



COVID-19 Standards and Practices for First Responders Managing Code Blue Alerts/ Patients in Cardiopulmonary Arrest

Disclaimer:

This *Quick Response Report* was published on June 22, 2021. Given the rapidly changing nature of the coronavirus pandemic, some of the references included in this report may quickly become out-of-date. We further caution readers that researchers at the Newfoundland & Labrador Centre for Applied Health Research are not experts on infectious diseases and are relaying work produced by others. This report has been produced quickly and it is not exhaustive, nor have the included studies been critically appraised.

Original Inquiry

“How do other healthcare jurisdictions manage Code Blue/cardiopulmonary arrest protection levels for fully vaccinated healthcare workers?”

- “A Code Blue alerts all staff to a medical emergency such as cardiac arrest. Now, all critical patient arrests are “Protected Code Blues” where the care team meticulously don and doff their Personal Protective Equipment (PPE) in controlled areas, to mitigate risk to themselves, their colleagues and their patients.” – Sinai Health, Mount Sinai Hospital ([LINK](#))
- “Fully vaccinated refers to a person who is: ≥ 2 weeks following receipt of the second dose in a 2-dose series, or ≥ 2 weeks following receipt of one dose of a single-dose vaccine; there is currently no post-vaccination time limit on fully vaccinated status” – CDC (US) ([LINK](#))

Summary

- Our search results indicate that there appear to be no changes to protected status for Code Blue alerts (and other medical emergencies) among Canadian healthcare jurisdictions. Code Blue alerts still require all healthcare personnel to wear PPE, regardless of the worker’s vaccination status.
- Guidelines and protocols referring directly to “Code Blue” alerts are mainly found among hospital-based organizations. Our search results indicate that these organizations consistently still require healthcare workers to don PPE for Code Blue alerts.

Guidance

National or Sub-National Health Jurisdictions

CDC. Updated Healthcare Infection Prevention and Control Recommendations in Response to COVID-19 Vaccination. April 27, 2021 ([LINK](#))

- “Recommendations for use of personal protective equipment by [healthcare personnel] remain unchanged.”

Health Canada / Public Health Agency of Canada. Infection prevention and control for COVID-19: Interim guidance for acute healthcare settings. May 21, 2021 ([LINK](#))

- “AGMPs (aerosol generating medical procedures) on a patient who is considered potentially infectious with SARS-CoV-2 should only be performed when all healthcare workers in the room are wearing a fit-tested, seal-checked N95 or equivalent respirator, gloves, a gown and eye protection.”
- Resuscitation is considered an aerosol generating medical procedure. See WHO (2020): [Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations](#).
- These guidelines appear to remain in effect.

Ontario Ministry of Health. COVID-19 Guidance: Acute Care. June 15, 2020 ([LINK](#))

- “All healthcare workers or other employees who are within two metres of suspected, presumed, or confirmed COVID-19+ patients or residents shall have access to appropriate PPE. This will include access to: surgical/procedure masks, fit tested NIOSH-approved N-95 respirators or approved equivalent or better protection, gloves, face shields with side protection (or goggles) and appropriate isolation gowns.”
- See also: [Personal Protective Equipment \(PPE\) use during the COVID-19 Pandemic](#) (March 30, 2020). Indicates that resuscitation is an aerosol generating medical procedure that requires appropriate PPE.
- These regulations appear to remain in effect.

BC Centre for Disease Control & BC Ministry of Health. Infection Prevention and Control (IPC) Protocol during In-Hospital Code Blue for Adult Patients. January 20, 2021. ([LINK](#))

- E. Code Blue Team:
 - Minimize Code Blue team personnel present in the patient’s room or surrounding area to decrease the risk of exposure.
 - If available, additional Code Blue team members should be outside the room donned in appropriate PPE in case they are required.
 - Consider early application of mechanical CPR device to limit staff exposure, if available.
- These regulations appear to remain in effect.

Regional Health Authorities and Hospitals

McGill University Health Centre. MUHC: COVID-19 Code Blue Adult Procedures. Focused Update on CODE BLUE Procedures. April 21, 2021. ([LINK](#))

- “All patients at the MUHC requiring Code Blue interventions should be considered potentially COVID-19 positive.”
- All healthcare staff are required to don and doff PPE.
- PPE required for Code Blue:

- Gloves
- Impermeable Gown (Level 3)
- N95 mask
- Face shield
- No need for hat/shoe covers (shoes should be restricted to the work units)
- These guidelines (for all aerosol-generating procedures) appear to remain in effect.

Hamilton Health Sciences: Code Blue Committee. **Practice Alert: Adult Code Blue Response during COVID.** April 14, 2020. [LINK](#)

- All Code Blue calls will be treated as “Protected Code Blue” effectively immediately. A Protected Code Blue (PCB) is a response framework designed to minimize exposure of staff and physicians to suspected or confirmed COVID patients as well as minimize the unnecessary utilization of our PPE stocks.
- What does the Protected Code Blue team do differently?
 - The team is made up of the most skilled staff and physicians available to respond (some variation in members depending on your specific site)
 - The team captain will determine which members are required in the room on arrival based on cardiac vs respiratory arrest
 - Enhanced PPE will be worn by the team members selected to enter the room and must be checked by the Safety Coach prior to entering the room
 - The team captain will determine what equipment/supplies are needed and they will be passed into the room (The Code Cart will remain outside the room)
 - The team will use specialized tools and medications to further minimize the risk of exposing the team to aerosolized particles
 - Members of the team who aren’t in the room will be outside providing support to the team in the room

St. Joseph’s Healthcare. **Safety Protocols.** April 15, 2020. [LINK](#)

Protected Code Blue:

- St. Joseph’s has implemented a Protected Code Blue Policy (PCB) to help protect our healthcare workers and patients, and to help reduce the spread of COVID-19. Protected Code Blue is a specialized response to a life-threatening event and will replace the normal code team response to ALL Code Blue calls during the COVID-19 pandemic.
- In addition, the Department of Anesthesia has organized to have 24/7 coverage for anesthesia support for protected intubations and for protected Code Blues effective April 14, 2020. There will be a dedicated anesthesiologist for these calls.

Sunnybrook Health Science Center. **Protected Code Blue/Emergent Medical Intervention. Acute Care Unit/Wards.** March 17, 2020. [LINK](#)

- General guiding principles to reduce potential exposure to healthcare workers where it relates to aerosol generating procedures with high consequence pathogens, include minimizing staff and equipment entering room and modifying processes where possible (e.g. application of surgical mask on patient for compressions, avoiding direct laryngoscopy, pausing compressions for intubation and implementation of a Safety Leader for donning and doffing)

Sinai Health. **Protected Code Blue and Aerosol Generating Medical Procedures for Patients with High Consequence Respiratory Pathogens.** March 19, 2020. [LINK](#)

- The policy describes the modified procedures to be used for cardiopulmonary arrest/Code Blue and other aerosol generating medical procedures to minimize the risk of exposure to healthcare providers carrying out these procedures that are at high risk of generating aerosols.

Anesthesiology and Pain Medicine, University of Toronto. **Code Blue (Protected).** [LINK](#)

Key Points:

- The clinical procedures for Protected Code Blue are similar to those for Emergency Intubation during COVID 19 pandemic.
- Cardiopulmonary resuscitation (CPR) is considered an aerosol generating procedure. Medical personnel involved in CPR of patients with COVID positive / unknown status must wear FULL aerosol generating procedure PPE.
- Medical personnel involved in resuscitation must don FULL PPE (airborne transmission) quickly but meticulously prior to initiation of resuscitation.
- Do not rush into the resuscitation room without proper donning. This is a paradigm shift for many healthcare providers.
- Minimize the number of personnel in the room during resuscitation.
- Recommend administering a full dose of muscle relaxant for paralysis prior to intubation even when vital signs are absent.
- Stop chest compression at the time of endotracheal intubation to prevent the risk of viral aerosolization.

Nova Scotia Health Authority. **Code Blue Guiding Principles during COVID-19 Pandemic.** [LINK](#)

Compression-only cardiopulmonary resuscitation is thought to be a low risk procedure and can be safely initiated with the patient's mouth and nose covered.

- A procedure/surgical mask must be placed over the patient's mouth and nose before starting chest compressions.
- The minimum PPE for the initial responders is Droplet PPE (procedure/surgical mask and eye protection) to initiate chest compression. Additional PPE requirements are based on Point of Care Risk Assessment.
- The PPE for aerosol generating medical procedure (AGMP) is more extensive than for non-AGMPs and, therefore, likely to result in a delay in initiating life saving measures such as chest compressions.
- *Equipment Considerations:*
 - Readily accessible procedure/surgical masks to apply to patient
 - Additions to crash cart during COVID-19 pandemic:
 - 6 N95 masks (2 of each variety)
 - 5 Gowns (level 3 or 4)
 - 5 Face-shields
 - Disposable stop clock
 - Bag mask valve with HME filter attached
- More information on protection measures can be found in [Point of Care Risk Assessment](#)

Systematic Reviews

- None found at this time.

Other Reviews

- None found at this time.

Expert Opinion

Heart and Stroke Foundation Canada. **Updated CPR algorithms in COVID-19 patients.** No date indicated.

[LINK](#)

- “Summary of adjustments to CPR algorithms in suspected or confirmed COVID-19 patients.
 - Reduce provider exposure
 - Don PPE before entering the room/scene
 - Limit personnel
 - Consider using mechanical CPR devices for adults and adolescents who meet height and weight criteria
 - Communicate COVID-19 status to any new providers”
- These algorithms appear to remain in effect.

Resuscitation Council UK. **Resuscitation of COVID-19 Patients in Hospital Infographic.** March 27, 2020.

[LINK](#)

- Guidance referenced by several Canadian healthcare organizations, consists of an infographic on resuscitation of COVID-19 patients.
- “Full Aerosol Generating Procedure (AGP): Personal Protective Equipment (PPE) must be worn by all members of the resuscitation/emergency team before entering the room... No chest compressions or airway procedures such as those detailed below should be undertaken without full AGP PPE.”
- These guidelines appear to still be in effect.

COVIDprotocols.org. **Critical Care Management.** December 20, 2020. [LINK](#)

- *Minimizing Healthcare Worker Exposure:*
 - Code Responses to COVID-19 patients are high-risk events for healthcare worker exposure due to aerosolization with chest compressions and intubation.
 - Use PPE:
 - CDC guidelines recommend N95 respirator, face shield, gown and gloves be used by all code responders during code events (CDC Guidelines, 2020).
 - Minimize personnel:
 - Use an automated compression device where available to minimize personnel.
 - Cover the patient’s face:
 - If it does not interfere with oxygen equipment, place a surgical facemask and/or a blanket over the patient’s face prior to chest compressions while awaiting a definitive airway.
 - Prepare code equipment:
 - To limit transmission of virus while passing meds/supplies into the patient’s room from the code cart, consider creating Code Bags inside the Code Cart pre-packed with necessary code meds (Epinephrine, Bicarbonate, Calcium etc.) and IV/lab supplies.

Primary Research

Resuscitation. **European Resuscitation Council COVID-19 Guidelines Executive Summary.** August 2020.

[LINK](#)

- *Personal protective equipment (PPE) as summarized in Table 2:*
 - Minimum droplet-precaution PPE
 - Gloves
 - Short-sleeved apron
 - Fluid-resistant surgical mask
 - Eye and face protection (fluid-resistant surgical mask with integrated visor or full-face shield/visor or polycarbonate safety glasses or equivalent)
 - Minimum airborne-precaution PPE:
 - Gloves
 - Long-sleeved gown
 - Filtering face piece 3 (FFP3) or N99 mask/respirator (FFP2 or N95 if FFP3 not available)
 - Eye and face protection (full-face shield/visor or polycarbonate safety glasses or equivalent). Alternatively, powered air purifying respirators (PAPRs) with hoods may be used

Med Intensive. **Recommendations on cardiopulmonary resuscitation in patients with suspected or confirmed SARS-COV-2 (COVID-19) infection. Executive Summary.** December 2020. [LINK](#)

- *Recommendations on protection strategies regarding personal protective equipment (PPE) must contemplate the transmission mechanisms described above and include:*
 - Protective clothing and gloves:
 - We recommend the use of comprehensive protective equipment such as overalls or long-sleeved waterproof gowns that can be associated with integrated hoods or removable hoods, for head protection, and leggings to cover footwear. If you do not have full-length overalls or waterproof long-sleeved gowns, the use of plastic aprons or other waterproof material should be considered.
 - We recommend the use of a double glove during the airway approach, subsequently discarding the external pair
 - Respiratory protection measures:
 - During the evaluation of the patient with COVID-19 who suffers clinical deterioration, regardless of their location, we recommend the use of surgical masks or, ideally, FFP2 masks.
 - Given that CPR includes in its development techniques capable of generating aerosols with a high risk of viral transmission, we recommend, regardless of the patient's location, the use of FFP2 masks or, ideally, FFP3.
 - We recommend removing the respiratory protection equipment last, after removing the rest of the PPE components and, if possible, outside the patient's box.
 - Eye and face protection measures applicable in any patient location:

- We always recommend the use of disposable eye protection devices, such as full-face glasses (ideally), screens or caps, both during the evaluation of the patient with suspected or confirmed SARS-CoV-2 infection who suffers clinical deterioration and during CPR maneuvers which may involve the generation of aerosols. We recommend the use of eye protection devices, given the risk of eye contamination through splashes or drops.
 - Ideally, we recommend the use of disposable equipment. If this is not possible, protective equipment must be placed in suitable bags or containers and decontaminated according to the manufacturer's instructions
- General considerations:
 - We recommend clearly communicating the patient's infection status in PCR at the time of activation of the resuscitation teams, whenever new members are incorporated into the resuscitation team and at the time of transfer of the patient to the destination unit.
 - We suggest limiting the number of people who make up the resuscitation team to the minimum necessary to minimize exposure times.
 - All members of the resuscitation team will perform assistance with the recommended PPE, following the established rules and protocols for donning and doffing and always under supervision. It is crucial that ALL healthcare personnel involved in the care of a CPA have received training and training, ideally based on clinical simulation methodology, for the use of PPE.
 - Ideally, disposable / single use PPE is recommended. If this is not possible, disinfection of the equipment will be considered strictly following the manufacturer's standards.
 - We recommend having resuscitation kits that contain all the basic material to be able to carry out a complete advanced resuscitation together with the appropriate PPE for each member of the team that will attend the arrest. To avoid cross contamination, we recommend avoiding the transfer between different areas of the hospital of stop trolleys, defibrillators, etc.

News Articles

Rebelm. **COVID-19: Protected Code Blue.** April 4, 2020. [LINK](#)

- **Proper Personnel Protected Equipment (PPE)**
 - Treat the code as you would an aerosolizing procedure so team members should be in an N-95 mask, with goggles, face shield and hair cap or PAPR. Double gown with water resistant gown and double glove. Members should not enter the room until proper PPE donned.

Methodology

Newfoundland and Labrador Centre for Applied Health Research (NLCAHR) *COVID-19 Quick Response Reports* are initiated by, and shared with, our partners in the provincial health system, including the four NL Regional Health Authorities, the Departments of Health and Community Services and of Children, Seniors and Social Development, and public health officials.

NLCAHR staff work with topic submitters to clarify the research question. We then search for related systematic reviews, meta-analyses, other reviews, interim and other guidance statements, primary research, expert opinion and health and science reporting.

We use several search strategies, with a focus on the following databases:

- [Alberta Health Services](#)
- [CADTH](#)
- [Canadian Pharmacists Association](#)
- [Campbell Collaboration](#)
- [Cochrane Collaboration](#)
- [Centre for Disease Control](#) (CDC)
- [Centre for Evidence Based Medicine](#) (CEBM)
- [Evidence for Policy and Practice Information and Co-ordinating Centre](#)
- [European Centre for Disease Prevention and Control](#)
- [Health Canada](#)
- [Joanna Briggs Institute](#)
- [Johns Hopkins](#)
- [MedRxiv](#)
- [National Institutes of Health](#) (NIH)
- [National Institute of Allergy and Infectious Diseases](#) (NIAID)
- [National Library of Medicine](#)
- [Public Health Agency of Canada](#)
- [Trip Database](#)
- [World Health Organization](#)

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