

## COVID 19 CRITICAL CARE TRAINING SURGE EXPERIENCE FOR PHYSICIANS IN RIYADH HEALTH CLUSTER ONE, SAUDI ARABIA

MADY AF<sup>1,2\*</sup>, RAMADAN O<sup>1</sup>, ALYOUSEF R<sup>3</sup>, ISHAG A<sup>4</sup>, BAKIROVA G<sup>1</sup>, KUHAİL A<sup>1</sup>, SHAHZAD S<sup>1</sup>, EL-ETREBY W<sup>1</sup>, MUMTAZ S<sup>1</sup>, ALMOZAINY S<sup>3</sup>, PALACIO K<sup>1</sup>, ALDAMAHSHI D<sup>3</sup>, ALCAZAR A<sup>1</sup>, ALODAT M<sup>1</sup>, ABDELRAHMAN B<sup>1</sup>, HARTHY A<sup>1</sup>

<sup>1</sup>Critical Care Department, King Saud Medical City, Riyadh, Saudi Arabia

<sup>2</sup>Department of Anesthesiology and critical care, Tanta University Hospitals, Tanta, Egypt

<sup>3</sup>Organization Development Department, Riyadh Health Cluster One, Riyadh, Saudi Arabia

<sup>4</sup>Medical Liaison Office, King Saud Medical City, Riyadh, Saudi Arabia

Corresponding author email address: [afmady@hotmail.com](mailto:afmady@hotmail.com)

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**General Goals and Objectives:** *As the COVID-19 pandemic spreads, the number of critically ill patients is expected to surge in hospitals across the world. This may result in non-ICU clinicians being needed to care for critically ill patients, In line with Pandemic COVID – 19 situations that we are facing currently; the Critical Care Department Training Committee of King Saud Medical City in collaboration with the Riyadh Health Cluster One, Saudi Arabia conducted a series of training projects. Its goal is to help non – ICU Physicians to be equipped and be more competent to handle critically ill patients when the situation will have the need for it. We aim to provide basic knowledge and skills to successfully manage critically ill patients with suspected or confirmed COVID – 19 cases in a critical care setting.*

**Keywords:** COVID-19, critically ill, training, ICU, physicians

### Targeted Audience

This plan aims to deliver non-ICU physicians who haven't received prior formal critical care training and would like to volunteer or nominated as back up workforce in covid-19 crisis. They are being nominated in collaboration with a chain communication between Organization Development and Academic Affairs, Riyadh 1<sup>st</sup> Health Cluster (C1), Postgraduate departments of C1 institutions, Hospitals medical directors, Head of Departments, KSMC Medical Liaison Office and training program directors. Three target audiences with different training approach for each category. First, non – ICU physicians either service physicians or trainees, which is the most target category of our training plan. Second, ICU and Anesthesia physicians, the most connected specialty to ICU and finally, Maternity staff (COVID19 in pregnancy).

### Chain of Communication for nomination and deployment

Below a diagram showing the chain of command from Cluster executives who have detailed reviewed the Surge staffing plan to the support of Riyadh Health Cluster 1 hospital and medical directors in

collaboration with the head of departments and training program director's effort in nominating their colleagues through the communication of COVID19 command center and Medical Liaison Office (MLO). Final nominees were forwarded to CCD Physicians Affairs Divisions (PAD) through an email for final deployment.

### Educational Training Approaches

The training committee meticulously organized a series of courses and workshops to accommodate larger number of participants. The participants will go through 6 phases before officially joining the workforce on the Frontline.

### Clinical Training

These are the following phases

#### I. Online Learning (Self – directed): Phase 1

They are given resources of online courses from Society of Critical Care Medicine free open and ongoing SCCM's Critical Care for the Non-ICU Clinician as well as The Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU). They must take the course as a prerequisite to our course so as to build an idea of the intended theoretical learning objective for basic critical care and COVID – 19. MBRU have designed a free online

course titled “Let’s Break the Chain of COVID-19 Infection”, as part of the MBRU Community Immunity Ambassador Program. This program will provide you with rapid training on key aspects of infection and immunity to empower you on how to prevent and control the spread of COVID-19. The

course covers the chain of infection, how infectious diseases are transmitted and how to break the chain of infection through concrete preventive actions.

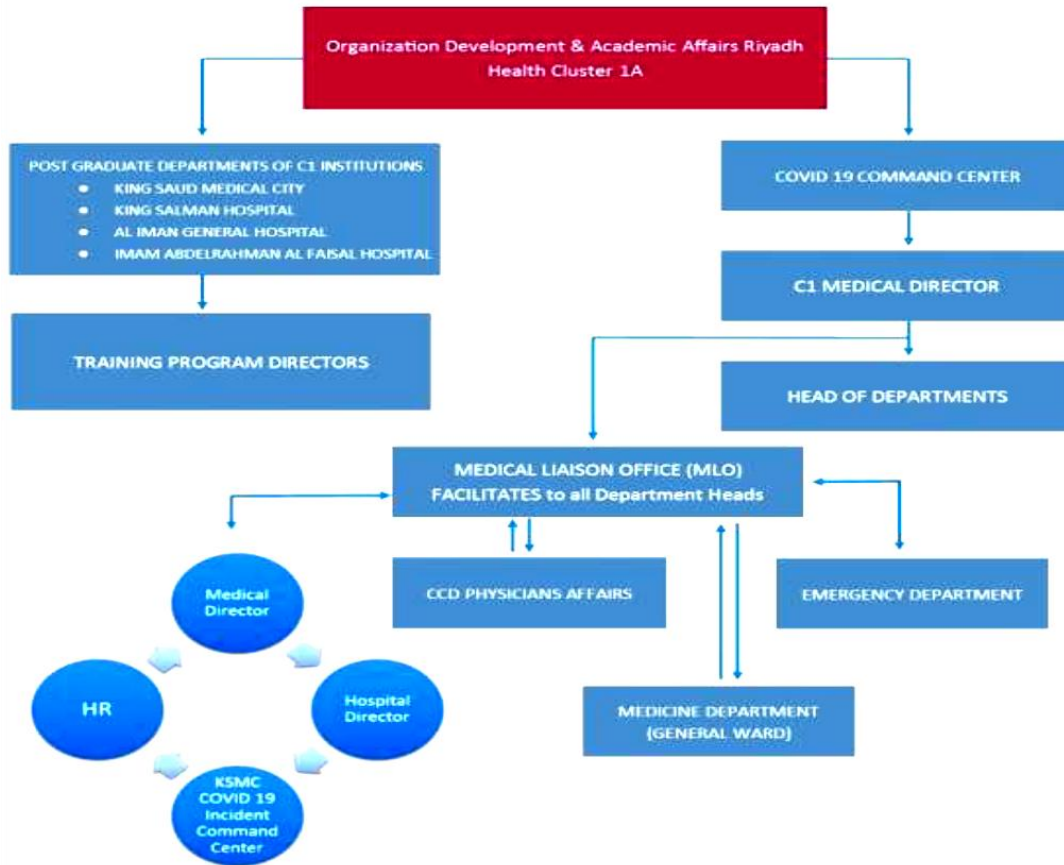


Figure 1. Chain of Communication for nomination and deployment of non-ICU physicians



Figure 2. Phases of training of Non-ICU physicians

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**II. Online Critical Care Courses: Phase 2**

A series of courses conducted in an interactive virtual setting set to focus on topics essential and relevant to critical care and COVID 19 (tables 1 and 2)

**Table 1 A) Online Critical Care Topics for Non – ICU Physicians**

Follows three major domains:

**1- Essentials of critical care**

- ✚ ABG Interpretation
- ✚ Shock and Fluid Resuscitation
- ✚ Essentials of Mechanical Ventilation

**2- HCW Safety during COVID19**

- ✚ Infection Control for COVID – 19
- ✚ Aerosolized generating procedures
- ✚ STAY SAFE: Open Discussion

**3- COVID19 management**

- ✚ Pathway & Definitions of COVID – 19
- ✚ Quick Guide for Management of Critically Ill patients with COVID – 19
- ✚ COVID – 19: A Pathological Approach to Management
- ✚ ARDS in COVID – 19
- ✚ Pharmacology of COVID – 19
- ✚ COVID 19 Pneumonia
- ✚ CPR Dynamics in COVID – 19

- ✚ COVID Intubation, Transfer of Patients, Airway Management (with simulation Videos)

**B) COVID – 19 Infection & Pregnancy**

- ✚ Overview of COVID – 19 Diagnosis & Management Protocols
- ✚ COVID – 19 in Pregnancy (Case Definition & Pathways)
- ✚ COVID – 19 in Pregnancy: General Management
- ✚ Infection Control Precautions & PPR Recommendations
- ✚ Airway Management and special considerations in pregnancy
- ✚ Pharmacology of COVID19 in Pregnancy
- ✚ CPR & Considerations in pregnancy

**C) Online Critical Care Course for ICU & Anesthesia Physicians**

- ✚ Definition, Clinical Presentation – Triage
- ✚ PPE – Donning and Doffing
- ✚ Pathophysiology of COVID19
- ✚ Diagnostic Testing & Severity of COVID19
- ✚ ARDS COVID Basic and advanced management
- ✚ Pharmacology in COVID – 19
- ✚ Novel modalities: Convalescent Plasma and Plasmapheresis
- ✚ Aerosol Generating Procedures – AGP
- ✚ Cluster COVID – 19 Protocol Awareness

**Table 2 Courses Dates & Number of Attendees**

Course Title	Date	Number of Attendees
1 <sup>st</sup> Online Critical Care Course for Non- ICU Physician	April 5 - 8, 2020	69
2 <sup>nd</sup> Online Critical Care Course for Non- KU Physicians	April 12.15, 2020	60
3 <sup>rd</sup> Online Critical Care Course for Non- ICU Physicians	April 19-20 & 22-23,	75
4 <sup>th</sup> Online Critical Care Course for ICU & Anesthesia Physicians	May 4 - 5, 2020	61
5 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	May 12 -14, 2020	34
6 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	May 19 - 21, 2020	32
7 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	June 2 -4, 2020	109
8 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	June 16 -18, 2020	32
9 <sup>th</sup> COVID 19 Infection & Pregnancy (Mixed Pklicians & Musa)	25-Jun-20	62
10 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	July 13 —15, 2020	Expected: 85
11 <sup>th</sup> Online Critical Care Course for Non- ICU Physicians	Aug. 3 — 5, 2020	Expected: 85
Total number trained		534

**III. MCQs Assessment: Phase 3**

At the end of the session, 40 Multiple-Choice Questionnaires (MCQs) were distributed. This is to evaluate the participants’ understanding in all topics presented. Once passed, he/she will proceed to the next phase which is clinical training.

**IV. Clinical Training: Phase 4**

In adherence with the COVID19 precautionary measures under the Infection control

recommendation, there were 3 stations organized within ICU premises. These stations namely Basic Airway Management; Basics of Mechanical Ventilation and infection control measures and Personal Protective Equipment ( table 3) . Each participant was rotated every 40 minutes following the 6:1 trainee/trainer ratio per station. Then, competencies were being administered utilizing the Saudi Commission for Health Specialists (SCFHS) Competency forms. Every competency involves

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interactive and participants were allotted time to seek questions that were unclear to them.

**Table 3 Clinical Training workshops**

**A) Airway management: Building on established BLS skills:**

- ✚ Safe two hand face - mask bagging to optimize seal and minimize aerosolization.
- ✚ Oropharyngeal and nasopharyngeal airway selection and insertion.
- ✚ Rescue airways insertion: Supraglottic airway (laryngeal mask).

**B) Ventilator management:**

- ✚ Provide instruction on dealing with different type of oxygen delivery system that are required for critical ill COVID- 19 patients:
- ✚ High flow nasal cannula (HFNC)
- ✚ Invasive mechanical ventilators (IV)
- ✚ Non-invasive mechanical ventilators (NIV)
- ✚ Hands on practice for setting and adjusting basic ventilator settings:
- ✚ Respiratory rate
- ✚ Tidal volume
- ✚ Fractional inspired oxygen (FiO2)
- ✚ Positive end expiratory pressure (PEEP)

**c) Infection control measures:**

- ✚ Proper use of Personal Protective Equipment (PPE) e.g. N95 mask, PAPR etc...
- ✚ Donning and doffing

**V. Orientation and Preparation for Joining: Phase 5**

Introduction to ICU Settings, COVID - 19 protocols, ICU allocation and file orientation, rotation schedule, job description, psychological preparedness, receiving questions for queries from them.

**VI. Deployment and Joining: Phase 6**

In charged division; ICU Physician Affairs Division (PAD) , **Roles:** KSMC ICU Physicians and Non-ICU Manpower in charged; Cluster A1 ICU Staffing plan and ICU Physician support deployment, ROTA & Logistics

**Process:** Once non-ICU physician’s nominees from department heads is received through ICU email. Automatically their names will be added in the database for Surge plan. Fig 3

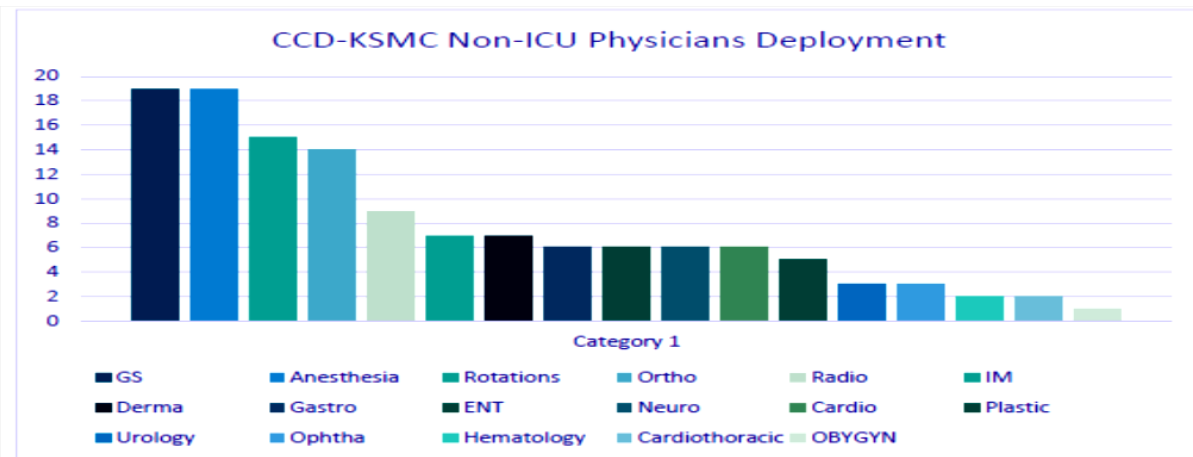
**Training Evaluation and Feedbacks**

A survey was distributed to all participants before and after of each course to assess their readiness and satisfaction. Tab 4

**Tab 4 Training Evaluation and Feedbacks**

Positive Feedbacks:

- ✚ Remarkable Speakers
- ✚ Easy and Accessible anytime, anywhere with good internet connection
- ✚ Informative Course
- ✚ Point to be improved:
- ✚ Need more detailed and deeper ICU Course
- ✚ Arranging between presenters to avoid repetition
- ✚ Time management
- ✚ Topics too advanced for Non- ICU Audience



**Figure 3. Non-ICU Physicians Deployment at ICU of King Saud Medical City**

**Insightful Analysis**

Even though this Pandemic struck us all hard in the gut, we proved that with hard work and team work we can do impossible things. Due to this crisis, we came hand in hand in preparing our Front liners to be the best in caring COVID – 19 patients. We have set aside our own indifference for all the greater good... etc.

**Points to Ponder**

- ✚ Our aim is to help as many physicians as possible to be prepared for this crisis, however we cannot avoid issues along the way.
- ✚ Geographical location of the attendees affecting the internet quality. For instance, during the course poor quality internet reception is a major factor. Considering different locations of

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attendees, thus some episodes of buffering occurred while lectures were ongoing.

- ✦ Nomination of participants, we are grateful that almost all departments are nominating physicians to participate but it turns out sometimes the nominated physician doesn't know he is being nominated therefor resulting to cancellation or participant being absent.
- ✦ We faced some difficulties for doing the practical part of training due to social distancing precautions, infection control instructions and shortage of spacing but we did our best to compensate and focusing on bedside clinical training at joining to ICU,
- ✦ Demographic summary, Average Age Group was 35 (25-59) years old but we still have few elder physicians which are categorized as high risk in COVID19, Common Comorbidities among participants were Hypertension & Diabetes Mellitus which considered high risk during COVID19
- ✦ Untimely date. During these periods majority of the attendees were Residents, who were at a time occupied in preparation of their upcoming promotion exams while some completed the training programs and served the covid-19 crisis
- ✦ Subspecialty conflict. Non familiarization of the topics. Some specialties are not connected to ICU; oftentimes we are facing difficulties in extensive information being delivered to them like Dermatology, Radiology, etc.
- ✦ COVID 19 Crisis surge; the same attendees were a time attached to serve the ICU and ER covid-19 surge coverage. Tough time for everyone who was not accustomed to a hectic duty schedule in an unfamiliar place. Deliberately, less were able to proceed due to this conflict. Thus, future courses will be offered to accommodate everyone who is willing to participate but with the same concern.

#### Acknowledgment

It has been an ultimate mission on our part as organizers to deliver the most effective and quality course in ICU. Now, as this pandemic has led us to adopt the current trend of online teachings. It is of



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great privilege in recognizing the support of the KSMC executives under the patronage of Dr. Ahmed Alenezi, ICU administration headed by CCD energetic mentor our very own supportive Medical Director -Dr. Abdulrahman Al Harthy, Riyadh Health Cluster One executives to KSMC head of departments, Dr. Rafah Saleh Alyousef (Vice President of Organization Development of Riyadh Health Cluster One), Ms. Shatha Hamza Almozainy (Strategic planning & Development of Human Capital Director), Ms. Dimah Aldamahshi (Organization Development Specialist), Ms. Kristene Palacio and Ms. Emiliana Alvarez (CCD Coordinators) and the technical and scientific expert Dr. Ahmed Kuhail and Dr. Gultakin Bakirova academic and program directors, colleagues and the team whom without their tireless support this course will not be a success. Lastly, the attendees and knowledgeable speakers (Dr, Ahmed Mady, Dr. Omar Ramadan, Dr. Basim Huwait Dr. Mohammad Al Odat Dr. Shahzad Mumtaz, Dr. Ahmed Balshi Dr. Waqas Mahmood, Dr. Saima Shahzad, Dr. Gultakin Bakirova, Dr. Waleed Tharwat El-etreby, Dr. Tasmiya Asad, Dr. Basheer Abdelrahman, Dr. Alhussain Alhazzmi) who interactively shared their knowledge and expertise. The KSMC active training coordinators. The brilliance and well systematic organization of manpower strategy headed by Dr. Omar Ramadan with his passionate assistant Ms. Alva Alcazar and active participation of MLO by Dr. Adam Ishag. Last but never the least to Allah for giving us the opportunity to resume our mission, not just the KSMC staff now we're delivering wider audiences of MOH medical staff in Cluster A1 Riyadh.

Truly, an esteemed milestone in Critical care department Education and training division of King Saud Medical City in collaboration of cluster A1 leaders.

#### Conflict of interest

The authors declared absence of conflict of interest.

#### References

- 1 <http://sccm.informz.net/z/cjUucD9taT05MjA4NTc3JnA9MSZlPTEwODM2MDM4ODUmbGk9NzUwMDA3MDQ/index.html>
- 2- <https://learn.mbru.ac.ae/courses/covid19>

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