

Pandemic ICU triage challenge and medical ethics

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ABSTRACT

The COVID-19 pandemic has made unprecedented global demands on healthcare in general and especially the intensive care unit (ICU). The virus is spreading out of control. To this day, there is no clear, published directive for doctors regarding the allocation of ICU beds in times of scarcity. This means that many doctors do not feel supported by their government and are afraid of the medicolegal consequences of the choices they have to make. Consequently, there has been no transparent discussion among professionals and the public. The thought of being at the mercy of absolute arbitrariness leads to fear among the population, especially the vulnerable groups.

Having learnt our lesson, we have set up a triage protocol that will serve as a clinical guideline when we are next faced with excessive demand on intensive care unit (ICU) capacity.¹

In this way, we want to respond to the call of White *et al*, after the Mexican flu in 2009, for open discussion about the selection criteria and ethical considerations underlying such protocols.² Only then can the necessary professional and social consensus be reached.^{3–5}

Alongside that consensus, the directive must also provide professionals with the practical tools necessary to do their jobs. It must be useable in the workplace, under high pressure, where split-second decisions need to be made.^{2 6 7} But at least as important is that sufficient attention must also be paid to the fact that an ICU admission is by no means always the perfect solution. In fact, a (long term) need for mechanical ventilation and the challenging rehabilitation period that this entails can go against the will of the patient, because it is at odds with how that patient wishes to shape his own quality of life.

On the basis of experience gained in our hospitals during the COVID-19 pandemic,

Key statements

- ▶ Covid-19 can lead to scarcity of necessary IC care, in which case ICU triage is indicated. Triage means that a choice must be made between patients.
- ▶ This choice must be made on the basis of medical-ethical criteria that doctors can cope with, which are verifiable and which are understood and accepted by both the government and society.
- ▶ The consequences of an ICU admission should not be taken lightly, especially elderly and vulnerable people experience a great decrease in quality of life after such an invasive process.
- ▶ The question of whether an ICU admission is desirable, both from the point of view of the doctor, but especially also from the patients and his loved ones, seems to be completely ignored in the so-called triage discussion.
- ▶ However this crucial 1st question: whether someone should be ventilated should always be preceded by the actual triage question: who should be ventilated?

along with an extensive literature review, we propose a framework for dealing with a massive influx of patients in potentially life-threatening condition. We look at the challenges in the context of sufficient ICU capacity and in the context of scarcity. We have developed a model for both situations: the advance care planning (ACP) advice model and the multi-principle allocation model, respectively.

A CHOICE: FOR THE BEST OR FOR THE LESSER OF TWO EVILS?

There are two distinct questions to be answered: whether someone should be ventilated and who should be ventilated in the ICU. The question of whether someone should be ventilated is restricted to the individual patient, while the question of who should be ventilated is



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addressed more widely and assumes that a choice must be made between two patients.

The first question, whether it is in the interests of the patient to be ventilated, is rarely addressed in available literature about allocation of resources in times of (impending) scarcity. If addressed at all, it is often limited to the concept of futility (medically meaningless interventions).⁸ Which means that there has been a physician’s assessment that, for example, IC admission will not be successful because it will not lead to survival.⁹ However, deciding on the desirability of (invasive) medical treatments involves more than that. We believe it is also about the opposite question, namely, how harmful ICU care can be. This potential damage applies to patients who survive an ICU admission: a long recovery period awaits them as well as to the patients who eventually die: their deathbeds have been far from humane.¹⁰

In addition to futility, quality of life and death are therefore important concepts. What we argue for is that the question of whether it is in the interest of a patient to be ventilated is not only up to the clinicians but also to the patient. The physician must make a medical assessment and then discuss it fairly, only then can the patient decide whether an ICU admission is appropriate within his own concept of a good quality of life (or death). Moreover, this anticipatory strategy can ward off the need for the second question (who must be ventilated).

FIRST QUESTION: WHETHER SOMEONE SHOULD BE VENTILATED

ACP advice

The first question, whether it is in the interests of a patient to be ventilated, should always be considered at the moment of admission. This is part of the broader concept of ACP. ACP is a dynamic process in which treatment goals and preferences are defined together with the patient.^{11 12} ACP has its origin in diseases with a long and progressive course. COVID-19, on the other hand, can have a fulminant course, leaving insufficient time to properly apply ACP as traditionally intended.¹³ However, this does not mean that we should abandon it. All the more because we know from previous research that one in three seriously ill older people choose comfort-oriented care,

while their practitioner assumes otherwise.¹⁴ This choice is based on the importance of their quality of life during the rest of their lives, even if it is very short. Other research also states that for vulnerable patients not only survival, but especially the quality of life in the months to 1 year after the ICU is of decisive importance.^{15 16} If this quality of life is insufficient, then the ICU admission might be successful for the survival statistics, but futile and even harmful for the patient.

Unfortunately, ACP is still rarely used.¹⁷ So many patients will only be confronted with such end of life issues for the first time when they have to be admitted because of COVID-19. This makes ACP, limited to the question of whether it is in the patients’ best interest to be ventilated and whether the patient actually wants it, in times of COVID-19 both as necessary as difficult.¹³ It requires a robust, holistic assessment of the patient’s context and an honest discussion about the pros and cons of ICU admission with the patient and their next of kin.¹⁸

For such an assessment, forced to be performed by a physician unknown to the patient, we developed the ACP advice model (figure 1). We want to emphasise that this model is not an attempt to quantify the concept of futility, let alone to define a cut-off value for an individual patient. It is primarily intended as an aid for the physician to encompass into a more balanced conversation about preventing harm versus doing good with the patient and his loved ones (figure 1).

The first row notes the sum of the Clinical Frailty Scale (CFS) and comorbidities. The second row notes the patient’s age. One to four points are assigned per row. If the overall total is more than 5, a consideration has to be made about whether ICU admission is in the best interests of the patient.

The principles of this model are explained below.

SECOND QUESTION: WHO SHOULD BE VENTILATED

In times of shortage in ICU capacity, choices must be made: who will be ventilated? The process of making this extraordinarily complex decision is called triage. It conceptually differs from denial of admission to an ICU because of futility. Decisions about rationing

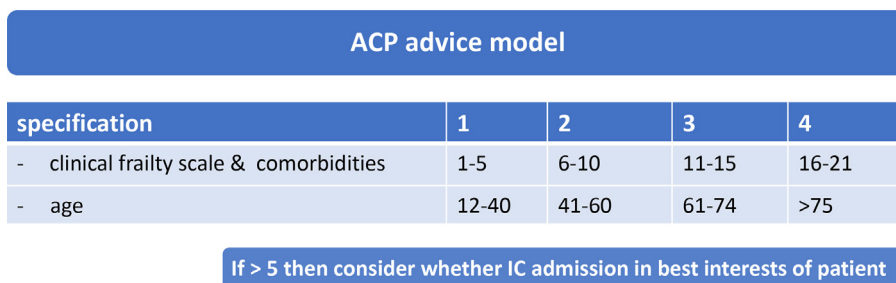


Figure 1 ACP advice model.

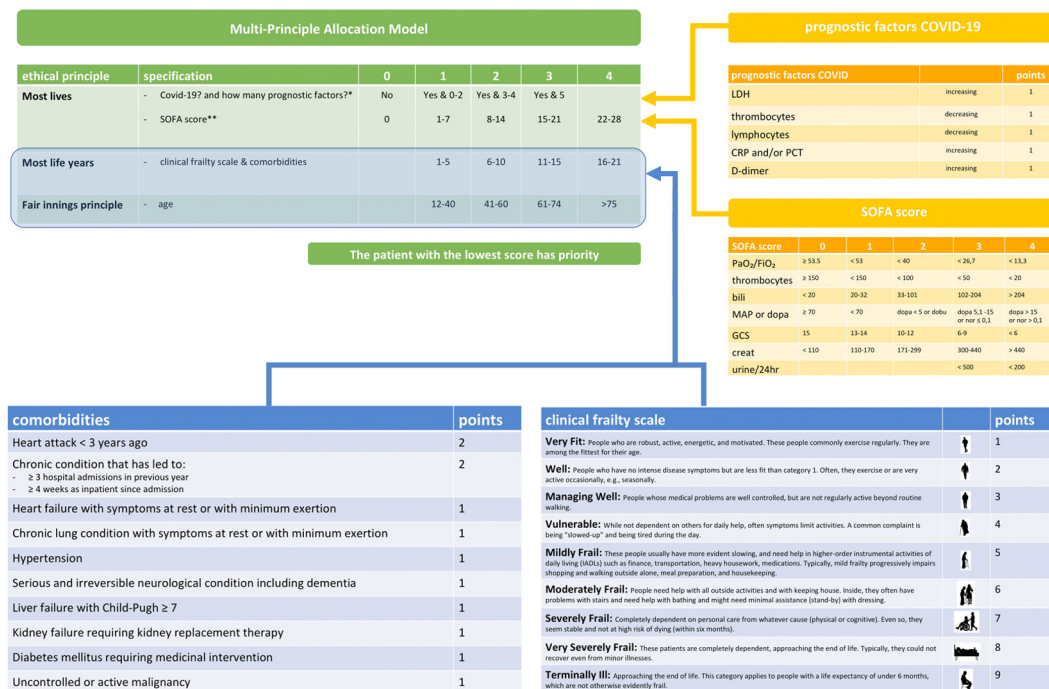


Figure 2 Multi-principle allocation model. LDH; Lactate Dehydrogenase, CRP; C-Reactive Protein, PCT; Procalcitonin, MAP; Mean Arterial Pressure, GCS; Glasgow Coma Scale

address the question of how limited resources should best be used in times of scarcity.¹⁹

In the current COVID-19 pandemic, this triage process is further complicated by a lack of knowledge about the course of the illness, the absence of clear selection criteria and the potential for social and media reaction.

Two ethical standpoints play a key role in triage literature: utilitarianism, where as many lives as possible are saved, and egalitarianism, where everyone gets an equal chance.

We have made an attempt to create a model based on both principles, which is easy to apply in practice. We call it the Multi-Principle Allocation Model. It is based on the following ethical principles:

1. Maximisation of the number of lives
2. Maximisation of the number of life years.
3. Fair innings principle.

The Multi-Principle Allocation Model is a sum of three parts, each based on one of the above ethical principles. Each part can be adjusted, for instance, where in a pandemic, other prognostic details are known. It can also be used to compare patients with and without COVID-19. If both patients have COVID-19, points are additionally assigned for adverse prognostic factors of COVID-19 (see Annex 3).

The blue-bordered section is the same as the ACP advice model: this score is already known for all admitted patients.

Ethical basis for the models

Our proposed Multi-Principle Allocation Model and the ACP advice model outlined above are built largely

on an ethical framework described by White *et al.*² However, the utilitarian principle of achieving ‘the greatest good for the greatest number’ is insufficient in itself. This principle is often limited in the medical world to the maximisation of the number who survive hospital admission. By focusing only on this, certain groups of people are categorically excluded from the ICU in times of scarcity.²⁰ This categorical exclusion can suggest, to professionals and public, that some groups of people, for instance, above a certain age, are not worth saving. This leads to a sense of unfairness and injustice. It is essential to have the trust of both professionals and society in a public health crisis. An allocation model should therefore be based on the principle that everybody is worth saving. Therefore, alongside the principle of achieving the greatest good for the greatest number, two further principles must be added.

The first principle is the maximisation of the number of life years won back: a woman of 60 without significant comorbidity lives longer than a woman of 60 with serious comorbidity. The justification for the admission of a second utilitarian principle is simply that all else being equal, it is better to save more life years than fewer.

The second principle is the fair innings principle, that every individual must have the same opportunity to experience all stages of life: childhood, young adulthood, middle age and old age. Young people are put first because they have had the least opportunity thus far. Empirical evidence also suggests that the majority of people believe that younger patients should receive priority when resources are scarce.²¹

Patients who are already on ventilators must also be taken into account in the decision-making process. It must not be the case that patients not already in the ICU are denied access to it (first-come, first-served), since this would mean that people who become ill earlier or who have easier access to healthcare facilities receive better care than other people of equal standing.²²

As the decision to take somebody off a ventilator weighs more heavily than the decision not to ventilate in the first place, and as there is more time for decision-making when a patient is already in the ICU, we have made the comorbidity table more extensive for patients in ICU.^{15–18} We also assume that a patient must be given 96 hours to react to treatment after admission. We therefore look at the trend of the Sequential Organ Failure Assessment (SOFA) score

And thus we reach the three ethical principles on which our model is based:

Principle 1: maximisation of the number of lives

White *et al* use the SOFA score. Alongside the SOFA score, COVID-19 and the potential adverse prognostic factors which accompany it play a role in the risk assessment of whether the patient will leave the hospital alive.^{23–25}

Principle 2: maximisation of the number of life years

We have also expanded and detailed the second principle under which White *et al* address comorbidity. We make use of recognised, validated forecasting models such as the CFS and the proposed NHS adjustments to the Charlson Comorbidity Index.^{26 27}

Principle 3: fair innings principle

White *et al* published an update in response to the COVID-19 pandemic where, without explanation, they omitted the fair innings principle.⁴ Age is a controversial factor in such triage models: questions are asked about whether older patients are unfairly disadvantaged.

One argument is that age is also used in the CFS. However, the concept of frailty central to the CFS is linked to biological age. Biological age is not necessarily the same as chronological age. There are young people who are frail and old people who are extremely fit. Studies have shown that CFS and chronological age are separate entities. Furthermore, a high chronological age is in itself an independent predictor for a poor ICU outcome, for patients both with and without COVID-19.^{24 28}

A key cause of these poor outcomes is the continuous loss of muscle mass, which can amount to 2%–3% per day during mechanical ventilation, and which accelerates with organ failure.²⁹ It is therefore legitimate to consider chronological age as well as biological age during triage.

CONCLUSION

We have tried to set up a practical, useable triage protocol, having been confronted in the Netherlands—and may well again—with an impending shortage of ICU capacity.

During the course of this exercise, it became clear that little attention is given in the literature about allocation of ICU capacity to the question of whether it is actually in the patient's best interests to be ventilated.

Both media as (some) physicians seem to emphasise that an ICU admission by definition leads to survival. Little attention has been paid to the downside of such an invasive treatment. It can indeed lead to more harm than good. Despite the fact that in the past several fruitless attempts have been made to classify a treatment as futile based on empirical data and the possible controversy that this entails, it does not relieve physicians of the obligation to make such a trade-off between doing good and avoiding harm.³⁰ Withholding this information harms the patient's autonomy.³¹ It does not enable the patient to make a suitable assessment whether the physician's treatment proposals match his own wishes. It may very well be that the patient does not want to be ventilated because it does not seem fit in his own perception of a good quality of life. On the other hand, it deprives the patient of the opportunity to understand the decision not to embark on certain medical treatments based on futility. A proper understanding is mandatory in creating room to discuss treatments that do contribute to the patient's well-being.^{18 32} However, we should be aware that while ACP is a widely accepted model among palliative care physicians, it is not necessarily the case with other physicians. Therefore, our ACP advice model can help forming such an advice and share this decision-making process with the patient and their loved ones, especially under high pressure associated with COVID-19 care.

By attending explicitly to this special kind of ACP, we emphasise the importance of each individual patient, and at the same time, these ACP decisions play an important role in the prevention of shortages in ICU capacity and therefore also benefit the entire population. Shortages in ICU capacity can nonetheless occur, and then difficult choices need to be made. We tried to create a practical model, based on several ethical principles, that minimises injustice as much as possible.

We make absolutely no claim that our models are perfect. On the contrary, it is undoubtedly open to interpretation, discussion and improvement. Hopefully, the focus on ICU survival alone in this discussion will shift to more attention to the potential damage and loss of quality of life (or death) that such an invasive treatment can also entail.

Contributors SN and ND came up with the initial concept and thought out and laid out the main lines of the article. They were also jointly responsible for overall direction and planning.

In terms of content, ND has mainly done the medical content concepts such as the Clinical Frailty Score and SN especially the ethical aspects such as the Fair Innings concept. Both ND and SN mainly shaped the introduction and the discussion. The contribution of SN and ND is similar. DP and AH have further refined and given more structure to the ethical concepts indicated by SN and ND. KvdW and JWdG designed the figures and the accompanying texts. KvdW especially for the ICU and JWdG for the general patient population. KCPV has mainly had a supervising role and an oversight role. All authors fully endorse the content of the article and share the view that SN and ND are joint first authors. According to Dutch custom, the first initial of a person's full name determines the order. That is the ND fully agrees with that.

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REFERENCES

- Kissler SM, Tedijanto C, Goldstein E, *et al.* Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science* 2020;368:860–8 <https://science.sciencemag.org/content/early/2020/04/24/science.abb5793>
- White DB, Katz MH, Luce JM, *et al.* Who should receive life support during a public health emergency? using ethical principles to improve allocation decisions. *Ann Intern Med* 2009;150:132–8.
- Persad G, Wertheimer A, Emanuel EJ. Principles for allocation of scarce medical interventions. *Lancet* 2009;373:423–31.
- White DB, Lo B. A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. *JAMA* 2020;323:1773 <https://jamanetwork.com/journals/jama/fullarticle/2763953>
- Matheny Antommarrina AH, Gibb TS, McGuire AL. Ventilator triage policies during the COVID-19 pandemic at U.S. hospitals associated with members of the association of bioethics program directors. *Ann Intern Med* 2020 <https://annals.org/aim/fullarticle/2765364/ventilator-triage-policies-during-covid-19-pandemic-u-s-hospitals>
- Winsor S, Bensimon CM, Sibbald R, *et al.* Identifying prioritization criteria to supplement critical care triage protocols for the allocation of ventilators during a pandemic influenza. *Healthc Q* 2014;17:44–51.
- Zachariasse JM, van der Hagen V, Seiger N, *et al.* Performance of triage systems in emergency care: a systematic review and meta-analysis. *BMJ Open* 2019;9:e026471.
- Schneiderman LJ, Jecker NS, Jonsen AR. Medical futility: its meaning and ethical implications. *Ann Intern Med* 1990;112:949.
- Joynt GM, Gomersall CD, Tan P, *et al.* Prospective evaluation of patients refused admission to an intensive care unit: triage, futility and outcome. *Intensive Care Med* 2001;27:1459–65.
- Buurman B, Olde Rikkert M. Covid-19 bij ouderen [Internet]. Available: <https://www.medischcontact.nl/nieuws/laatste-nieuws/artikel/covid-19-bij-ouderen-.htm> [Accessed 24 May 2020].
- Rietjens JAC, Sudore RL, Connolly M, *et al.* Definition and recommendations for advance care planning: an international consensus supported by the European association for palliative care. *Lancet Oncol* 2017;18:e543–51.
- Brinkman-Stoppelenburg A, Rietjens JAC, van der Heide A. The effects of advance care planning on end-of-life care: a systematic review. *Palliat Med* 2014;28:1000–25.
- Moorman S, Boerner K, Carr D. Rethinking the role of advance care planning in the context of infectious disease. *J Aging Soc Policy* 2020:1–7.
- Teno JM, Fisher ES, Hamel MB, *et al.* Medical care inconsistent with patients' treatment goals: association with 1-year Medicare resource use and survival. *J Am Geriatr Soc* 2002;50:496–500.
- Ferrante LE, Pisani MA, Murphy TE, *et al.* The Association of Frailty With Post-ICU Disability, Nursing Home Admission, and Mortality: A Longitudinal Study. *Chest* 2018;153:1378–86.
- Tang H-J, Tang H-YJ, Chang C-M, *et al.* Functional status in older intensive care unit survivors. *Clin Nurs Res* 2020;29:5–12.
- Howard M, Bernard C, Klein D, *et al.* Barriers to and enablers of advance care planning with patients in primary care: survey of health care providers. *Can Fam Physician* 2018;64:e190–8.
- Gross J, Williams B, Fade P, *et al.* Intensive care: balancing risk and benefit to facilitate informed decisions. *BMJ* 2018;363:k4135 <https://www.bmj.com/content/363/bmj.k4135>
- Helft PR, Siegler M, Lantos J. The rise and fall of the futility movement. *N Engl J Med* 2000;343:293–6.
- Justice AC, Covinsky KE, Berlin JA. Assessing the generalizability of prognostic information. *Ann Intern Med* 1999;130:515.
- Neuberger J, Adams D, MacMaster P, *et al.* Assessing priorities for allocation of donor liver grafts: survey of public and clinicians. *BMJ* 1998;317:172–5.
- Emanuel EJ, Persad G, Upshur R. Fair allocation of scarce medical resources in the time of Covid-19. *N Engl J Med* 2020.
- Cummings MJ, Baldwin MR, Abrams D, *et al.* Epidemiology, clinical course, and outcomes of critically ill adults with COVID-19 in New York City: a prospective cohort study. *Lancet Lond Engl* 2020.
- Zhou F, Yu T, Du R, *et al.* Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395:1054–62.
- Grasselli G, Zangrillo A, Zanella A, *et al.* Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. *JAMA* 2020;323:1574.
- Muscudere J, Waters B, Varambally A, *et al.* The impact of frailty on intensive care unit outcomes: a systematic review and meta-analysis. *Intensive Care Med* 2017;43:1105–22.
- NHS. Covid 19 decision support tool [Internet]. Available: <https://www.nice.org.uk/guidance/ng159> [Accessed 15 Apr 2020].
- Bagshaw M, Majumdar SR, Rolfson DB. A prospective multicenter cohort study of frailty in younger critically ill patients. *Crit Care* 2016;20.
- Puthucheary ZA, Rawal J, McPhail M, *et al.* Acute skeletal muscle wasting in critical illness. *JAMA* 2013;310:1591.
- McCrary SV, Swanson JW, Youngner SJ, *et al.* Physicians' quantitative assessments of medical futility. *J Clin Ethics* 1994;5:100–5.
- Paris JJ, Reardon FE. Physician refusal of requests for futile or ineffective interventions. *Camb Q Healthc Ethics* 1992;1:127–34.
- Gawande A. Being mortal: medicine and what matters in the end. *Metropolitan Books* 2014:282 p.