

ORIGINAL ARTICLE

Comparing the Dutch ICU triage guidelines to guidelines from abroad: differences and similarities

I.L. Abma, G.J. Olthuis, A.J.M. Oerlemans

IQ healthcare, Healthcare Ethics section, Radboud Institute of Health Sciences, Radboud University Medical Center, the Netherlands

Correspondence

I.L. Abma - inger.abma@radboudumc.nl

Keywords - COVID-19, pandemic, intensive care, triage, ethics

Abstract

Background: The COVID-19 pandemic has overwhelmed healthcare systems all over the world. Many countries have formulated guidelines for a scenario in which ICU triage is needed: when there are more patients requiring ICU beds than there are beds available. In this study, we provide an overview of how the Dutch ICU triage guidelines compare with the guidelines of other countries.

Methods: All triage grounds were extracted from the guidelines of the Netherlands, Belgium, Germany, United Kingdom, Italy, Switzerland, Australia & New Zealand, Canada and South Africa.

Results: The Netherlands has one of the most clearly operationalised and presented guidelines. The most important Dutch triage ground – maximising benefits – is also a central triage ground in other countries, although which benefits are maximised differs: saving the most lives or also saving the most life years with the best quality of life. Other differences are whether prioritising younger patients irrespective of medical arguments is acceptable, whether patients already in the ICU should be triaged along with patients waiting for a bed and the choice of ‘last resort’ strategy.

Conclusion: The most important ICU triage ground for all countries in this comparison is ‘maximising benefits’. However, which benefits are maximised exactly and to what extent this is operationalised in each of the guidelines differs. Unlike the Netherlands, most countries in this comparison did not describe step-by-step guidelines. The Netherlands therefore appears to be one step ahead of many other countries when it comes to preparedness for a situation in which ICU triage is needed.

Introduction

In the past 18 months, the COVID-19 pandemic has overwhelmed healthcare systems all over the world. After

China, in March 2020 Italy was one of the first countries to be faced with a great number of COVID-19 patients needing mechanical ventilation on the ICU. Many countries quickly started formulating guidelines for a worst-case scenario in which life-or-death choices would have to be made: more patients requiring ICU beds than there are beds available. In the first half of 2020 many such guidelines were published, including detailed Dutch guidelines which present a phased ICU triage process.^[1,2]

Several aspects of the Dutch triage guidelines sparked national debate about their ethical acceptability. Therefore, it is interesting to study how other countries approach the decision-making process for ICU triage. Several international comparisons of ICU triage guidelines have been published,^[3,4] however, these did not include the Netherlands and several of the national guidelines have since been updated based on new insights and national discussions. With this international comparison, we aim to provide an insightful overview of how the triage guidelines of the Netherlands compare with the guidelines of other countries.

Methods

Country selection was based on the study by Jöbges et al.^[3] which included guidelines describing triage in the context of the COVID-19 pandemic. We added one additional inclusion criterion: author(s) of the document are one or more national organisations (for example a medical association), not writers in their personal capacity or single healthcare centres. This resulted in the United States and Pakistan being excluded. Furthermore, the Netherlands was added to this list of countries. The full list of included documents/countries is: the Netherlands,^[1,2] Belgium,^[5,6] Germany,^[7] United Kingdom (UK),^[8] Italy,^[9] Switzerland,^[10] Australia & New Zealand (with a shared document^[11]), Canada^[12] and South Africa.^[13]

On 1 June 2021, the websites that published the documents of each country (the medical association or a government website, see references) were checked for the most recent version of the document(s).

Author IA started by analysing the documents and created the first version of a table with relevant aspects of triage, based on the content of the documents. Then authors GO or AO checked the data extraction for agreement for each document and noted suggestions for additional categories. Meetings with all authors were held to find consensus regarding interpretation of the documents and categories in the table. After agreement was reached regarding the categories, IA performed a second round of checks to ensure it was completed correctly for all countries and any changes were again checked by GO or AO.

Results

Description of the documents

The eleven documents included in this comparison were published between March 2020 and March 2021. The characteristics of the documents are shown in *table 1*. The Netherlands and Belgium have two documents: for the Netherlands, one document with medical criteria for ICU triage (which are to be applied first), and one document with non-medical criteria for triage; for Belgium, one document that was written by a medical association in March 2020 and a complementary document that was written by the Belgian Bioethics Advisory Committee in December 2020. Most documents were written by one or more medical associations, usually related to intensive care.

Table 1. Characteristics of the ICU triage guidelines

	Netherlands - medical	Netherlands - non-medical	Belgium - medical	Belgium - ethical	Germany	UK	Italy	Switzerland	Australia & New Zealand	Canada	South Africa
Publication month of most recent version	March 2021	Nov. 2020	March 2020	Dec. 2020	April 2020	Jan. 2021	Jan. 2021	Dec. 2020	April 2020	April 2020	May 2020
Previous versions in 2020	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No
Initiator of document	Dutch Society for Intensive Care (NVIC)	Health and Youth Care Inspectorate (IGJ)	Federal Public Service Health and Belgian Society of Intensive Care Medicine			British Medical Association	Istituto Superiore di Sanità (Italian National Institute of Health)				
Type of author(s)	Professional association	Professional association	Professional association	Belgian Bioethics Advisory Committee	Professional association	Professional association	Professional association	Professional association	Professional association	Professional association	Professional association
Medical ethicists involved	+	+	+	+	+			+	+	+	
- As author			+	+	+			+			
- As advisor	+	+							+	+ ¹	
Citizen groups consulted		+						+	+		
Patient federation consulted	+	+									
Mandatory to perform triage as described in document	+	+		-							
Triage guidelines must be worked out locally			+				+		+		
National announcement when hospitals should start triage	+	+						+ ²	+		

+ = true for this document; (empty) = not mentioned for this document. ¹Indirectly, as the framework is also based on documents by ethicists;

²The writers recommend that a national coordination body should make this announcement

Table 2. Composition of triage teams as recommend in the guidelines

	Netherlands ¹	Belgium ¹	Germany	UK ²	Italy	Switzerland	Australia & New Zealand	Canada	South Africa
Triage decisions by more than one person	+	+	+		+	+	+	+	+
Multidisciplinary team		Preferably	+			+			+
Not by treating physician								Preferably	+
One physician involved in previous care for patient							Preferably		
One physician <u>not</u> involved in previous care for patient		Preferably							
ICU physician	+	+	+			+	+		
Acute care physician			+ ³						+
Geriatrician		If necessary ⁴							
Nurse		Preferably	+						+
General practitioner		If necessary ⁴	+						
Ethicist			If necessary						
Administrator									+

¹Based on both documents of this country (see table 1); ²No information on triage teams is provided in the UK document; ³Acute care physician or a physician from the department from which the patient is referred; ⁴Deliberation with geriatrician or general practitioner may be an option

The Dutch triage guidelines (which are called ‘roadmaps’ (draaiboeken)) are the only guidelines whose application is mandatory if triage is necessary, i.e. triage teams have to triage according to the rules laid out in the documents, with no exceptions allowed. The Dutch documents and the South African guidelines are the most elaborate and clearly presented of all the studied documents: all triage steps are described in detail and presented in a flow chart that supports triage teams in their decision-making. The documents of other countries mostly do not aim to provide step-by-step guidelines on how to perform triage, but present recommendations or guiding principles for triage, which are not always operationalised. Several documents mention that their recommendations will have to be worked out locally in different regions or hospitals. Three countries, including the Netherlands, mention that there will or should be a national proclamation of when the crisis in a country becomes severe enough for ICU triage to become necessary. In the Netherlands, the Ministry of Health will make this proclamation.^[2]

Composition of triage teams

The recommended composition of the triage teams, which is described for all countries except the UK, is shown in *table 2*.

All countries recommend that triage should be performed by a team, not a single physician. For seven countries, it is (to some extent) described which type of healthcare professional(s) should ideally be on a triage team. Six of these countries including the Netherlands mention that they consider an intensivist an important part of any triage team. Three of the countries have additional recommendations: for example involving an acute care physician, geriatrician, nurse, general practitioner, ethicist and/or administrator.

Grounds for triage

The grounds for triage of the included countries can be found in *table 3*. All countries have the utilitarian principle of ‘maximising benefit’ as one of their central triage grounds. Furthermore, our findings show several other important triage grounds: priority based on the societal role of the patient; priority based on the personal characteristics of the patient; and the ‘last resort’ strategy for triage if multiple patients still have equal priority for a bed after the triage process. These topics are all shown as sections in *table 3* and are also described below. Furthermore, the table shows who is subject to triage in each country: only patients waiting for an ICU bed or also those already in the ICU?

Maximising benefit

In all included triage guidelines the principle of ‘maximising benefit’ is a central ethical aspect. Saving a maximum number of lives by selecting the patients with the greatest chance of survival for ICU treatment is a central argument in all countries. The Dutch guidelines aim to achieve this by first using strict exclusion criteria for the ICU: patients with severe conditions or comorbidities, or great frailty, should be excluded from triage. Remaining patients are first compared on prognosis: those with a $\geq 20\%$ better chance of survival than the other patient(s) have priority. If the prognosis is similar, the next comparison will be the expected length of stay in the ICU, because more patients can potentially be saved if beds are freed up quickly.

Other countries mostly also recommend medical exclusion criteria and/or a comparison based on estimated chance of survival to maximise the number of lives saved, although they differ in the extent to which these criteria are operationalised. Expected length of stay is not mentioned as a clear ground for triage in any of the other documents. However, several other countries recommend that the expected number of life years saved should be taken into account when prioritising between patients. Additionally, Belgium and Australia & New Zealand recommend taking into account the expected quality of life of patients after release from the ICU, although the latter countries acknowledge this may be challenging to estimate. Canada, while it considers maximising the number of life years saved justifiable, counsels against taking expected quality of life (or quality-adjusted life years) into account due to limited time and information during an emergency.

Whereas the Netherlands describes several subsequent triage steps to maximise the number of lives saved, South Africa uses a points system to determine priority in which all criteria are taken into account simultaneously. A score for short-term survival is created based on the Sequential Organ Failure Assessment (SOFA) score, to which a score for long-term survival is added based on the presence or absence of comorbidities that may influence survival. Patients with the lowest scores are assigned the highest priority.

Priority based on role

Seven countries mention that under certain conditions, healthcare workers may be given (some) priority during the triage process. In the Netherlands, this is only potentially relevant if there are still more patients than beds after applying the criteria for maximising benefit. Furthermore, it is only relevant if the healthcare worker was subjected to substantial risk due to absence of personal protection equipment while caring for patients with COVID-19. Two other countries also mention the high risk of infection (implying the principle of reciprocity) as reason to (potentially) give some priority to healthcare workers. The UK, Canada and South Africa suggest that essential workers should have priority because they

are essential to the pandemic response or if this is needed to maintain societal order.

Additionally, the document of Australia & New Zealand mentions that it ‘may be ethically justifiable to consider’ giving priority to patients subject to social deprivation and adults with caring responsibilities. This is not mentioned in the documents for any of the other countries. Canada is the only country to give priority to COVID-19 research participants.

Priority based on personal characteristics of the patients

All documents contain some statements about which personal characteristics of the patients should and should not be allowed to play a role during triage.

Seven documents mention specifically that irrelevant discriminatory considerations are not allowed. For example, considerations based on ‘gender, sexual orientation, religion, disability, social status, personal connections, wealth, citizenship, insurance status, ethnicity or race.’^[11] Furthermore, the Netherlands and Belgium mention that if a patient’s risky behaviour led to the need for ICU admission, this should not be taken into account during triage. All countries agree that patients with the condition causing the health crisis (in this case COVID-19) should be considered in the same way as patients with other conditions.

Some countries also count age as an irrelevant discriminatory consideration. While age is generally accepted as a relevant aspect when determining a patient’s prognosis, countries have opposing views regarding whether younger patients should have priority over older patients irrespective of medical arguments. Five countries, including the Netherlands, recommend giving some priority to patients in younger generations (or at least consider this ‘ethically justifiable’). South Africa argues that it is ‘a valuable goal to give individuals equal opportunity to pass through the stages of life—childhood, young adulthood, middle age, and old age’. This is also referred to as the ‘life-cycle principle’^[13] or ‘fair innings.’^[1] Whether Switzerland uses age independent of medical arguments is debatable: they apply age limits in combination with the clinical frailty scale (CFS) score and/or comorbidities, which in practice means a 65-year-old with CFS 6 may get an ICU bed, while an 85-year-old with the same score will not. Canada acknowledges that younger patients might have priority in practice due to their ‘life years saved’ triage ground. Three countries (Belgium, UK and Germany) mention that they do not consider it desirable to use age as triage ground independent of medical arguments, as they did not find enough ethical justification. Italy mentions it is not considered desirable to apply a hard age limit, without mentioning priority based on years of life or life stages.

‘Last resort’ strategy

Four countries describe what they do (or do not) consider acceptable as a strategy to assign priority to patients who still

Table 3. Triage grounds in the Netherlands and eight other countries

	Netherlands ¹	Belgium ¹	Germany	UK	Italy	Switzerland	Australia & New Zealand	Canada	South Africa
Maximising benefit									
Number of lives saved	+	+	+	+	+	+	+	+	+
• Chance of short-term survival	+	+	+	+	+	+	+	+	+
- Medical exclusion criteria for ICU	+	? ²	+	+ ³		+		? ⁴	+
- Comparison chance of ICU survival	+	? ⁴	+	+ ⁵	+	+	+	? ⁴	+
• Expected length of stay on ICU	+			? ⁵					
Expected number of life years saved		+				-	+	+	+
Expected quality of life after ICU		+ ⁶					+	-	
Points system to determine priority (for example based on SOFA score)							-		+
Priority based on societal role									
Priority for healthcare workers ⁷	+	+		+ ⁸			+ ⁹	+	+
• Because they are at high risk (reciprocity)	+	+					+		
• Because their skills are needed	- ¹⁰			+				+	+
Priority for (other) essential professions		-		+ ⁸					+
Priority based on characteristics of patient									
Irrelevant discriminating considerations not allowed	+	+	+	+		+	+		
Risky behaviour of patient may not play a role	+	+							
Patients with the disease causing the crisis (e.g. COVID-19) should be considered in the same way as other patients that need the ICU	+	+	+	+	+	+	+	+	+
Priority for younger patients (not based on medical arguments)	+	-	-	-		+ ¹¹	+ ⁹	+ ¹²	+
• Hard age limit				-	-	+ ¹¹			
• Comparison based on age in years		-	-			-			
• Comparison based on generation (fair innings)	+	-					+		+
Priority for patients subject to social deprivation							+ ⁹		
Priority for adults with caring responsibilities							+ ⁹		
Priority for COVID-19 research participants								+	
Last resort strategy									
First come, first served		+ ¹³				-		-	
Drawing lots	+					-		+	
Triage with patients in ICU?									
Triage also takes place with patients already in ICU	-		+	+	- ¹⁴	- ¹⁴	- ¹⁴	+	- ¹⁴

+ = yes; - = described that this is not desirable/should not be done; ? = topic is mentioned but not clearly described; empty = not mentioned

have equal priority after applying their previously described triage criteria. The Netherlands and Canada prefer drawing lots: chance is considered a justifiable basis when patients are considered equal. The Belgian document is not very clear in its statement, but seems to suggest that first come, first served should be used as a last resort. The Swiss document only mentions that neither strategy should be applied.

Patients in the ICU

Most documents mention that patients in the ICU should be reassessed frequently and should have their ICU support withdrawn if the treatment does not provide the benefit that was hoped for. This will give other patients a chance to undergo potentially beneficial treatment. However, it differs per country whether it is considered desirable or acceptable to perform triage on patients who have already been admitted to the ICU along with those waiting for an ICU bed. The Dutch guidelines state that this is not acceptable, because treatment of a patient might be stopped based on grounds not related to the individual. Several other countries also do not advocate including ICU patients in the triage process, although they do not always mention this explicitly. The UK, Germany and Canada do consider it justifiable to include patients in the ICU in triage. The Canadian document states that even though it may be psychologically traumatising for clinicians to stop a patient's ICU treatment in favour of someone with a better prognosis, maximising benefit is most important.

Discussion

This international comparison of triage guidelines shows that the Netherlands has one of the most clearly operationalised and clearly presented guidelines. The most important triage ground of the Dutch guidelines – maximising benefits – is also a central triage ground in the other countries, although operationalisation differs per country. There are also other differences: for example whether prioritising younger patients irrespective of medical arguments is acceptable, whether patients already in the ICU should be triaged along with patients waiting for a bed and the choice of 'last resort' strategy.

All countries in this comparison want to maximise the benefits of the ICU by aiming to save the most lives. One might argue that if 'benefit maximisation' is a central principle, trying to save as many *life years* as possible with the highest *quality of*

life could also be pursued, as some countries in this comparison do. However, arguments have been made against this on both an ethical and a practical level: it may suggest that the lives of people with disabilities and older people are worth less; and estimating long-term survivability and quality of life is difficult, time-consuming and may incur bias.^[14-17] In practice, Canada suggests that the most important operationalisation of saving the most life years may be to maximise the number of patients that survive treatment with a 'reasonable life expectancy', with maximising improvements in length of life as a subordinate aim. This might be seen as a non-operationalised version of the medical exclusion criteria of the Dutch documents, which aim to take a (slightly) longer-term prognosis into account when allocating ICU beds, in addition to chance of survival in the ICU. Australia & New Zealand and Belgium do recommend fully taking into account saved life years and quality of life after ICU discharge, although without describing how to balance this with the additional goal of saving the most lives.

Another triage ground that has been discussed extensively both in Dutch society^[18-20] and in the scientific literature^[21-24] is age: should younger patients be prioritised independent of medical arguments? Similar to the statements in the triage guidelines in this comparison, age cut-offs and prioritisation based on age in years are generally considered a form of unacceptable discrimination in the literature. Opinions differ on whether prioritisation based on the 'fair innings' principle, which states that everyone should have equal opportunity to live through life's stages, is ethically acceptable. Interestingly, in practice priority of younger patients independent of medical arguments may still take place in countries that are opposed to this if 'number of life years saved' is recommended as part of maximising benefits, such as in Belgium. A young person with an equal chance of survival compared with an older person would still be assigned higher priority.^[12,16] unless the young person's medical issues suggest a shorter life expectancy. There therefore seems to be tension between being opposed to using age as a triage ground but proposing 'life years saved' as part of maximising benefits.^[3] In the Netherlands, a consultation round with patient groups and elderly citizens showed that using 'generations' as a triage ground (when patients have similar prognoses) was well-received and considered justifiable.^[25] However, a recent UK study aiming to explore general public views found no support for an age-based triage ground, including 'fair innings'.^[26]

¹Based on both documents of this country (see table 1); ²According to the medical document, terminal oncological disease and severe chronic morbidity such as end-stage organ failure should be 'taken into account'. This is not further specified. ³The document states that "to maximise benefit it will be necessary to adopt a threshold for intensive care" but does not clearly specify what this threshold should look like. ⁴It is not clearly described whether exclusion criteria and/or a comparison between patients should be applied. ⁵It is suggested in the document that it is relevant to compare patients based on chance of survival and anticipated length of stay in the ICU, but it is not clearly stated. ⁶This is only quality of life regarding the outcome of the ICU treatment: the patient should benefit from the treatment and not deteriorate. ⁷In which circumstances this applies differs per country (see text). ⁸Essential workers should have priority if this is needed to avoid 'social and economic disruption'. ⁹This 'may be ethically justifiable to consider'. ¹⁰At least not in the context of the COVID crisis, as it may take many months before the healthcare worker can return to work. ¹¹Patients above a certain age who have a high CFS score or have comorbidities are excluded from the ICU. ¹²The Canadian document describes that in practice younger patients will often have priority based on the 'life years saved' argument. ¹³At the same time they acknowledge great controversy about the "first come, first served" criterion. ¹⁴The document describes that frequent reassessment of patients in the ICU should take place and instructs to stop ICU treatment if survival becomes unlikely. Including them in triage is not mentioned. Therefore it is assumed that this is not recommended, and scored as -.

Exploration of the opinions on the ‘fair innings’ argument in other countries may provide more insight into the acceptability of this ethical principle in different countries.

Only three of the included countries, including the Netherlands, have described a ‘last resort’ strategy to prioritise patients who are similar regarding all previously described triage grounds. Potentially, writers of the documents that lack a ‘last resort’ strategy assume that patients can always be prioritised based on medical arguments if considered in enough detail (e.g. 1% difference in estimated prognosis is still a difference). However, this could lead to prioritisation based on (presumed and debatable) small differences, of which one might question if they are important enough to warrant choosing one patient over another. Describing when there is a relevant medical difference between patients and how to make a choice when there is no relevant difference is therefore important.

Unlike the Netherlands, most countries in this comparison did not describe operationalised, step-by-step guidelines for ICU triage. While outlining general considerations for triage may be an important first step, when guidelines are theoretical rather than practical this does not encourage their use.^[27,28] The Netherlands, therefore, appears to be one step ahead of many other countries when it comes to preparedness for a situation in which triage is needed. However, practical testing of the mandatory Dutch guidelines is essential to make sure the guidelines are sufficiently clear and applicable in practice. A study in which triage teams apply the guidelines on simulated patient cases is currently being undertaken by the authors of this article.

Our study has found similar triage grounds to the international comparison by Jöbges et al.^[3] although some results are also different due to triage guidelines being updated: most notably the Italian guidelines, which for example removed their previously suggested hard age limit, and the additional document that was published for Belgium.

This international comparison does not include all ICU triage guidelines that have been published since the start of the COVID-19 pandemic. The selection of countries was based on the selection used in another comparison, which included countries in Europe and other continents that had published guidelines at the time of their analysis. A different or more extensive selection of countries for this comparison could have been possible, which could have resulted in partially different results.

Conclusion

The international comparison shows that the most important triage ground of the Dutch guidelines – maximising benefits – is also a central triage ground in the other countries. However, which benefits are maximised exactly and to what extent this is operationalised in each of the guidelines differs. Unlike the Netherlands, most countries in this comparison did not describe

step-by-step guidelines. The Netherlands therefore appears to be one step ahead of many other countries when it comes to preparedness for a situation in which ICU triage is needed.

Disclosures

All authors declare no conflict of interest.

Funding: This research was funded by a ZonMw grant (project number 10430022010004). The funder did not influence the analysis, results or conclusion of this manuscript nor the decision to publish.

References

1. Federatie Medisch Specialisten (FMS) and Koninklijke Nederlandsche Maatschappij tot bevordering der Geneeskunst (KNMG). Draaiboek Triage op basis van niet-medische overwegingen voor IC-opname ten tijde van fase 3 in de COVID-19 pandemie. 2020. (Accessed 1 June 2021, at <https://www.rijksoverheid.nl/documenten/rapporten/2020/11/24/draaiboek-triage-op-basis-van-niet-medische-overwegingen-voor-ic-opname-ten-tijde-van-fase-3-in-de-covid-19-pandemie>)
2. Nederlandse Vereniging voor Intensive Care (NVIC). Draaiboek pandemie deel 1 versie 2.0. 2021. (Accessed 1 June 2021, at <https://nvic.nl/draaiboek-pandemie-deel-1-versie-20>)
3. Jobges S, Vinay R, Luyckx VA, Biller-Andorno N. Recommendations on COVID-19 triage: international comparison and ethical analysis. *Bioethics*. 2020;34:948-59.
4. Sarmiento J, Pedrosa C, Carvalho A. What is common and what is different: recommendations from European scientific societies for triage in the first outbreak of COVID-19. *J Med Ethics*. 2021;0:1-7.
5. Belgisch Raadgevend Comité voor Bio-ethiek. Ethische aspecten betreffende de prioritering van zorg in tijden van COVID-19. 2020. (Accessed 1 June 2021, at <https://www.health.belgium.be/nl/aanbeveling-prioritering-van-zorg-tijden-van-covid-19>)
6. Belgische Vereniging voor Intensive Geneeskunde (BVIG). Ethische principes betreffende de gelijkwaardigheid van intensieve zorg tijdens de COVID-19-pandemie van 2020 in België: advies van de Belgische Vereniging voor Intensive Geneeskunde. 2020. (Accessed 1 June 2021, at <https://www.health.belgium.be/nl/aanbeveling-prioritering-van-zorg-tijden-van-covid-19>)
7. Deutschen Interdisziplinären Vereinigung für Intensiv- und Notfallmedizin (DIVI) and other associations. Entscheidungen über die Zuteilung intensivmedizinischer Ressourcen im Kontext der COVID-19-Pandemie. 2020. (Accessed 1 June 2021, at <https://www.divi.de/empfehlungen/publikationen/covid-19-dokumente/covid-19-ethik-empfehlung-v2>)
8. British Medical Association (BMA). COVID-19 – ethical issues and decision-making when demand for life-saving treatment is at capacity. 2021. (Accessed 1 June 2021, at <https://www.bma.org.uk/advice-and-support/covid-19/ethics/covid-19-ethical-issues-when-demand-for-life-saving-treatment-is-at-capacity>)
9. Decisioni per le cure intensive in caso di sproporzione tra necessità assistenziali e risorse disponibili in corso di pandemia di covid-19. SIAARTI; 2020. (Accessed 1 June 2021, at <https://www.siaarti.it/news/382977>)
10. Schweizerische Akademie der Medizinischen Wissenschaften (SAMW) and other associations. Covid-19 pandemic: triage for intensive-care treatment under resource scarcity. 2020. (Accessed 1 June 2021, at <https://www.samw.ch/en/Ethics/Topics-A-to-Z/Intensive-care-medicine.html>)
11. Australian and New Zealand Intensive Care Society (ANZICS). Guiding principles for complex decision making during Pandemic COVID-19. 2020. (Accessed 1 June 2021, at <https://www.anzics.com.au/coronavirus-guidelines/>)
12. Canadian Medical Association (CMA). Framework for Ethical Decision Making During the Coronavirus Pandemic. 2020. (Accessed 1 June 2021, at <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/ethics-framework-guide-use-response-covid-19-pandemic.html>)
13. Critical Care Society of Southern Africa (CCSSA). Allocation of Scarce Critical Care Resources During the COVID-19 Public Health Emergency in South Africa. 2020. (Accessed 1 June 2021, at <https://criticalcare.org.za/covid-9/>)
14. Solomon MZ, Wynia MK, Gostin LO. Covid-19 Crisis Triage - Optimizing Health Outcomes and Disability Rights. *N Engl J Med*. 2020;383:e27.
15. Zivot J. Coronavirus Disease 2019 Triage Teams: Death by Numbers. *Crit Care Med*. 2020;48:1241-2.
16. 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.
17. Peterson A, Largent EA, Karlawish J. Ethics of reallocating ventilators in the covid-19 pandemic. *BMJ*. 2020;369:m1828.

18. Bredenoord A, Derde L. Laten loten om een IC-bed is geen goede geneeskunde. NRC. 7 January 2021.
19. Jongepier F. Voor de IC selecteren op leeftijd is en blijft ongegrond. NRC. 13 January 2021.
20. Paauw S. Van Ark wil met wetgeving ic-triage op leeftijd verbieden. Medisch Contact. 5 January 2021. (Accessed 1 June 2021 from: <https://www.medischcontact.nl/nieuws/laatste-nieuws/nieuwsartikel/van-ark-wil-met-wetgeving-ic-triage-op-leeftijd-verbieden-htm?elementHolder=2303269>).
21. Archard D, Caplan A. Is it wrong to prioritise younger patients with covid-19? BMJ. 2020;369:m1509.
22. Erasmus N. Age discrimination in critical care triage in South Africa: The law and the allocation of scarce health resources in the COVID-19 pandemic. S Afr Med J. 2020;110:1172-5.
23. Haas LEM, de Lange DW, van Dijk D, van Delden JJM. Should we deny ICU admission to the elderly? Ethical considerations in times of COVID-19. Crit Care. 2020;24:321.
24. Rosenbaum L. Facing Covid-19 in Italy - Ethics, Logistics, and Therapeutics on the Epidemic's Front Line. N Engl J Med. 2020;382:1873-5.
25. Verweij M, van de Vathorst S, Schermer M, Willems D, de Vries M. Ethical Advice for an Intensive Care Triage Protocol in the COVID-19 Pandemic: Lessons Learned from The Netherlands. Public Health Ethics. 2020;13:157-65.
26. Kuylen MNI, Kim SY, Ruck Keene A, Owen GS. Should age matter in COVID-19 triage? A deliberative study. J Med Ethics. 2021. Open access: PMC7944418
27. Herreros B, Gella P, Real de Asua D. Triage during the COVID-19 epidemic in Spain: better and worse ethical arguments. J Med Ethics. 2020;46:455-8.
28. Ryberg J. COVID-19, triage decisions, and indirect ethics: A model for the re-evaluation of triage guidelines. Ethics Med Public Health. 2021;17:100639.