CCSSA
CRITICAL CARE SOCIETY OF SOUTHERN AFRICA

SASA COVID-19 UPDATE

ENDORSED

Allocation of Scarce Critical Care Resources During the COVID-19 Public Health Emergency in South Africa

02 APRIL 2020

www.criticalcare.org.za

CCSSA
CRITICAL CARE SOCIETY OF SOUTHERN AFRICA

Email: secretariat@criticalcare.org.za

Introduction

- The purpose of this document is to provide guidance for the triage of critically ill patients in the event that a public health emergency creates demand for critical care resources (e.g., ventilators, critical care beds) that outstrips the supply.
- These triage recommendations will be enacted only if:

  1) critical care capacity is, or will shortly be, overwhelmed despite taking all appropriate steps to increase the surge capacity to care for critically ill patients; and

  2) His Excellency, the President of South Africa has declared a public health emergency.
- This allocation framework is grounded in ethical obligations that include:
  - duty to care,
  - duty to steward resources to optimize population health,
  - distributive and procedural justice, and
  - transparency.

  It is consistent with existing recommendations for how to allocate scarce critical care resources during a public health emergency.
- This document is based largely on The University of Pittsburgh, Pennsylvania guidelines from whom we have borrowed liberally with permission, with modifications as were deemed necessary.
- This document describes:
  I. The creation of triage teams to ensure consistent decision making;
  II. Allocation criteria for initial allocation of critical care resources; and
  III. Reassessment criteria to determine whether ongoing provision of scarce critical care resources are justified for individual patients.

Section 1. Creation of triage teams

- The general recommendation in triage processes is that patients' treating clinicians should not make triage decisions.
- The separation of the triage role from the clinical role is intended to promote objectivity, avoid conflicts of commitments, and minimize moral distress.
- Each hospital will designate an acute care physician triage officer, supported if resources allow by an acute care nurse and administrator, who will apply the allocation framework described in this document.
- The triage team will use the allocation framework, detailed below, to determine priority scores of all patients eligible to receive the scarce critical care resource.
- The triage officer will also be involved in patient or family appeals of triage decisions, and in collaborating with the attending physician to disclose triage decisions to patients and families.
- An appeals process for individualized triage decisions needs to be in place.

*****NOTE**

The recommendation in terms of formation of triage teams as a formalized process will often be difficult in many of our settings. There is a limited number of critical care practitioners with the requisite experience to lead such triage teams. An alternate model may need to be sought where suitable team leaders and members are not available.

In these situations, at an institutional level, any additional practitioners experienced in triage are encouraged to become involved in teams. Where possible, senior members of the critical care teams are encouraged to take on these roles. Where dedicated triage teams separate from clinical management teams cannot be formed, it is recommended that triage decisions are not left to individual managing clinicians, but are rather made by the managing clinical team. Additionally, consultative teams of experienced practitioners covering broader geographical areas may be necessary to provide an advisory role to local, institutional teams involved in triage.

Section 2. Allocation process for ICU admission/ventilation

- Consistent with accepted standards during public health emergencies, the primary goal of the allocation framework is to maximize benefit to populations of patients, specifically by maximizing survival to hospital discharge and beyond for as many patients as possible - "doing the greatest good for the greatest number."
- This goal is different from the traditional focus of medical ethics, which is centered on promoting the wellbeing of individual patients.
- A triage system will be applied to all patients presenting with critical illness who meet the usual indications for ICU beds, not merely those with the disease or disorders that have caused the public health emergency.
- First responders and bedside clinicians should perform the immediate stabilization of any patient in need of critical care, as they would under normal circumstances. Along with stabilization, temporary ventilatory support may be offered to allow the triage team to assess the patient for critical resource allocation. Every effort should be made to complete the initial triage assessment within 90 minutes of the recognition of the likely need for critical care resources.

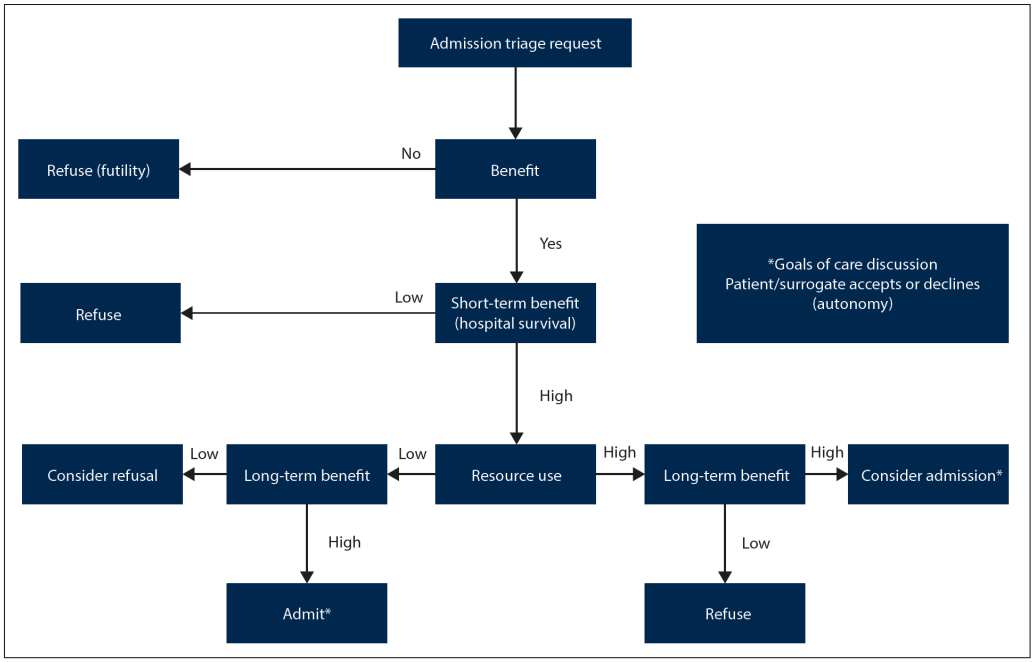


Figure 1. A triage (prioritisation) decision is a complex clinical decision made when ICU beds are limited. (Ref. 11)

- The initial assessment of the referred patient focusses on whether the patient is critically ill needing ICU admission for either ventilatory support or other organ support only available in ICU. If care, e.g. advanced monitoring is all that is needed, such patients should be managed at appropriate sites outside the ICU.
- Referred patients that are deemed not critically ill enough to be admitted to ICU will need to be monitored. In the event of a deterioration in their condition, such patients will be re-referred to the ICU team.
- Patients' wishes in respect of ICU care need to be ascertained. The presence of e.g. advanced directives needs to be determined. If there is no clear indication of an expression by the patient to NOT be admitted, further evaluation of priority continues. If there is a clear expression of a wish to no be admitted to ICU, a further management plan excluding ICU is activated.
- An assessment is then made of the likelihood of care in the ICU being beneficial. Patients will not be considered for admission to critical care beds where further therapy is deemed to be futile. Futility is not necessarily related to the degree or pattern of acute organ dysfunction, but takes into account long term outcome. In general, ICU admission of the *following examples* of patients would be deemed non-beneficial (futile):
    - Brain death in terms of legally defined criteria
    - Chronic, terminal and irreversible illness, facing imminent death
    - Post cardiac arrest patients
        - Resulting from a progressive decline in physiological function
        - In whom a normal respiratory pattern or full level of consciousness without sedation is not achieved
        - Fixed dilated pupils not due to medication
        - Secondary to a cause that is not reversible
    - Irreversible severe brain damage
    - Acute, irreversible severe multi-organ failure and anticipated poor prognosis
- An assessment of the patient is then made on the Clinical Frailty Scale (CFS) (Figure 2) Patients with a CFS score ≥ 6 are to be offered a management plan excluding ICU. Patients with a CFS score < 6 are prioritized further.
- All patients who meet usual medical indications for ICU beds and services will be assigned a priority score using a 1-8 scale (lower scores indicate higher likelihood of benefit from critical care), derived from a multi-principle allocation framework (Table 1):

    1) patients' likelihood of surviving to hospital discharge, assessed with an objective and validated measure of acute physiology, the Sequential Organ Failure Assessment (SOFA); and

    2) patients' likelihood of achieving longer-term survival based on the presence or absence of comorbid conditions that may influence survival.

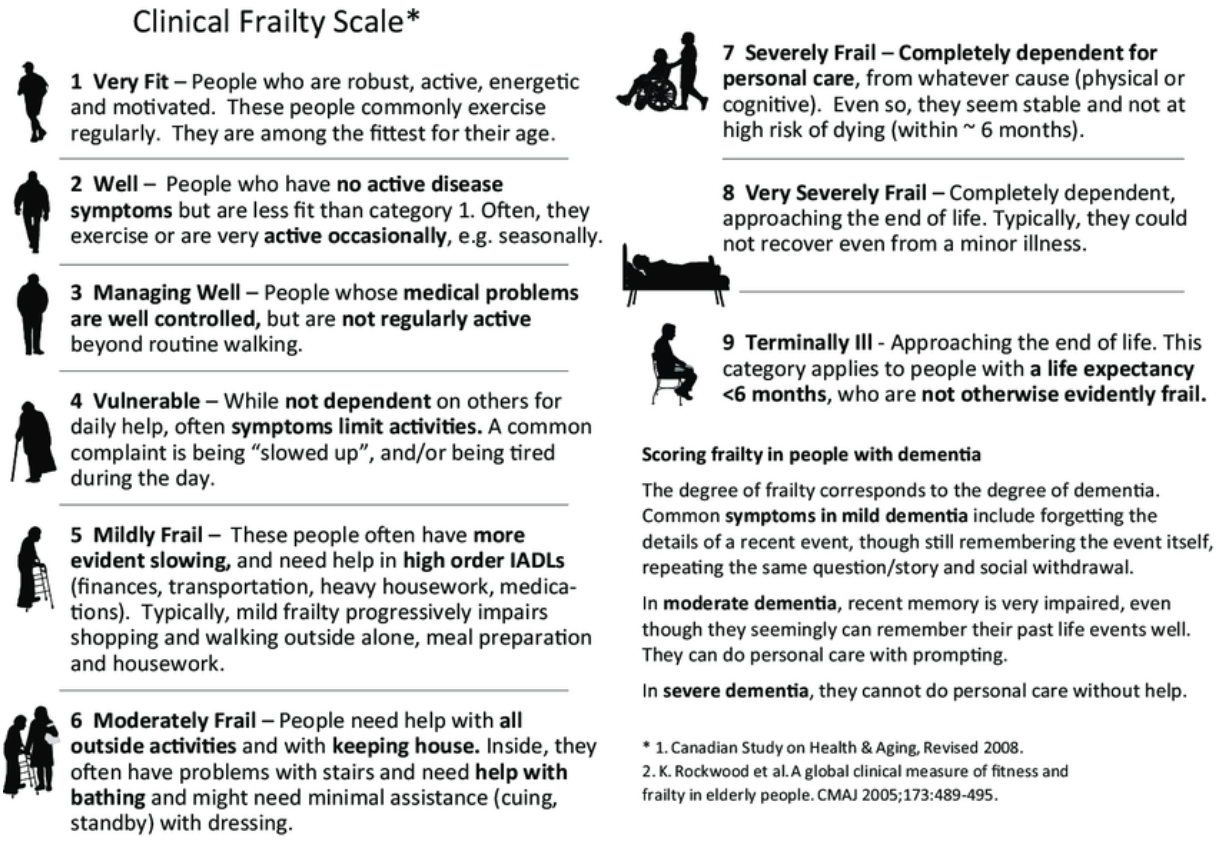


Figure 2. Clinical Frailty Score. (Ref 9)

Table 1. Multi-principle Strategy to Allocate Critical Care/Ventilators During a Public Health Emergency

Principle	Specification	Point System*			
		1	2	3	4
Save most lives	Prognosis for short-term survival	SOFA score < 6	SOFA score 6-8	SOFA score 9-11	SOFA score ≥12
Save most life-years	Prognosis for long-term survival (medical assessment of comorbid conditions)		Major comorbid conditions with substantial impact on long-term survival		Severely life-limiting conditions; death likely within 1 year

#SOFA= Sequential Organ Failure Assessment

*Scores range from 1-8, and persons with the lowest score would be given the highest priority to receive critical care beds and services.

- Points are assigned according to the patient's SOFA score (range from 1 to 4 points) plus the presence or absence of comorbid conditions (1-4 points) See Table 2 for examples of comorbid conditions. These points are then added together to produce a total priority score, which ranges from 1 to 8. Lower scores indicate higher likelihood of benefiting from critical care, and priority will be given to those with lower scores.
- **Priority Groups**
    - This raw priority score is converted to three color-coded priority groups (e.g., RED=high, ORANGE=intermediate, and YELLOW=low priority) to facilitate streamlined implementation in individual hospitals. (Figure 3)
    - The priority group colour should be noted clearly on the patient chart.
    - Individuals in the red group have the best chance to benefit from critical care interventions and should therefore receive priority over all other groups in the face of scarcity.
    - The orange group has intermediate priority and should receive critical care resources if there are available resources after all patients in the red group have been allocated critical care resources.
    - The yellow group has lowest priority and should receive critical care resources if there are available resources after all patients in the red and orange groups have been allocated critical care resources.

Table 2. Examples of Major Comorbidities and Severely Life Limiting Comorbidities*

Examples of Major comorbidities (associated with significantly decreased long-term survival)	**Examples of Severely Life Limiting Comorbidities (**commonly associated with survival < 1 year)
• Moderate Alzheimer's disease or related dementia • Malignancy with a < 10 year expected survival • New York Heart Association Class III heart failure • Moderately severe chronic lung disease (e.g., COPD, IPF) • End-stage renal disease in patients < 75 • Severe multi-vessel CAD • Cirrhosis with history of decompensation	• Severe Alzheimer's disease or related dementia • Cancer being treated with only palliative interventions (including palliative chemotherapy or radiation) • New York Heart Association Class IV heart failure plus evidence of frailty • Severe chronic lung disease plus evidence of frailty • Cirrhosis with MELD score ≥20, ineligible for transplant • End-stage renal disease in patients older than 75

*This Table only provides examples.

- All patients will be eligible to receive critical care beds and services regardless of their priority score, but available critical care resources will be allocated according to priority score, such that the availability of these services will determine how many patients will receive critical care.

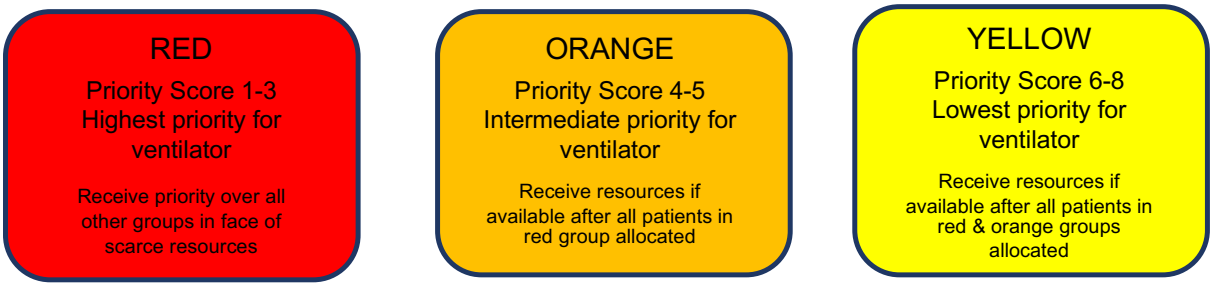


Figure 3. Assigning Patients to Color-coded Priority Groups

- In the event that there are ties between patients within the same priority groups, factors below need to be considered in the following order:
    - Life-cycle considerations with priority going to younger patients, who have had less opportunity to live through life's stages. We recommend the following categories: age 12-40, age 41-60; age 61-75; older than age 75.
      The ethical justification for incorporating the life-cycle principle is 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.7 The justification for this principle does not rely on considerations of one's intrinsic worth or social utility. Rather, younger individuals receive priority because they have had the least opportunity to live through life's stages. Evidence suggests that, when individuals are asked to consider situations of absolute scarcity of life-sustaining resources, most believe younger patients should be prioritized over older ones.
    - Individuals who perform tasks that are vital to the public health response – specifically, those whose work supports the provision of acute care to others – will also be given heightened priority.
      This category should be broadly construed to include those individuals who play a critical role in the chain of treating patients and maintaining societal order.
    - Actual raw priority score from above (1-8) with priority going to the patient with the lower raw score.

- **Appropriate clinical care of patients who cannot receive critical care.**
  Patients who are triaged to not receive ICU beds or services will be offered medical care including intensive symptom management and psychosocial support. They should be reassessed daily to determine if changes in resource availability or their clinical status warrant provision of critical care services. Where available, specialist palliative care teams will provide additional support and consultation. Families need to be involved from an early stage.

- During a public health emergency, clinicians should still make clinical judgments about the appropriateness of critical care using the same criteria they use during normal clinical practice.

- **Make daily determinations of how many priority groups can receive the scarce resource.** Regular (daily or twice daily) determinations to be made about what priority scores will result in access to critical care services. These determinations should be based on real-time knowledge of the degree of scarcity of the critical care resources, as well as information about the predicted volume of new cases that will be presenting for care over the near-term (several days). For example, if there is clear evidence that there is imminent shortage of critical care resources (i.e., few ventilators available and large numbers of new patients daily), only patients with the highest priority (lowest scores, e.g., 1-3) should receive scarce critical care resources. As scarcity subsides, patients with progressively lower priority (higher scores) should have access to critical care interventions.

Reassessment for ongoing provision of critical care/ventilation

- The ethical justification for such reassessment is that, in a public health emergency when there are not enough critical care resources for all, the goal of maximizing population outcomes would be jeopardized if patients who were determined to be unlikely to survive were allowed indefinite use of scarce critical care services. In addition, periodic reassessments lessen the chance that arbitrary considerations, such as when an individual develops critical illness, unduly affect patients' access to treatment.
- The triage team will conduct periodic reassessments of all patients receiving critical care services during times of crisis (i.e., not merely those initially triaged under the crisis standards).
- The timing of reassessments should be based on evolving understanding of typical disease trajectories and of the severity of the crisis. It is recommended this occurs at 48 hours as a formality and thereafter every 24 hours.
- A multidimensional assessment should be used to quantify changes in patients' conditions, such as recalculation of severity of illness scores, appraisal of new complications, and treating clinicians' input.
- Patients showing improvement will continue to receive critical care services until the next assessment.
- If there are patients in the queue for critical care services, then patients who upon reassessment show substantial clinical deterioration as evidenced by worsening SOFA scores or overall clinical judgment and that portends a very low chance for survival, should have critical care withdrawn, including discontinuation of mechanical ventilation, after this decision is disclosed the patient and/or family.
- **Appropriate clinical care of patients who cannot receive critical care.**
  Patients who are no longer eligible for critical care treatment should receive medical care including intensive symptom management and psychosocial support. Where available, specialist palliative care teams will be available for consultation. Where palliative care specialists are not available, the treating clinical teams should provide primary palliative care. Families are to be intimately involved in these processes.

Special Acknowledgment:
Writing Team CCSSA EXCO (Dean Gopalan, Ivan Joubert, Fathima Paruk, Brian Levy)
Critical Care Teams from around South Africa for input
Scott Halpern & Doug White - University of Pittsburgh, Pennsylvania on whose original document much of this guideline is based.

References

1. Halpern S, White D. Allocation of Scarce Critical Care Resources During a Public Health Emergency. Univ Pittsburgh, Pennsylvania. 23 March 2020
2. Childress JF, Faden RR, Gaare RD, et al. Public health ethics: mapping the terrain. J Law Med Ethics 2002;30:170-8
3. Gostin L. Public health strategies for pandemic influenza: ethics and the law. Jama 2006;295:1700-4.
4. Beauchamp TL, Childress JF. Principles of Biomedical Ethics. 6th ed. ed. New York, NY: Oxford University Press; 2009
5. White DB, Katz MH, Luce JM, Lo B. Who should receive life support during a public health emergency? Using ethical principles to improve allocation decisions. Ann Intern Med 2009;150:132-8.
6. Young MJ, Brown SE, Truog RD, Halpern SD. Rationing in the intensive care unit: to disclose or disguise? Crit Care Med 2012;40:261-6.
7. Emanuel EJ, Wertheimer A. Public health. Who should get influenza vaccine when not all can? Science 2006;312:854-5.
8. COVID-19 rapid guideline: critical care. NICE guideline. 20 March 2020. www.nice.org.uk/guidance/ng159
9. Rockwood K, et al. CMAJ. 2005;173:489-495.
10. Emanuel EJ, Persad G, Upshur R, et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. NEJM. 2020. DOI: 10.1056/NEJMsb2005114
11. COVID-19 pandemic: triage for intensive-care treatment under resource scarcity. Swiss Med Wkly. 2020;150:w20229. doi:10.4414/smw.2020.20229
12. Joynt GM; Gopalan PD; Argent A; et al. The Critical Care Society of Southern Africa Consensus Statement and Guideline on ICU Triage and Rationing (ConICTri). Joint publication. S Afr J Crit Care. 2019;35(1):36-65 and S Afr Med J 2019;109(8):613-642.

Allocation of Scarce Critical Care Resources During the COVID-19 Public Health Emergency in South Africa

CCSSA
CRITICAL CARE SOCIETY OF SOUTHERN AFRICA

Referral of any patient to ICU (COVID-19 + non-COVID-19)

RE-REFER

DETERIORATION

Management Plan excl. ICU
e.g. Isolation COVID-19 ward.
Advise on O_2 Rx, IPC.
e.g.non-COVID-19 patient in HCU/ward

Does the patient need to be admitted?
Critically ill needing ventilatory support/other organ support only in ICU?

NO

YES

Has the patient expressed wish NOT to be admitted to ICU?

YES

Management Plan excluding ICU

e.g. Isolation COVID-19 ward.
Advise on O_2 Rx, IPC.

e.g.non-COVID-19 patient in HCU/ward

Discuss end-of-life issues with next-of-kin

No Response *or* Worsening

End-of-life care
(palliative care teams to provide additional support & consultation)

NO

Is the patient likely to benefit from being admitted to ICU?

NO

YES

Frailty Assessment Scale
Assess function 1-2 weeks prior to presentation

SCORE ≥ 6

SCORE < 6

Calculate Priority Score(= SOFA + Co-morbidity)

Principle	Specification	Point System*			
		1	2	3	4
Save most lives	Prognosis for short-term survival	SOFA score < 6	SOFA score 6-8	SOFA score 9-11	SOFA score ≥12
Save most life-years	Prognosis for long-term survival (medical assessment of comorbid conditions)		Major comorbid conditions with substantial impact on long-term survival		Severely life-limiting conditions; death likely within 1 year

SOFA – Sequential Organ Failure Assessment
* Add points for SOFA category to points for Co-morbidity category. Point score between 1-8

RE-CLASSIFY

Improvement in clinical status and/or resource availability

Reassess daily for changes in resource availability or clinical status

No Response *or* Worsening

Transfer to Appropriate Site

- COVID-19 patients in Isolation ward
- Non-COVID-19 patients in high care/other site

Management Plan excl. ICU

- Medical care incl. intensive symptom management
- Advise on O_2 Rx, IPC
- Psychosocial support.
- Discuss end-of-life issues with next-of-kin

RED
Priority Score 1-3
Highest priority for ventilator
Receive priority over all other groups in face of scarce resources

ORANGE
Priority Score 4-5
Intermediate priority for ventilator
Receive resources if available after all patients in red group allocated

YELLOW
Priority Score 6-8
Lowest priority for ventilator
Receive resources if available after all patients in red & orange groups allocated

If there are ties within the same colour group, rank as follows:

1. Patient age groups (years) in following order: 12-40; 41-60; 61-75; > 75.
2. Individuals whose work supports provision of acute care to others
3. Lower raw priority score from above (1-8)

Admit referrals sequentially from red to orange to yellow groups.
- Determinations daily of what priority scores will result in access to ventilators/beds
- Based on real-time knowledge of degree of scarcity of resources & prediction of volume of new cases over near-term

Patients triaged to not receive ICU bed/ventilation

Patients in non-COVID-19 ICUs

Patients in COVID-19 ICU

Assess all patients admitted to ICU at 48 hours

- Quantify changes in patients' conditions
- Reclassify as per: i) recalculated SOFA scores; ii) new complications & iii) treating clinicians' input

RED
Highest priority for ventilator

ORANGE
Intermediate priority for ventilator

YELLOW
Lowest priority for ventilator

Patients with substantial clinical deterioration & very low chance for survival

Discussion amongst team and then with next-of-kin

Critical care to be discontinued

End-of-life care

(palliative care teams to provide additional support & consultation)

Subsequently assess all patients admitted to ICU at least every 24 hours

- Quantify changes in patients' conditions
- Reclassify as per: i) recalculated SOFA scores; ii) new complications & iii) treating clinicians' input

RED
Highest priority for ventilator

ORANGE
Intermediate priority for ventilator

YELLOW
Lowest priority for ventilator

References:
- Halpern S, White D. Allocation of Scarce Critical Care Resources During a Public Health Emergency. Univ Pittsburgh, Pennsylvania. 23 March 2020
- COVID-19 rapid guideline: critical care. NICE guideline. 20 March 2020. www.nice.org.uk/guidance/ng159
- Emanuel EJ, Persad G, Upshur R, et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. NEJM. 2020. DOI: 10.1056/NEJMsb2005114
- COVID-19 pandemic triage for intensive-care treatment under resource scarcity. Swiss Med Wkly. 2020;150:w20229. doi:10.4414/smw.2020.20229
- Joynt GM, Gopalan PD, Argent A, et al. The Critical Care Society of Southern Africa Consensus Statement and Guideline on ICU Triage and Rationing (ConICTri). S Afr J Crit Care. 2019;35(1):36-65 and S Afr Med J 2019;109(8):613-642.

Allocation of Scarce Critical Care Resources During the COVID-19 Public Health Emergency in South Africa

CCSSA
CRITICAL CARE SOCIETY OF SOUTHERN AFRICA

Clinical Frailty Scale*



1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



3 Managing Well – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.



4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.



5 Mildly Frail – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



6 Moderately Frail – People need help with **all outside activities** and with **keeping house.** Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



7 Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



9 Terminally Ill - Approaching the end of life. This category applies to people with **a life expectancy <6 months,** who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

TABLE. Examples of comorbidities to be used for Priority Scoring

Examples of Major comorbidities (associated with significantly decreased long-term survival)	Examples of Severely Life Limiting Comorbidities (commonly associated with survival < 1 year)
• Moderate Alzheimer's disease or related dementia • Malignancy with a < 10 year expected survival • New York Heart Association Class III heart failure • Moderately severe chronic lung disease (e.g., COPD, IPF) • End-stage renal disease in patients < 75 • Severe multi-vessel CAD • Cirrhosis with history of decompensation • Current AIDS defining illness (*or* viral load >10000 copies/ml despite Rx *or* recent HIV diagnosis not on Rx with CD4+ < 50)	• Severe Alzheimer's disease or related dementia • Cancer being treated with only palliative interventions (including palliative chemotherapy or radiation) • New York Heart Association Class IV heart failure plus evidence of frailty • Severe chronic lung disease plus evidence of frailty • Cirrhosis with MELD score ≥20, ineligible for transplant • End-stage renal disease in patients older than 75

Table 1. Sequential [Sepsis-Related] Organ Failure Assessment Score[a]

	Score				
System	0	1	2	3	4
Respiration					
Pao_2/Fio_2, mm Hg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation					
Platelets, $\times 10^3/\mu L$	≥150	<150	<100	<50	<20
Liver					
Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular	MAP ≥70 mm Hg	MAP <70 mm Hg	Dopamine <5 or dobutamine (any dose)[b]	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1[b]	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1[b]
Central nervous system					
Glasgow Coma Scale score[c]	15	13-14	10-12	6-9	<6
Renal					
Creatinine, mg/dL (μmol/L)	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d				<500	<200

Abbreviations: Fio_2, fraction of inspired oxygen; MAP, mean arterial pressure; Pao_2, partial pressure of oxygen.

[a] Adapted from Vincent et al.[27]

[b] Catecholamine doses are given as μg/kg/min for at least 1 hour.

[c] Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

Vincent JL, Moreno R, Takala J, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine. Intensive Care Med. 1996 Jul;22(7):707-10.

Note: In the absence of measured blood values for parameters needed for the SOFA score, it is suggested that clinical assessment of signs (such as bleeding for platelet value and jaundice for bilirubin value) by the managing doctor be performed to place the patient in the appropriate category for that parameter.