British Medical Bulletin, 2021, 1–12
doi: 10.1093/bmb/ldab009

Invited Review

Ethics of ICU triage during COVID-19

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Received 3 December 2020; Revised 25 February 2021; Accepted 17 March 2021

Abstract

Introduction: The coronavirus disease 2019 pandemic has placed intensive care units (ICU) triage at the center of bioethical discussions. National and international triage guidelines emerged from professional and governmental bodies and have led to controversial discussions about which criteria—e.g. medical prognosis, age, life-expectancy or quality of life—are ethically acceptable. The paper presents the main points of agreement and disagreement in triage protocols and reviews the ethical debate surrounding them.

Sources of data: Published articles, news articles, book chapters, ICU triage guidelines set out by professional societies and health authorities.

Areas of agreement: Points of agreement in the guidelines that are widely supported by ethical arguments are (i) to avoid using a first come, first served policy or quality-adjusted life-years and (ii) to rely on medical prognosis, maximizing lives saved, justice as fairness and non-discrimination.

Areas of controversy: Points of disagreement in existing guidelines and the ethics literature more broadly regard the use of exclusion criteria, the role of life expectancy, the prioritization of healthcare workers and the reassessment of triage decisions.

Growing points: Improve outcome predictions, possibly aided by Artificial intelligence (AI); develop participatory approaches to drafting, assessing and revising triaging protocols; learn from experiences with implementation of guidelines with a view to continuously improve decision-making.

Areas timely for developing research: Examine the universality vs. context-dependence of triaging principles and criteria; empirically test the appropriateness of triaging guidelines, including impact on vulnerable groups and risk of discrimination; study the potential and challenges of AI for outcome and preference prediction and decision-support.

Key words: ICU triage, COVID-19, guidelines, ethics, resource allocation

Introduction

Intensive care units (ICU) triage is the process of examining incoming patients to quickly identify those needing immediate intensive care and treatment, and to make efficient use of resources in cases of emergency. The recent coronavirus disease 2019 pandemic (COVID-19) has placed triaging and the allocation of scarce health resources more broadly at the center of bioethical discussions. With an influx of patients presenting to intensive care, facilities need to be prepared to be facing greater demands of resources than supplies. Triage protocols and guidelines have been developed by different actors in the healthcare system and have led to controversy over which criteria should be used. For example, is short-term prognosis the only medical criterion that should be used, or should long-term prognosis also be included? And if two persons have a similar prognosis, should priority be given to socially disadvantaged persons, or to younger persons or to healthcare workers? Or is randomization the only fair criterion? The review will present ethical debates about triage with a focus on COVID-19. As our discussion illustrates, there are certain general features and criteria that form the core of triage, but triage criteria are also to some extent context-dependent and always have to be examined in and possibly adjusted to specific scenarios.

General definition, structure and application of triage

Triage refers to situations of emergency where different patient priority groups are established in order for scarce vital health resources to be distributed. Today, triage is mainly used in healthcare contexts during disasters, mass casualty incidents, in emergency departments and ICU. Previous global influenza outbreaks (such as SARS and H1N1 for example), have prompted countries to create pandemic preparedness plans, in order to minimize mortality rates and the impacts on social and economic disruptions should an outbreak be identified.

Historically, triage is opined to be a utilitarian principle for scarce resources to be allocated as efficiently as possible to maximize utility.[1] This application stems from military triage, used to determine which injured soldiers would receive priority treatment in order to return to the battlefield.[2,3] However, triage is not strictly committed to a utilitarian outlook. Triage systems can be adapted by other moral theories such as contractualism, deontology and egalitarianism. For instance, while a utilitarian understanding of triage aims at a maximization of benefits for the greatest number of people,[4] egalitarianism and deontology as well may allow for triage as maximizing the number of lives saved and justify this by appeal to the idea of equal respect for persons.[1,5] Many believe that contractualism is particularly well suited to justify triage protocols, with its emphasis on a (*ex ante*/hypothetical) contract among all who are affected.[6]

One definitional question that has not received much attention concerns the demarcation of triage from allocation of scarce resources in general. It has been suggested that triage refers to situations of emergency in which survival or protection of core capabilities are concerned.[7] This approach seems plausible, but it does not distinguish triage during a pandemic from allocation problems in the context of, e.g. organ transplantation, which many would not regard as triage. Some propose to distinguish between triage and resource allocation by understanding resource allocation as the act of distribution of resources in terms of demand and supply, and triage as the process to sort patients into priority groups to determine how best to use scarce resources.[8] In this regard, it can be added that 'persons' are triaged, while what is distributed are access to care, ventilators, hospital beds, etc.[9]

Effective triage during a pandemic begins first with the implementation of an equitable policy. Within Switzerland, for instance, triage policies were formulated by the Swiss Academy of Medical Sciences and the Swiss Society of Intensive Care Medicine. However, discussion about its legal basis on a national scale is arising as guidance is being revised with the ongoing pandemic.[10] Similarly, questions of legitimacy were of interest within the UK. Professional bodies such as the British Medical Association and the National Institute for Health and Care Excellence developed clinical guidelines, however their implementation remained at the discretion of individual Trusts.[11] The question at which level triage protocols should be developed (e.g. in local hospitals, or on a national or international level), in which way this process should be designed, and who is authorized to pass and enforce such protocols calls for further discussion.

The structure of triage can be understood as a three-step process[12] (Table 1). First, in order to create a successful system, certain patient groups will need to be excluded, consisting of patients who are either too well or too badly off to profit from intensive care. Second, within the group of those that are eligible, a ranking has to take place in order to determine who is likely to benefit most from the treatment. Clinical scores are frequently used to perform this task. Among those with a similar ranking, criteria that determine priority in tiebreaker situations of similar prognosis and benefit are needed. Third, repeated assessments are carried out that may lead to patients whose condition is not improving being removed from the ventilator to make it available for another patient ('re-triage'). As will become clear in the presentation of existing guidelines and ethical controversies, these steps are not always clearly separated, which can lead to some confusions and misunderstandings.[12]

Up to this point, we have presented those definitional aspects and structures of triage that form the core of triage irrespective of the specific context. However, as soon as normative and ethical discussions about the use or application of certain criteria in triage protocols start, it becomes clear that triage criteria are partly context-sensitive. As a starting-point, we briefly review national and international guidelines in response to COVID-19.

Review of guidelines as a starting point

This section briefly summarizes the results of a comparative study of national and international triage guidelines and the most important points of consensus and disagreements.[13,14] Our review is based on this study but in addition invokes the ethical literature that has recently evolved around the ethical dimension of triaging. In general, one can observe an emerging consensus in national guidelines and recommendations, with some limited disagreement regarding triage criteria. There is widespread agreement that triaging should be applied to all patients (COVID and non-COVID) the same, that a first come, first served (FCFS) approach should not be implemented, and that number of lives saved should be used as triaging criterion rather than life years or quality of life. Guidelines also agree on the importance of advance care planning and the need for palliative care, and on protecting healthcare workers from mental and physical fatigue. These points of consensus mainly target the principles of fairness and justice, and they aim to avoid discrimination and to provide more equitable care for all members of society through transparent decision-making.

Despite an emphasis on fair and impartial triage criteria, situations in which two patients share the same short-term prognosis is key in highlighting the different strategies recommended by countries to determine the best approaches for maximizing

Table 1 A timeline of triage phases

Pre-triage	Triage	Re-triage
Establish medical need/urgency (inclusion criteria and medical indication)	Clinical scores	Medical indication (benefit outweighing harm for individual patient)/medical futility
Medical futility (exclusion criteria)	Ranking (first-order criteria)	Patient will
Patient will (e.g. advance directive and proxy decision)	Tiebreaker (second-order criteria)	Benefit/need compared with other patients (including new arrivals)

benefits. Whereas some countries, such as Germany, explicitly reject the use of such tiebreakers and argue in favor of randomization, others suggest using criteria such as life-cycle considerations, reciprocity considerations (e.g. in the case of healthcare workers) and others. Further points of disagreements include the role long-term prognosis should play and whether a first-order criterion would apply to the lives saved or life years saved. Using age as a criterion is generally disregarded as a triage criterion; however some countries, such as Italy, allude to imposing age restrictions under critical capacities and extreme scarcity. There is also consensus in some guidelines to use age as a decision tool for tiebreaker situations, with younger patients receiving priority over the elderly. Disagreements are also found in the discussion of whether frontline and healthcare workers should be given priority for scarce resources over patients through arguments of reciprocity and instrumental value.

Areas of agreement

The points of agreement that could be identified in existing guidelines and that have been briefly summarized above are widely reflected in ethical discussions. In this section, we will elaborate on the arguments that bolster these points of agreement; at the same time, revealing that agreements on certain points, in particular non-discrimination and fairness, may be rather vague and superficial and need further reflection.

Agreement on criteria ‘not to be used’

FCFS

Allocation using a FCFS principle can be seen in different medical decisions, such as organ transplantation,[15] where waiting time periods are often part of the allocation decisions when patients are able to survive for some time without receiving resources. However, in the current COVID-19 pandemic, due to the scarcity of resources, a FCFS approach raises efficiency and equality issues. Allocation through FCFS can mean that patients who present later to ICU with greater need for life-saving resources may miss out on receiving therapy. Such a practice also implies that scarce resources are not able to be used most efficiently, as they are allocated based on presence of admission rather than medical need. Further, individuals living in advantageous societies or those with higher socio-economic status are more able to access care or care-alternatives than disenfranchised members of society, in which case, FCFS principles would aid in heightening already present health inequities faced by minority and disadvantaged groups.[16]

Quality-adjusted life-years

Using quality-adjusted life-years (QALYs) as a triage criterion is regarded as inadequate by many bioethicists due to its tendency to undervalue the quality of life for disadvantaged and disabled persons in particular. Generally, disabled persons already face challenges due to social arrangements which neglect their participation and interaction with the rest of society. Applying a quality of life assessment to such patient groups thus runs the risk of favoring those healthier and younger, who would be expected to live longer based on assessments of pre-COVID health. Using QALYs is also seen to give prejudice to pre-COVID lifestyles, where social disparities have been engrained in communities for generations, making them more likely to present to the ICU, yet being undervalued for resource allocation. Hence, as quality of life assessments inherently increase discrimination among the disabled and elderly and are not value neutral, there seem to be strong reasons to exclude them from triage criteria.[17,18]

Quality of life as a triaging criterion needs to be distinguished from quality of life considerations undertaken by individuals in thinking about the future health care choices, e.g. when completing an advance directive or discussing one's treatment preferences with an appointed proxy. In these individual considerations, probable outcomes including future quality of life will play a key role for many people. In this case it is left to the individual, however, to judge what outcome appears to be worth the burden of going through intensive care.

Agreement on criteria which may play an important role

Maximizing benefits

The wide-spread agreement on maximizing benefits based on short-term medical prognosis that can be found in the guidelines is supported by several ethical arguments put forward in the debate: To begin with, a triage criterion which focuses on survival and preservation of core function is consistent not only with an utilitarian outlook, but also with egalitarian and deontological perspectives that bestow equal value to every individual.[19] Using short-term prognosis and aiming to save most lives is thus thought to express equal respect for the value of every individual. Furthermore, a focus on short-term prognosis allows for better operationalization of maximizing benefits than long-term outcomes, which may be harder to foresee.

Other understandings of 'maximizing benefits' are more controversial: some bioethicists suggest to cap the prediction of life-expectancy at 6 months, which can be considered a near-term prognosis.[19] Predictions reaching further into the future, as is argued, may be too vague and unreliable. Furthermore, individuals with poorer health and disabilities are further placed at a disadvantage when triaged according to large life expectancy scales.[17]

Procedural justice/non-discrimination

All guidelines entail a commitment to fairness and non-discrimination, mostly spelled out in a negative way: triage criteria should not refer to race, class, age, disability, etc. Understood in this way, fairness and non-discrimination means that all persons are treated equally in the process of triage, irrespective of their history and social situation. But while existing guidelines converge on this point, and their commitment to such a 'thin' and 'formal' understanding of justice is supported by considerations of practicality, ethical discussions are more ambivalent due to the fact that justice as procedural (and domain-specific) fairness is only one way to bring in and conceptualize justice. As will be presented below, concerns about social justice have led bioethicists to argue that a merely procedural understanding of fairness and negative understanding of non-discrimination may increase existing structural inequalities and disadvantage those who already suffer from inequalities.

Areas of controversy

In this section, we review the ethical controversies that surround triage guidelines. We will indicate which arguments speak for or against certain criteria and suggest a way to lead such discussions more constructively, i.e. by more clearly distinguishing between first-order and second-order criteria in triage protocols.

Exclusion criteria

Many guidelines try to avoid categorical exclusion criteria. Some guidelines however, such as those from Switzerland, explicitly use exclusion criteria for ICU admission and offer a clear operationalization based on age, life expectancy, comorbidities and frailty score. Previous pandemic triage plans before COVID-19 have also shown encouragement of categorical exclusion criteria based on age, disability, poor outcome prediction scores and metastatic malignancy.[20]

Categorical exclusion criteria have been criticized as an excessive response to the current public health crisis, while pointing to the risk of discrimination of disadvantaged groups, such as the elderly.[20] On the other hand, it has been argued that not using any exclusion criteria can create false hope for successful treatment, especially for patients who suffer from severe comorbidities. Exclusion criteria are also argued to remove distress from clinicians having to make tough triage decisions, and to remove conscious/unconscious bias in allocation decision-making.[21] An intermediary view holds that the shortcomings of strict exclusion criteria could be remedied through an 'event-based' exclusion criterion concerning comorbidities that result in poor near-term prognosis, which cannot be improved with intensive therapy.[22] An event-based exclusion criterion might help with fine-graining patient groups, to create better triage outcomes.

First-order and second-order criteria/tiebreakers

Within guidelines as well as in ethical discussions, it is not always made clear which criteria should be used at which level or in which way. We propose to distinguish between (i) first-order criteria that are used to rank people within the group of eligible patients, and (ii) second-order criteria that come into play if two people have the same ranking and a decision has to be made on who should get priority. Relating this general distinction to the guidelines and the ethical debate, first-order criteria will typically focus on short-term survival, whereas long-term survival or other criteria may come in as a second-order criterion as tiebreakers.

In situations of significant scarcity, patients would first be screened with the use of inclusion and exclusion criteria (see Table 1) and, if they pass the screening, subsequently be assessed through a first-order criterion (short-term prognosis). If several patients have a similar prognosis, they would enter a tiebreaker situation which would be further decided by second-order criteria. Examples of (supposedly) second-order criteria in the guidelines include: long-term prognosis, age, comorbidities, life-years and functional status (including cognitive impairment) (see Table 2). However, while it seems important to make this distinction between inclusion and exclusion criteria, first- and second-order criteria, there is no consistent and systematic application of this terminology in either guidelines or the ethical literature.

Within ethical debates, many bioethicists have proposed hybrid moral theory frameworks, combining, for instance, a utilitarian and an egalitarian model of triage. Under this hybrid model, the initial triage criteria might follow utilitarian approaches to resource allocation, applying medical utility and—suggested by some—social utility criteria. If a tiebreaker situation arises, egalitarian approaches could be implemented for fair allocation, such as a lottery or random allocation.[23] Social utility, or instrumental value, has been controversially discussed. Adding value to social functions aims to maximize the welfare of society in general, with criteria focusing on an individual's benefit to the society in a public health response.[24] This differs from a broad notion of social utility where an individual's social worth is determined irrespective of the pandemic, which will be discussed in further detail in the following sections.

Life expectancy

Patients severely affected by COVID-19 are often elderly. They are more likely to present with comorbidities or other factors which could affect the medical benefit of treatment as well as the length of their stay in a hospital. That the younger patient should be prioritized when two patients have the same prognosis, is a position defended by several moral philosophers. Life expectancy, in this sense, is applied as a second-order criterion in many guidelines once two patients share the same short-term prognosis and enter a tie-breaker.

However, the reasoning behind age rationing is contested. For instance, consequentialism would favor a younger patient through a fair innings argument, where a 20-year-old would have lived fewer life years than a 60-year-old.[6] Contractualism, on the other hand, sees reasons for ensuring that some resources are also allocated to the elderly and that treatment is provided to patients at all stages of life.[6]

Table 2 Examples of second-order criteria used in tiebreakers

Criteria	First-order	Second-order	Consensus or controversy
Short-term prognosis	X		Consensus
Long-term prognosis		X	Controversy (some recommendations use it as part of a first-order criteria)
Age		X	Controversy (some recommendations disagree on its use, and some use it explicitly)
Comorbidities		X	Consensus
Medical futility	X		Consensus
Social justice		X	Controversy (not raised as an issue in many documents, saving most lives takes precedence over other criterion)
Social utility		X	Controversy (priority to HCW is not well received in all recommendations)

Social justice & disability rights

One of the important ethical points of controversy that is for the most part not reflected in existing guidelines concerns the role of social justice in triage. In the context of public health, social justice theorists generally attempt to reveal and tackle structural inequalities and inequalities of health that are determined by social factors. Although it is generally agreed nowadays that social justice is an important and too often neglected dimension of justice,[25] it is disputed how it should figure in discussions of triage. A spectrum of views has emerged: some contend that triage protocols should explicitly address existing social injustices, e.g. by using a reserve system for ventilator allocation for patients from disadvantaged communities,[26] or by giving priority to socially disadvantaged persons in tiebreaker situations.[27,28] By contrast, others emphasize that a pandemic is not the place to remedy structural injustices and that triage protocols should not attempt to do so.[29,30] An intermediary view holds that social justice requires, at least, that triage protocols do not (explicitly and implicitly) disadvantage groups of persons that are already subject to existing inequalities.[31] Although such a view seems plausible, it is far from clear how it can be implemented in triage guidelines, and how far social justice concerns should go. One possible implication is that, in the development of guidelines, persons from local communities, including disability advocates, should be consulted and included.[32]

Priority to HCW

Giving priority to frontline workers is justified by an argument from reciprocity, not unfrequently found in guidelines: if you are willing to put yourself at an increased risk for others, you can expect preferential treatment if you get infected. This stance is regarded as problematic by many as it raises the question of what special services to society should be considered to qualify for preferential treatment in a triaging situation. In the ethical literature, a more mainstream position holds that healthcare workers will be able to recover quicker and return to providing necessary care in a public health response (direct multiplier effect). This argument is related to the instrumental value of social functions that help save more lives or maintain social order.[24] Again, it has been pointed out that it can be controversial to determine which workers are entitled to such utility privileges. These decisions will also be of importance with the introduction of vaccines, where a priority in distribution is being considered for production workers or physicians in direct contact with infected patients.[24]

Re-assessment and re-triage

Questions are raised about whether priority should be given to patients who are already receiving treatment in the ICU or to new incoming patients who may have greater need (and benefit). Some bioethicists have highlighted the importance of ensuring resources are only allocated if patients are expected to survive treatment, ensuring that resources are saved for those who are expected to benefit from them.[33,34] At the same time, there has been some concern that premature patient discharges due to admission of new patients may lead to reduced efficiency and thus suboptimal use of resources. As treatment outcomes are not always predictable, it is important to ensure that re-assessment is conducted routinely. As these decisions are not made based not only on individual standards of care but include the needs and prognoses of other patients, challenges arise in transparent decision-making, especially for medical teams who must report such decisions to patients' families.[35]

Some ethicists believe that withdrawing treatment is more problematic than withholding, due to the moral significance of the distinction between acts and omissions. The UK guidelines also concur that while a clear ethical distinction cannot be made between withholding and withdrawing therapies, medical professionals might find decisions of withdrawing to be more challenging.[36] Medical professionals responsible for triaging may find it difficult to justify decisions of withdrawing treatment, and here some ethicists argue that perhaps accommodating views of conscientious objection or rejection would provide medical professionals the ability to uphold their moral integrity.[37] At the same time, however, it is argued that allowing physicians to conscientiously object or reject to withholding and withdrawing decisions can also place an unfair burden on other non-objecting colleagues on whom triaging decisions would then be placed. Medical professionals are already facing physical and mental stress from overworked conditions that have arisen from the pandemic, and allowing colleagues to practice conscientious objection would exacerbate the existing medical personnel shortages within the ICU.[38]

Concerns were also raised about doctors' perceived duty to act as agents for their patients that might bias decisions.[39] This problem can be solved by separating triaging teams from treatment teams, a procedural element emphasized in some of the guidelines. Guideline analysis showed that withdrawal of treatment was considered acceptable if it was done so on grounds of medical futility or disproportionate care, and palliative care was always offered.[14] UK guidelines espouse the concept of 'time-limited trial' of therapy, where a withdrawal of intensive care can be justified if a patient's condition deteriorates after admission into the ICU, for re-allocation to a patient with greater need and prognosis.[36]

Need for further research and debate

Our discussion shows that existing guidelines and triage protocols lean towards short-term medical prognosis as the most important criterion. This is understandable, given the ethically problematic nature of other criteria such as quality of life, life expectancy or age, and given the practical problems that arise when one attempts to include considerations about social justice or priority for healthcare workers. In this section, we describe growing points that relate to the practice and implementation of ethical triage, and point to some challenges and topics that deserve further research.

First, advances in knowledge about the clinical course of COVID-19 and more accurate and fine-grained individual prognoses will, on the one hand, lead to fewer situations in which two patients are considered to have a similar diagnosis, reducing the number of tiebreaker situations. On the other hand, this might give rise to new challenges that have so far remained largely unexplored. For instance, socially disadvantaged persons may more often have conditions that subtly affect their individual prognosis.

Artificial Intelligence (AI) may aid physicians in arriving at triage decisions by predicting outcome and possibly patient preferences.[40] This could lead to more efficient and reliable decision-making during a public health emergency, allowing medical teams to focus on providing care rather than on applying triaging criteria. At the same time, doctors and other health professionals might be—at least partially—relieved from the moral challenge and psychological burden of triaging. At the same time, it is well known that AI is also vulnerable to bias and discrimination, and maintaining human agency in AI-supported decisions is an emerging key principle of AI applications.

Second, even if we acknowledge that there is a commonly shared understanding of core principles for triage and that other features may be context-dependent, we need to develop a clearer understanding of what variation is well justified and what the adequacy of models depends on. We also need to figure out how much heterogeneity between guidelines can be tolerated without different standards starting to appear unfair and arbitrary. Although it may be impractical for every hospital and institution to create their own protocols based on community demographics, government or medical professional bodies can provide normative orientation through a generic triage guideline that can be adapted and adjusted to suit specific circumstances. Similarly, when we call for participatory approaches in the development of triaging protocols it is important to define who should participate and why, and to demarcate the room for negotiation.

Third, with current surges of ICU admission, there are first indications that nursing homes seem to be conducting their own pre-hospital or 'silent' triage, where elderly patients are identified as candidates for in-patient referral or not. We will need to better understand how triaging protocols connect to pre-triaging settings. In a pre-hospital admission setting it is important not to confuse informal, possibly unjustified triaging with the needed processes of establishing the medical indication (or the lack thereof) and the will of the patient. An overemphasis on access as a moral concern may overlook the fact that not everyone is served best by receiving ICU treatment.

More generally, examinations of guidelines being implemented into practice will be vital for future triage policymaking. Conducting empirical studies that test how well these guidelines were received will allow for future commentary and discussion on how to further improve unforeseeable/unintended consequences. These studies will also illuminate the parallels and intersections of ethical discussion and practice of discussed criteria.

Fourth, discussions on the ethics of triage can inform other areas of medical practice. For instance, with the progression of COVID-19 vaccines, questions surrounding distribution and priorities have begun to make way in ethical literature. Practices of 'vaccine nationalism' are emerging as wealthier countries begin to make agreements with pharmaceuticals for reservations of resources, leaving poorer countries to remain vulnerable.[41] Bioethicists have suggested a Fair Priority Model that follows distribution through a model targeting three distributive justice arguments: (i) benefit people and limit harm, (ii) priority to the disadvantaged and (iii) equal moral concern.[42]

When we try to profit from the extensive discussions around triaging for other justice-related questions it will be important to ensure consistency between terminology of triage and resource allocation. Protocols on triage are not established to distribute ICU beds or mechanical ventilators, but rather to create and sort patient priority groups for receiving life-saving treatment. Allocation of resources consists of the process of determining the distribution of scarce materials, as can be seen with organ transplants and with the COVID-19 vaccines in the near future.

Concluding remarks

Over the course of the current pandemic, triaging guidelines have developed quickly in many countries. Whereas they converge on important points, such as the principles of utility and equity, they also reveal some disagreement, particularly with a view to what tiebreakers should be used. Ethical analysis can help spell out more clearly normative differences and relate them back to ethical theory. Even if we hope that there will be no need to extensively put triaging guidelines to use, their practical implementation—and the response of healthcare professionals, patients, family and the general population—will be a unique learning opportunity for further improvement and to more deeply probe our normative premises.

Data availability statement

No new data were generated or analyzed in support of this review.

Funding

RV's PhD research is funded by the Swiss Government Excellence Scholarship from the Federal Commission for Scholarships for Foreign Students.

Conflict of interest

The authors have no potential conflicts of interest.

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References

1. Baker R, Strosberg M. Triage and equality: an historical reassessment of utilitarian analyses of triage. *Kennedy Inst Ethics J* 1992;2:103–23. doi: 10.1353/ken.0.0035.
2. Mace SE, Mayer TA. Chapter 155- Triage. In: Baren JM, Rothrock SG, Brennan JA *et al.* (eds.). *Pediatric Emergency Medicine*. Philadelphia: Saunders Elsevier, 2008,1087–96
3. Aacharya RP, Gastmans C, Denier Y. Emergency department triage: an ethical analysis. *BMC Emerg Med* 2011;11:1–13. doi: 10.1186/1471-227X-11-16.
4. Savulescu J, Persson I, Wilkinson D. Utilitarianism and the pandemic. *Bioethics* 2020;34:620–32. doi: 10.1111/bioe.12771.
5. Childress JF. Who shall live when not all can live. *Soundings* 2013;96:237–53. doi: 10.5325/soundings.96.3.0237.
6. Nielsen L. Contractualist age rationing under outbreak circumstances. *Bioethics* 2020;00:1–8. doi: 10.1111/bioe.12822.
7. Lauridsen S. Emergency care, triage and fairness. *Bioethics* 2020;34:450–8. doi: 10.1111/bioe.12689.
8. Society of Critical Care Medicine. *Disaster Triage and Allocation of Scarce Resources*. https://www.sccm.org/LearnICU/Resources/Disaster-Triage-and-Allocation-of-Scarce-Resources (18 November 2020, date last accessed).
9. Persad G, Wertheimer A, Emanuel EJ. Principles for allocation of scarce medical interventions. *Lancet* 2009;373:423–31. doi: 10.1016/S0140-6736(09)60137-9.
10. The Local. *COVID-19: How Will a Priority Triage System in Swiss Hospitals Work?* https://thelocal.ch/20201105/covid-19-what-will-be-the-priority-triage-in-swiss-hospitals (26 November 2020, date last accessed).
11. England NHS. *NHS and Other Professional Bodies' Response to the Sunday Times*. https://www.england.nhs.uk/2020/10/nhs-and-other-professional-bodies-response-to-sunday-times/ (26 November 2020, date last accessed).
12. Truog RD, Mitchell C, Daley GQ. The toughest triage – allocating ventilators in a pandemic. *N Engl J Med* 2020;382:1973–5. doi: 10.1056/NEJMp2005689.
13. Jöbges S, Biller-Andorno N. Ethics guidelines on COVID-19 triage – an emerging international consensus. *Crit Care* 2020;24:1–5. doi: 10.1186/s13054-020-02927-1.
14. Jöbges S, Vinay R, Luyckx VA, Biller-Andorno N. Recommendations on COVID-19 triage: international comparison and ethical analysis. *Bioethics* 2020;34:948–59. doi: 10.1111/bioe.12805.
15. John TM, Millum J. First come, first served? *Ethics* 2020;130:179–207. doi: 10.1086/705763.
16. Solomon MZ, Wynia MK, Gostin LO. COVID-19 crisis triage – optimizing health outcomes and disability rights. *N Engl J Med* 2020;383:e27. doi: 10.1056/NEJMp2008300.

17. Wasserman D, Persad G, Millum J. Setting priorities fairly in response to COVID-19: identifying overlapping consensus and reasonable disagreement. *J Law Biosci* 2020;7:1–12. doi: 10.1093/jlb/lsaa044.
18. Mello MM, Persad G, White DB. Respecting disability rights – towards improved crisis standards of care. *N Engl J Med* 2020;383:e26. doi: 10.1056/NEJMp2011997.
19. Persad G, Wasserman D. Diversity and solidarity in response to COVID-19. *The Hastings Center* 2020. https://www.thehastingscenter.org/diversity-and-solidarity-in-response-to-covid-19/ (12 November 2020, date last accessed).
20. Auriemma CL, Molinero AM, Houtrow AJ *et al.* Eliminating categorical exclusion criteria in crisis standards of care frameworks. *Am J Bioeth* 2020;20:28–36. doi: 10.1080/15265161.2020.1764141.
21. Malek J. Defending the inclusion of categorical exclusion criteria in crisis standards of care frameworks. *Am J Bioeth* 2020;20:156–8. doi: 10.1080/15265161.2020.1779854.
22. Courtwright AM. When exclusion criteria are appropriate. *Am J Bioeth* 2020;20:158–60. doi: 10.1080/15265161.2020.1777349.
23. Tabery J, Mackett CW. Ethics of triage in the event of an influenza pandemic. *Disaster Med Public Health Prep* 2008;2:114–8. doi: 10.1097/DMP.0b013e31816c408b.
24. Childress JF. Moral considerations: bases and limits for public health interventions. In: Bernheim RG, Childress JF, Bonnie RJ, Melnick AL (eds.). *Essentials of Public Health Ethics*, 1st edn. Burlington, MA: Jones & Bartless Learning, 2015,21–44
25. Powers M, Faden RR (eds.). *Social Justice: the Moral Foundations of Public Health and Health Policy*. New York: Oxford University Press, 2006
26. Pathak PA, Sönmez T, Ünver MU. Improving ventilator rationing through collaboration with experts on resource allocation. *JAMA Netw Open* 2020;3:e2012838. doi: 10.1001/jamanetworkopen.2020.12838.
27. Schmidt H. Vaccine rationing and the urgency of social justice in the COVID-19 response. *Hastings Centre* 2020;50:46–9. doi: 10.1002/hast.1113.
28. Emanuel EJ, Persad G, Upshur R *et al.* Fair allocation of scarce medical resources in the time of COVID-19. *N Engl J Med* 2020;382:2049–55. doi: 10.1056/NEJMsb2005114.
29. McGuire AL, Aulisio MP, Davis FD *et al.* Ethical challenges arising in the COVID-19 pandemic: an overview from the association of bioethics program directors (ABPD) task force. *Am J Bioeth* 2020;20:15–27. doi: 10.1080/15265161.2020.1764138.
30. Dudzinski DM, Hoisington BY, Brown CE. Ethics lessons from Seattle's early experience with COVID-19. *Am J Bioeth* 2020;20:67–74. doi: 10.1080/15265161.2020.1764137.
31. Reid L. Triage of critical care resources in COVID-19: a stronger role for justice. *J Med Ethics* 2020;0:1–5. https://jme.bmj.com/content/medethics/early/2020/06/15/medethics-2020-106320.full.pdf.
32. Galiatsatos P, Kachalia A, Belcher HME *et al.* Health equity and distributive justice considerations in critical care resource allocation. *Lancet Respir Med* 2020;8:758–60. doi: 10.1016/S2213-2600(20)30277-0.
33. Latham SR. Avoiding ineffective end-of-life care: a lesson from triage? *Hastings Cent Rep* 2020;50:71–2. doi: 10.1002/hast.1141.
34. Emmerich N. Anti-theory in action? Planning for pandemics, triage and ICU or: how not to bite a bullet. *Med Health Care Philos* 2011;14:91–100. doi: 10.1007/s11019-010-9289-5.
35. Misak CJ, White DB, Truog RD. Medically inappropriate or futile treatment: deliberation and justification. *J Med Philos* 2016;41:90–114. doi: 10.1093/jmp/jhv035.
36. British Medical Association (BMA). *COVID-19 – Ethical Issues. A Guidance Note*. Retrieved from https://www.bma.org.uk/media/2226/bma-covid-19-ethics-guidance.pdf (16 April 2020, date last accessed).
37. Emmerich N. Ought conscientious refusals to implement reverse triage decisions be accommodated? *J Bioethical Inq* 2020;17:783–7. doi: 10.1007/s11673-020-10042-7.
38. Wicclair M. Allocating ventilators during the Covid-19 pandemic and conscientious objection. *Am J Bioeth* 2020;20:204–7. doi: 10.1080/15265161.2020.1777347.
39. Hope T, McMillan J, Hall E. Intensive care triage: priority should be independent of whether patients are already receiving intensive care. *Bioethics* 2012;26:259–66. doi: 10.1111/j.1467-8519.2010.01852.x.
40. Biller-Andorno N, Biller A. Algorithm-aided prediction of patient preferences-an ethics sneak peek. *N Engl J Med* 2019;381:1480–5. doi: 10.1056/NEJMms1904869.
41. Halabi S, Heinrich A, Omer SB. No-fault compensation for vaccine injury – the other side of equitable access to COVID-19 vaccines. *N Engl J Med* 2020;383:e125. doi: 10.1056/NEJMp2030600.
42. Emanuel EJ, Persad G, Kern A *et al.* An ethical framework for global vaccine allocation. *Science* 2020;369:1309–12. doi: 10.1126/science.abe2803.