulted in their being infected, then the government has killed that citizen.

It must be conceded that the Virus Killing Principle will be controversial, as it involves an expansive notion of killing. We won’t try to defend this principle here, but, if true, it could ground the following response to the doing/allowing objection.

The response proceeds from the rather anodyne claim that not all killings are morally equal. Specifically, when an action kills an individual, if that individual has *consented* to that action before she is killed, then the action is less morally bad than it would have been had the victim not consented. Imagine that you are mountain climbing. Something has gone horribly wrong. You are attached to your partner by a rope as they dangle above a deep chasm. If you cut the rope, you thereby kill them. But that act of killing is less morally bad if your partner insists that you cut the rope to improve your chances than if your partner has begged you not to cut the rope. This example supports the following general principle:

**Consent Principle:** All else equal, consensual killings are morally better than non-consensual killings.
If one were to accept both the Virus Killing Principle and the Consent Principle, then one should maintain that the DEI scenario above is morally preferable to the CTC scenario above, even if the total number of deaths from SARS-CoV-2 in each scenario is the same. For in the DEI scenario, there are (given the Virus Killing Principle) fewer non-consensual killings and more consensual killings relative to the CTC scenario, and this (according to the Consent Principle) is morally preferable to more non-consensual killings and fewer consensual killings (provided the total number of killings is equal in each case). Thus, we have a non-consequentialist argument from the Virus Killing Principle and the Consent Principle for the view that adoption of a DEI program can represent a moral improvement over the status quo even if it does not reduce overall harm.

The foregoing responses to the doing/allowing objection will be controversial and cannot be fully developed in the space of this paper. We’ve laid it out here only in order to illustrate that those who make the doing/allowing objection cannot assume that the distinction between killing and letting die straightforwardly supports CTC over DEI.

Lastly, even if DEI programs kill and CTC policies alone merely let people die, and even if killing is worse than letting die, other things equal, it needs to be reiterated that all of that is still compatible with DEI programs being justified when other things are not equal, as they may well not be. In particular, deaths that occur as a result of a DEI program will be the result of a consensual exposure, rather than a non-consensual exposure, and, depending on the empirical facts discussed earlier, the risk of death and other harms may be substantially reduced by a DEI program. The fact is that justified government policies and programs, including justified public health policies and program, frequently reduce overall harm as well as personal risk without
being free of all risk of causing deaths; recall the example of human challenge studies for SARS-CoV-2 vaccines.

6 DEI and doctors’ professional norms

We have given consequentialist and non-consequentialist arguments for the view that a DEI program ought to be adopted as a part of public policy response to the virus, given certain plausible empirical assumptions. Another, separable issue has to do whether the roles that doctors might play in the implementation of a DEI program are consistent with their professional norms.

6.1 Do no harm

One might think that medical doctors infecting someone with SARS-CoV-2 is inconsistent with professional norms simply because of the legendary Hippocratic oath including the phrase, “First, do no harm.” But this phrase is not even a part of the Hippocratic oath or of most doctors’ professional codes (Shmerling 2015). More significantly, doctors routinely and justifiably engage in harmful procedures: for example, a doctor can justifiably bruise a patient’s chest in the course of resuscitating them, break a bone to reset it, or make an incision to remove a tumor. Consider prophylactic mastectomy, a common procedure that carries serious risk of harm or even death (as all invasive surgeries do) but is justifiable in cases where the probable benefits to the patient outweigh the probable harm. In general, it is plausible that the professional norm that applies to doctors, in their capacity as doctors, is that (provided they have their patients’ informed consent) they are required to do what is in their patients’ (overall ex ante) best interests, even if that involves some harm and even if, in some unfortunate cases, that results in more harm than benefit.
6.2 Patients’ best interests in the context of uncertainty

The requirement that doctors do what is in their patients’ best interests is consistent with physicians engaging in interventions that are risky for their patients. For example, many surgeries and cancer treatments are quite risky. In the current pandemic, there was a time when administering hydroxychloroquine to patients with severe COVID-19 was standard procedure in some hospitals: even though it was known that hydroxychloroquine can have harmful, even fatal, side-effects, it was thought to give hospitalized patients in dire straits a better chance of survival. Critical analysis of the preclinical data and emerging evidence suggest that this was a mistake (Kim et al. 2020; Kupferschmidt 2020) but it was not inconsistent with professional norms, given what was known at the time.

Doctors’ deliberately exposing people to SARS-CoV-2 as part of a well-planned DEI program could similarly be within professional norms. While there is uncertainty as to whether exposing young and healthy individuals to low-dose exposures of SARS-CoV-2 can reliably confer immunity with reduced disease severity, participating in a well-planned DEI program could still be in patients’ best interests. This might be especially likely when the patient is at high risk of being subject to natural exposure in the course of their ordinary life and when the individual rightly regards immunity as highly desirable. Moreover, this uncertainty will be rapidly reduced as researchers learn more about SARS-CoV-2, COVID-19, and related matters. If general presumptions about viral load, disease severity, and immunity are borne out in this specific case (as many scientists expect them to be), doctors’ participation will be even more likely to consistent with volunteer’s best interests and so consistent with the relevant professional norms.
6.3 Doctors’ primary obligations are to their patients

The norm that doctors perform a medical procedure on a patient only if that procedure is in the best interests of their patients is more stringent than the norm that doctors perform a medical procedure on a patient only if their doing so is best overall in consequentialist terms. Consider the familiar case of a doctor who has to decide whether to kill their healthy patient and harvest their organs in order to distribute the organs to five individuals in need of organ transplants. Perhaps killing the healthy patient to save the five is best overall in consequentialist terms, but it is certainly not what is best for the patient, and so it is not acceptable (even with the patient’s consent) according to the norm suggested above. Rather, doctors’ primary obligations are to their patients (although these obligations are constrained, of course, by other considerations).

Similarly, it may contravene professional norms for doctors to expose people with SARS-CoV-2, if this is not what is best for those people, even if a DEI program can be justified in consequentialist terms.

That said, it should be noted that people’s interests include not only their narrow, health-related interests, but a broad array of psychological, emotional, family-related, and altruistic interests as well. Such benefits are often appealed to in justifying live organ donations, for example, as being not just in the recipient’s interests, but in the donor’s best interests, broadly construed, as well (Spital 2004; Williams 2018).

And notice that even if doctors would be contravening professional norms were they to expose people to SARS-CoV-2, they would not be contravening those norms were they to provide necessary medical care to DEI participants who develop COVID-19 as a result of their exposure.
7. Conclusion

Our purpose in this paper has not been to offer a decisive argument for DEI. Indeed, despite everything we have said in this paper, as a group of authors we remain collectively uncertain about whether DEI is morally defensible in light of the numerous empirical and ethical uncertainties discussed above. Moreover, there are arguments against DEI not addressed in this paper. For example, a DEI program could feed public distrust in health authorities, which might contribute to other problems, such as an increase in vaccine hesitancy. Since we have not given a full accounting of all of the counts for and against DEI, we cannot claim to have settled anything. Nevertheless, we believe that the series of arguments that we’ve laid out in this paper deserve ethicists’ attention.

Even if it is unlikely that a DEI program will be designed and implemented in response to the current pandemic, DEI may serve as a case study for examining much more general issues concerning the moral significance of consent. There are many deep and unresolved philosophical questions about the circumstances in which we should allow consenting adults to engage in activities that are or might be harmful to them, and consideration of DEI may help to further our understanding of these questions. Consideration of DEI in the context of SARS-CoV-2 may also be useful to ethicists and policymakers in the future, who may need to think about unconventional approaches like DEI in order to deal with new infectious pathogens that will almost certainly emerge in the coming years.

References

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Three big studies dim hopes hydroxychloroquine can treat or prevent COVID-19.


This assumes that recovery from the virus results in immunity (more on this assumption below). Population immunity is best understood as a matter of degree: a given population has more population immunity when the proportion of individuals with immunity in that population is higher (John and Samuel 2000). After population immunity is high enough, a threshold is reached beyond which the virus has enough difficulty finding new hosts that it will eventually stop spreading in that population, but degrees of population immunity below that threshold are still beneficial. Even a low level of population immunity reduces the risks to those as yet uninfected.

Historically, phase 3 trials alone for vaccines have taken around 2½ years (Pronker et al. 2013), but work on vaccine development for SARS-CoV-2 is proceeding with what is described as “unprecedented rapidity” (Le et al. 2020, 305), with over 140 vaccine candidates being explored and four in large-scale efficacy tests (Corum et al. n.d.).

The significance of this difference, though, should not be overstated: the research involved in implementing a DEI program that fails to achieve its main aim could still result in learning important information about how viral dose affects disease severity and antibody production, and the degree of immunity conferred by exposure.

What we are calling the dose-finding stage combines various aspects of phase 1-phase 3 research stages usually involved in human clinical trials.

For ease of exposition, we refer to DEI’s potential for harm-reduction as “consequentialist” arguments, although of course one does not need to be a consequentialist to give significant weight to such considerations.

In contrast to randomized clinical trials, other public health initiatives involve even larger numbers of individuals. For example, the CDC estimates that 62.6% of children and 45.3% of adults, approximately 160 million Americans total, received the flu vaccine in 2018-2019 (2019). Of course, flu vaccinations do not involve being quarantined and the management of a serious disease,
but given how much worse the public health and economic risks of COVID-19 are compared to the flu, funding such a large public health initiative may still be justified.

A concern may be raised about exploitation in a DEI program, especially if the program were to involve financial compensation for participants, not an essential part of a DEI program, but something which might improve levels of participation. Compensation raises familiar concerns about “undue inducement”: the worry that some may be lured by money to act against their best interests. But for such objections to succeed, strong grounds would need to be given for the judgment that such a choice would indeed be contrary to their interests. Many have a strong interest in receiving financial rewards—an interest which should not be neglected when considering the ethics of structuring a policy in this way. Perhaps most importantly, proponents of the “undue inducement” objection must defend against the response that they are unduly paternalistic; they are, after all, assuming that they are in a better position than the individuals themselves to determine what is in these individual’s best interests. It also bears noticing that empirical studies suggest that payment actually leads participants to examine risks more carefully (Cryder et al. 2010).

Wide availability of testing intersects with some of these harm-reduction-based considerations. Testing can afford some of the same benefits as DEI by allowing people to have an alternative way besides behavioral restrictions or immunity through deliberate exposure to ensure that they are not contagious or interacting with someone contagious. As testing regimens are developed and implemented, consideration of this alternative will be important for a more exhaustive ethical analysis of DEI.

The idea that CTC policies are straightforwardly immoral could be motivated by consideration of the following modified versions of Rachels’s cases:

Smith: Smith, moved by altruistic feeling, wants to build an orphanage to save many children. He would inherit a large sum of money were his six-year-old cousin to die. So, using his own hands, Smith drowns the boy in a bathtub. Smith sees the boy’s death as unfortunate but necessary to build the orphanage.

Jones: Jones, moved by altruistic feeling, wants to build an orphanage to save many children. He would inherit a large sum of money were his six-year-old cousin to die. But he is unwilling (on moral grounds) to kill his cousin with his own hands. One evening, he
comes into the bathroom and sees the boy drowning, unconscious in the bathtub. Jones does nothing. Jones sees the boy’s death as unfortunate but necessary to build the orphanage.

One could argue that a CTC policy (where the government allows citizens to be infected to secure some further social benefit) is morally similar to Jones (where Jones allows his cousin to die to create an orphanage). Further, one could argue that a DEI program is fundamentally different from Smith (because any deaths that occur in a DEI program are a result of choices made by consenting adults). If these claims hold up, then they support the view that CTC policies are immoral in the same way as Jones’s behavior is immoral—whereas properly constructed DEI programs can be morally acceptable in virtue of their difference from Smith’s behavior. But much more would need to be said in order to develop this analogical argument.

Consider the case of deactivating an implanted total artificial heart (Bronner 2016). In withdrawing the life support provided by an artificial heart, the agent allows the victim to die; but this act nevertheless seems (to some philosophers) to also be a case of killing. Similarly, it has been argued that when an agent causes someone to need saving and subsequently refrains from saving them, the agent both kills the victim and allows the victim to die (McMahan 1993, 252–53).

Thanks to [redacted].