Fair and equitable subject selection in concurrent COVID-19 clinical trials

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ABSTRACT

Clinical trials emerged in rapid succession as the COVID-19 pandemic created an unprecedented need for life-saving therapies. Fair and equitable subject selection in clinical trials offering investigational therapies ought to be an urgent moral concern. Subject selection determines the distribution of risks and benefits, and impacts the applicability of the study results for the larger population. While Research Ethics Committees monitor fair subject selection within each trial, no standard oversight exists for subject selection across multiple trials for the same disease. Drawing on the experience of multiple clinical trials at a single academic medical centre in the USA, we posit that concurrent COVID-19 trials are liable to unfair and inequitable subject selection on account of scientific uncertainty, lack of transparency, scarcity and, lastly, structural barriers to equity compounded by implicit bias. To address the critical gap in the current literature and international regulation, we propose new ethical guidelines for research design and conduct that bolsters fair and equitable subject selection. Although the proposed guidelines are tailored to the research design and protocol of concurrent trials in the COVID-19 pandemic, they may have broader relevance to single COVID-19 trials.

INTRODUCTION

In June, the Nuffield Council on Bioethics published a report calling for international collaboration to ensure fair and equitable access to COVID-19 treatments and vaccines.[1] It emphasised the importance of clinical trials for identifying effective treatments. Subject selection in these trials should aim to include 'diverse populations' so that 'drugs and vaccines are effective across diverse populations'.[1] While funding and global collaboration influence the scope of clinical trials, physicians and investigators have considerable influence over subject selection at a local level. Through research design and real-time decision-making, physicians and investigators determine which patients receive an investigational therapy.

However, the emergence of many concurrent COVID-19 trials has altered the nature of subject selection. While Research Ethics Committees monitor subject selection for individual trials, no standard oversight exists for subject selection across multiple trials for the same disease, such as the concurrent COVID-19 trials that predominate in the USA.

To illustrate, we briefly describe subject selection for concurrent clinical trials at a single academic medical centre in the USA. The following investigational therapies were offered to patients with COVID-19 at the University of Chicago: remdesivir, tocilizumab and convalescent plasma. All three trials had potential subject pools with significant overlap, but subjects were not allowed to participate in more than one trial.[2–4] The inclusion and exclusion criteria of each trial designated many patients with COVID-19 as eligible for all trials. Investigators could not rely on the scientific parameters to allocate patients to different trials. Instead, each trial approached only a subset of patients as determined by the physician's best judgment. Even as all parties acted in good faith, the provisional method of subject selection raised concerns about the overall equitable distribution of burdens and benefits and the inclusion of diverse populations in trials.

In response to this experience, we propose several guidelines that aim to bolster fair and equitable subject selection for concurrent COVID-19 trials.

DEFINING THE PRINCIPLE OF JUSTICE AND ITS APPLICATION FOR SUBJECT SELECTION

As set out in the Belmont Report, the principle of justice demands that subject selection should ensure an equal distribution of the benefits and burdens of research. Researchers 'should not offer potentially beneficial research only to some patients who are in their favour or select only 'undesirable' persons for risky research'.[5] That is not to say that patients are entitled to participate in a clinical trial. Trials cannot be offered to all eligible patients, for otherwise resources are diverted from other important health needs. Nevertheless, as the Belmont Report points out, subject selection should ensure an equitable distribution of benefits and burdens within the constraints of a clinical trial. The National Institutes of Health (NIH) echoes the Belmont Report's concept of equitable distribution in subject selection—namely, fairly sharing the burdens and benefits of research among subjects.[6]

While a full definition of justice in subject selection is beyond the scope of this paper, we will consider that the application of the principle stipulates equity and fairness in subject selection. Namely, equity requires creating equal opportunities for eligible patients to participate and demands an equitable distribution of burden and benefits among trial subjects. We define fairness in subject selection to mean an impartial and unbiased decision-making process.

CONCURRENT COVID-19 TRIAL CONSIDERATIONS: INDIVIDUAL AND SOCIAL LEVELS

More specifically, we posit two distinct rationales for fair and equitable subject selection in concurrent COVID-19 trials:

1. *Equitable distribution of benefits in the short term.*
2. *Social value of research and long-term benefits.*

First, the absence of a known curative treatment may make patients with COVID-19 desperate for an experimental option that confers benefits. Equity seems to demand that patients who are eligible at an institution that offers a trial should have an equal opportunity to participate. Nevertheless, one could argue that benefits are uncertain and hence equitable access to participation is unnecessary. We will consider this argument below. Still, ethical guidance from the Belmont Report specifies that subject selection must fairly distribute the benefits of trials, including the short-term potential benefit of an investigational therapy. We can call this first argument for *equitable distribution of benefits in the short term*.

Second, in order to have social value, research must generate useful evidence, which relies on fair and equitable subject selection. The ethical guidelines of the Council for International Organization of Medical Sciences state that 'the ethical justification for undertaking health-related research…is its scientific and social value: the prospect of generating the knowledge and the means necessary to protect and promote people's health'.[7] In the COVID-19 pandemic, clinical research is critical for identifying effective therapies. It implicates many several stakeholders—patients, pharmaceutical companies, governments and health systems and, lastly, physicians advising and caring for patients.[8] For instance, regulatory agencies and pharmaceutical companies depend on clinical trials to determine the 'efficacy and safety profiles' of therapies, and authorise the product to enter the market.[1] Hence, clinical trials are recommended in international ethical guidelines in favour of emergency expanded access or off-label use because they better advance knowledge and protect safety, even as it delays the timeline to make medicines available.[1 7]

Inequitable or unfair subject selection is ethically problematic because it undermines the social value of research. For instance, exclusion of minorities leads to a biased and subject population—an example of selection bias.[9] The overall results may be invalid because the outcome is an artefact of subject selection rather than the intervention itself. Furthermore, with a limited subject pool, a trial is less applicable for the entire population—limiting the so-called generalisability of results.[9] The NIH promotes the inclusion of women and minority groups since the 'quality and generalizability of biomedical research…depends on appropriate consideration of key biological variables, such as sex'.[10] Hence, fair and equitable subject selection is instrumental to enhancing the social value of research and its long-term benefits.

FOUR CHALLENGES TO FAIR AND EQUITABLE SUBJECT SELECTION

As illustrated by the example of the University of Chicago, no standard oversight exists for subject selection across concurrent trials. Each trial must select from the same subject pool without a mechanism to ensure equitable distribution of benefits and burdens or inclusion of diverse patient population across trials. We argue that new guidelines are necessary. In particular, we have identified four challenges in subject selection for concurrent COVID-19 trials. Each of these has the potential to render subject selection inequitable or unfair by favouring certain patients over others, undermining an equitable distribution of benefits and the social value of research. Tailored to the unique dynamics of subject selection in concurrent clinical trials, our proposal addresses a critical gap in the current literature and international regulation.

Multiple options amidst scientific uncertainty

Subject selection for concurrent COVID-19 clinical trials is precarious because of multiple options with lack of evidence about the risks and benefits of therapies. In any trial, investigators ought to have clinical equipoise—or genuine uncertainty—about the effectiveness of the therapy under investigation.[8] However, when data about the investigational therapies are lacking and multiple options are available, physicians and researchers may have moral distress about recommending certain trials over others. Although justice demands an equitable distribution of benefits and burdens, uncertainty and multiple options make this calculus more difficult.

We propose that all trials be made available equally to all eligible patients while patients seek out the best possible individualised treatment. This would respect patients' strong desire to participate as curative treatments are still lacking. Since no definitive evidence exists, offering multiple options to patients would not constitute an inequitable distribution of benefits or risks.

Still, subjects may not have access to all pertinent advice. Current US and international research guidelines do not specify that subjects in therapeutic trials must speak to their physician. Instead, patients often speak to research staff not trained to act as a medical adviser and may have a bias towards enrolling subjects. Low levels of health literacy further compound the poor understanding of risk and benefits for many patients.[11]

To ensure that subjects can make an informed decision, physicians may adopt the role of neutral medical adviser. As the influential shared-decision model recommends, patient autonomy is better protected in clinical settings when patients have input from physicians and through conversation consider how their health needs and goals can best be met.[12] Further, physicians ought to adopt communication strategies to help present clinical trials in a clear manner—such strategies have been proposed for use in clinical oncology trials.[13] These communication strategies would allow subjects to better understand risks, as well as temper expectations about benefits.

Collaboration between clinical trials provides a more structural solution to address the uncertainty that surrounds the distribution burdens and benefits of investigational therapies. Large, multiple-armed trials were proposed in the aftermath of Ebola, and were also implemented by the WHO and England recently.[14] They allow investigators to preferentially offer promising drugs, while removing others that show evidence of harm (eg, the controversy over hydroxychloroquine).

In the short term, multiple-armed trials might restrict a patient's choice through random allocation to trial arms. Given the uncertainty about benefits and risks, we cannot say that random allocation to a trial arm would be inequitable until evidence emerges to the contrary. Still, it will be important to preferentially offer one trial arm to certain patients as soon as evidence is available.

Importantly, collaboration between trials also enhances the social value of research. Through overarching multiple-armed trial platforms, trials may create a representative subject pool for each trial. Often, these trials can randomly allocate patients to different arms to remove the element of competition between trials and evaluate the comparative effectiveness of several interventions.

Transparency about concurrent trials

In institutions without multiarmed trials, lack of transparency about the availability of concurrent COVID-19 trials may compromise equity and fairness. Namely, studies may bias participation against certain subjects, and lead to unrepresentative or biased subject pools.

Current regulation for clinical trials does not ensure that patients are informed of concurrent alternative trials. The Food and Drug Administration and International Council for Harmonization both mandate that informed consent documents disclose 'appropriate alternative procedures or courses of treatment'.[15 16] Yet, this regulation can be satisfied with informed consent forms that indicate that 'other clinical trials may be available'. It is unclear whether informed consent documents must disclose the *potential availability* of other trials to patients or enumerate the specific trials at the same institution.

Without consistent transparency about the existence multiple trials, imbalances may arise in representation of patients per trial. At institutions with several trials, certain patients may be presented with only one trial option, and never made aware of other multiple options. Subject pools could become biased towards those patients who are proactive and privileged in knowledge acquisition. Imagine a patient whose family has heard of convalescent plasma and approaches a physician immediately about that option. Other patients who are not as proactive may never hear of alternative options. Further, transparency regarding other options is critical because most clinical trials require subjects to not receive concomitant investigational therapies to isolate the effect of the therapy. By participating in one clinical trial, the patient automatically forgoes other investigational therapies.

We recommend that treating physicians and research staff adopt a duty to disclose all ongoing clinical trials at an institution. The responsibility to discover all the experimental therapies available should not rest with the patient. Placing this onus of information gathering on patients leads to inequalities, and it means that patients are not fully informed when agreeing to participate in clinical trials. While informed consent is not a primary consideration of this paper, lack of transparency may undermine informed consent, as the patient cannot make adequate analysis of the potential options available.

It is not unprecedented that investigators inform potential subjects about the options for clinical trial participation—it is analogous to the surgeon's responsibility to inform patients of the alternatives to the recommended operation. Even as there is an important distinction between informed consent for therapeutic reasons and clinical trials, the informed consent standard in clinical trials supports a more extensive disclosure as patients are assuming more risks. When research staff or physicians offer other trials options, they should not 'conduct a medical cafeteria' with a wide or overwhelming range of options available from which to choose.[17] Instead, all relevant information about treatment options should be made available to the subjects prior to receiving their consent.

Scarcity

In the COVID-19 pandemic, demand far outstrips supply for convalescent plasma as it depends on recovered patients' donation. Furthermore, many new investigational drugs are limited in supply in the short term, which was the case for remdesivir. As a result, investigators and treating physicians must decide which patient has priority in receiving investigational resources, raising questions about how to select patients equitably and fairly.

It is not clear whether scarce investigational therapies need to be distributed in the same way as proven interventions such as ventilators. One could argue that subject selection is distinct since benefits are unproven, and patients face potential harm. One might further propose that trials should select the least vulnerable persons given the risks.

However, an uncertain benefit is not synonymous with an irrelevant potential benefit. Instead, it points to a debate in the scientific community about benefit—with some scientist hypothesising a benefit and others not.[8] After a phase I trial, in which non-affected patients are tested to prove safety, clinical trials may gain Institutional Review Board (IRB) approval to enrol affected patients. They must demonstrate that benefits to society outweigh the harms to individuals, and risks are minimised.[18] At that point, phase II trials aim to demonstrate efficacy.

We argue that investigational therapies in post-I phase trials should be distributed as equitably as possible to patients who are interested and eligible to participate. Without a known curative treatment, ill patients may wish to participate to benefit or help advance science. As the scientific parameters of the COVID-19 studies are currently broad, investigators or scientists will inevitably control which patients receive the scarce investigational therapies. If investigators pick certain eligible subjects over others without attempting to do so equitably, it communicates that the ill patient's wish is not morally relevant. Besides the scientific and social value of research, no other factors can outweigh the need to respect the potential good the study may represent for the patient. Concurrently, equitable subject selection also enhances the generalisability of research. Therefore, both the equitable distribution of benefits and burdens, and the social value of research are best protected by equitable subject selection.

However, many clinical trials operate on a 'first-come, first-served' basis. Under this model, patients who have knowledge about the study or have social connections may have an unfair advantage. As Persad *et al* describe, 'first-come, first-served allows morally irrelevant qualities—such as wealth, power and connections—to decide who receives scarce interventions'.[19] In the context of convalescent plasma trials, instances of first-come, first-served include family members paying volunteers to donate plasma for their loved one. Thus, the allocation of plasma in a first-come, first-served manner privileges those with wealth, knowledge or social connections, and undermines the equitable distribution of benefits and burdens and potentially the generalisability of research if it leads to the under-representation of groups.

To enforce equitable subject selection, IRBs should demand that trials adopt an allocation principle—that is, a rule for determining which patients will receive the scarce resource first. It is tempting to suggest that the therapies in clinical trials should be distributed according to scientific parameters alone to best generate good evidence. However, the inclusion and exclusion parameters are too broad to set a specific priority. For instance, if only one unit of plasma is available to two persons with identical COVID-19, would it be acceptable to prioritise the younger patient over the older patient? Either way, the decision impacts the distribution of benefits—or the individual good of patients—and may affect the generalisability of research.

Therefore, clinical trials must pre-emptively consider how to ensure equitable subject selection with scarce investigational resources. Considerations to balance include (1) maximising benefits[19] and (2) the promotion of social value of research by ensuring a representative study population. A random process of selection could ensure impartiality. Prioritising patients who

Table 1 Ethical guidelines for subject selection in concurrent COVID-19 trials

Challenge	Justice concerns in subject selection	Overlapping principles/applications of justice principle	Recommendations	Explanation
Scientific uncertainty about risk/benefits	Social value of research (ie, its representativeness and generalisability)	Respect for persons	► Multiple-armed trials may be preferable to avoid competition between trials and improve evidence generated. ► Physicians must assume the role of neutral medical advisor and acknowledge uncertainty of risks and benefits inherent in trial. ► Physicians adopt new communication strategies to explain the various trials.	Collaboration between trials may generate better evidence than stand-alone trials. Physicians are needed as advisors to patients who should be provided the opportunity to reflect on their decision to participate and make an informed decision.
Lack of transparency about concurrent trials	► Social value of research (ie, its representativeness and generalisability) ► Equitable distribution of benefit and risks	Respect for persons	► Institutions ensure eligible patients are made aware of all clinical trials for which they qualify. ► IRBs enforce a duty to disclose alternative therapies as well as restrictions on participating in multiple trials.	Without clear reinforcement, patients may not be aware of all trials available. Subject selection may favour certain groups, and discrimination (conscious or not) may occur.
Scarcity of investigational therapies	Equitable distribution of benefit and risks	Accountability for reasonableness[21]	► Clinical trials adopt an allocation principle in protocol and communicate to all patients and healthcare workers. ► Clinical trials work with a task force to arrive at an allocation principle specific to the scientific parameters of the investigational product.	As investigational therapies will be limited, justice demands that there are clear rationales for who receives treatments. When reasonable disagreements exist, the decision-makers must be held accountable.
Existing structural inequalities and barriers to equity	► Social value of research (ie, its representativeness and generalisability) ► Equitable distribution of benefit and risks	► Minimise implicit bias ► Minimise structural barriers to participation	► Implement a blinded system for approach or scoring system to avoid implicit bias. ► Address language and technology barriers by adopting multiple recruitment strategies (consent forms in multiple languages, phone consent). ► Implement a structural competency curriculum for physicians and investigators involved in research design.	All institutions and their clinical trials must diagnose and address barriers to access and equity, which may vary per medical institution.

could benefit most would allow for the maximisation of benefits yet must be balanced by the need to ensure the generalisability of research.

Trials must also account for reasonable disagreement about the manner of prioritisation. As proposed by the fair process model of Norman Daniels—implemented previously in the rationing of critical drug supplies[20]—it is critical to be transparent and accountable for an allocation principle. In Daniels' theory, 'accountability for reasonableness', the presence of reasonable disagreement about resource allocation implies that 'we must find a fair process whose outcomes we can accept as just or fair'.[21] In other words, if we cannot arrive at a substantive justification for why one allocation principle takes precedence over another, we must justify allocation principles procedurally—by having a fair process to arrive at the final decision. Institutions may create a task force consisting of healthcare workers, and community members, that collectively arrives at the allocation principle for research. National agreement on some of these principles is preferable to regional variability to avoid unfair discrepancies.

Structural barriers to equity and implicit bias

Even if subject selection addresses uncertainty, lack of transparency and scarcity, structural barriers and biases may affect equitable access to trials, just as they impact health outcomes.[22] Subject selection will depend on both the study design, as well as the decision-making of the physician and investigators in real time. We consider that barriers to equity in subject selection will appear in two specific layers of a study protocol:

1. Who is approached for enrolment?
2. How are patients to be consented and enrolled?

First, in deciding who to approach for enrolment, implicit bias may compromise the impartial decision-making necessary for fair patient selection. Implicit biases involve associations outside conscious awareness that lead to a negative evaluation of a person on the basis of irrelevant characteristics such as race or gender. Significant research in this field has concluded that healthcare professionals share the same implicit biases as the general population, largely favouring white patients over patients of colour, especially African– American patients.[23] Higher implicit bias was associated with disparities in treatment recommendations including life-saving medicine.[23] Therefore, physicians may unwittingly allocate scarce resources such as plasma preferentially to white patients.

On the level of study design, we recommend a blinding process in patient selection. A blinded scoring system helps determine medical needs on the basis of relevant medical information alone. Rather than undermining the integrity of research, a blinding process could ensure selection is unbiased, enhancing the scientific and social value of research, just as it does in blinded trials.

Furthermore, the method of enrolment will introduce language-related and technological barriers that may undermine fair subject selection. These barriers include speaking a non-native language, lack of access to technology and lower levels of health literacy. For instance, non-native language-speaking patients and proxies will not be enrolled if multilingual informed consent forms are not available, or increased effort is required to discuss the risks and benefits compared with 'easier' (ie, native language-speaking, medically literate) patients. Hospitals ought to facilitate consent via phone when proxies or patients do not have access to devices with internet.

Lastly, physicians and researchers are not immune to the impact of structural racism on medicine, lowering healthcare outcomes for minority groups.[24] This leads to the collection and integration of biased health data, procuring worse outcomes for patients of colour.[24] While these concerns are not exclusive to concurrent COVID-19 trials, their importance is heightened as certain groups of society are disproportionally affected by COVID-19. If studies do not address barriers to equity, the evidence collected leads to biased health data, and potentially adds to worse outcomes for patients of colour. To further address this problem, IRBs should mandate that researchers complete a structural competency curriculum to identify and mitigate structural barriers that threaten equity in their research.[25]

CONCLUSION

Concurrent COVID-19 trials offered amidst scientific uncertainty, lack of transparency, scarcity, and existing structural inequities and implicit bias, significantly challenge the achievement of fair and equitable subject selection. In table 1, we summarise our recommendations to address the above-mentioned challenges. A potential rebuttal to our proposed guidelines is that fair and equitable selection cannot be reduced to a few guidelines for research design and protocols—that is, virtuous behaviour is uncodifiable.[26] Yet, while we acknowledge the morally grey area of decision-making, we have argued that the current lack of guidance will perpetuate injustices and undermine research's social and scientific value, rather than allow for any needed flexibility. Still, our guidelines must be open to change when new challenges emerge.

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