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| <b>Title: Critical Care Unit bed crisis management policy</b>  |   |
| <b>Policy Owner:</b> MOH committee on hospital clinical services and polices                                 | <b>Policy code:</b> ADM-007                       |
| <b>Section location:</b> Emergency room, ICU, CCU, wards   | <b>Effective date:</b> 25 <sup>th</sup> July 2021 |
| <b>Applies to:</b> Intensive Care Units, Operating Rooms, Coronary Care Units, Medical Wards, Surgical Wards | <b>Revision dates:</b> 25 <sup>th</sup> July 2023 |
| <b>Approvals:</b>  | <b>Signature/Date</b>                             |
| <b>Approved by:</b> MOH committee on hospital clinical services and polices                                  |   |
| <b>Approved by:</b> Director of technical affairs  |   |
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| <b>Notes:</b>  |   |

### **1.0 Purpose:**

1.1 The purpose of this policy is to outline the process that need to be activated for incidences where the bed capacity of the Intensive Care Units are expected to reach maximum occupancy and the services of the Intensive Care Units are overwhelmed within a single or multiple hospitals of the Ministry of Health due to a specific series of events, incidents or pathologies (e.g. epidemic, chemical warfare, mass casualty etc).

1.2 This document is intended to support the Departments' resources to ensure proper and efficient allocation.

### **2.0 Objective:**

2.1 The objective of this policy is to guide all involved personnel (task force, departments, units, or teams) in the index hospital(s) or MOH facilities to the organized, triaged, and staged care which should ensure the most efficient utilization of resources and thus optimal care provision and best outcome to the patient population in need of Critical Care.

### **3.0 Definitions:**

**3.1 Crisis:** An unstable or crucial time or state of affairs in which a decisive change is impending especially: one with the distinct possibility of a highly undesirable outcome.

#### **3.2 Intensivist/ICU consultant:**

3.2.1 Physician from different base-specialty (Anesthesia, Internal Medicine, Surgery, Emergency Medicine, Neurology ..etc.) specialist and above with training in Critical Care Medicine.

#### **3.3 Physician with an Intensive Care competency:**

3.3.1 A Senior registrar or above rank from the Anesthesia and ICU Department with >40% ICU service and ICU On-calls in the past 12-24 months and deemed to possess the competency to lead the Intensive Care Unit, ICU outreach/rapid response/consults team or the ward critical care support team.

3.3.2 An attending physician (General Internal Medicine, Cardiology, Respiriology, , Nephrology, Infectious diseases, General Surgery ...etc), specialist and above with critical care and ACLS competency and/or expertise.

**3.4 Intensive care nurse:** A nurse experienced and or credentialed in patient care in the Intensive Care Unit or any other monitored setting (CCU) and practicing critical care nursing in the past 12 months.

**3.5 Nurse with Intensive Care competency:** A nurse **not** experienced and/or credentialed in patient care in the Intensive Care Unit or any other monitored setting (CCU) **but** practicing or trained in critical care nursing in the past 1-6 months (Usually are ward or operating room nurses trained before the event or during the event to assume the necessary critical care nurse roles in the ward or areas of need).

**3.6 ICU Outreach/Rapid response/Consults team:** A team of ICU based physicians (registrar or senior registrar and above rank physicians with either Anesthesia and/or Critical Care training) who are delegated with the task of managing patients with critical illness and or are on mechanical ventilators in the wards. They are either consulted or delegated to assess, manage and follow up critically ill patients and those on mechanical ventilators in the ward. They provide support, and oversight to the ward critical care support team and relay updates on critically ill patients, free mechanical ventilators and resources to the intensivist in the ICU to regulate flow and resource allocation.

**3.7 Respiratory therapist:** A certified/credentialed technician experienced in noninvasive and invasive mechanical ventilators and responsible for adjustments, follow up, weaning and or discontinuation of ventilatory support to patients as deemed fit by the leading Intensivist, ICU outreach leader or attending (specialist and above rank) of ward critical care support team. He/she is also responsible for audit of available, functional and dysfunctional devices and maintenance of the invasive and noninvasive mechanical ventilators.

**3.8 Physician with airway/mechanical ventilator competency:** A Physician Certified/credentialed and or experienced in airway management and noninvasive and invasive mechanical ventilators (senior registrar rank and above physicians with either Anesthesia and/or Critical Care training). He/she will be responsible for adjustments, follow up, weaning and or discontinuation of ventilatory support to patients as deemed fit by the leading intensivist, ICU outreach leader or attending (specialist and above rank) of ward critical care support team. He/she will also be responsible for audit of available, functional and dysfunctional devices and, maintenance of the invasive and noninvasive mechanical ventilators. He/she provides support to respiratory therapists.

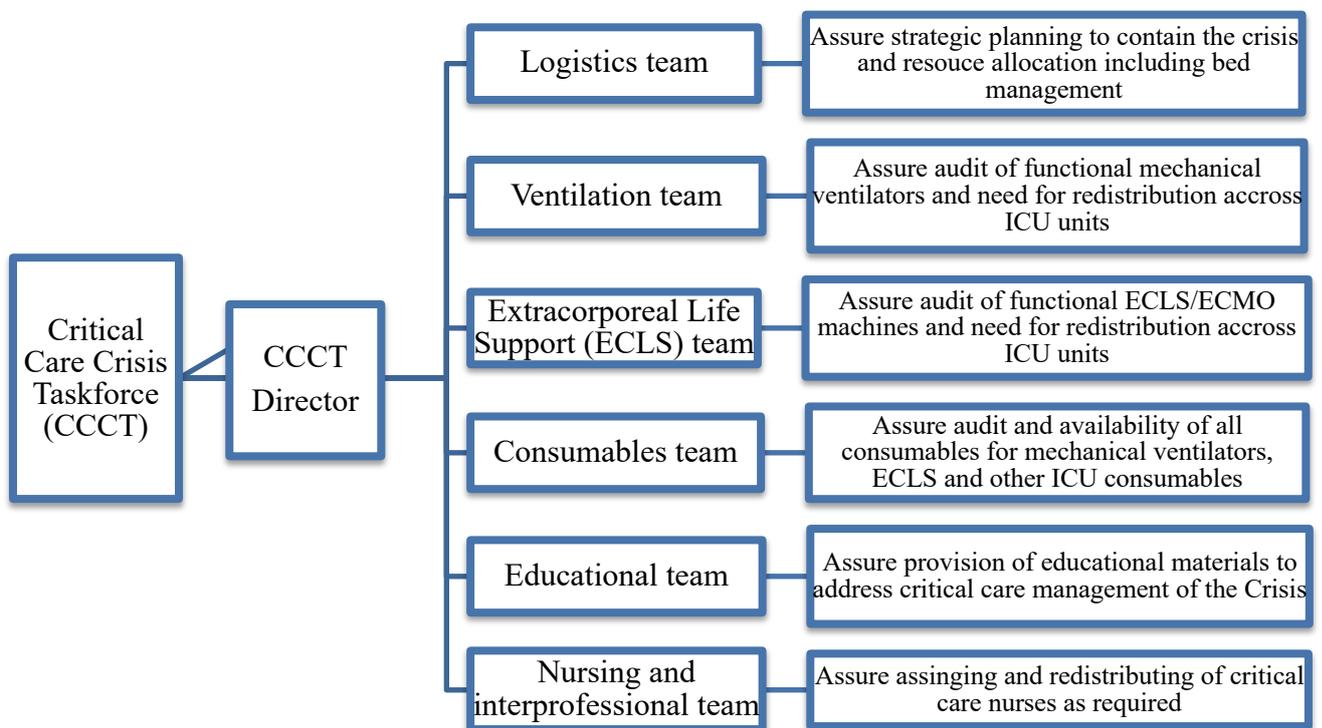
Numbers of respiratory therapists and physicians with airway/mechanical ventilator competency are subject to department and competency availability in the hospital, in relation to the case load ,and is aimed for at least one person per unit per crisis allocated hospital area per shift.

**3.9 Ward critical care support team:** A Team of non-ICU based physicians (e.g. internal medicine, general surgery, cardiology, subspecialties ...etc) whom are delegated with the task of managing patients with critical illness and or on mechanical ventilators in the wards. They are considered to be the extension of the ICU care and services to the ward and critical patients outside the ICU (newly diagnosed or transfers from ICU). They are delegated to round on the patients , set management plans and or ventilator settings (from intubation, to extubation and shock management ...etc). They are provided with support and oversight by the ICU outreach team and/or the Intensivist covering the ICU. Every team should be composed of at least an attending (specialist and above rank) and a senior registrar or register and an assistant registrar and the supportive nursing staff to provide 1:2 or 1:3 nurse-patient care to cover 5-15 beds of critically ill patients with/without mechanical ventilators. They report back to the ICU outreach team and or the Intensivist covering the ICU in order to update and guide patient flow to and from the ICU and resource allocation.

**3.10 Critical care crisis management taskforce:** A unit specially organized for the task of ensuring the most optimal and efficient resource allocations and manpower organization/utilization to provide the high acuity health care services to the largest possible population of critically ill patients in need, with the least damage or compromise to the remaining health care facility resources.

This taskforce should be composed of the following:

- 3.10.1 Head, Council of Anesthesia and Critical Care and pain management and/or a delegate from local hospital(s) .
- 3.10.2 Intensivist(s)/ICU consultant (with training in Critical Care Medicine) whom are from across MOH hospitals or the designated hospital(s)
- 3.10.3 Intensivist(s) (with training in Critical Care Medicine) whom are from **non**-MOH hospitals (private or Kuwait oil company) if deemed necessary
- 3.10.4 Nurse managers/lead of ICU units from at least 2 MOH hospitals, Or the local designated hospital(s)
- 3.10.5 Respiratory therapists and or senior staff/heads of ICU units from at least 2 MOH hospitals, Or the local designated hospital(s)
- 3.10.6 Interprofessional team senior representation (clinical pharmacists, physiotherapists, and clinical dietitians) as feasible and deemed fit by competency and Human Resources availability.



**Figure 1 - outline of Critical Care Crisis Taskforce (CCCT).**

The CCCT will be composed of a Director, an Intensivist appointed by the Head of council of anesthesia and critical care and serves as the main organizer of the taskforce. With the taskforce members divided into different teams, as seen in the figure above, each with specific tasks. The taskforce team will meet on a weekly basis to set and revise specific policies to address the crisis in hand.

**3.11 Mass casualty incident (MCI)** is any number of casualties that exceed the resources normally available from local resources. This could be due to a fire, demolition, explosion, toxic chemical, or lack of electricity outside or within an index health care facility. This could result in the index hospital (with or without its staff) being non-functional.

**3.12 Index hospital** it is a hospital at which MCI occurred and emergency evacuation is warranted.

**3.13 Staffed ICU beds** An ICU or monitored bed WITH a dedicated nursing staff and a physician ratio capable of covering daily work and on-call duties.

**3.14 Unstaffed ICU beds** An ICU or monitored bed WITHOUT a dedicated nursing staff and a physician ratio capable of covering daily work and on-call duties.

**3.15 Unit space** The ICU unit or Critical Care Unit in index hospital with an MCI.

#### **4.0 Intensive Care Unit Readiness Condition (ICCON):**

**4.1 Introduction:** ICU readiness to such crisis which might adversely affect health care and patient outcome at the critical care level should be staged by a system which prescribes graduated levels of readiness akin to the defense readiness condition (DEFCON) & EMERCON (emergency condition) an alert state used by the United States Armed Forces. The ICU readiness condition will be termed ICCON.

##### **4.2 ICCON-1:**

An ICCON-1 is declared when a specific incident, or pathology results in an **expected** 5% ICU bed occupancy and 15-25% hospital capacity.

##### **4.2.1 ICU team:**

Duties remain the same within the ICU with the Intensivist & ICU team coverage of the patients in the ICU and 1:1 nurse-patient coverage/care.

*\*\*the nurse-patient ratio is subject to change depending on manpower and resource availability.*

The ICU leadership will be tasked with the following:

- Review numbers of available usable ventilators (standby and defective ventilators).
- Review manpower availability and leaves, cancel all pending leaves, ensure equipment's and resource readiness, ensure company and medical stores back up supply, aim to free ICU resources (discharge of chronically ventilated patients on home ventilators to home or ward, discharge non-reversible cases to the ward, and aim to tracheostomize patients amenable to ventilator disconnection but unable to protect airway ...etc).
- Recruit candidates (physicians, nurses, therapists ...etc), refresh competencies, rehearse duties and roles, delegate duties and on-call schedules and allocate the necessary wards and ensure the availability of mechanical ventilators and necessary resources.
- Initial ward allocation should aim to ensure 5-10 beds/rooms with mechanical ventilators. Activate crash course for faculty development and start simulation revision courses.

**4.2.2 ICU outreach team:** Duties remain the same with intensivist & ICU team coverage/follow up and guidance of management; with first line of contact, decision making and resuscitations being a responsibility of the treating medical/surgical team.

**4.2.3 Respiratory therapist and physicians with airway/mechanical ventilator competency:** Duties remain the same towards patients in the ICU and wards as per Department policy or duty delegation. Are Informed to be on standby for delegation of duties in case of escalation.

**4.2.4 Ward critical care support team:** Are informed to be on standby.

**4.2.5 Coronary cardiac unit:** Duties remain the same towards patients in the CCU and wards as per Department policy or duty delegation. Officially informed to be standby in case of escalation for bed/manpower/resource allocation.

**4.3 ICCON-2:** An ICCON-2 is declared when a specific incident, or pathology results in or will result in an **expected** 25% ICU bed occupancy and >25% but < 50% hospital

capacity.

#### **4.3.1 ICU team:**

Duties remain the same within the ICU with the intensivist & ICU team coverage of the patients in the ICU, and 1:1 nurse-patient coverage/care.

*\*\*the nurse-patient ratio is subject to change depending on manpower and resource availability, and choice to change from 8 hours to 12 hours shifts to increase the available manpower.*

The ICU leadership will be tasked with the following:

- Aim to free the ICU resources; discharge of chronically ventilated patients (on home ventilators to home or ward), discharge non-reversible cases to the ward.
- Allocate 5-15% of beds as back up for non-incident related critical cases (Sepsis and septic shock, trauma, cerebro-vascular accidents, general surgical emergency ...etc).
- An Official declaration of the emergency status and request to **stop** non-urgent non-emergency surgical and endoscopic procedures (excluding cancer, symptomatic pathology and emergency surgeries/endoscopy only).

#### **4.3.2 ICU outreach team:**

Duties remain the same with Intensivist & ICU team coverage/follow up and guidance of management with first line of contact, decision making and resuscitations being that of the treating medical/surgical team.

**4.3.3 Respiratory therapist and physicians with airway/mechanical ventilator competency:** duties remain the same towards patients in the ICU and wards as per Department policy or duty delegation. Informed to be on standby for delegation of duties in case of escalation.

**4.3.4 Ward critical care support team:** activated to establish team, refresh competency, delegate duties and on-call schedules and allocate the necessary wards and ensure the availability of mechanical ventilators and necessary resources. Initial ward allocation should aim to ensure 5-10 beds/rooms with mechanical ventilators.

**4.3.5 Coronary cardiac unit:** duties remain the same towards patients in the CCU and wards as per Department policy or duty delegation. Assure that 10-

15% bed/manpower/resources are on standby for ICU.

#### **4.4 ICCON-3:**

An ICCON-3 is declared when a specific incident, or pathology results in/or will result in an **expected** 50% ICU bed occupancy and 50-75 % hospital capacity.

##### **4.4.1 ICU team:**

duties remain the same within the ICU, with the Intensivist & ICU team coverage of the patients in the ICU and 1:1 nurse-patient coverage/care.

*\*\*the nurse-patient ratio is subject to change depending on manpower and resource availability, and choice to change from 8 hours to 12 hours shifts to increase the available manpower.*

The ICU lead will be tasked with the following:

- Aim to free the ICU resources; discharge of chronically ventilated patients (on home ventilators to home or ward), discharge non-reversible cases to the ward.
- Allocate 5-15% of beds as back up for non-incident related critical cases (Sepsis and septic shock, trauma, cerebro-vascular accidents, general surgical emergency ...etc).
- The Official declaration of status and request to **stop** non-urgent non-emergency surgical and endoscopic procedures (excluding cancer, symptomatic pathology and emergency surgeries/endoscopy only). Only emergency surgery/endoscopic procedures are allowed.
- Delegate members to ward critical care support team duties and establish am/pm duty schedule.

**4.4.2 ICU outreach team:** Initiate, lead ,organize and oversee duties with the ward critical care support team and report back to the intensivist covering the ICU.

**4.4.3 Respiratory therapist and physicians with airway/mechanical ventilator competency:** Delegated to duties in the ICU, CCU, wards, ER and operation theatre as seen necessary

**4.4.4 Ward critical care support team:** Activated to establish team, refresh competency, delegate duties and on-call schedules and allocate the necessary wards and ensure the availability of mechanical ventilators and necessary resources. Initial ward allocation should aim to ensure 10-15 beds/rooms with

mechanical ventilators. Receive and manage patients on ventilators discharged from the ICU and new incident related patients

**4.4.5 Coronary cardiac unit:** Duties remain the same towards patients in the CCU and wards as per Department policy or duty delegation. Assure the allocation of 40% bed/manpower/resources standby for ICU.

**4.5 ICCON-4:**

An ICCON-4 is declared when a specific incident, or pathology results in/or will result in an **expected** >75 % ICU bed occupancy and >90% hospital capacity.

**4.5.1 ICU team:**

Duties remain the same within the ICU with the Intensivist & ICU team coverage of the patients in the ICU and 1:1 - 1:3 nurse-patient coverage/care.

*\*\*the nurse-patient ratio is subject to change depending on manpower and resource availability, and choice to change from 8 hours to 12 hours shifts to increase the available manpower.*

The ICU leadership will be tasked with the following:

- Aim to free the ICU resources; discharge of chronically ventilated patients (on home ventilators to home or ward), discharge non-reversible cases to the ward.
- Allocate 5-15% of beds as back for non-incident related critical cases (Sepsis and septic shock, trauma, cerebro-vascular accidents, general surgical emergency ...etc). Official declaration of status and request to **stop** non-urgent non-emergency surgical and endoscopic procedures (excluding cancer, symptomatic pathology and emergency surgeries/endoscopy only). Only emergency surgery/endoscopic procedures are allowed.
- Delegate members to ward critical care support team duties and establish am/pm duty schedule.

**4.5.2 ICU outreach team:** Initiate, lead and organize and oversee duties with the Ward critical care support team and report back to the intensivist covering the ICU.

**4.5.3 Respiratory therapist and physicians with airway/mechanical ventilator competency:** Delegated to duties in the ICU, CCU, wards, ER and operation theatre as seen necessary.

**4.5.4 Ward critical care support team:** Activated to establish team, refresh competency, delegate duties and on-call schedules and allocate the necessary wards and ensure the availability of mechanical ventilators and necessary resources. Organize duties with the ICU outreach team and report back to delegated ICU outreach team leader or representative. Initial ward allocation should aim to ensure 20-30 beds/rooms (depending on the crisis) with mechanical ventilators. Receive and manage patients on ventilators discharged from the ICU and new incident related patients

**4.5.5 Coronary cardiac unit:** Duties remain the same towards patients in the CCU and wards as per Department policy or duty delegation. Allocate 15-25% bed/manpower/resources standby for ICU incident related cases and 5-10% for ICU non-incident related cases (Maximum acceptable occupancy of CCU beds by incident related pathology is 50-60%).

#### **4.6 ICCON-5:**

An ICCON-5 is declared when disasters, as mass casualty, fire or destruction in an index hospital(s) may render certain facilities and services, such as the Intensive Care Unit(s) (ICUs), non-functional, necessitating relocation of patients and health care services from one nonfunctional setting to another more functional one.

It's the role of the head of department (HOD) of the Anesthesia and ICU in each hospital to identify and update the emergency procedures of their index hospital and coordinate with their respective hospital administration and clinical departments to identify emergency plans for relocating critical care patients.

Once an MCI is activated in an index hospital, the HOD of the Anesthesia and ICU at that index hospital will inform the Council group immediately. Each HOD in general MOH hospitals is to disclose the number of staffed and unstaffed ICU beds available in their hospital. If need be, specialist hospital HOD will be in the alert to serve as a backup if all physical space is filled in the general hospitals.

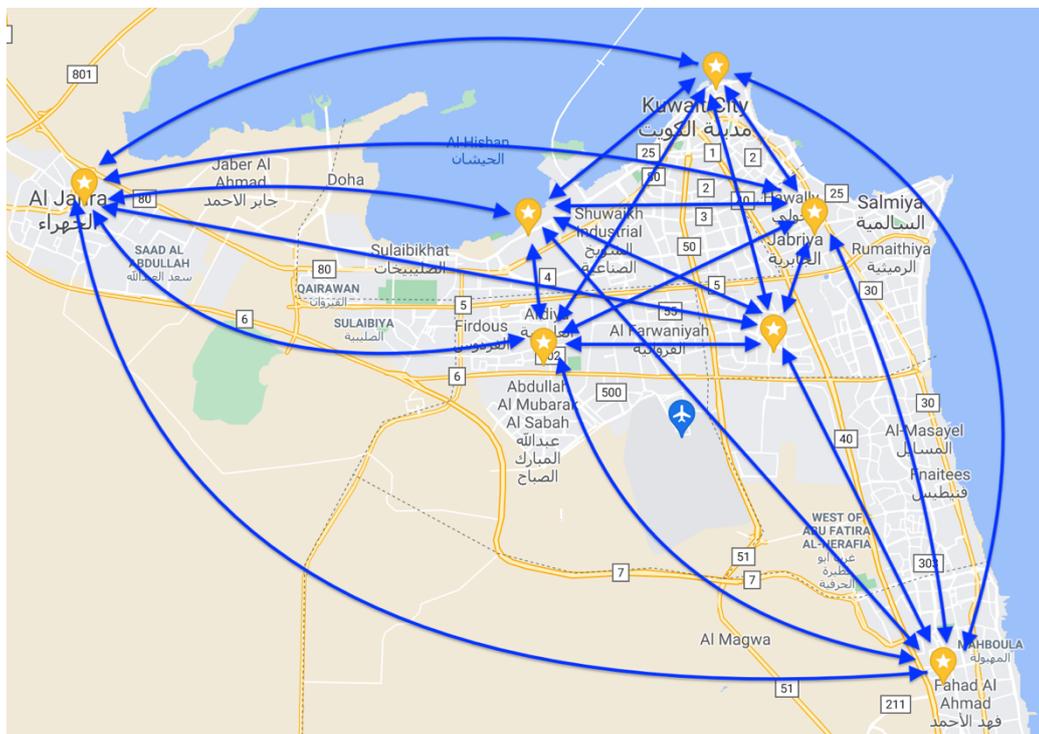
This will generate a list of staffed ICU beds and unstaffed ICU beds in each hospital, and relocation of the patients involved in an MCI will be at the discretion of the head of the council or the rapporteur or a designated head of disaster taskforce appointment by the council.

Relocation of patient is dependent on the following scenarios:

1. If the Unit space is **nonfunctional**, BUT team and index hospital are **functional** (e.g.

ICU fire only, electrical default, flooding ...etc). The Critical Care Unit bed crisis management policy should be activated, and the patients relocated to designated monitored settings in the index hospital (e.g. Coronary Care Unit).

2. If the Unit space, team and index-hospital are ALL **nonfunctional** (as fires or toxic chemicals or explosion ...etc in entire index hospital) making even wards and other monitored settings nonfunctional and effecting the mass of healthcare providers: patients should be relocated to staffed beds provided by designated referral general hospital(s), with equal proportional distribution of patients among the designated referral hospitals.
  
3. If the Unit space and index hospital are **nonfunctional** BUT team is **functional** (as fires or lack of electricity or toxic chemicals ...etc) in an index hospital: The patients with their nursing and treating teams of physicians should be relocated-if deemed necessary -to the unstaffed beds provided by the designated general hospital(s).



The transfer of the patients should be distributed equally between available staffed beds in different hospital, so it does not deprive the recipient hospital from all its resources. This should be coordinated with head of EMS directly by the head of council or the rapporteur or a designated head of disaster taskforce appointment by the council, based on the capacity in each hospital.

## **5.0 Intensive Care Unit Action and Responsibilities:**

### **5.1 Duties within an ICU with 100% occupancy and ~50% on mechanical ventilators.**

- The minimum Ratio of attendings (specialist and above rank) **to** patients/beds would be at 1-2:20-30.
- At least 1-2 of attending (specialist and above rank) intensivists with ECLS/ECMO competency/expertise per team/week for incidents associated with high rates of respiratory or cardiac failure, if available.
- The minimum Ratio of senior registrars/registrar **to** patient/beds 4-6:20-30 (excluding assistant registrar) with the aim of at least 25% having Anaesthesia/airway/ventilator expertise or competency (e.g. senior anaesthesia resident or registrars).
- Aimed ratio to ensure for on-call of members to be 1 in 3 or 4 days.
- Nurse -patient ratio is to be 1:1 - 1:2. *The nurse-patient & physician-patient ratio is subject to change depending on manpower and resource availability, and choice to change from 8 hours to 12 hours shifts to increase the available manpower.*
- **If the respective ICU bed capacity is >20 but <50 beds**, the distribution of duties should be divided between the covering team members so that one attending and/or senior registrar (or equivalent) focuses care on the patients with high acuity, requiring active hemodynamics/ventilator management and/or organ support (dialysis, ECLS/ECMO, advance mechanical circulatory support), while the other attending and or senior registrar (or equivalent) and team are delegated to the care of the patients with less acute or improving critical illness, hemodynamics status or ventilatory support.

### **5.2 Duties within an ICU with 100% occupancy and ~100% on mechanical ventilators.**

- The minimum Ratio of attendings (specialist and above rank) **to** patients/beds would be at least 1-2:20-30.
- The minimum Ratio of senior registrars/registrar **to** patient/beds 6-8:20-30 (excluding assistant registrar) with the aim of at least 25% having Anaesthesia/airway/ventilator expertise or competency (e.g. senior anaesthesia resident or registrars).
- Aimed ratio to ensure for on-call of members to be 1 in 3-4 days.
- In times of lack of Human Resources and manpower, physicians from other specialties (Internal Medicine and subspecialties and Surgery and subspecialty) and departments maybe be recruited to the ICU teams and/or ICU outreach or ward critical care support team to provide the necessary assistance in care and management after short period of training and orientation to bedside management, duties and responsibilities.
- At least 1-2 of attending (specialist and above rank) intensivists with ECLS/ECMO competency/expertise per team/week for incidents associated with high rates of respiratory and cardiac failure, if available.
- Nurse-patient ratio is to be 1:1 - 1:2. *The nurse-patient & physician-patient ratio is subject to change depending on manpower and resource availability, and choice to change from 8 hours to 12 hours shifts.*

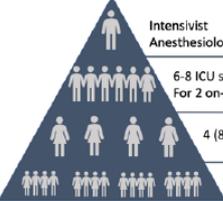
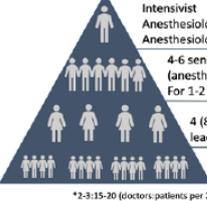
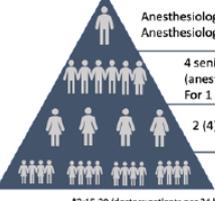
- ***If the respective ICU bed capacity is 50-100 beds, the following should be applied:***
  1. Distribution of teams based on above ratio:
    - a. 1-2:20-30 attending **to** patient ratio.
    - b. 6-8:15-20 senior registrars/registrar **to** patient (excluding assistant registrar).
  2. The ICU should be aimed (if applicable) to be divided to zones (***high acuity zone***: example ECLS/ECMO zone, ***moderate acuity zone***, and ***lower acuity zone***: example weaning zone, non-incident related pathology zone, discharge zone) that are dynamic and amenable to expansion or reduction based on patient flow and status with duties divided between the covering team members to these zones so that one attending and or senior registrar (or equivalent) focuses care on the patients with high acuity, requiring active hemodynamics/ventilator management, while the other attending and or senior registrar (or equivalent) and team are delegated to the care of the patients with less acute or improving critical illness, hemodynamic status or ventilatory support.
  3. The on-call schedule of such a team will be dependent on case load in each zone (at least one per acuity zone), manpower and resources and maybe between the ICU team as a whole or within the specific designated zone teams.

### **5.3 Criteria for discharge to ward and sign-over to ICU outreach team/ward critical care support team**

- At times of crisis, adjustments to ICU discharge policies might need take place to ensure that the provision of critical care medicine is addressed to the patients that might benefit from it the most. This is dependent on case-flow, acuity, resources and the competency, status and readiness of the wards and the ward critical care support team and services. For example; some patients might be fast tracked to a tracheostomy after they reach a plateau in their pulmonary status and weaning from mechanical ventilatory support and be discharged to the ward with/without a ministry issued home ventilator to receive rehabilitation in the ward in order to free a bed and/or ventilator for a patient that requires admission to ICU.
- In hospitals with an open ICU model, the sedation/analgesia, hemodynamics and ventilatory management is to be guided and lead by the anesthesia & ICU overseeing the patients in the intensive care unit, while all other management plans are to be lead and guided by the most responsible physician (from Internal Medicine, Surgery, or any other subspecialties).

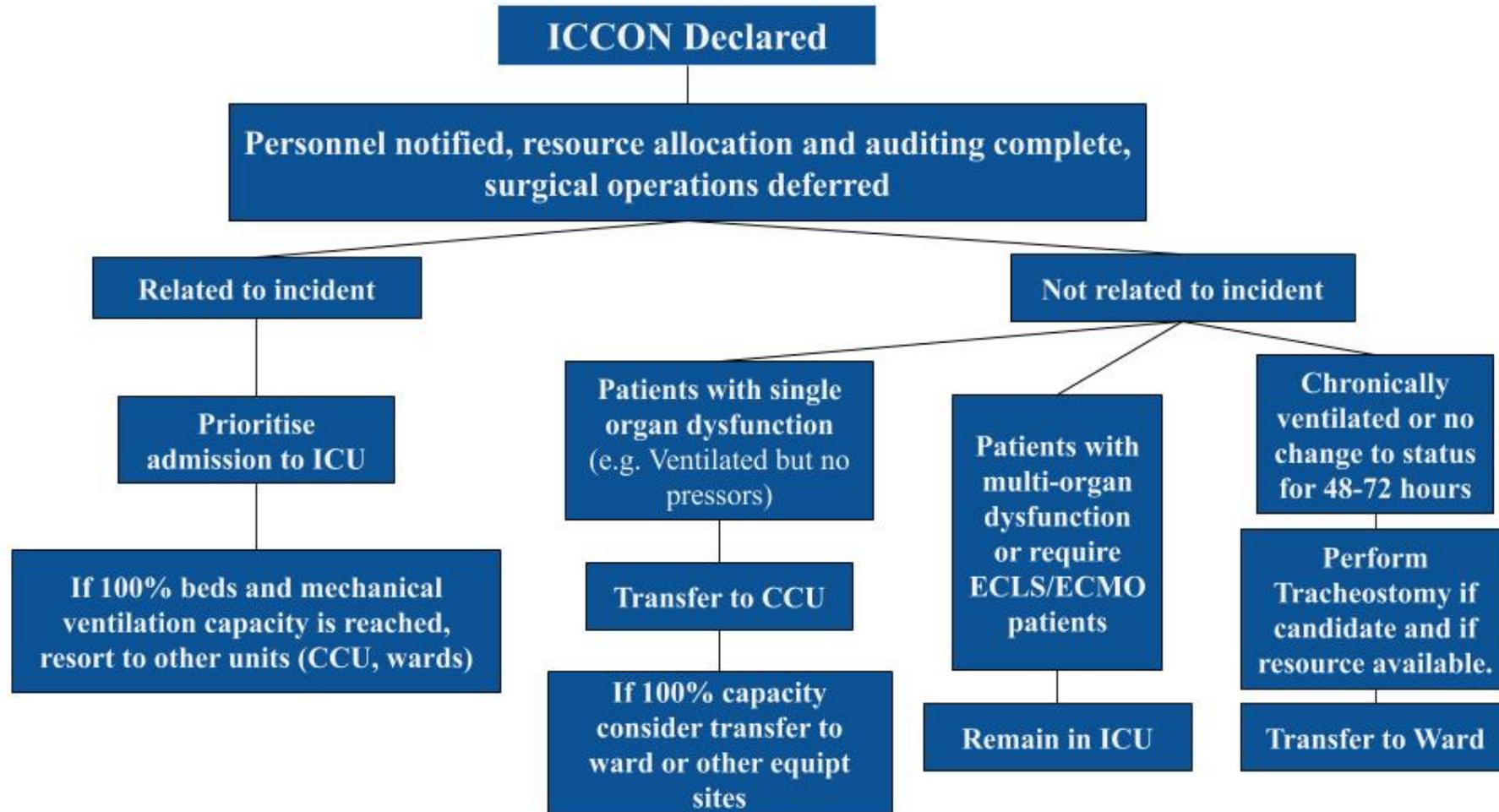
## **6.0 Proposed ICU structuring if ICCON-4 is declared:**

- When ICCON-4 is declared, the following system for critical care beds is recommended to be adopted.
  - Tier 1 (40%) = 1:1 nursing, high acuity, mirrors regular ICU care
  - Tier 2 (30%) = 1:2 nursing, intermediate acuity, mirrors open ICU
  - Tier 3 (30%) = 1:2/1:3 nursing, low acuity, mirrors chronic ICU/long term weaning
  
- Attending coverage would be either by an Intensivist, an anesthesiologist with ICU competency or an anesthesiologist coupled with an internist.
  
- Nursing shift have to change to 12 hours.
  - Tier 1 (ICU nurses)
  - Tier 2 (40% ICU nurses, 60% others)
  - Tier 3 (20% ICU nurses, 80% others)
  
- Patient triage system should be adopted within all incident designated ICU's, with patient spending more than 10-14 days on maximal mechanical ventilation and hemodynamic support with no improvement, to have their SOFA scores calculated and if >8, move to tier 3 ICU.
  
- Each hospital is encouraged to form a local taskforce or a critical care triage/consult service that can triage which patients from the emergency room would require which Tier ICU. Moreover, patients from the ward or ICU need to be triage by ward critical care team or ICU attending, respectively.

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| <p><b>Tier 1 Critical Care</b><br/>15—20 beds</p>  <p>Intensivist<br/>Anesthesiologist with ICU competency</p> <p>6-8 ICU senior registrar + registrars + residents<br/>For 2 on-call in 1:4</p> <p>4 (8) senior ICU nurses (1 group leader)</p> <p>16 (32) junior ICU nurses (1:1 nurses)</p>  | <ul style="list-style-type: none"> <li>- Site: ICU, CCU, ICU designated areas (20 beds)</li> <li>- Care: High acuity, awake proning, NIPPV, MV, ECMO</li> <li>- Nurse : patient ratio - 1:1, nurses q12 hours 44 nurses + 35% = 59 nurses (1 group leader, 1 narcotics, 20 bedside, 15 off duty for 35%).</li> <li>- MD : patient ratio 1 attending : 15-20 patients, + 2 senior/registrars +/- 1 assistant reg vs registrars q24 hours 1:4 on-calls (total 8-10 anesthesia registrars + 4 assistant registrar's vs IM regs)</li> </ul>   |
| <p><b>Tier 2 Critical Care</b><br/>15—20 beds</p>  <p>Intensivist<br/>Anesthesiologist with ICU competency<br/>Anesthesiologist + Internist</p> <p>4-6 senior registrars/registrars/residents<br/>(anesthesiology, internal medicine ...etc.).<br/>For 1-2 on-call in 1:4*</p> <p>4 (8) senior nurses +/- critical care (1 group leader)</p> <p>10 (20) junior non-ICU nurses (1:2 nurses)</p> <p><small>*2:15-20 (doctors:patients per 24 hour call, 1:4 days oncall, 1:2 anesthesia:MD)</small></p> | <ul style="list-style-type: none"> <li>- Site: ICU/HDU, CCU, ICU designated Wards (20 beds)</li> <li>- Care: Intermediate acuity, awake proning, NIPPV, MV</li> <li>- Nursing : patient ratio 1:2, nurses q12 hours, 24 nurses + 35% = 32 nurses (1 group leader, 1 narcotic, 10 bedside, 8 off duty for 35%).</li> <li>- MD : patient ratio 1 attending : 15-20 patients, + 1 registrar anesthesia, 1 registrar/SR medicine, 1 Assistant registrar medical, 1 intern, q24 hours, 1:4 on-calls (total 4-6 anesthesia registrars + 4-6 registrars IM vs assistant registrars)</li> </ul>                                   |
| <p><b>Tier 3 Critical Care</b><br/>15—20 beds</p>  <p>Anesthesiologist with ICU competency<br/>Anesthesiologist + Internist</p> <p>4 senior registrars/registrars/residents<br/>(anesthesiology, internal medicine ...etc.).<br/>For 1 on-call in 1:4*</p> <p>2 (4) nurses +/- critical care (1 group leader)</p> <p>8-10 (16-20) nurses (1:3 or 1:4 nurses)</p> <p><small>*2:15-20 (doctors:patients per 24 hour call, 1:4 days oncall, 1:1 anesthesia:MD)</small></p>                              | <ul style="list-style-type: none"> <li>- Site: CCU, step down, Wards, field facilities (20 beds)</li> <li>- Care: Low acuity, awake proning, NIPPV, MV (transferred FROM ICU for weaning or comfort care)</li> <li>- Nursing : patient ratio 1:3, nurses q12 hours, 16 nurses + 35% = 22 nurses (1 group leader, 7 bedside, 6 off duty for 35%).</li> <li>- MD : patient ratio 1 attending : 15-20 patients, + 1 registrar anesthesia, 1 registrar/SR medicine, 1 assistant registrar medicine, 1 intern q24 hours, 1:4 on-call (total 4-6 anesthesia registrars + 4-6 registrars IM vs. assistant registrars.</li> </ul> |

## 7.0 Conclusions:

- The ICU crisis policy is subject to review and amendment biennially and/or after any major incidents or crises to re-evaluate deficiencies, and lessons learned.
- It is and will always be a work in progress.
- It is the responsibility of all involved departments to be aware of this policy and oriented to their duties and responsibilities and practice readiness on a regular basis through whatever educational or interactional means seen fit.
- It is furthermore the responsibility of the hospital directors of all the MOH general hospitals and their respective chairs of the anesthesia and ICU to ensure this policy is reviewed, distributed, educated to and practiced regularly.



## Appendix C

| Status         | Trigger  | ICU Team   | ICU outreach Team  | Respiratory Therapist                                      | Adjunct Staff   | Ancillary Areas   |
|----------------|--|--|--|--|---|---|
| <b>ICCON-1</b> | Incident, or pathology results in:<br><br>5% ICU<br><br>15-25% hospital capacity   | <b>Physician</b> : 1-2:20-30.<br><b>Nurse Ratio:</b><br>1:1 for standard<br><b>AIMS:</b><br>Audit resources<br>Optimize patients for discharge   | Same but informed of situation   | Same but informed of situation                             | <b>Ward critical care support</b> informed of situation.<br><br>Begin Refresher course and review.  | <b>CCU :</b><br><br>Informed of situation   |
| <b>ICCON-2</b> | Incident, or pathology results in:<br><br>25% ICU bed occupancy<br><br>>25%-50% hospital capacity                            | Same as above.<br><b>In addition:</b><br>Allocate 5-15% of beds as back up non incident related critical cases<br>Stop non-urgent non-emergency surgical cases                                 | Same as above.   | Same as above  | Same as above,<br>In addition:<br>ward Team allocation should aim to ensure 5-10 beds/rooms with mechanical ventilators.  | <b>CCU:</b><br><br>Allocate 10-15% of resources for possible ICU services.  |
| <b>ICCON-3</b> | Incident, or pathology results in:<br><br>50% ICU bed occupancy<br><br>50-75 % hospital capacity                             | Same as above in addition:<br>Only emergency surgery / endoscopic procedures are allowed.<br><br>Delegate members to ward critical care support team duties and establish am/pm duty schedule. | Initiate, lead organize and oversee duties with the Ward critical care support team and report back to the intensivist covering the ICU. | Same as above, distribution to ward, CCU and adjunct areas | <b>Physician with airway/mechanical ventilator competency;</b><br>Delegated to duties in the ICU, CCU, ward, emergency room and operation theatre as seen necessary<br><br><b>Ward Team:</b><br>Initial ward allocation should aim to ensure 10-15 beds/rooms with mechanical ventilators<br><br>Receive and manage patients on ventilators discharged from the ICU and new incident related patients | Allocate 40 % bed/manpower/resources standby for ICU.   |
| <b>ICCON-4</b> | Specific incident, or pathology results in:<br><br><b>&gt;75 % ICU bed occupancy</b><br><br><b>&gt;90% hospital capacity</b> | Same as above<br><br>All chronically ventilated to be sent to ward<br><br>All home ventilated patients should be sent home.  | Same as above,<br><br>Coordinate with ward team to allow for 20-30 ventilated patients onward.   | Same as above, distribution to ward, CCU and adjunct areas | Receive patients and liaise with ICU attending  | <b>CCU :</b><br>15-25 % bed / manpower / resources standby for ICU incident related cases and 5-10% for ICU non incident related cases (maximum acceptable occupancy by incident related pathology is 50-60%. |