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Section A: Introduction

1. Executive Summary

1.1.1. This document represents a consensus on the approach to managing the outbreak of SARS-CoV-2 in the Western Cape. The Critical Care Forum has representation from tertiary, secondary, regional and large district hospitals.

1.1.2. There is currently little or no robust data on the management of patients with SARS-CoV-2 in the literature. The content of this document has been put together based on the limited information available, international recommendations and guidelines, the experience of international colleagues, the participating clinicians and information that has come forth on the internet and through social media.

1.1.3. This document needs to be interpreted in conjunction with circulars H67 and H68 of 2007. These are the Critical Care Admissions, Discharge and Transfer Policy Document and Policy: Defining Critical Care for the Western Cape.

1.1.4. The main objectives of the guidelines contained in this document are to:

- 1.2. Maintain a standard of quality critical care
- 1.3. Direct scarce critical care resources as efficiently and efficaciously as possible
- 1.4. Provide a coordinated and consistent approach for public hospitals across the Western Cape

2. Fundamental issues in dealing with COVID-19

- 2.1. Tygerberg Hospital is currently designated as the referral hospital for port authorities. This does not equate to Tygerberg Hospital being the receiving hospital for all, either suspected or confirmed, cases of COVID-19. It is a reality that Tygerberg Hospital does not have the capacity to deal with all COVID-19 patients in the Western Cape.
- 2.2. The recommendations of the World Health Organisation are to attempt to contain the spread of disease through isolation. This will be upheld as far as is reasonably possible.
- 2.3. It is desirable to keep the movement of confirmed cases to an absolute minimum both within and between healthcare facilities.
- 2.4. It is desirable to keep the exposure of all categories of healthcare workers, support personnel and the general public to an absolute minimum.
- 2.5. To successfully manage an outbreak the combined efforts of all healthcare facilities is required. Each hospital will have to shoulder its share of the disease burden.
- 2.6. Close communication between hospitals with respect to the demand for critical care beds is likely to be crucial in trying to ensure the best outcome for as many patients as possible.

Section B: Planning and Preparedness

3. Legal, regulatory and ethical framework

The guidelines in this document conform to the following:

- National Health Act 61 of 2003
- Disaster Management Act 57 of 2002
 - Regulations issued in terms of Section 27(2) as published in volume 657 of the Government Gazette on 18 March 2020
- Health Professions Act 56 of 1974
- Nursing Act 33 of 2005
- Occupational Health and Safety Act 85 of 1993, as amended by the Occupational Health and Safety Act 181 of 1993
- All guidelines of relevant Professional Councils
- The following ethical duties:
 - Non-maleficence (duty to do no harm and to prevent harm)

- Distributive justice (fair distribution of benefits and burdens)
- Autonomy (the patient or their surrogate can make an informed decision to refuse critical care treatment)

As seen in other countries where healthcare systems have been overwhelmed by COVID-19, it may happen that medical and nursing personnel exceed their scope of practice out of necessity. These circumstances are extraordinary and unprecedented. While every effort will be made by incident management teams, medical personnel and nursing personnel to abide by legal, regulatory and ethical standards there may be actions taken that cannot be justified or that may lead to harm. The following actions will warrant immediate disciplinary action:

- 3.1. Theft of medication or supplies
- 3.2. Sharing of patients' photographs or other confidential information on social media
- 3.3. Physical altercations with colleagues, patients or other members of the public
- 3.4. Disobedience of a direct order that results in harm to the patient
- 3.5. Unauthorised release of information to the press

4. Surge capacity

4.1. Isolation and critical care areas

Current reality is that a limited capacity to expand intensive care services exists.

It is likely that the major stumbling block to the expansion of capacity will be in the form of staff constraint, particularly nursing. With the progression of the outbreak, staff illness, fear and truancy are likely to limit the ability to expand services.

The secondment of staff from other components of the service may be needed to support intensive care units.

- 4.1.1. Isolation rooms must be identified and equipped for patients who require testing or are awaiting test results for COVID-19
- 4.1.2. Intensive care units in public hospitals are almost always operating at full capacity
- 4.1.3. From what is known about COVID-19 the number of patients requiring critical care will place a significant burden on our system
- 4.1.4. Hospitals are advised to find suitable areas to convert into temporary intensive care units provided that there is sufficient equipment and trained personnel to care for patients in these areas
- 4.1.5. The table below indicates the maximum potential for accommodating ventilated patients in the Western Cape given current resources. It is important to appreciate that this represents a theoretical maximum and the resource cannot be directed solely at the management of patients with COVID-19.

Hospital	ICU Ventilators	Emergency Unit Ventilators	Expansion capacity
George	6	2	
Groote Schuur	118 (all inclusive)		
Paarl	2	2	2
Somerset	4	4	4 transport ventilators
Tygerberg	122 (all inclusive)		
Victoria	2	2	1
Worcester	5	2	1
Totals	259	12	8

4.2. Other patient care areas

Providing isolation rooms and additional intensive care units will impact on the space available for other patient care areas. Each hospital must make a careful assessment of which services can be deferred in order to free up space for isolation rooms and intensive care units

4.3. Rapid discharges

In the event that potential COVID-19 patients still need to be admitted but all available space has been allocated and healthcare services have already been deferred it will become necessary to discharge patients in order to free up beds. A rapid discharge policy that lists specific criteria and guidelines should be in place so that patients are not randomly discharged, possibly needing to be readmitted at a later stage.

4.4. Temporary transit lounges

Areas will need to be identified for patients who have been rapidly discharged but who are unable to leave the hospital immediately.

4.5. Morgue capacity

With the current mortality rates in the country, the average 3% mortality rate associated with COVID-19 could lead to insufficient space in hospital and state mortuaries. Protocols such as coordination with private mortuaries must be in place as soon as possible.

5. **Inter-hospital mutual aid agreements**

Where possible hospitals may agree to assist each other with resources, procedures and information

Records should be kept when equipment is transferred between hospitals or when personnel are rerouted to other hospitals as this may have financial implications that need to be addressed later

6. **Incident management structure**

6.1. This section only applies if a specific hospital does not already have an incident management team.

6.2. The response to this outbreak follows an incident management approach, allowing for hospitals to maintain a level of autonomy while still fitting into the provincial incident management structure. Each hospital must be able to make decisions for its own circumstances to provide the highest level of care according to the guidelines of this document.

6.3. The functions of the management structure will include making decisions about whether or not to escalate or de-escalate event stages regardless of thresholds and triggers, making decisions regarding the critical care of patients and the operations of the intensive care units and adjusting the hospital's response plan when necessary.

6.4. The recommended members of the incident management team are:

6.4.1. Hospital CEO

6.4.2. Head of ICU

6.4.3. Senior Nurse Manager or Deputy

6.4.4. Assistant Manager of Nursing: Emergency Unit

6.4.5. Assistant Manager of Nursing: ICU

6.4.6. Representative for facility management rep

6.4.7. IPC team

6.4.8. Representative for EHS

6.4.9. Representative for support services

7. **Roles and responsibilities**

Roles and responsibilities that relate specifically to the COVID-19 outbreak should be established for all affected departments and/or services and assigned to specific people for communication to their departments. Job cards can be created for these roles so that, should certain responsibilities be assigned to specific people, someone else can easily fill that role when the designated person is not available.

- 7.1. General management
- 7.2. Nursing management
- 7.3. Allied health management
- 7.4. Equipment distribution and tracking (clinical technicians and asset management)
- 7.5. Procurement (supply chain management and those responsible for ordering agency staff)
- 7.6. Security
- 7.7. Food, water, linen, hygiene, etc.
- 7.8. Support services
- 7.9. Bed management
- 7.10. Public and media liaison
- 7.11. Communications, information technology and information management

8. Infection prevention and control

It is absolutely imperative that all institutions ensure that staff are adequately prepared and practised in the proper use of personal protective equipment and infection control.

It is suggested that staff that will be in contact with patients with SARS-CoV-2 have their infection control practises scrutinised and checked.

The following recommendations apply –

- 8.1. The use of the following is mandatory if in contact with patients either known or suspected to have COVID-19:
 - 8.1.1. A surgical facemask
 - 8.1.2. A protective apron, or similar
 - 8.1.3. Gloves
- 8.2. The use of the following is mandatory for procedures where aerosol production is a risk (the taking of nasopharyngeal and pharyngeal swabs in non-ventilated patients or the performance of intubation):
 - 8.2.1. An N95 face mask
 - 8.2.2. Eye protection (goggles)
 - 8.2.3. A protective apron, or similar
 - 8.2.4. Gloves

The above measures need to be employed in combination with meticulous hand hygiene. N95 masks, when used need to be discarded after each use.

9. Training

Training, at this point, should already have been done for all hospital personnel. Hands-on refresher training may be necessary and can be conducted by IPC or intensive care Operational Managers. Full training sessions for agency personnel may be practical or feasible. It is recommended that only experienced agency personnel be allowed to care for infected patients and that these agency workers be included in any refresher courses conducted in the intensive care units.

10. Safety and security

It is left to the discretion of each hospital to decide how many visitors, if any, to allow per patient during this outbreak. Security may need to be increased for intensive care units and isolation units to assist with irate visitors who have been refused entry and to ensure that no unauthorised people try to gain access to these areas.

A control measure must be implemented to control access for personnel who have been asked to assist during this outbreak but who are not employed by the hospital or working through a registered agency.

Vigilance in the affected areas is needed to prevent the theft of medication or supplies.

Section C: Operations

11. Proportionate response

11.1. Business continuity

While it is of utmost importance to provide the highest level of care to patients infected with COVID-19, the treatment and care of other patients in the intensive care units and throughout the rest of the hospital cannot be jeopardised. The additional requirement for critical care beds will impact the normal functions of a hospital but this effect must be limited for as long as possible. Any plans for the expansion of the critical care units and the implementation of additional isolation areas must be done in consultation with affected areas.

11.2. Comorbidity

Critical care resources are always in high demand and this outbreak will increase that demand. Difficult decisions will have to be made in allocating limited resources when demand exceeds availability, including the expanded intensive care units. The assessment criteria will include comorbidity. Patients and their relatives must be made aware of this. There is currently not enough known about how COVID-19 affects patients with HIV and TB which are both widespread in the Western Cape. As more information is made available it may affect the triage assessment of these patients.

11.3. Critical care triage (assessment and escalation criteria)

Current evidence suggests that patients requiring intensive care deteriorate 6-10 days after presenting with symptoms of COVID-19, becoming progressively short of breath and developing signs of multiple organ dysfunction.

At the outset it must be appreciated that many patients will present as severe community acquired pneumonias, of which only a subgroup will have SARS-Cov-2 as an aetiologic agent. There is little need to alter the management of this group of patients other than to include viral screening on tracheal aspirate/bronchoalveolar lavage as a routine.

Patients presenting with a severe community acquired pneumonia, and no diagnosis of COVID-19, who fit the case definition for COVID-19, should receive the usual standard of care and then be isolated and discussed with an infectious diseases expert.

For patients fitting the case definition of COVID-19 and presenting with late respiratory failure the following are noteworthy:

- 11.3.1. The late development of respiratory failure appears to carry a worse prognosis.
- 11.3.2. Elderly patients in other parts of the world have experienced a higher mortality than younger patients.
- 11.3.3. Patient comorbidity has an adverse impact on outcome. The comorbidities particularly associated with a poor outcome are diabetes, hypertension and ischaemic heart disease.
- 11.3.4. The onset of other organ failure in addition to respiratory failure has a grave prognosis.
- 11.3.5. The need for acute dialysis, in combination with the need for ventilation, also carries a grave prognosis.
- 11.3.6. ECMO appears to have little benefit in the management of COVID-19 patients.
- 11.3.7. With this in mind the following recommendations are made:
- 11.3.8. Older patients (age more than 65 years) with comorbidity not be considered for ventilation.
- 11.3.9. Patients either already on ventilation, or requiring both ventilation and dialysis be offered palliative care.
- 11.3.10. Ventilated patients showing no improvement after 5 days be considered for palliative care. [The Italian experience is that mortality after admission to ICU is 60-65% with death occurring between

the end of first and the beginning of the second week of hospitalisation. Recovery is long, reducing the turn-over of ICU beds].

12. Clinical management of COVID-19 patients

12.1. The ventilation of patients with COVID-19

The guidelines below are given based on the experience of colleagues, predominantly in Italy, and current best practise. There is currently no literature based evidence for ventilatory recommendations specific to COVID-19. The information below should be interpreted and implemented cautiously.

- 12.1.1. High flow nasal oxygen, non-invasive ventilation and face mask CPAP be avoided at all costs due to the risk of creating viral aerosols
- 12.1.2. Lung protective ventilation with a tidal volume 4-6mL/kg predicted body weight be implemented
- 12.1.3. Permissive hypercapnoea be practised with the lowest possible respiratory rate to achieve a $pH > 7.2$
- 12.1.4. A PEEP of 13-15cmH₂O be titrated taking care that the p_aCO_2 does not increase.
- 12.1.5. Minimal recruitment manoeuvres be performed
- 12.1.6. Increase of F_iO_2 as necessary to maintain S_aO_2 of 88%
- 12.1.7. Saturation does not need to be greater than 90%
- 12.1.8. Limit oxygen exposure as far as possible and try to keep $F_iO_2 < 60\%$ if at all possible.
- 12.1.9. Prone positioning is beneficial and patients frequently improve oxygenation
- 12.1.10. Lung compliance is usually good in patients with COVID-19, hence the plateau pressure (P_{plat}) is usually $< 25-27$ cmH₂O, with a driving pressure ($\Delta plat$) < 13 cmH₂O.

12.2. General ICU management of patients with COVID-19

- 12.2.1. Tracheal aspirates (or bronchoalveolar lavage) should be sent as a routine on admission. Nasopharyngeal or pharyngeal swabs may be negative, but tracheal aspirate/bronchoalveolar lavage has a much higher sensitivity.
- 12.2.2. Steroids should only be used in cases of septic shock (at doses of hydrocortisone 50mg IV 6 hourly).
- 12.2.3. High dose steroids for the purposes of treating the pneumonia are not recommended.
- 12.2.4. Intravenous fluids must be limited as far as possible. Have a low threshold for commencing vasopressors rather than fluid loading in patients with hypotension.
- 12.2.5. Review fluid volumes used for the delivery of all drugs including: vasopressors, insulin, electrolyte replacement and antimicrobial administration.

13. Implementation

The guidelines are scalable to allow for the most effective response at each hospital whatever their current situation may be. Due to the urgency of the situation the guidelines in this document must be implemented immediately. Circumstances will differ between hospitals and they might be at different event stages. The CEO/Incident Manager/Intensivist must assess the situation at the hospital to determine at which event stage to implement these guidelines.

14. Triggers and thresholds

Each hospital, according to their resources, will set thresholds and triggers for escalating or de-escalating into a different event stage. Moving from one event stage to another cannot happen randomly. The situation must be assessed by the incident management team before a decision is taken. Triggers and thresholds could be based on:

- Admission numbers
- Demand for intensive care beds
- Availability of equipment, personnel or other resources necessary for treatment

Any escalation or de-escalation between stages must be communicated to all areas of the hospital.

15. Escalation

It may cause unnecessary disruption to hospital services and result in improper or wasteful allocation of resources to implement these guidelines for the worst case scenario while confirmed infection rates are relatively low. A phased approach allows for a planned and strategic increase and/or redirection of resources as it becomes necessary.

All personnel should be aware of their roles in each event stage. All personnel must be informed when an escalation takes place so that they can adjust their tasks accordingly. Escalation should also be communicated to other hospitals.

16. Contingency plans

There are a number of variables which can affect the care of critically ill patients during this pandemic. Personnel may become infected and require isolation or treatment. Availability of equipment and medication could be affected by stricter import protocols. Other incidents at the hospital, e.g. fires or power outages, could impact critical care. As far as possible there should be contingency plans for the incidents most likely to have a moderate to serious impact on critical care.

17. De-escalation and return to normal function

As the outbreak is contained and fewer infections are reported there will be a decrease in demand for critical care treatment. It is advisable to delay the closure of expanded intensive care units and isolation areas until assurance is received from the National Department of Health that there is little to no chance of sudden re-emergence of large numbers of COVID-19 infections.

De-escalation must be strategic. Temporary intensive care units and isolation areas must be deep-cleaned before being returned to normal use. Equipment must also be properly cleaned according to IPC principles before being returned to use. De-escalation will most likely occur simultaneously with or shortly before the phased reintroduction of services that were put on hold due to the outbreak. This transition process can be managed between a member of the incident management team (or an appointed person) and the Operational Managers of the areas being reopened.

18. Data collection, storage and protection

Throughout the course of this outbreak it is important to collect as much data as possible and to maintain record keeping procedures. The knowledge and insight gained during this period will allow for better planning in preparedness for future infectious disease outbreak scenarios.

Accurate data collection will make it easier for hospitals to compile the necessary reports once the outbreak is declared resolved. Data will also be needed for financial reconciliations at a later stage when hospitals assess the financial impact that this outbreak has had.

The coordinated and consistent approach taken by the hospitals in the Western Cape requires that certain information be shared, within the hospital and between hospitals. An information system should be set up that facilitates easy storage of and access to shared data and resources.

The patient's right to privacy must still be respected and any details pertaining to a patient's identity and treatment must be kept confidential.

19. Communication

The key to a coordinated and consistent response is effective communication. The incident management team must keep personnel informed about any changes to the plan or any directives from the National or Provincial Department of Health. Communication must be accurate and transparent. Personnel should also be able to communicate their concerns, challenges and suggestions to the incident management team.

It is essential that hospitals remain in contact with each other to share information and resources as well as to offer support.

General information regarding the nature and spread of COVID-19 and basic preventative and protective measures should be posted on public noticeboards. Personnel should politely remind visitors about correct hygiene procedures upon entering the facility and whenever lapses are noticed. Communication with patients and their relatives must be timely, honest and direct especially as it pertains to treatment. A certain amount of frustration and possibly aggression is to be expected from patients or their relatives when being informed that their conditions have declined or that they do not meet the criteria for critical care treatment. Personnel are strongly advised to remain calm in these situations and to call a senior nurse or physician, or security if the situation escalates.

Any requests from the press for information or access to the hospital must be addressed to public relations and permission must be given by the CEO. Liaising with the press is necessary to keep the public abreast of the situation but it must be done in a way that ensures the dignity of the patients and the safety of personnel and members of the press. No member of staff may provide the media with any photographs, documents, copies of photographs or documents or any information without authorisation from the CEO.

20. Event stages and activities

To be determined by each hospital in accordance with the National and Provincial Department of Health's response plan and guidelines.

21. Staff support and debriefing

It is expected that hospital personnel will at some point become overwhelmed by the daunting task of working through this outbreak. There will be long hours, short tempers and not enough sympathy towards healthcare workers, especially those who have to make decisions regarding refusal or withdrawal of treatment. Healthcare workers are one of the most at risk groups and there will almost certainly be infections amongst hospital personnel. It can be challenging to keep focused on the patients when healthcare personnel are seeing their colleagues becoming ill. Personnel may also be worried about family members who are infected. This will be a difficult period for South Africa as a nation, more so for those tasked with caring for the sick. Hospital management is advised to provide support for personnel in any capacity that they can. The Western Cape Government's Employee Health and Wellness Programme can assist in this regard. If possible, hold regular debriefings for personnel instead of waiting for a debriefing once the outbreak has been resolved. While patient care is of great importance, the physical and psychological health of healthcare workers must be a priority.