

Recommendations for Rapid Response Teams (RRTs) and Critical Care Outreach (CCO) services in the context of the COVID-19 pandemic



INTERNATIONAL
SOCIETY FOR RAPID
RESPONSE SYSTEMS

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What are Rapid Response teams and Critical Care Outreach services?

The international Society for Rapid Response Systems (iSRRS) is the peak international body related to Rapid Response Teams (RRTs) and Critical Care Outreach (CCO) services around the world. The aim of the iSRRS is to **improve the prevention of, and response to acute deterioration in hospitalised patients.**

A RRT is a team of expert clinicians who are called to review patients who are clinically deteriorating in a hospital with the aim of assessing, triaging, resuscitating, and escalating care to a safer environment when needed. The RRT is a reactionary team that is activated when a patient breaches pre-defined calling criteria, typically based on derangement of abnormal vital signs.

The term CCO service is intended to indicate a team of critical care clinicians working outside of the intensive care unit who also pre-emptively review and manage patients who are at-risk of clinical deterioration. It is acknowledged that there will be overlap between the RRT and CCO services.

The term "Rapid Response System" (RRS) describes the entire system: the afferent and efferent limbs, as well as evaluative/ process improvement and administrative limbs (Fig 1).

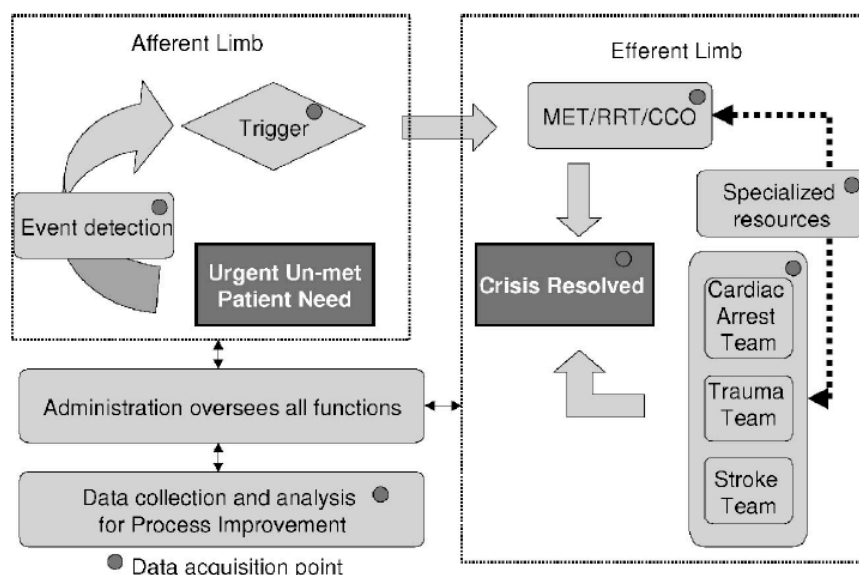


Figure 1: Elements of the Rapid Response System (RRS)

What is COVID-19?

COVID-19 is an infectious disease primarily affecting the respiratory tract of humans, caused by a newly described virus of the corona virus family (SARS-CoV-2). The most common features of COVID-19 are:

1. Fever,
2. Dry cough,
3. Sore throat,
4. Muscle aches and pains, and
5. Shortness of breath.

Rhinorrhoea and diarrhoea are less common features of COVID-19. Typically, 80% of cases are mild and improve in approximately 5-7 days. Approximately 15% of cases develop

a viral pneumonia while 5% progress to respiratory failure, acute respiratory distress syndrome (ARDS) and other organ failures requiring intensive care support. Mortality is increased in older patients and in those with chronic heart and lung conditions.

Why is COVID-19 important to the RRT and CCO service?

Patients with suspected or confirmed COVID-19 represent an important cohort of patients for the RRT and CCO services because they:

1. require hospitalisation in instances in cases where the patient's condition worsens,
2. may present to the emergency department as an undifferentiated respiratory illness, or flu-like symptoms,
3. might experience clinical deterioration in hospital requiring RRT/CCO service review,
4. pose an infective risk to the responders from the RRT and CCO service, particularly if advanced respiratory support is required,
5. may require admission to the intensive care for advanced respiratory support, mechanical ventilation and other artificial organ supports, and
6. may require review by critical care staff to determine whether admission to intensive care is likely to provide a significant benefit without causing unreasonable discomfort and distress.

Overarching principles

We recommend the following overarching principles for RRT and CCO services in the context of the COVID-19 pandemic.

1. Staff should be trained and practiced in the appropriate use of personal protective equipment (PPE) to prevent transmission of infection.
2. A contemporaneous list of patients with suspected/confirmed COVID-19 should be maintained and be available to critical care staff.
3. All patients should have appropriate documentation of goals of care and/or not for resuscitation (NFR) orders to record their suitability for intensive care treatment in the event of significant deterioration.
4. Afferent limb calling criteria may need to be tailored to enable early identification of respiratory deterioration; noting that sudden deterioration is common in this group
5. Responding teams should be trained, ideally using simulation, particularly in the area of cardio-pulmonary resuscitation, endo-tracheal intubation, and patient transport.
6. Identification of personnel and roles in a "time out" format should precede all airway management events and should be led by the most senior clinician available.
7. Hospitals should have a documented approach to the clinical evaluation of patients with suspected/confirmed COVID-19 which includes escalation of care in the event that the patient requires transfer to the intensive care or endotracheal intubation.
8. In the event that intensive care units are overwhelmed with critical illness related to COVID-19, non-intensive care staff may need to be involved in RRT and CCO services.
9. Staff should review contemporaneous evidence regarding the relative risk:benefit ratio to patients and staff of nasal high flow oxygen and non-invasive ventilation.
10. RRT and CCO staff meet with staff from infectious diseases, respiratory medicine and anaesthesia to be aware of team members and current at-risk patients. Use of conference calls can allow this communication to occur in without in-person meetings.
11. Frequent opportunities for shared learning should be organised.
12. RRT/CCO service staff will require moral support and opportunities for debriefing.

Safety for RRT responders

We recommend that the composition of existing response teams be examined and modified such that key tasks can be accomplished with the minimum number of people entering a patient's space. Use of video conferencing facilities to support remote consultations for patients who are not critically ill should be used where possible.

We recommend that hospitals obtain PPE equipment consistent with current recommended guidelines. Responders should be trained in the use of PPE. If staffing permits, dedicated staff should supervise application (donning) and removal (doffing) of PPE. Examples of PPE include:

1. hand sanitiser,
2. N95 face masks,
3. waterproof gowns,
4. gloves,
5. face shields or goggles, and
6. hats

PPE should be available to the arriving RRT /CCO staff. A limited supply of PPE should be kept on the RRT trolley for remote response areas. The smallest number of people possible should enter the room or bed space of suspected / confirmed COVID-19 patients, as well as patients with respiratory symptoms. When possible, the emergency trolley/cart should not be taken into the room. Consideration should be given for having a bowl on the trolley to allow passing of items into the room without contacting the hands of potentially contaminated staff.

Staff involved in endo-tracheal intubation may require higher levels of PPE and should complete simulation training for endo-tracheal intubation. This should ideally occur pre-emptively (not too late) and under controlled conditions. Intubation should ideally occur in designated areas of the hospital such as a negative pressure room. Following intubation, the patient should remain in the designated intubating area for a defined period (e.g. 15 min) prior to moving to a definitive area to reduce aerosolization.

Staff involved in RRT and CCO response are at an increased risk of fatigue, anxiety, moral distress and post-traumatic distress disorder. We recommend strategies for maintaining team morale including "safe spaces", social media forums to create a positive culture, as well as the use of hospital psychologists or psychiatrists to support staff. Staff should receive adequate nutrition, hydration, and rest.

Identification of suspected / confirmed cases

We recommend hospitals maintain a list of patients who have suspected / confirmed COVID-19 to allow:

1. pre-emptive and pro-active review of patients to plan care and promptly detect clinical deterioration, noting that deterioration can sometimes be rapid,
2. responding staff to know the COVID-19 status of patients prior to arrival,
3. appropriate isolation and barrier nursing.

We recommend segregation and cohorting of confirmed cases in designated clinical areas where possible in order to reduce transmission of infection. In instances where the hospital is overwhelmed it may be necessary to use portable oxygen and suction equipment. Responding staff will be required to bring equipment and need to be educated about the location of these novel locations and essential equipment.

Use of non-invasive ventilation and high flow nasal oxygen

At the time of writing this report there were conflicting recommendations regarding the use of non-invasive ventilation (NIV) (including continuous positive airway pressure [CPAP]) and high flow nasal oxygen (HFNO). These treatments may avert the need for endo-tracheal intubation but may potentially pose an increased risk of infection transmission due to aerosolization.

If NIV, CPAP and HFNO are used for the treatment of hypoxic respiratory failure in cases of COVID-19 we recommend:

1. appropriate PPE for treating staff,
2. use of negative pressure rooms where possible,
3. implementation of clear guidelines to assist staff in their use,
4. clear guidelines for SpO₂ targets, as well as oxygen flow and FiO₂ limits, and
5. avoiding escalation to high inspired fraction of oxygen (FiO₂) or high flows of oxygen as this may mask the need for intubation

Method of activation of the RRT

Hospitals should consider modifying calling criteria or the method for activation of the RRT / CCO service review based on:

1. contemporaneous evidence about the appropriate timeliness of endo-tracheal intubation,
2. skill mix and expertise of responders,
3. availability of critical care beds, and
4. contemporaneous evidence regarding the relative risk:benefit to patients and staff of HFNO, CPAP, and non-invasive ventilation.

Hospitals may need to lower the thresholds for inspired fraction of oxygen (FiO₂) and respiratory rate so that the RRT responds earlier in the course of deterioration.

Hospitals may wish to have a specific calling criteria or response call for patients with suspected or confirmed COVID-19. Such an approach should protect the privacy and confidentiality of the patient concerned. An example is the creation of a "Code-95" to alert responding staff, and to remind them to apply N-95 masks and other PPE before arrival.

Coordinating a response to a patient with suspected or confirmed COVID-19

Staff who respond to emergencies involving COVID-19 patients should have a clear understanding of the following.

1. Their role in the assessment, triage and management of the patient.
2. To whom they should communicate and escalate care.
3. The donning and doffing of PPE.

4. Guidelines and protocols regarding:
 - a. the triggers/thresholds for transferring patients to the intensive care unit
 - b. designated areas where intubation should occur,
 - c. their roles in endo-tracheal intubation, and
 - d. preferred medications for use during rapid sequence intubation.

Most guidelines regarding intubation advocate:

1. having experts rather than trainees attend to intubation procedure and
2. use of Video Laryngoscopy to improve first-time success rate and to increase the distance between the anaesthetist and the airway.

Additional support staff will be required to assist with acquisition of essential equipment and medications and for intra-hospital transport of patients. Such staff should also be involved in team training and education regarding the appropriate use of PPE.

Equipment trolleys made need modifications and plastic covers to prevent contamination as well as a supply of PPE. Pre-made bags (grab bags) containing medications for endo-tracheal intubation may facilitate timely and coordinated intubation.

Hospitals may consider the use of simplified decision support tools that are available at the point-of-care to guide clinicians in the assessment and disposition of suspected/confirmed COVID-19 patients. An example is provided in Figure 2.

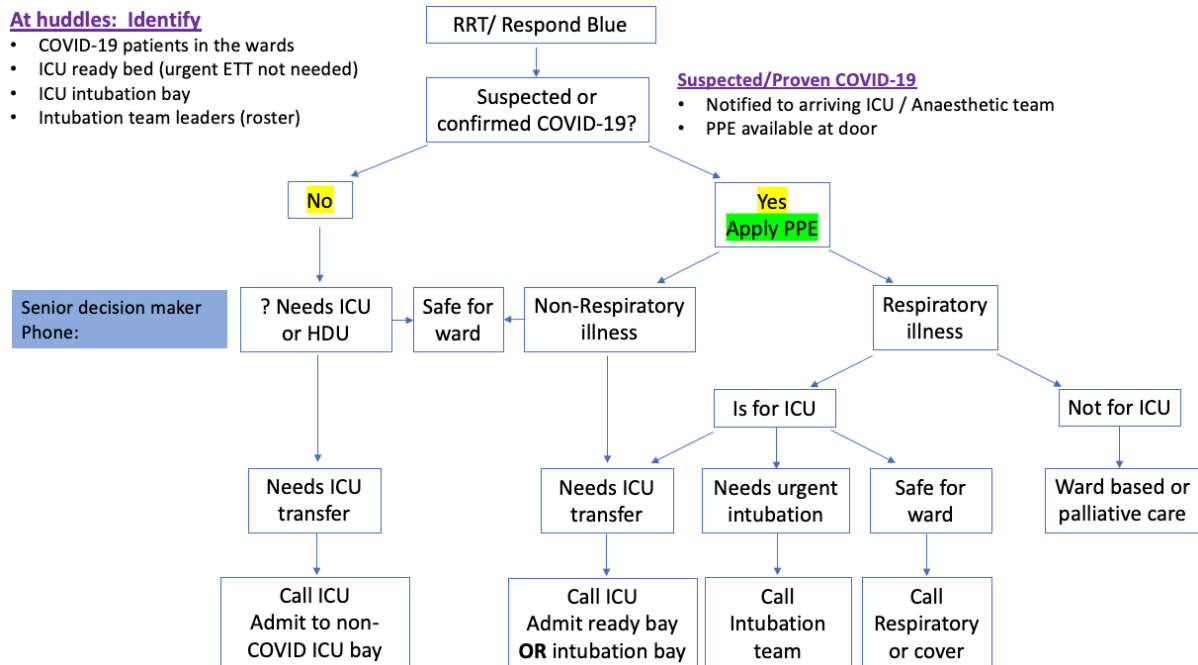


Figure 2: Example of decision support tool to guide RRT/Respond Blue teams in the evaluation, management and disposition of deteriorating patients in COVID-19 pandemic. RRT = Rapid Response Team; ICU = intensive care unit; HDU = high dependency unit.

Hospitals need to develop strategies and contingencies for the management of large number of COVID-19 patients. This should include:

1. cohorting of positive patients in the same area,
2. the location of additional clinical care areas when usual ward capacity is exceeded, and
3. principles for triaging of patients requiring ICU care, particularly when demand for ICU care exceeds capacity.

Use of non-ICU staff as members of the responding team

In instances where the Intensive care staff are overwhelmed by critically ill COVID-19 cases or are themselves unwell due to illness, it may be necessary to have non-intensive care trained staff responding to deteriorating ward patients. We recommend the following guiding principles in the use of non-ICU staff in such circumstances:

1. The most senior and experienced staff available should respond to the clinical deterioration.
2. Patients should have consideration for goals of care and Not For Resuscitation orders where appropriate. Such conversations should include evaluation of patient preferences for care, functional status, clinical frailty, and the benefits and likely outcome of intensive care versus other treatment options.
3. Examples of responding staff may include anaesthetists, anaesthetic trainees, respiratory physicians or trainees, general physicians or trainees.
4. Calling criteria may need to be adjusted so that deterioration is recognized at an earlier time.
5. Staff should receive training material regarding the evaluation and management of such patients. A free and open access e-book is available at <https://rrthandbook.org>.
6. Hospitals should develop criteria for referring to ICU staff and alternative pathways for care of deteriorating patients in the absence of an available ICU bed. Such criteria and pathways may change with time.

Training of staff

We recommend that proactive training occurs in the following areas.

1. Donning and doffing of PPE.
2. Awareness of any modification of calling criteria and means of activation that is specific to COVID-19.
3. The indications and precautions around the use of HFNO, CPAP and non-invasive ventilation where assessed as appropriate.
4. Criteria for escalation to senior decision makers.
5. Transfer of patients from areas outside of the ICU to the ICU.
6. Endo-tracheal intubation following appropriate PPE application.

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Appendix 1: Authors

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