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JACC REVIEW TOPIC OF THE WEEK

Scarce-Resource Allocation and Patient Triage During the COVID-19 Pandemic



JACC Review Topic of the Week

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ABSTRACT

The COVID-19 pandemic and its sequelae have created scenarios of scarce medical resources, leading to the prospect that health care systems have faced or will face difficult decisions about triage, allocation, and reallocation. These decisions should be guided by ethical principles and values, should not be made before crisis standards have been declared by authorities, and, in most cases, will not be made by bedside clinicians. Do not attempt resuscitation and withholding and withdrawing decisions should be made according to standard determination of medical appropriateness and futility, but there are unique considerations during a pandemic. Transparent and clear communication is crucial, coupled with dedication to provide the best possible care to patients, including palliative care. As medical knowledge about COVID-19 grows, more will be known about prognostic factors that can guide these difficult decisions. (J Am Coll Cardiol 2020;76:85-92) © 2020 the American College of Cardiology Foundation. Published by Elsevier. All rights reserved.

The worldwide COVID-19 pandemic has already overwhelmed health systems in certain “hot spots” and has prompted intense discussion and planning elsewhere. Although the pandemic appears to be slowing in some areas, concerns exist for a resurgence of the virus in the setting of relaxation of social distancing regulations and for a more severe pandemic in the coming months. Intensive care unit (ICU) beds, ventilators, dialysis machines, and personal protective equipment (PPE) have been and may again become scarce commodities for which construction and production lag behind need in most regions. Health care workers have also been in short supply, particularly when

they fall ill and are quarantined, hospitalized, or succumb to the disease.

As such, cardiovascular clinicians and their patients may face the prospect of rationing and allocation of valuable resources and the triaging of patients in regard to life-sustaining interventions. Unfortunately, the community’s duty to steward scarce resources for populations comes into conflict with the duty of clinicians to promote the interests of individual patients under their care. Many difficult questions and the potential for confusion result in clinical decisions that unnecessarily compromise the health and welfare of both patients and health care workers.



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**ABBREVIATIONS
AND ACRONYMS****COVID-19** = coronavirus disease-19**CPR** = cardiopulmonary resuscitation**DNAR** = do not attempt resuscitation**ICU** = intensive care unit**PPE** = personal protective equipment

This document was commissioned by the leadership of the COVID-19 Hub of the American College of Cardiology to help clinicians meet the unique challenges of the current pandemic. However, it does not represent official policy of the American College of Cardiology. The authors were chosen for their expertise in cardio-ethics, palliative care, and geriatric cardiology, and were asked to rapidly prepare practical recommendations for ethically managing triage and other crucial issues. This document therefore seeks to describe the salient clinical and ethical issues surrounding triage and rationing decisions in the face of the COVID-19 pandemic (**Central Illustration**). This document draws upon enduring principles (**Table 1**) but also upon a current knowledge base to produce recommendations for cardiovascular clinicians (**Table 2**). Importantly, it should be noted that the experience, science, and response to COVID-19 are rapidly changing and often depend on local practices and protocols.

**PRINCIPLES AND VALUES FOR ALLOCATION
OF SCARCE MEDICAL RESOURCES**

OVERVIEW. In 2009, Persad et al. (1) articulated principles and values for allocation of scarce medical resources, and these were recently applied to the COVID-19 pandemic by Emanuel et al. (2) (**Table 1**). For the most part, these decisions pertain to ICU beds, mechanical ventilation, and extracorporeal membrane oxygenation circuits but may involve PPE and other resources in short supply. Many cardiovascular clinicians involved in heart and/or lung transplantation are well versed in processes that strive to maximize the beneficial use of scarce resources while ensuring fairness, as well as often prioritizing the sickest patients who are likely to benefit from intervention. These considerations influence both listing and allocation of organs and are also important in crisis standards of care during a pandemic. An important value implicit in age limits in listing for organ transplantation is the concept of “fair innings” or “life cycles”—the idea that scarce resource distribution should favor those who have not had the opportunity to experience the full spectrum of life, rather than older patients who have already had their “fair innings.” Using this bias in favor of the young is more controversial in resource allocation during a pandemic than when applied to transplantation listing. More controversial still is the promotion of instrumental or social value: maximizing the value of clinical interventions to society beyond direct patient

HIGHLIGHTS

- Difficult decisions about triage and allocation have arisen in the COVID-19 pandemic.
- In a crisis, autonomy may become subordinate to maximize the number of lives saved.
- Fairness involves equal access to scarce resources, ignoring factors unrelated to prognosis and maximizing benefit.
- Transparent communication and palliative care are central to providing the best possible care to patients.

benefits. The idea is that scarce resources are preferentially allocated in a way that exerts the broadest benefit. In practical terms, the promotion of instrumental or social value could be grounds for giving health care workers priority to receive critical care support to maximize their chances of recovery so they can provide care for more patients in the future.

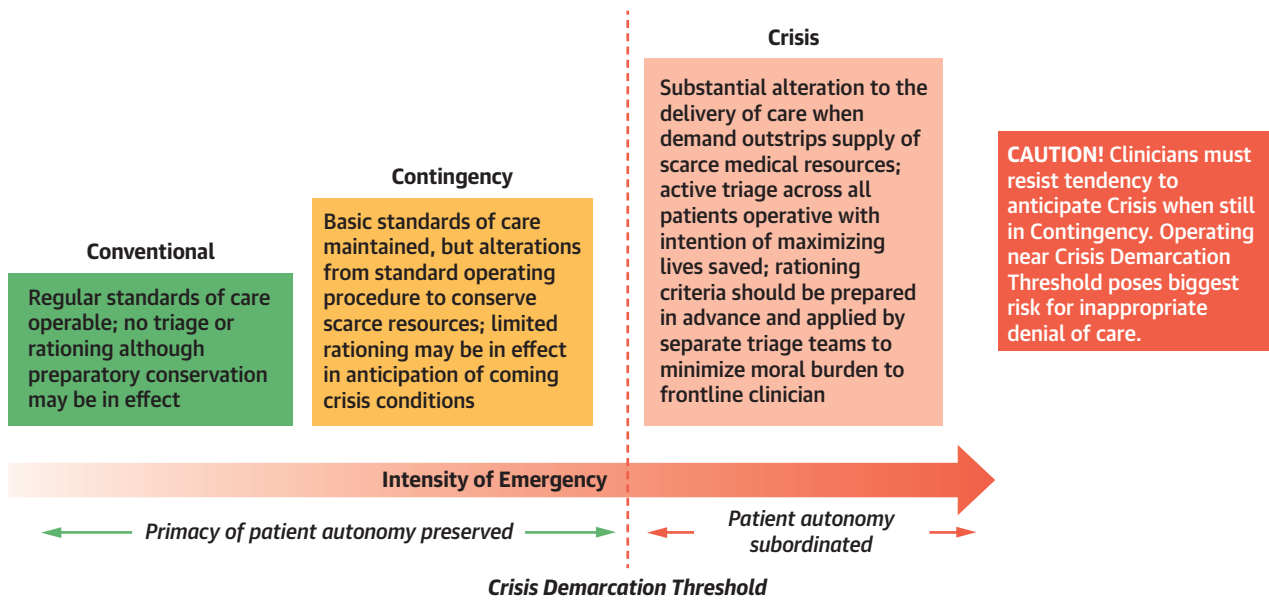
Importantly, the superseding value of patient self-determination (autonomy) that normally operates in clinical care may necessarily become subordinate when triage decisions, based on need and ability to benefit, aim to maximize the number of lives saved. Although the preferences of individual patients and the clinical judgment of their clinicians remain important, these values may need to yield in triage situations (3).

IMPLEMENTATION. There are many ways to maximize benefits, including maximizing the number of lives saved or life-years saved. These specific aims are often cited as the highest priorities during a natural disaster. Practically, this usually means allocating scarce resources to patients who are sick enough to benefit but also have the best chance of survival in the short term and possibly the longer term. Those less likely to benefit in these ways may have these resources withheld or withdrawn.

Ensuring fairness involves providing equal access to scarce resources without regard to factors that are not relevant to prognosis and maximizing lives saved. There is broad agreement that allocation of interventions should not be influenced by factors such as name recognition, race or ethnicity, sex or gender identity, religion, sexual orientation, income, financial assets, family situation or social contacts, and, of course, whether a patient is likeable or otherwise. Safeguards to ensure fairness bar those who make

CENTRAL ILLUSTRATION Framework for Understanding Standards of Care Implications During Pandemic Conditions

Standards of Care Under Asymmetric Pandemic Conditions



Kirkpatrick, J.N. et al. *J Am Coll Cardiol.* 2020;76(1):85-92.

Conventional and contingency standards of care do not involve decisions about allocation or reallocation of resources. Under crisis standard of care, as declared by regional authorities, in most circumstances triage teams will make decisions. However, cardiovascular clinicians at the bedside play a crucial role in providing care, conducting advance care planning, explaining the process of allocation and triage, and determining the appropriateness or futility of medical interventions, including resuscitative measures. Adapted with permission from Christian et al. (6).

triage decisions from considering these elements in making allocation decisions.

Strict utilitarian approaches that prioritize saving the maximum number of lives raise questions of ageism and discrimination against those already afflicted with severe chronic disease and frailty. Considering these factors is usually justified by the fact that they significantly influence prognosis, but an important factor is the difference between short- and long-term mortality. If the latter is prioritized, this discrimination can be compounded, particularly as the definition and determination of “long term” are complicated. More concerning, however, is that these approaches may disadvantage patients with disabilities, particularly if maximizing quality, an inherently subjective metric, is included as a value. Additional safeguards to avoid improper discrimination in the care of patients with disabilities and COVID-19 have been advanced by the United States Health and Human Services Office for Civil Rights in Action (4). Pertinent elements of triage related to prognosis will

change as more is known about prognostic factors in COVID-19.

Operationalizing the promotion of instrumental or social value involves many controversies, in addition to the disadvantaging of persons with disabilities. There is wide consensus that allocation decisions must not be made on the basis of perceived present or future social worth except, possibly, for one group—health care workers. An expected shortage of trained clinicians, in particular, provides the rationale for allocating scarce resources toward “returning them to the battle.” A number of controversial points emerge beyond questions of fairness that relate to relative instrumental or social value. All health care workers are not the same, and some are much more “essential” in the setting of a pandemic. For instance, clinicians with expertise in emergency medicine, critical care, and infectious disease could be seen to carry more “instrumental value” than general cardiologists. Furthermore, the level and duration of training affects the ability to maintain the workforce—it takes

TABLE 1 Important Ethical Principles in Triage and Allocation Decisions	
Principle	Explanation
Autonomy	The principle that every person (patient) has the right to self-determination as a moral agent of infinite worth. This principle occupies a position of primacy in current Western medical ethics and is operationalized by the ubiquity of informed consent. Clinicians may not unilaterally withhold or withdraw medically appropriate or indicated treatment without the consent of a patient or surrogate. In a pandemic crisis, this principle may be superseded by the imperative to maximize public health when resources become scarce and require judicious allocation or rationing.
Beneficence/non-maleficence	The principle that physicians have a duty to provide care to promote the health and wellness of their patients, and they also have a duty to avoid causing harm to patients. Because all treatments pose some theoretical risk of harm (however small), implicit in this definition is that the imperative is to avoid net harm. However, in a nod to autonomy as a first principle, clinicians may not impose any treatments without a patient's informed consent. In a pandemic crisis, clinicians' paramount duty remains their commitment to individual patients, recognizing this may conflict with the duty of our profession as a whole to promote and protect public health when resources become scarce. As such, bedside physicians should not be expected to triage their own patients out of receiving what they consider optimal care, and these decisions instead should be made by an independent and impartial triage team.
Justice	The principle that patients should have equitable access to resources, or that resources should be fairly allocated regardless of patients' age, sex or gender identity, race or ethnicity, religion, socioeconomic status, religion, putative VIP status, and similar individual factors. This does not necessarily mean that everyone has equality in access, or the same chance as others at accessing resources, but rather that equity is ensured such that those who need resources the most and those who are most likely to benefit receive preferential access to scarce resources. However, there may be conflicting considerations at play, which makes resource allocation ethically challenging (especially during a pandemic crisis).
Fair innings	The notion that all people have the right, whenever possible, to experience all life stages, and as such that the young should be prioritized over older adults when resources are limited. Another more utilitarian argument for prioritizing the young over older adults is that advanced age is correlated with decreased physiological reserve, and if the greater good entails the maximization of lives or life-years saved, this will not be achieved if age is not factored into triage protocols. Opponents argue this is tantamount to age discrimination.
Instrumental value	The notion that certain individuals should receive priority access not just because of their intrinsic value as human beings (which every person has in equal and infinite measure), but also because of their instrumental value to other human beings. Many caution against using the concept of social worth in granting anyone preferential treatment during a pandemic because this can easily devolve into discrimination. However, many also make an exception for health care workers, arguing that prioritizing them incentivizes them to continue working and thus reduces voluntary absenteeism, and also that making sure health care workers receive medical treatment helps to return more of them to the workforce so that they can continue caring for more patients in the future. Opponents argue this can lead to discrimination against those with disabilities and is difficult to operationalize.

longer to train a surgeon than a medical assistant. More broadly, there are other nonmedical workers that are essential to a functioning society, from law enforcement, military personnel, and institutional leaders, to sanitation and delivery workers. Finally,

clinicians' readiness to return to work soon after ICU stays is questionable, potentially attenuating the instrumental or social value of prioritizing them with regard to scarce resources. Preferentially allocating ICU beds and ventilators to clinicians is quite different in terms of social value than preferentially providing them with vaccines or prophylactic treatments (5). These considerations must be balanced against the argument that the efforts of front-line health care workers should be recognized in allocation policies, especially in the setting of PPE shortages, at least as a bulwark against absenteeism.

TABLE 2 Recommendations for Triage and Allocation
Clinicians must not use crisis standards of care when at contingency capacity.
Special consideration may be necessary to ensure fair distributions of medical resources, especially to patients with disabilities.
A clear distinction should be drawn between withholding and withdrawing decisions made by triage teams for triage purposes in a crisis situation and withholding and withdrawing decisions made by the clinicians in the setting of inappropriate and/or futile interventions.
Bedside clinicians should focus on providing optimal care in adverse circumstances for their patients, including palliative care for those from whom life-sustaining therapies are withheld or withdrawn.
Clinicians should not coerce patients in end-of-life decisions but should discuss care that is consistent with their expressed values and recommend appointment or reconfirmation of a surrogate.
Clinicians have a professional duty to care for patients during a pandemic, but this duty should be supported by adequate personal protective equipment and public participation in practices that reduce illness transmission. Consideration must be given to the risk status of individual health care workers.
There is also a fiduciary duty toward patients who do not have COVID-19 and ensuring that cardiovascular morbidity and mortality in this group is mitigated, even as diagnostic and interventional procedures are postponed and resources are shifted.

CONTINGENCY VERSUS CRISIS: NOT TO BE CONFUSED

Most plans for crisis standards of care currently being discussed or implemented are not completely new. Local, regional, and national disaster response frameworks have included planning for pandemics for years, although the actual response to a particular situation involves unique nuances.

CONVENTIONAL, CONTINGENCY, AND CRISIS STANDARDS OF CARE. A crucial distinction must be made among 3 standards of care (6).

1. Conventional standard of care is the normal situation in which demand does not threaten to outstrip supply, and the regular standards for care and operating procedures are in place. In anticipation of future difficulties, there may be special attempts to avoid waste and conserve resources, but none of these substantially affect the conventional delivery of care.
2. Contingency standards of care are currently in place for many health systems and may remain so for some time. Resources are not yet overwhelmed, but there is a significant concern this will happen in the near future. Standard operating procedures have been altered to conserve, re-use, or substitute for potentially scarce resources. Creative use of other resources may be used. Some degree of rationing may take place, or care plans altered, but at least basic standards of care are maintained.
3. Crisis standards alter the system and delivery of care. Despite conservation, re-use, substitution, and adaptation, demands outstrip supplies and some needs go unmet. Normal standards of care can no longer be followed, needs must be triaged, and resources must be allocated to some patients but not others, and some resources will be reallocated (withdrawn from some patients and given to others). A true crisis involves region-wide shortages, not just shortages at a specific hospital. Triage decisions will involve all patients, not just those with COVID-19. For example, in a crisis capacity situation, a ventilator should be allocated to a patient with COVID-19 and acute respiratory failure instead of a patient with end-stage heart failure if doing so would be likely to maximize benefits.

Importantly, clinicians must not use crisis standards of care when at contingency capacity. During both conventional and contingency standards of care, patient autonomy maintains its position of primacy in medical decision-making. Only in crisis standards of care must patient autonomy in some ways be subordinated to the larger goal of protecting the lives of as many patients as possible. Clinicians operating under contingency standards of care will experience a tendency to anticipate the next level but should avoid inappropriate denial of care to certain patients or reallocating resources from one patient to another. Procedures deemed elective and those that can be safely postponed should be deferred. Resources should be conserved, but testing and therapeutic treatments necessary to avoid morbidity and mortality should be implemented.

ALLOCATION AND REALLOCATION. The determination of crisis conditions will be made by local and regional officials. Regional collaboration should allow the shifting of resources between hospitals and clinics to meet needs. In many jurisdictions, triage teams, rather than bedside clinicians, will make decisions about which patients will receive life-sustaining intervention (allocation) and whether resources will be withdrawn from one patient and given to another (reallocation) (7). The principles and values under which these triage teams operate, the factors they consider in making decisions, and the composition of the teams, should be transparent, although the identities of individual team members may not. Decisions made by triage teams and the information and values upon which they are based are imperfect but necessary to alleviate moral distress for individual clinicians and may provide them legal protection (8).

Clinicians, with more detailed knowledge of individual patients, may find resulting decisions disappointing and even distressing. However, procedures that attempt to avoid inappropriate bias must try to shield triage teams from the influence of factors that are relevant to the care of individuals but not to the fair allocation of scarce medical resources. Implementing decisions about reallocating resources from one patient to another may be much more difficult than withholding them, whether or not one made the decision. Reallocation of resources may be made after time-limited trials to see if recovery or improvement is possible, and if not, these resources may be reallocated to another patient. This is particularly true for the use of extracorporeal membrane oxygenation for acute lung injury and myocarditis associated with COVID-19. Removing a life-sustaining therapy to provide it to a patient with a better chance of survival may compound the moral distress experienced by clinicians in crisis situations.

Furthermore, bedside clinicians may be placed in the difficult position of communicating a decision they did not make while bearing the brunt of negative reactions to that decision. In communicating decisions, clinicians must outline the principles underlying allocation decisions in crisis capacity situations, including the processes in place to ensure fairness. This process may be aided by public education about crisis standards of care and triage protocols. Some have advocated that patients admitted to the hospital be made aware that life-sustaining resources may be withdrawn from them during crisis standards of care (2). In some regional triage protocols, there are mechanisms to appeal triage team decisions, and clinicians will be placed in the difficult position of

making the choice to request a review of a decision they deem inappropriate (3).

Regardless of triage decisions, the individual clinician's duty to patients should remain paramount, even in a pandemic. Rather than focusing on resource allocation decisions, clinicians should focus on providing the best available care in adverse circumstances for their patients, including palliative care for those from whom life-sustaining therapies are withheld or withdrawn, as well as those nearing end of life, despite having received the full range of life-sustaining treatments.

RESUSCITATION DECISIONS

Determination of resuscitation status is a distinct issue from triage, and although these issues may share overlapping considerations, they should not be conflated. Physicians may advocate that very ill patients with a low likelihood of survival or neurological recovery be assigned a status of "do not attempt resuscitation" (DNAR), regardless of the scarcity of resources. This recommendation is typically made in a situation in which cardiopulmonary resuscitation (CPR) is deemed either medically inappropriate or physiologically futile, quantitatively futile (low chance of benefit), or qualitatively futile (unlikely to achieve goals of care) (9). COVID-19 may factor into these decisions if it confers a grave prognosis and adds to the futility of resuscitation attempts. Ideally, this should be a shared decision that takes into account both the expert recommendations of the treating physician as well as the goals, values, and preferences of the patient.

However, there is a general ethical consensus that clinicians are not required to provide futile care. Some medical centers have policies outlining processes for enacting DNAR in the absence of agreement by the patient or surrogate. Such unilateral DNAR orders usually involve the agreement of a second physician not involved in the patient's care. Assent (not consent) of the patient or surrogate may be sought, meaning that the patient or surrogate is asked to agree to allowing natural death, but the decision to not attempt CPR is not predicated on the agreement. Most unilateral DNAR policies require that patients and surrogates be fully informed of the process of determination to place a DNAR order and the reasons underlying the decision, including a clear explanation of the medical inappropriateness or futility of resuscitation attempts. Some require offer of transfer to another medical center. Clinicians require skills to refocus goals of care on palliation rather than life prolongation if the latter is not meaningfully

attainable. They must explicitly let patients and families know that they will manage symptoms and will not abandon the patient (10). Acknowledgment of anticipatory bereavement on the part of the patient and family are essential to this conversation. It can take time for family and friends to process their grief and say goodbye, especially if they were previously unprepared to do so. Support can be provided by interdisciplinary palliative care providers or chaplains and social workers trained in bereavement support.

During a pandemic crisis, unique considerations exist. Critically ill patients with COVID-19 who have ventilator-dependent respiratory failure and progress to cardiorespiratory arrest in most cases would not be expected to derive benefit from CPR. Conversely, health care workers who administer CPR to patients with COVID-19 are at increased risk of contracting the infection themselves due to enhanced infectious spread through aerosolization of viral particles during a "code." There is a moral imperative to protect health care workers from undue harm, especially when patients are unlikely to benefit, in part because of the need to preserve their health so that they can continue to provide care to other patients. Furthermore, the scarcity of PPE raises questions about its use during a predictably futile resuscitation attempt.

WITHHOLDING AND/OR WITHDRAWING LIFE-SUSTAINING THERAPIES

Withholding or withdrawing of life-sustaining interventions is the medically appropriate course of action, regardless of resource shortages, when the interventions are deemed futile. A clear distinction should be drawn between withholding and withdrawing decisions made by triage teams for triage purposes in a crisis situation and withholding and withdrawing decisions made by the clinicians in the setting of inappropriate and/or futile interventions. Cardiovascular clinicians routinely face decisions to withhold interventions for patients with a poor prognosis who are unlikely to benefit or for whom the risk/benefit ratio is unfavorable. Percutaneous coronary intervention for ST-segment elevation myocardial infarction may be deemed inappropriate in patients with chemotherapy-induced thrombocytopenia and severe gastrointestinal bleeding. Structural heart procedures and mechanical circulatory support may be withheld from patients with advanced dementia. Electrophysiological ablative procedures are not performed to treat atrial and ventricular fibrillation in patients with multiorgan system failure from overwhelming sepsis.

Although there is a general consensus that withholding and withdrawing are not ethically distinct, in practice it can be more emotionally difficult to withdraw life-sustaining interventions than to withhold them in triage situations. Clinicians, patients, surrogates, and patients' loved ones may view withdrawal as killing the patient, although it represents allowing the life-threatening underlying illness to take its course. In cardiology, ethical controversy exists in relation to removing temporary and durable mechanical circulatory support, deactivating the shocking function of implantable cardioverter-defibrillators, and turning off pacemakers, particularly in pacemaker-dependent patients (11-13).

Decisions about withholding and withdrawing life-sustaining interventions ideally are made with the patient and/or surrogate without regard to resource use, leaving triage decisions to triage teams. However, unique withholding considerations exist in relation to COVID-19. Catheterization procedures on patients with COVID-19 consume PPE and require cleaning of facilities, in addition to risking exposures during the procedure and transport. Other means of differentiating ischemia from other causes of troponin elevation besides invasive angiography may be warranted in the setting of COVID-19, and non-interventional treatments such as the use of thrombolytics for ST-segment elevation myocardial infarction may be more widely used (14). In end-of-life care, deactivation of cardiac devices will need to be considered for patients made DNAR and those who are removed from ventilators or denied ICU care by triage team decisions. Clinicians should not hide these considerations from patients and surrogates. Rather, they should transparently address the conflicting interests that arise during a pandemic. Cardiovascular clinicians will continue to play a significant role in such decisions under contingency and crisis standards of care.

ADVANCE CARE PLANNING

The COVID-19 pandemic provides an opportunity to encourage more widespread care planning in advance of serious illness. All patients should appoint a durable power of attorney for health care or the surrogate decision-maker or reconfirm their surrogates if already appointed. Cardiovascular clinicians should help patients consider their values, goals, and preferences and discuss these with their surrogates and loved ones. The COVID-19 pandemic has resulted in prohibitions of visitors for hospitalized patients in many institutions. Patients may opt for home hospice when they become seriously ill, because they would

not be able to be surrounded by loved ones in the hospital.

In advance care planning discussions, clinicians should not coerce patients into decisions to forego potentially beneficial medical interventions, hospitalization, or ICU transfer. Unilateral DNAR orders are generally not appropriate in the outpatient setting and should not be enacted outside of local hospital procedures. However, it is appropriate to talk with patients prospectively about care that is consistent with their expressed values and provide information about the risks and benefits of interventions, if applicable. Cardiovascular clinicians may need to correct misperceptions about COVID-19 and underlying cardiovascular disease (e.g., that all older patients with cardiovascular disease who contract COVID-19 will die) in addition to any misconceptions that patients hold with respect to cardiovascular interventions.

FIDUCIARY DUTIES IN CRISIS

Health care workers have a professional duty to care for patients even when this entails considerable personal sacrifice (15,16). However, this duty does not exist in a vacuum. Medical institutions have a duty to ensure adequate PPE and testing during a pandemic, and society as a whole has a duty to practice social distancing to "flatten the curve" and slow the spread of disease. Furthermore, government has a duty to ensure an adequate supply chain for the former and appropriate legal support for the latter. Individual liberty and personal autonomy must be weighed against public health and the greater good during a pandemic.

In addition, the duty of health care workers to provide care needs to be weighed against other potentially conflicting obligations. Avoidance of high-risk exposure may be appropriate for clinicians who are older, have dependents, are pregnant, are immunocompromised, or have chronic cardiopulmonary disease. The supply of PPE may also play a role in these decisions. However, those who are making duty schedules may experience significant difficulties in balancing competing interests among clinicians. For example, it is difficult to weigh mitigating exposure risk for a single caregiver of children versus a single caregiver for an elderly parent versus a 2 clinician family with no extended support network. These questions do not have easy answers but require careful consideration.

There is also a fiduciary duty toward patients who do not have COVID-19. As elective diagnostic and interventional procedures are postponed and

resources are shifted, there is a risk that non-COVID-19 cardiovascular morbidity and mortality may rise. Cardiovascular clinicians should not lose sight of the needs of these patients and provide as high quality care as possible.

CONCLUSIONS

The COVID-19 pandemic has stretched the resources of many health care institutions and threatens to do so again in a resurgence. Difficult decisions about allocating these resources will follow principles and

values, some of which may diverge from the autonomy-based, decision-making systems predominant during conventional situations. Contingency and crisis standards of care in the face of a disaster change the way we practice cardiovascular medicine, but the duties of cardiovascular clinicians remain focused on individual patients.

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