

PERSONAL VIEWPOINT

Coronavirus disease 2019: Utilizing an ethical framework for rationing absolutely scarce health-care resources in transplant allocation decisions

Anji E. Wall¹  | Timothy Pruett²  | Peter Stock³  | Giuliano Testa¹

¹Annette C. and Harold C. Simmons Transplant Institute, Baylor University Medical Center, Dallas, Texas

²Division of Transplantation, University of Minnesota, Minneapolis, Minnesota

³Division of Transplant Surgery, University of California San Francisco, San Francisco, California

Correspondence

Anji E. Wall

Email: anji.wall@bswhealth.org

The novel coronavirus disease 2019 (COVID-19) is impacting transplant programs around the world, and, as the center of the pandemic shifts to the United States, we have to prepare to make decisions about which patients to transplant during times of constrained resources. In this paper, we discuss how to transition from the traditional justice versus utility consideration in organ allocation to a more nuanced allocation scheme based on ethical values that drive decisions in times of absolute scarcity. We recognize that many decisions are made based on the practical limitations that transplant programs face, especially at the extremes. As programs make the transition from a standard approach to a resource-constrained approach to transplantation, we utilize a framework for ethical decisions in settings of absolutely scarce resources to help guide programs in deciding which patients to transplant, which donors to accept, how to minimize risk, and how to ensure the best utilization of transplant team members.

KEYWORDS

editorial/personal viewpoint, ethics, ethics and public policy, infection and infectious agents – viral, infectious disease, organ acceptance, organ allocation, organ procurement and allocation, organ transplantation in general, patient safety

1 | INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) has upended health care in the United States and around the world.¹ As the first wave of surges hits the coasts of the United States, the rest of the country is likely to follow and most of us will be faced with challenging decisions at personal, professional, and institutional levels. As transplant professionals, we will encounter even more limitations in donor organs, as well as personnel, capacity, and equipment limitations in our hospitals. These limitations will differ among states, cities, and programs, making it exceptionally challenging to come up with national

guidance on how to approach transplantation during the COVID-19 pandemic.

While transplants have been categorized as Tier 3b by the Centers for Medicare and Medicaid (CMS) recommendations for limiting nonessential surgical procedures, meaning they are of the highest acuity and should not be postponed, we all know that there is nuance to which transplant patients and procedures truly meet this standard.² We, therefore, must prepare ourselves to make difficult decisions about which patients to transplant, when to limit transplant capacity, and how to best care for those patients who have undergone transplantation.³ Transplant capacity is being constrained

Abbreviations: CMS, Centers for Medicare and Medicaid; COVID-19, coronavirus disease 2019; DCD, donation after circulatory death; ICU, intensive care unit; MELD, model for end-stage liver disease.

by limited resources beyond that of donor organs, and absolutely constrained in areas where resources are not available (eg, if there are no ICU beds, transplants requiring postoperative ICU beds cannot be done).⁴ As resources become limited, our decisions about who to transplant will need to be guided by both the practical reality of each center's capacity as well as underlying ethical values. In this manuscript, we discuss the ethical standards and values that we can use to guide the transition into making decisions regarding transplantation in each of our centers and programs as we are faced with the COVID-19 pandemic.

2 | BOLSTERING THE ETHICAL FRAMEWORK OF TRANSPLANT ALLOCATION

As transplant professionals, we have significant experience with allocating scarce resources. Most of us make listing decisions regularly, considering not only medical factors but also financial and psychosocial factors all needed to make a transplant successful.⁵ The balance we have tried to strike is between justice, or providing an equal opportunity for transplantation, and utility, or ensuring acceptable benefits from transplantation.⁶ The way that we currently put allocation into practice is a two-step process. To achieve utility, if a patient is deemed to have an acceptable potential to benefit from transplantation, he or she is listed. To ensure justice, when an organ becomes available for transplant, a match run determines the order in which listed patients are prioritized for that organ. What the COVID-19 pandemic is forcing transplant programs to do is determine which of the patients who have met the bar for utility, or have been deemed acceptable for transplantation in general, should continue to be considered for transplantation given the new concerns of increased limitations on our ability to transplant patients as well as the risks of COVID-19 infection.⁴

As we move into the era of COVID-19, it is time to think beyond our traditional use of the two principles of justice and utility for organ allocation, and begin to think in terms of the ethical values framework for rationing absolutely scarce health-care resources, described by Dr Emanuel and colleagues, to make the transition from usual practice to increasingly resource-constrained practice.⁷ The four ethical values that guide rationing of absolutely scarce health-care resources are to maximize benefit, treat people equally, promote and reward instrumental value, and prioritize the sickest patients. Maximizing benefit can be conceptualized as saving the most lives and saving the most life years. Treating people equally is based on the principle of justice, which sets rules for how to treat people with the same need for a scarce resource in the same way (eg, first come, first served as done with kidney allocation or random selection so as not to advantage those with quicker and easier access to hospitals). Promoting and rewarding instrumental value means giving priority of treatment to those who have made contributions (eg, health-care workers, those involved in research) or to those who are likely to make contributions in the future (eg, health-care

workers who can return to the workforce and treat patients). Finally, prioritizing the worst off requires determining who is the worst off and what they should be prioritized for. The following sections apply each ethical value to transplantation, making the argument that we will have to transition our mindset from the simple utility vs justice calculus of organ allocation to the more nuanced ethical values approach of rationing absolutely scarce health-care resources during the COVID-19 pandemic. This paper is not a call to abandon the already established ethical principles of justice and utility in organ allocation, but rather to add the consideration of the ethical values framework for decisions that deviate from standard transplant practice due to capacity constraints, risks of COVID-19 transmission and transplant team safety.

3 | APPLYING THE ETHICAL VALUES FRAMEWORK TO TRANSPLANTATION

3.1 | Maximize benefits

Maximizing benefits to our transplant patients is a delicate balance in the setting of COVID-19. Just looking at a match run and determining if the donor and recipient pairing is a good combination will not be enough. And continuing to apply the dominant mindset that the more patients we transplant, the more lives we save and the more life years we gain will not be adequate. We have to pivot and think about what patients will truly benefit from transplantation in each program during this pandemic.^{4,8} There are several ways in which we can answer this question based on the local environment.⁴ In severely resource-constrained areas, the answer is to transplant only the sickest patients who are already using medical resources and most likely to die in a short time frame without an organ transplant; for example, patients with fulminant hepatic failure who will die without a liver transplant or status 1A heart patients who are nondischargeable on biventricular assist devices, both of whom are already occupying an ICU bed. In less affected areas, maybe the answer is to transplant the moderately ill patients who still have significant short-term mortality but are likely to have better outcomes, shorter ICU stays, hospital stays, and use less blood products and other scarce resources. In minimally affected areas, we may broaden this to patients who will benefit from transplant, use fewer resources, and are low risk for exposure to COVID-19. One example that comes to mind is a straight-forward kidney transplant recipient who will have a 2-hour operation, 3-day hospital stay, will be able to go home and self-isolate, and has a low risk of readmission.

In order to answer the question of who can benefit from transplantation, we must begin by determining the resources that are needed for a successful transplant and if those resources are available. If we start with the donor, we have a dead person who is utilizing an ICU bed, nursing staff, and mechanical ventilation. After the ICU, the donor utilizes operating room resources, including personnel, surgical masks, and gowns. Here, we must consider the competing needs of the donor hospital for these resources. After donation, the

organ transplantation is also resource intensive. Recipients utilize operating rooms, blood products, and ICU beds, albeit to different extents depending on the organ transplanted. Again, this requires personnel, ventilators, and personal protective equipment that may be needed in other areas of the recipient hospital.

Maximizing benefit goes hand in hand with minimizing risk. Therefore, we must also consider the parallel risk of COVID-19 transmission to the recipient either through donor-derived infection, nosocomial spread or community transmission pre- or post-transplant.^{9,10} Kumar et al⁴ suggest that transmission of COVID-19 in lung transplantation is high risk as the virus is primarily isolated from the respiratory tract, but that there is evidence of viremia in 15% of cases, making donor to recipient transmission possible in any transplant. In areas of high rates of community spread, it is essential to screen all recipients for COVID-19 risk and may be ideal test some or all recipients prior to transplantation. Currently, only South Korea is testing all asymptomatic recipients with NP swabs prior to transplantation.⁴ Moreover, as part of patient screening, we must determine if patients can enact a postdischarge quarantine or physical distancing plan, including virtual clinic visits, to minimize the risk of exposure to COVID-19. Patients who are unable to physically distance from others after transplantation due to living arrangements may need assistance from the transplant program to secure alternative housing for to allow for this or be given supplies such as masks to assist in decreasing the risk of COVID-19 transmission. If postdischarge housing arrangements are high risk and cannot be changed, then transplant programs may need to consider not transplanting these high-risk patients, acknowledging that this type of policy may affect lower income patients more harshly than higher income patients and should only be a consideration if there is truly no alternative strategy for risk minimization.

Moreover, as a transplant community, we should strive to test all donors so as to minimize the risk of transmission from donors to recipients, as has been done in Italy, Canada, Switzerland, Spain, and Korea.⁴ Even with universal donor testing, there will be false negatives, so a negative test does not guarantee zero risk of donor

to recipient transmission.¹¹ Just as we discuss the risk of infectious disease transmission from increased risk donors with recipients, we have an obligation to discuss the risk of COVID-19 transmission with recipients, even if that discussion is focused more on the unknown rather than known risk. Table 1 provides a series of questions to address the resource limitations and risk minimization capacity to consider prior to transplantation.

When considering the limitations and risks, we have to recognize that each solid organ transplant is different with respect to the risk of transmission of COVID-19, anticipated ICU and hospital stay, level of immunosuppression needed to prevent early rejection, and intensity of postoperative monitoring. A standard kidney transplant from a good donor, for example, will not require intensive care and be discharged within 3 days of the operation while a decompensated lung transplant patient will require both postoperative ICU care and a longer duration of hospital stay. A frail heart transplant candidate with a high likelihood of needing postdischarge inpatient rehabilitation afterward is at higher risk for COVID-19 infection than a robust candidate who can quarantine at home after discharge. Each donor-recipient scenario will have different considerations when it comes to resource limitations, potential benefits, and risks.

In our assessment of the ethical value of maximizing benefit, we must acknowledge that there are many unknowns.^{9,10} We currently do not have the supplies to test for COVID-19 on a large scale, and therefore do not know the true prevalence in our communities. We do not know the risk of transmission of COVID-19 to solid organ recipients from donors who have the disease, as there are no known donor to recipient transmissions at this time.⁴ Moreover, we do not know how transplant patients who acquire COVID-19 postoperatively or who undergo transplantation while infected will fare given their immunosuppressed state. We are entering a time of uncertainty and have to acknowledge this uncertainty to ourselves and also to our patients as we try to make the best decisions to maximize the benefits and minimize the risks of transplantation.

Question	Considerations
What are the limitations of the donor hospital and organ procurement organization?	Blood products, ICU, ventilators, operating room capacity, operating room staff, OR time constraints
What are the limitations of the recipient center?	Blood products, ICU, ventilators, operating room capacity, OR staff, postoperative housing
What patients are safe to transplant given limitations?	None, only the sickest already utilizing resources, only the most urgent, the moderately urgent with less resource utilization
What resources does the institution and organ procurement organization have to minimize risks?	Donor COVID-19 testing capability, recipient COVID-19 testing capability, recipient isolation room capacity, recipient hospital personal protective equipment to prevent nosocomial spread of COVID-19

TABLE 1 Guide for transplant programs to define limitations of resource availability and ability to mitigate risks

3.2 | Treat people equally

The section above addresses the consideration of assessing the potential benefits and risks for each individual transplant scenario. However, as programs become more resource constrained, they will have to make decisions about categorically excluding certain groups of patients from transplantation, even if patients are currently active on the transplant waiting list.⁴ The ethical value underpinning these decisions is that all people must be treated equally.⁷ For example, many programs have made the decision to discontinue living donor kidney and liver transplantation. That means all living donor operations are discontinued regardless of patient desire to proceed. Some programs have had to limit liver transplantation to only high MELD patients, lung transplantation to unstable patients, and heart transplantation to higher status patients. Some programs are refusing to consider donors who are not tested for COVID-19. Each of these decisions is made at the level of the program and not at the level of the patient. They do not consider whether the patient is willing to take a risk on a donor that is not tested, or if a patient with a lower MELD than the cutoff would still like to be considered for transplantation. As programs are forced to make decisions that set more stringent criteria regarding who will be considered for transplantation, it is essential that these decisions are made in a transparent and equitable manner. One way to ensure this is for programs to communicate their decisions to patients who do not meet the new criteria and make these patients inactive so that they do not receive offers for transplantation.

3.3 | Promote and reward instrumental value

The discussion thus far regarding maximizing value and treating patients equally has focused primarily focused on transplant recipients. As we transition to a more global assessment of transplant practices within the context of a pandemic, we have to think beyond the recipients. Promoting and rewarding instrumental value in the framework of rationing absolutely scarce health-care resources is aimed at ensuring the protection of the health-care workforce who both take on personal risk by treating COVID-19 patients and who have the potential to continue to provide societal benefit with their expertise after recovery.⁷ The idea of instrumental value can also play into transplantation in at least two ways, broadening the scope of consideration beyond the transplant recipient. The first is the instrumental value of the deceased donor. A deceased donor has the potential to save the lives of several patients who are suffering from end organ disease. This is a huge societal contribution which should be generally be rewarded by prioritizing the utilization of critical care and operating room resources. However, the scale can be tipped against prioritizing deceased donors if the donor is suboptimal, a DCD unlikely to pass within an acceptable time frame, or the donor or recipient hospitals are too overwhelmed to have the capacity for organ donation or transplantation. During a surge, there will likely be a live person with a competing need for the resources being utilized by the

donor. Can we as the transplant community recommend that a donor takes priority over a live individual in need of ICU care and mechanical ventilation? We might if that donor will save more lives or more life years with their organs, thereby maximizing overall benefit, but we must be selective about which donors will truly maximize benefits to transplant patients through donation and be expedient in our donor evaluation and timing so as to minimize the utilization of these scarce resources. We must keep in mind that in a severely resource-constrained scenario, the donor has the *potential* to save many lives while there is a patient, or multiple patients, whose *real* lives are in jeopardy awaiting a ventilator.

A second consideration in the framework of instrumental value is that of the transplant team members. Most transplant physicians, surgeons, and advanced practice providers are ready to jump in and do what is necessary not only to take care of their transplant patients but also to care for any patients where they are needed. Many of us have the training to be versatile in our roles. For example, abdominal and thoracic transplant surgeons generally have critical care, acute care surgery, and trauma surgery training. If we cannot do transplants due to a COVID-19 surge, we can step in to assist our acute care and trauma surgery colleagues as they will have to continue to operate even in the face of the pandemic. We can also offer to do donor operations at our own hospitals so as to minimize donor team travel.^{4,12} An area in which we have to be thoughtful is who should take on the role of direct patient care of COVID-19 patients. It is essential that those of us caring for immunosuppressed transplant patients are not also caring for COVID-19 patients thereby putting our immunosuppressed patients at risk.¹² In a surge situation, we must all have a plan for how our groups can care for our transplant patients while supporting the needs of our institutions.

3.4 | Priority to the worst off

A final, more global consideration that must occur as resources become further constrained is how to prioritize the worst off in general. The concept of prioritizing the worst off is secondary to and supportive of the first concept of maximizing benefit.⁷ It requires defining who is the worst off and how the worst off are prioritized. This value is useful in determining who should be prioritized for vaccines, experimental treatments, ICUs, and ventilators. We must specifically consider transplant patients in these scenarios. Should, for example, transplant patients or waitlisted patients get priority for vaccination if one becomes available so as to protect those who are already immunosuppressed or those likely to become immunosuppressed? Should they receive priority for experimental treatments as they are potentially more vulnerable due to immunosuppression? For ICUs and ventilators, should a transplant patient who suffers a complication and is likely to have a prolonged, resource-intensive recovery take priority over a young patient with COVID-19 and respiratory decompensation? In addressing these types of questions, we have to determine which patient is worse off and then balance the “worse

off" patient with the value of maximizing benefits and favor the individual who will meet our first goal saving more lives or life years. These global decisions about prioritization of the worst off within a hospital are not decisions that physicians in the United States are used to facing. Moreover, the culture of transplantation is that of pushing the limits and getting patients through their postoperative course even when it will be a long, resource-intensive process. Our desire to do everything for our transplant patients may conflict with the competing interest of other patients in the hospital and may end in triage decisions that go against our nature as transplant physicians. Ultimately, we must be willing to consider what it means to be the worst off in a pandemic and make or allow our institutions to make prioritization decisions in light of the larger picture of all patients in need of scarce resources.

4 | DISCUSSION

The transplant enterprise is well-versed in allocating scarce health-care resources because of the limited supply of donor organs and we are now facing new challenges with the COVID-19 pandemic. While the examples we provide in this manuscript come from abdominal transplantation, our area of expertise, the general principles, values, and processes for determining who we should transplant applies across organ types. We cannot afford to continue business as usual when we are faced with more limitations in donors, personnel, supplies, and hospital capacity. We must begin thinking of transplantation in the context of the COVID-19 pandemic and apply the framework of ethical values for rationing absolutely scarce health-care resources to this transition so that we can be thoughtful stewards of donor organs, honest advocates for our patients, and continue to add value to our institutions. Moreover, this is unfortunately unlikely to be the last time that we face a pandemic or large-scale disaster situation, and this framework is not just applicable to COVID-19 but can guide us in future scenarios.

DISCLOSURE

The authors of this manuscript have no conflicts of interest to disclose as described by the *American Journal of Transplantation*.

ORCID

Anji E. Wall  <https://orcid.org/0000-0002-7359-1337>

Timothy Pruett  <https://orcid.org/0000-0002-0715-8535>

Peter Stock  <https://orcid.org/0000-0002-5806-0167>

REFERENCES

1. Fauci AS, Lane HC, Redfield RR. Covid-19 - navigating the uncharted. *N Engl J Med*. 2020;382(13):1268-1269.
2. Centers for Medicare and Medicaid Services. CMS Adult Elective Surgery and Procedures Recommendations: Limit all non-essential planned surgeries and procedures, including dental, until further notice. <https://www.cms.gov/files/document/31820-cms-adult-elective-surgery-and-procedures-recommendations.pdf>. Accessed March 27, 2020.
3. Berlinger N, Wynia M, Powell T, et al. Managing Uncertainty, Safeguarding Communities, Guiding Practice. 2020. <https://www.thehastingscenter.org/ethicalframeworkcovid19/>. Accessed March 27, 2020.
4. Kumar D, Manuel O, Natori Y, et al. COVID-19: a global transplant perspective on successfully navigating a pandemic [published online ahead of print 2020]. *Am J Transplant*. <https://doi.org/10.1111/ajt.15876>.
5. Levenson JL, Olbrisch ME. Psychosocial evaluation of organ transplant candidates. A comparative survey of process, criteria, and outcomes in heart, liver, and kidney transplantation. *Psychosomatics*. 1993;34(4):314-323.
6. Organ Procurement and Transplantation Network. Ethical Principles in the Allocation of Human Organs. <https://optn.transplant.hrsa.gov/resources/ethics/ethical-principles-in-the-allocation-of-human-organs/>. Accessed March 27, 2020.
7. Emanuel EJ, Persad G, Upshur R, et al. Allocation of scarce medical resources in the time of Covid-19 [published online ahead of print 2020]. *N Engl J Med*. <https://doi.org/10.1056/NEJMs2005114>. [epub ahead of print].
8. Andrea G, Daniele D, Barbara A, et al. Coronavirus disease 2019 and transplantation: a view from the inside [published online ahead of print 2020]. *Am J Transplant*. <https://doi.org/10.1111/ajt.15853>.
9. D'Antiga L. Coronaviruses and immunosuppressed patients. The facts during the third epidemic [published online ahead of print 2020]. *Liver Transplant*. <https://doi.org/10.1002/lt.25756>.
10. Michaels MG, La Hoz RM, Danziger-Isakov L, et al. Coronavirus disease 2019: Implications of emerging infections for transplantation [published online ahead of print 2020]. *Am J Transplant*. <https://doi.org/10.1111/ajt.15832>.
11. Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens [published online ahead of print March 11, 2020]. *JAMA*. <https://doi.org/10.1001/jama.2020.3786>
12. American Society of Transplant Surgeons. COVID-19 Strike Force. <https://asts.org/advocacy/covid-19-resources/asts-covid-19-strike-force#Xn5i7eq6Opo>. Accessed March 27, 2020.

How to cite this article: Wall AE, Pruett T, Stock P, Testa G. Coronavirus disease 2019: Utilizing an ethical framework for rationing absolutely scarce health-care resources in transplant allocation decisions. *Am J Transplant*. 2020;20:2332-2336. <https://doi.org/10.1111/ajt.15914>