Evidence on resource allocation

A summary of the international literature on ethical frameworks for resource allocation in intensive care units

NIHR Applied Research Collaboration (ARC) North Thames and UCLPartners

The NIHR ARC North Thames was asked to summarise the international literature on ethical frameworks for resource allocation in ICUs (Appendix 1). This updated document (version 4) incorporates a comparison of the NICE COVID-19 critical care guidance (e.g., NG159) with other frameworks identified.

Summary

Key findings:

- All frameworks incorporate a short-term outcomes assessment; NICE guidance applies the Clinical Frailty Score (CFS), whereas most others use the Sequential Organ Failure Assessment (SOFA)
- Some frameworks, including the NICE guidance, have been developed with input from key stakeholders, including lay members
- There is general agreement that criteria should be objective and clinical
- There is broad agreement that to provide most benefits for most people, it is necessary that treatment of the sickest people be limited in times of scarce resources. It is recognized that all patients still deserve the best care possible, including palliative care intended to reduce suffering[i].

Limitations include:

- NICE guidance centres on critical care provision, whereas most others focus on ventilator or life support allocation specifically
- The optimal treatment monitoring schedule is unclear; some frameworks suggest monitoring daily, or at 48 and 120 h after treatment initiation.
- There is a lack of evidence in general regarding implementation, sensitivity, or specificity of these guidelines. Modelling data suggests that to perform better than a first-come, first-served basis, the triage tool would have to have a 90% sensitivity and specificity[ii].

Forthcoming work

We continue to collate evidence on existing and emerging COVID-19-specific frameworks.

Existing frameworks

Appendix 2 summarises key features of each of the frameworks below.

COVID-19-specific frameworks

NICE guidelines on critical care[iii]

NICE have produced guidelines on Covid-19 critical care; these were not explicitly developed for a resource limited scenario, although this could be implied. The guidelines state that decisions about resource allocation should only be made *'by, or with the support of, healthcare professionals with expert knowledge and skills in critical care'*. They advise using a recognised tool to record decision making (e.g. a decision support form - https://www.ncbi.nlm.nih.gov/books/NBK549970/).

Italian clinical ethics recommendations for resource allocation[iv]

The Società Italiana di Anestesia Analgesia Rianimazione e Terapia Intensiva (SIAARTI) has produced clinical ethics recommendations regarding allocation of ITU resources in the Covid-19 pandemic. The recommendations suggest a 'soft utilitarian' approach, with age and capacity to benefit from care being the key drivers.

Frameworks not specific to COVID-19

NHS Wales guidelines on ventilator triage during a disaster[v]

NHS Wales produced criteria for the allocation of critical care and ventilators in the event of a disaster. There are three tiers suggested, with detailed criteria covering those unresponsive to treatment, with specific conditions, and pre-existing conditions. The guidelines recommend applying SOFA scoring to the triage process, with a cut off score above which mechanical ventilation will not be offered. Transition to palliative care is recommended once patients no longer meet inclusion criteria for ventilatory support.

Maryland resource allocation framework[vi]

Academics from Johns Hopkins University, USA, have developed a framework to guide allocation of scarce mechanical ventilation in the state of Maryland during disasters. They held forums with the general public, health care workers, and disaster workers, as well as expert working group meetings. The resultant framework provides a scoring system based on two ethical considerations: 1) likelihood of short-term survival; and 2) likelihood of long-term survival (based on presence of relevant comorbid conditions).

The paper also gives three practical principles: 1) separate clinical staff giving care from those making resource allocation decisions (although the decision-makers should include those with clinical expertise); 2) decisions should be regularly reviewed by a national-level committee; 3) the triage algorithm should also be reviewed regularly as more knowledge is gained about the disease.

New York ventilator allocation guidelines[vii]

The New York ventilator allocation guidelines have five underlying ethical principles: i) duty to care; ii) duty to steward resources; iii) duty to plan; iv) distributive justice; v) transparency. The primary goal of the guidelines is to save the most lives, and therefore patients are prioritised for whom ventilator therapy would most likely be lifesaving in the short term. The SOFA is the primary measure included in the framework. Age was rejected as a triage criterion due to discriminating against the elderly, in addition to the fact that age is indirectly taken into account by criteria assessing health due to older people being more likely to have more chronic medical problems. They recommend a 3-step protocol to implement the framework:

1. apply exclusion criteria: patients who do not have a medical condition that will result in immediate or near-immediate mortality even with aggressive therapy are eligible;
2. assess mortality risk: prioritise patients who have moderate risk of mortality and for whom ventilator therapy would most likely be lifesaving;
3. periodic clinical assessments: conducted at 48 and 120 h after therapy begins to determine whether treatment is continued.

Similarly to the framework above, these guidelines advise that allocation decisions should be made by a triage officer or committee, and not the treating clinician.

Multi-Principle Strategy to Allocate Ventilators during a Public Health Emergency[viii]
This illustrative framework combines three utilitarian principles: a) saving the most lives (determined using the SOFA); b) saving the most life-years; and c) giving individuals equal opportunity to live through life's stages. It is similar to but expands on the Maryland Resource Allocation Framework (above), which considers the first two criteria only. Authors also recommend considering individuals' instrumental value (e.g., ability to perform essential task during crisis; keyworkers) if there is convincing evidence that it would minimise mortality and with public consultation; however, they carefully distinguish this from criteria based on broad social value. A limitation of this framework is that it was devised by the authors without broader stakeholder input.

French Society for Support and Palliative Care guidelines[ix]
SFAP, France have published guidance ("tools and resources" in French) on palliative care for patients with Covid-19. These include breathlessness (clinical guidance), suffocation (clinical guidance), effective communication and empathy (communication skills = French translation of VitalTalk Covid-Ready), critical care utilization (ethical decisions), adapting palliative care provision to the pandemic (health care planning).

Points of reference regarding ethical decisions

NEJM paper on ethics during the Covid-19 pandemic[x]
A paper published on Monday (18/03/2020) in the New England Journal of Medicine discusses the guidelines and decision-making around this with specific references to what has happened in Italy. The paper notes that, "rationing is often better tolerated when done silently", but that despite the potential for a backlash from the public, guidelines are necessary.

Savulescu summary of ethical approaches[xi]
Professor Julian Savulescu (Director of the Uehiro Centre for Practical Ethics at the University of Oxford) has written an accessible piece summarising various ethical approaches to medical resource allocation. These include: egalitarianism ('first come, first served'); utilitarianism ('best use of resources to save the greatest number'); contractualism ('veil of ignorance').

Examples of guidance for different stakeholders regarding managing expectations

Palliative care communication[xii]
The Societa Italiana di Cure Palliative has produced communication sheet, detailing basic tips for managing communication with families and patients who are deteriorating.

Evidence about best practice in communicating guidance without creating undue alarm

CDC guidelines on communicating during an outbreak or public health investigation[xiii]
The CDC recommend strategies to manage risk perception in communicating public health messages. Credibility and trust are crucial factors contributing to persuasive messaging; organisations and spokespersons are more likely to maintain or build trust if they convey the following factors: empathy and caring; honesty and openness; dedication and commitment; and competence and expertise. Example messages are provided on the CDC website. Five steps are recommended when outlining key messages: 1) start with empathy; 2) identify and explain the threat; 3) explain what is currently known and unknown; 4) explain the actions being taken and why (share dilemmas and foreshadow possibilities); 5) emphasise a commitment to the situation.

Effective communication involving vulnerable populations[xiv]
Based on a summary of evidence and expert panel insights (from a CDC summit), this paper emphasises the importance of meeting the specific communication needs of all populations—especially those most vulnerable to the risks and most likely to experience communication gaps. They provide a framework for communication preparedness and implementation including the following factors: phased and situation specific communications; use of multiple channels; community-centred approaches; trusted and credible sources; harnessing community and capacity resources.

Guidance on communicating antiviral use and prioritisation[xv]
This chapter presents ethics, decision making and communication as interrelated factor; it focuses on antiviral use and prioritisation during a US pandemic, with principles that are relevant to other areas of scarcity. Evidence is suggested indicating that the public react to disasters and emergencies in ways that are adaptive and constructive, with little data to suggest the potential for widespread panic. Regarding communication, the public should be informed about the ethical goals and other factors that will influence decision-making around prioritisation; this should ideally be done in conjunction with a public engagement process.

Appendix 1

NIHR ARC North Thames was asked for input regarding resource allocation once ICUs become overloaded, specifically:

i) Examples of best practice and existing guidelines;

- NICE guidelines
- NHS Wales guidelines on ventilator triage during a disaster
- Maryland resource allocation framework
- New York ventilator allocation guidelines
- Italian clinical ethics recommendations for resource allocation
- Multi-Principle Strategy to Allocate Ventilators during a Public Health Emergency

ii) Provision of palliative care

- Servizio Sanitario Regionale Emelia-Romagna's Palliative care network framework in response to COVID-19 emergency
- Symptom Control in the last days of life during COVID-19 pandemic
- Hospice telephone screening questions for new admissions to the Inpatient Unit – 20 march 2020
- Operational guidance for community palliative care teams
- Royal Free London NHS FT's End of Life discharge home checklist
- From Palliative Care for Adults: Symptom Control Guidelines for Health Care Professionals 2020 Palliative care for Adults – mini guidelines on syringe drivers and symptom control
- Clinical guidelines for the control of symptoms in the COVID-19 patient who is deteriorating
- French Society for Support and Palliative Care guidelines
- Palliative Care Australia statement (https://palliativecare.org.au/wp-content/uploads/dlm_uploads/2020/03/Palliative-Care-Australia-statement-FINAL.pdf)
- German Society for Palliative Medicine (DGP) DGP Handlungsempfehlung Palliative Therapie bei COVID-19

iii) Points of reference regarding these ethical decisions;

- NEJM paper on ethics during the Covid-19 pandemic
- Savulescu summary of ethical approaches
- New Zealand's National Ethical Advisory Committee' s Getting Through Together: ethical values for a pandemic
- Resource allocation on the frontline of Public Health Preparedness and Response: Report of a Summit on Legal and Ethical Issues

iv) Examples of guidance for different stakeholders regarding managing expectations;

For managing dying at home:

- Central & NW London NHS FT's Supporting excellent care in the last days of life at home ('Conversations to expect' section)
- For communicating management of symptoms:
- Breathless management guidelines - community (March 2020)
- Cancer charities Q&A – People living with cancer now (18 March 2020)

v) Evidence about best practice in communicating guidance without creating undue alarm;

- SICP Societa Italiana di Cure Palliative's Basic tips COVID-19 communication
- Vitaltalks' adapted information on Communication during Covid-19 Guidance (section '*resourcing when limitations force you to choose, and even ration'*)
- Suggested script for calling patients to discuss ACP/CMC

Potentially relevant:

- Delivering the news of a death by telephone – general guidance - Not COVID-19 specific - Education for Scotland

Appendix 2

Key characteristics of resource allocation frameworks

Frame work	Context	Development (who/how developed)	Ethical principle underpinning guidance	Triage tools suggested for use in decision-making	Communication with patients/carers	Decision-making responsibility	Monitoring once allocation made	Link to source	Reference
NICE	Critical care treatment during COVID-19	Independent committee, including professionals and lay members, and consulted on by stakeholders	Base decisions on admission of individual adults to critical care on the likelihood of their recovery, taking into account the likelihood that a person will recover from their critical care admission to an outcome that is acceptable to them.	Clinical Frailty Scale (CFS) (https://static1.squarespace.com/static/5b5f1d4e9d5abb9699cb8a75/t/5dadc90bb11ecf3bce47f27e/1571670285023/Rockwood+CFS.jpg) Clinical care admission algorithm (https://www.nice.org.uk/guidance/ng159/resources/critical-care-admission-algorithm-pdf-8708948893) Decision support form (https://www.ncbi.nlm.nih.gov/books/NBK549970)	Faculty of Intensive Care Medicine guidelines (https://www.nice.org.uk/guidance/ng159/resources/information-to-support-decision-making-pdf-8708913901)	Decisions about the use of critical care resources should only be made by, or with the support of, healthcare professionals with expert knowledge and skills in critical care	Review critical care treatment regularly and when the patient's clinical condition changes. Include in the review an assessment of whether the goals of treatment are clinically realistic. Stop critical care treatment when it is no longer considered able to achieve the desired overall goals (outcomes).	https://www.nice.org.uk/guidance/ng159/chapter/4-Clinical-decision-making	NICE. Clinical decision-making | COVID-19 rapid guideline: critical care. (2020)
Italy	Allocation of critical care resources during COVID-19	Società Italiana di Anestesia Analgesia Rianimazione e Terapia Intensiva (SIAARTI)	We must aim at guaranteeing intensive treatments to patients with greater chances of therapeutic success. Therefore, it is a matter of favoring the "greatest life expectancy". The need for intensive care must be integrated with other elements of "clinical suitability", thus including: the type and severity of the disease, the presence of comorbidities, the impairment of other organs and systems, and their reversibility. This means, not necessarily having to follow a criterion for access to intensive care like "first come, first served."	Age, comorbidities, and functional status should be assessed. The presence of advance healthcare directives or advance care planning should be carefully evaluated, especially for patients affected by severe chronic illnesses.	Patients and their families interested in applying the criteria must be informed of the extraordinary nature of the measures in place, due to an issue of duty of transparency and maintenance of trust in the public health service.	Unclear. Task force/hospital governing bodies?	The appropriateness of life-sustaining treatments should be re-evaluated daily, considering the patient's history, current clinical course, wishes, expected goals and proportionality of ICU care. When a patient is not responding to prolonged life-sustaining treatments, or severe clinical complications arise, a decision to withhold or withdraw further or ongoing therapies should not be postponed in a resource-limited setting during an epidemic.	http://www.siaarti.it/SiteAssets/News/COVID19 - documenti SIAARTI/SIAARTI - Covid-19 - Clinical Ethics Reccomendations.pdf	Vergano, M. et al. Clinical Ethics Recommendations For The Allocation Of Intensive Care Treatments In Exceptional, Resource-Limited Circumstances. (2020).
NHS Wales	Critical care and ventilator allocation during disasters	Unclear - NHS clinicians/managers?	Focus is on the identifying and reserving immediate treatment for individuals who have a critical need for treatment and are likely to survive.	Detailed list in guidelines. Do not offer/withdraw ventilatory support to those with: 1) > 4 organ systems failing (Pulmonary; Cardiovascular; Renal; Hepatic; Neurologic; Hematologic) 2) pre-existing system compromise or failure	N/A	The decision for implementation of this guideline will be made by the Medical Staff Director in the Incident Command Center in collaboration with caregivers	Prioritisation tool used at 48hrs and 120hrs post disaster (in this scenario, post ventilation). Once the patient no longer meets inclusion criteria for critical care and ventilatory	http://www.wales.nhs.uk/sites3/documents/736/8 Critical Care and Ventilator	Childs, B. Critical Care and Ventilator Triage Guidelines During a

				(Known congestive heart failure; Acute renal failure requiring hemodialysis; Severe chronic lung disease; Immunodeficiency syndromes at stage of disease susceptible to opportunistic pathogens; Active malignancy with poor potential for survival; Cirrhosis; Acute hepatic failure with hyperammonemia; Irreversible neurologic impairment that makes the patient dependent for personal care 3) Sequential Organ Failure Assessment (SOFA) scoring above a certain cutoff		and the Ethics Committee.	support, the patient will be transitioned to palliative care or the appropriate level of care indicated.	Triage Guidelines During a Disaster Event Policy.pdf	Disaster Event. (2008).
Maryland	Ventilator allocation during disasters	Community engagement forums using Deliberative Democracy methodology - general public, healthcare and disaster professionals + 2x expert working groups (practitioners, ethicists, public health lawyers, and communication specialists) + advisory group who drew up the framework	(1) likelihood of short-term survival (with the support of the scarce resource in question and other intensive care services) and (2) likelihood of long-term survival (based on presence of comorbid conditions).	Primary: Sequential Organ Failure Assessment (SOFA) score or the Pediatric Logistic Organ Dysfunction 2 (PELOD-2) score AND prognosis for long term survival (Severe comorbid conditions; death likely within 1 year) e.g. 1. NYHA class IV heart failure; 2. Advanced lung disease with FEV1 < 25% predicted, total lung capacity < 60% predicted, or baseline Pao2 < 55 mm Hg; 3. Primary pulmonary hypertension with NYHA class III or IV heart failure; 4. Chronic liver disease with Child-Pugh score > 7; 5. Severe trauma; 6. Advanced untreatable neuromuscular disease; 7. Metastatic malignant disease or high-grade primary brain tumors. Secondary: Age	The triage officer should share information about these decisions with the clinical team and then inform affected patients and family members.	A triage officer, distinguished by established clinical expertise, leadership ability, and effective communication skills, should have ultimate responsibility for making decisions regarding which patients will receive priority for receiving critical care.	Daily application of the allocation framework for those admitted. Central monitoring by a national-level committee, communicating regularly with local hospital triage committees	http://www.sciencedirect.com/science/article/pii/S0012369218325650	Daugherty Biddison, E. L. et al. Too Many Patients…A Framework to Guide Statewide Allocation of Scarce Mechanical Ventilation During Disasters. Chest 155, 848–854 (2019).

Multi-principle strategy	Ventilator allocation during emergencies	Academic consideration of previous guidelines, and generation of composite strategy	Saving the most lives, maximizing the number of life-years saved, and prioritizing patients who have had the least chance to live through life's stages. These principles should be applied to all patients, rather than selectively to the elderly, those with functional impairment, and those with certain chronic conditions.	1) Prognosis for short-term survival - Sequential Organ Failure Assessment (SOFA) score 2) Prognosis for long-term survival (comorbidities) - no comorbidities; minor comorbidities with small impact; major comorbidities with substantial impact; severe comorbidities with death likely within 1 year 3) Age in years	No mention of how allocation should be discussed with patients/carers. Discussion of how public engagement should be used in planning resource allocation strategies: 1) public should be engaged before writing a draft policy; 2) adequate background information should be provided; 3) samples should be representative, with steps taken to limit special interest groups dominating the discussion.	During a public health emergency, allocation decisions will be the responsibility of state public health departments, with federal guidance and support.	N/A	https://annals.org/aim/article-abstract/744219/who-should-receive-life-support-during-public-health-emergency-using	White, D. B., Katz, M. H., Luce, J. M. & Lo, B. Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. Ann. Intern. Med. 150, 132–138 (2009).
New York	Ventilator allocation during emergencies	New York State Task Force on Life and the Law (experts in medicine and ethics), who conducted 13 focus groups throughout the State. A legal subcommittee explored the legal issues.	The primary goal of the Guidelines is to save the most lives in an influenza pandemic where there are a limited number of available ventilators. To accomplish this goal, patients for whom ventilator therapy would most likely be lifesaving are prioritized. The Guidelines define survival by examining a patient's short-term likelihood of surviving the acute medical episode and not by focusing on whether the patient may survive a given illness or disease in the long term (e.g., years after the pandemic)	Three steps are suggested: (1) application of exclusion criteria (e.g. Cardiac arrest; Irreversible age-specific hypotension unresponsive to fluid resuscitation and vasopressor therapy; Traumatic brain injury with no motor response to painful stimulus; Severe burns: where predicted survival ≤ 10% even with unlimited aggressive therapy; Any other conditions resulting in immediate or near-immediate mortality even with aggressive therapy) (2) assessment of mortality risk (SOFA score) (3) periodic clinical assessments ("time trials") at 48 and 120 hours using SOFA.	Efforts will be made to inform and gather feedback from the public before a pandemic. At the time a pandemic is declared, the public should be informed about the goals and steps of the clinical ventilator allocation protocols. Information should emphasize that pandemic influenza is potentially fatal, that health care providers are doing their best with limited resources, and the public must adjust to a different way of providing and receiving health care than is customary. Patients and families should be informed that ventilator therapy represents a trial of therapy that may not improve a patient's condition sufficiently and that the ventilator will be removed if this approach does not enable the patient to meet specific criteria	A patient's attending physician provides all clinical data to a triage officer/committee at Step 1. At Steps 2 and 3, a triage officer/committee examines a patient's clinical data and uses this information to assign a colour code to the patient.	Official clinical assessments at 48 and 120 hours after ventilator therapy has begun are conducted to determine whether a patient continues with this treatment.	https://www.health.ny.gov/regulations/task_force/reports_publications/docs/ventilator_guidelines.pdf	New York State Department of Health. Ventilator Allocation Guidelines. (2015).

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