

## COVID-19 Patients: COMMENTS WELCOME

### Protected Controlled Intubation & Cardiac Arrest.

V 5.0 March 23, 2020.L.Mazurik MD FRCPC

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#### Goal: PREVENT Medical Staff from contracting SARS Co V-2/ COVID-19

This is an approach based on SARS CoV 1 experience. Adapt your resources.

**Background:** In 2003 health care workers contracted SARS, despite wearing PPE. In trying to address this, infection prevention and control (IPAC) experts made frequent changes in the recommendations, sometimes daily. This was extremely unsettling for front line health care providers, as even with these changes, they continued to fall ill, until late in the outbreak when the reason for this was identified.

The risk of transmission was related to the viral load and duration of exposure. Viral loads are highest in the very ill patients and exposure risk is highest if aerosols are generated through:

- Triggered coughing i.e. intubation without paralytics or suction
- BiPAP, CPAP,
- High flow oxygen systems such as high flow nasal cannula,
- Nebulizers,
- Bag mask ventilation with a poor seal and
- Bronchoscopy.
- CPR through ventilation

Surprisingly a significant trigger for a cough is doing a *mid-turbinate swab* to test for SARS CoV2. There is also concern for the use of a supraglottic airway as it is not a closed system and could generate some aerosols. Tips to reduce risks for both of these procedures appear at the end of this document.

Ultimately the HIGHEST RISK TO STAFF was found to be intubation of the ill SARS patient. It was estimated that 9% of staff involved in intubating SARS patients at one Toronto hospital contracted SARS. None died. It is expected that within the patient care setting, SARS-CoV-2 will spread to health care workers the same way as SARS did in 2003.

The additional factor with COVID-19 will be staff contracting the illness in the community environment, where staff are not wearing PPE and will be exposed to mild or asymptomatic COVID-19 patients. Strategies to combat this may include work quarantine. Discussion of strategies to protect the health care workforce is not within the scope of this document.

**CAVEAT: Be prepared for personal protection recommendations to change or vary between various regions or countries.** Supply chain issues may also arise and shortages may occur. OWN the responsibility for your personal safety and those around you. LEARN about the different types of PPE and be ready to find new ways to reduce your risk. Collectively ADAPT to whatever comes your way. CURRENTLY There are differences in recommendations by country.

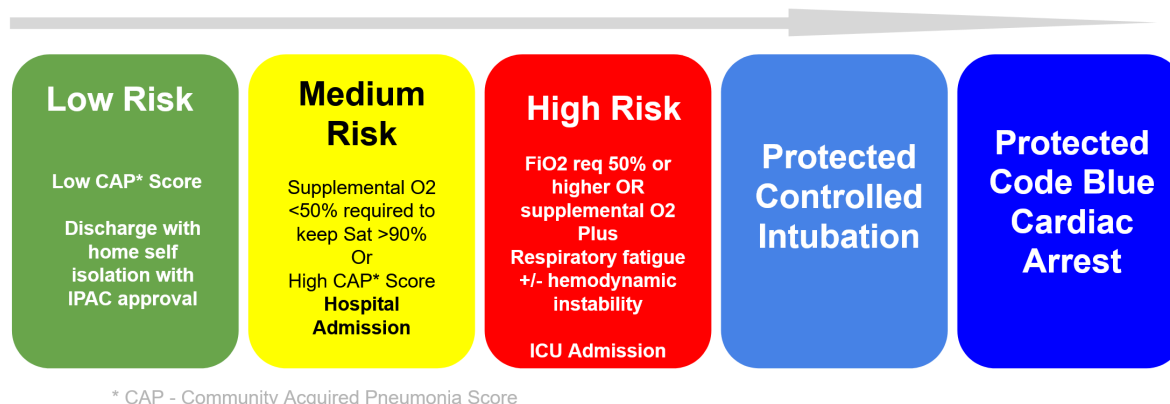
#### IN SUMMARY:

##### Basic Protected Code Blue Principles:

1. Avoid all aerosol generating procedures
2. Keep both the number of people and the duration of exposure to a minimum
3. Wear the correct PPE and DOFF under supervision
4. Use clear plans and checklists where possible.
5. Think **A-B-C not CAB in cardiac arrest. Secure the airway first to protect the team.**

## Protected Controlled Intubation

You will need to assess the risk of requiring advanced airway management with each patient.



Use a \*CAP Score of choice. Anticipate at some point there will be a COVID 19 Severity Score.

**Low Risk:** These are well patients who can go home. When numbers are low this will be done with the approval of IP&C and Public Health (PH). If numbers get high, you will likely have a process put in place to discharge patients without IPC/PH approval just like you would do for influenza now. IPC/PH will likely want to know the patient's name and contact information so they can track them. You should also have written instructions for patients about how to self-isolate and a telephone hotline they can call for advice to avoid a return visit.

**Intermediate Risk:** High CAP Score or Supplemental O2 < 50% needed to keep O2 sat >90. Admit to Hospital or COVID-19 treatment site (possible, if numbers are high).


**High Risk:** High CAP Score or FiO2 > 50 % needed to keep sat >90% OR signs of respiratory fatigue or hemodynamic instability. EARLY Referral or transfer to a hospital with ICU capacity to perform controlled intubation is key. If this is not rapidly available, your team must have a process in place to manage this patient and perform airway management safely. Video or teleconsulting may be available in some areas.

## ID HIGH RISK PATIENTS FOR EARLY INTUBATION

High Risk: FiO2 requirements > 50% to keep sat > 90 or  
<50% + resp fatigue +/- evidence of hemodynamic instability  
Consult ICU in anticipation of need for early intubation.

AVOID BVM, CPAP/BiPAP, High Flow Nasal Prongs, Nebulizers

In areas where there are insufficient ventilators, Helmet CPAP, BiPAP and HFNC are being used. The full risk of this to staff is not known and evidence is being gathered. Efforts to contain the aerosols, appropriate PPE and reduced exposure time is required to reduce this risk to staff.



## ASSIGN ROLES

**danger**

### IN THE ROOM

Best intubator  
Respiratory Therapist  
Nurse  
(add 1 more if doing CPR)

**danger**

### OUTSIDE

Support nurses  
Alternate Intubator  
Safety Officer with check list

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Assemble the minimum number of people needed to perform the procedure (usually 3).

**INSIDE TEAM:** The lead is usually an MD, however, in some facilities the RT may intubate. Adjust accordingly. If the RT intubates, the MD assists and gives the drug orders. RN puts the patient on monitors, starts IV(s) and gives meds.


**OUTSIDE TEAM** Alternate Intubator and Support RN (charts, gets medications) are IN PPE so they can rapidly enter to assist if needed; A Safety Officer –designated to watch for breeches and supervise doffing. If you don't have enough staff to do this (depends where you work) assign responsibilities of watching for breeches and observing doffing to the outside team. A runner out of PPE could support the Support RN to get meds/equipment.

NOTE: Sometimes the inside intubator may want the alternate inside with them. THINK about that, it increases the number of people (usually 2 MDs) exposed and delays them getting back to seeing other patients. If they stay outside, you can talk with them and they can quickly step in if needed, but if you successfully intubate, they can immediately return to seeing other patients.



## DON CORRECT PPE

- N95 respirator
- Gloves
- Impervious or Fluid Resistant Gown
- Head and neck cover if available
- Face shield
- PPE recommendations change, check local guidelines



## HUDDLE

- Meet outside the room
- Team Lead reviews the plan using a checklist.
- Confirm communication between IN/OUT Team works.

Be very clear and concise in your drug orders and intubation sequences.

### RSI Drug Combinations:

These patients are likely to have comorbidities that may reduce their apneic reserve and potentially drop their BP during the procedure. In addition, you will want to keep the patient paralyzed to prevent coughing etc. in the ED initially. If you choose succinylcholine as a paralytic, you should follow with rocuronium. All patients will also need post intubation infusions to keep them well sedated.

\*\*\*\* Prepare ALL drugs in advance \*\*\*\*

*A safe combination for a potentially unstable patient:*

Ketamine 0.5-2 mg/kg (Average adult 100 mg)  
Rocuronium 1.2 mg/kg (Average Adult ~ 100 mg)  
Phenylephrine 100 mcg (Rescue from hypotension)

#### **QUICK PICK 300: Ketamine 100 mg, Rocuronium 100 mg, Phenylephrine 100 mcg**

Use if you are rushed for time, don't know the weight and can't do the math in the moment. These are medications you can have ready and on hand for an unstable patient coming by EMS with a short ETA

Suggamadex 16 mg/kg IV can be used to immediately reverse paralysis from rocuronium. Keep available but *outside the room*, to avoid wasting if not used.

#### **QUICK PICK 350: Ketamine 100 mg, Succinylcholine 100 mg, Phenylephrine 100 mcg, Rocuronium 50 mg**

Use if your "go to" is Succinylcholine 1-1.5 mg/kg, but follow with Rocuronium 0.6 mg/kg to keep the patient paralyzed post intubation.


- Norepinephrine infusion can be prepared and even started in advance if hypotension is present or anticipated.
- Ketamine infusion can be initiated to provide sedation and analgesia 0-2 mg/kg/h

### **Other RSI Induction Options**

Etomidate: 0.3 mg/kg IV (not easily available in all countries)

Propofol: 0.5-1.5 mg/kg. Propofol can drop BP, is short acting and requires an infusion to keep sedated.

Midazolam 0.1 mg/kg plus fentanyl 1-3 mcg/kg or morphine 0.1 mg/kg IV may be a combination used by those with limited resources.



## DO PROTECTED INTUBATION

Avoid Generating Aerosols  
2-person BVM only if necessary  
RSI Unless Contraindicated or **Cardiac Arrest**

Intubation Options:  
Video Laryngoscopy  
Direct Laryngoscopy +/- Bougie  
IF Fail consider Supraglottic Airway (LMA)  
Reduce aerosols from LMA by covering mouth and nose  
**IF All above fails then Cricothyrotomy**

**Don't do a Chest x-ray unless needed.** If you do need one try to wait at least 20-30 minutes for the aerosols to settle, and clean up the room before x-ray tech enters.

**Post Intubation SEDATION is essential to keep the patient comfortable.**

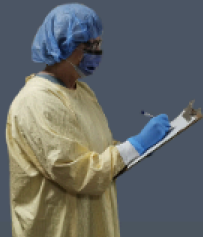
In unstable: Ketamine: 0-2 mg/kg/h

If stable: Propofol: 1-5 mg/kg/h plus fentanyl 0-3 mcg/kg/h.

Other combinations:

Midazolam 0-0.1 mg/kg (to start) plus fentanyl 0-3 mcg/kg/h or morphine 0-0.1 mg/kg/hr.

Goal is MAP >65.



## DOFF PPE UNDER SUPERVISION

Designate a "Safety Officer" or "Buddy" to watch you doff.  
If you feel you have had a breach that can't be managed easily with a simple wipe or wash, shower and change your scrubs

**Debrief.**

Always talk about the event afterwards, looking for ways to improve.

## COVID 19 CONTROLLED INTUBATION CHECKLIST

Organizational Style of Checklists adapted from multiple HEMS (helicopter EMS Services). ADAPT to your resources.

Pre-Intubation Patient Optimization (when possible)	Check
Correct hypotension (IVF, NE), correct acidosis, pre-oxygenate with NRB	
<b>Assign Roles</b>	
<b>IN</b> Team: Team Lead (usually Intubator unless RT intubates), RN, RT or intubation assistant	
<b>OUT</b> Team: Alternate Intubator; RN support (charts, meds, etc.) Runner & Safety Officer	
Confirm communication method is working (e.g. phone, baby monitor, hands free system)	
<b>Assign Tasks</b>	
<b>RN INSIDE ROOM</b>	
Puts patient on monitors (Cardiac, BP, O <sub>2</sub> Sat, ETCO <sub>2</sub> ) and starts IV(s)	
CHECK communication between IN/OUT Team using communication device	
NO CHARTING	
PREPARE and ADMINISTER DRUGS CHOSEN BY INTUBATOR (list below)	
Induction: Ketamine 0.5-2 mg/kg or Propofol 0.5-1.5 mg/kg or etomidate 0.3 mg/kg	
Paralytics: Rocuronium 1.2 mg/kg OR sux 1-1.5 mg/kg then roc 0.6mg/kg after intubation	
Rescue from hypotension: Phenylephrine 100 mcg (3 doses)	
Rescue from Rocuronium: Suggamadex 16 mg/kg IV (keep outside room)	
Post Intubation Sedation and analgesia: (choose one option)	
Ketamine: 0.3-2 mg/kg/h OR	
Propofol 1-5 mg/kg/h PLUS fentanyl 1-3 mcg/kg/h	
Midazolam: 0.05-0.15 mg/kg/h plus fentanyl or morphine 0-0.1 mg/kg/h	
Consider Norepi infusion 0.05-0.5 mcg/kg/min: Keep MAP>65	
<b>RT or intubating assistant prepares equipment requested by Intubator (List) outside the room then takes it in, when the team enters.</b>	
<b>INTUBATION PLAN</b>	
AVOID aerosol generating measures	
Pre-Oxygenate to NRB or hi-ox mask with HEPA filter if available	
If inadequate: 2 person BVM or Supraglottic Airway (e.g. LMA) cover with N95 (see tips)	
Video Laryngoscopy or	
Direct Laryngoscopy +/- Bougie	
If delay, insert Supraglottic airway (LMA) or 2 person BVM and change intubators	
IF still unable to intubate or oxygenate: Cricothyrotomy	
<b>INTUBATION EQUIPMENT</b>	
AN AIRWAY KIT or CART should be available with standard equipment.	
Choose ETT and alternate sizes, syringe & check cuffs; choose stylet	

Bougie ready, choose proper LMA size, proper syringe and check cuff; Lubricant ready	
ETC02, Inline Suction and HEPA filter for ETT; ETT/SGA securing method	
Prepare VL (if available) and DL	
Confirm cricothyrotomy equipment is available and location	
VENTILATOR	

<b>Tasks Continued</b>	
<b>OUTSIDE TEAM</b>	<b>Check</b>
<b>RN Support (in PPE ready to enter and assist INSIDE Team)</b>	
Checks communication system between IN/OUT Team	
Documents on behalf of team	
Takes orders for drugs and equipment then assigns runner to get them	
<b>Alternate Intubator (in PPE ready to enter and assist INSIDE Team.</b>	
Supports Team leader as alternate intubator and provides patient care advice.	
<b>Runner</b> (may be RN, PA or anyone who can procure what is asked for) PPE optional based on risk of exposure	
<b>SAFETY OFFICER:</b> watch for breaches and supervise inside team DOFFING If IPAC is present they can act as the Safety officer. If IPAC is not available, RN Support or Alternate Intubator share that role	
<b>DON CORRECT PPE</b>	
<b>TEAM HUDDLE</b>	
Review Strategy: Proper PPE; Patient positioning; No aerosol generation; Confirm drugs equipment & team ready; Speaker Phones or baby monitor connected and working.	
INSIDE Team Enters room. Close Door	
<b>PERFORM INTUBATION</b>	
<b>PLACE PATIENT ON VENTILATOR</b>	
No post intubation CXR for at least 20 minutes (allows aerosols to drop to ground) & dispose of waste	
<b>START POST INTUBATION SEDATION ANALGESIA</b>	
Keep paralyzed initially (prevent coughing and generating aerosols)	
Add Pressors as needed to keep MAP>65	
When Patient Stable: exit room to anteroom or designated doffing area.	
<b>DOFF UNDER SUPERVISION</b>	
Safety Officer or Buddy System.	
<b>Debrief as a Team</b>	

## Cardiac Arrest



### ASSIGN ROLES

**danger**  
**IN THE ROOM**  
Best intubator  
Respiratory Therapist  
Nurse  
(add 1 more if doing CPR)  
**danger**

**OUTSIDE**  
Support nurses  
Alternate Intubator  
Safety Officer with check list



### DON CORRECT PPE

- N95 respirator
- Gloves
- Impervious or Fluid Resistant Gown
- Head and neck cover if available
- Face shield

PPE recommendations change, check local guidelines


Each institution will have its own PPE combination.

Learn about your “ensemble”, the proper donning sequence and how to seal check your N95.

ALL 6 members DON PPE, as the outside team may have to enter to assist.

If you are facing a PPE shortage you may downgrade one member of the outside team’s PPE.

BE QUICK and HUDDLE as YOU DON PPE.



### HUDDLE

- Meet outside the room
- Team Lead reviews the plan using a checklist.
- Confirm communication between IN/OUT Team works.


CONFIRM Patient is to be resuscitated (if possible)

Support team gathers drugs and equipment to take in.

If a patient is intubated: Enter room, start CPR and follow appropriate ACLS Algorithm.

If not intubated go to next step:





## DO PROTECTED INTUBATION

**Avoid Generating Aerosols**  
2-person BVM only if necessary  
RSI Unless Contraindicated or **Cardiac Arrest**

**Intubation Options:**  
Video Laryngoscopy  
Direct Laryngoscopy +/- Bougie  
IF Fail consider Supraglottic Airway (LMA)  
Reduce aerosols from LMA by covering mouth and nose  
**IF All above fails then Cricothyrotomy**


Notes:

- **Change from CAB to A-B-Cs For COVID 19**

The airway is secured first to PROTECT the Team. Secondly, hypoxia is likely a main contributor to the arrest.

- Nurses will manage the monitors, IV(s), drug administration and participate with the RT in doing 2-minute CPR cycles.
- If the patient obtains a ROSC the RT will place them on a ventilator.
- Unless it has immediate clinical importance, delay performing a chest x-ray for 20-30 minutes for aerosols to settle on ground and try to clean somewhat before x-ray tech enters.
- OUTSIDE TEAM: RN charts, and gets or directs a runner to obtain medication or equipment as needed. The Outside MD (Alternate Intubator) can stand by to provide advice as needed by speaking with the INSIDE MD and monitoring the team with the communication system.

NOTE: This infographic includes a hood for head and neck cover. Use what you have available and discuss with your IPAC Team. Other options include a bouffant, face shield +/- bib. (PPE will be discussed at the end of this document).



## DOFF PPE UNDER SUPERVISION

Designate a "Safety Officer" or "Buddy" to watch you doff.  
If you feel you have had a breach that can't be managed easily with a simple wipe or wash, shower and change your scrubs

DOFF in a designated area such as anteroom.

If you don't have an anteroom, some IPAC may suggest you doff at least part of the PPE in the room in which you performed the intubation. The concern here is that you have just generated aerosols and they will land on you as they settle. Consider doffing outside the room, so you are not exposed to residual aerosols as they settle. Ask IPAC questions and think carefully about what you are told.

- Always be observed doffing. Use a checklist provided by your IPAC team.

- Wash or sanitize your hands (15-20 seconds) as often as you wish, just be aware if you are doing this frequently your skin will begin to crack. Use lotion to prevent this.
- Dirtiest PPE is removed first, usually gloves.
- An assistant in PPE (outside team) can untie your gown if it doesn't tear away.
- **N95 is always last** and ALWAYS sanitize your before removing it.

A *breach* is a significant self-contamination that cannot be managed easily with a simple wipe or wash. If you are concerned, shower and change your greens.

**Always DEBRIEF** postevent to look for ways to improve performance.

## COVID 19 SUSPECT OR CONFIRMED CARDIAC ARREST CHECK LIST

Adapted from multiple HEMS formatted checklists.

<b>RAPIDLY DON CORRECT PPE</b>	<b>Check</b>
N95 (seal check); gown, gloves, head/neck cover and Face shield	
<b>Assign Roles</b>	
<b>IN Team of FOUR</b> Team Lead (usually Intubator unless RT intubates) RN, RT (or intubation assistant) PLUS extra person (usually an RN) to perform CPR	
<b>OUT Team: THREE:</b> Alternate Intubator; RN support (charts, meds, etc.) Runner One of these can also serve as safety officer to watch for breaches and supervise doffing.	
Confirm communication system work between IN/OUT Teams (phone, baby monitor, etc.)	
<b>Assign Tasks</b>	
<b>Team Lead (usually Intubator)</b>	
<b>RN #1 AND RN # 2 IN: Tasks</b>	
Patient on monitor; IV/IO (2 if possible) running well; BP cuff; sat monitor; Prepares and gives drugs & infusions; NO CHARTING; Participates in CPR Cycle as able Uses speakerphone or baby monitor to communication with outside team	
<b>RT IN (or intubating assistant): Tasks</b>	
OPEN AIRWAY TRAY <u>IN</u> ROOM AND ASSIST WITH INTUBATION	
2-person BVM or LMA if delayed to ETT.	
PREPARE: ETT(s); Check Cuffs; Stylet; lubricant	
ETC02, Inline Suction and HEPA filter for ETT; ETT/SGA securing method	
Bougie Available	
Video Laryngoscopy (if available) or Direct Laryngoscopy +/- bougie	
Confirm cricothyrotomy equipment is available and location	
<b>ASSIST with Intubation</b>	
<b>Participate in the CPR Cycle.</b>	
Leave the ventilator outside the room. Bring in only if ROSC.	
<b>Tasks Continued</b>	
<b>OUTSIDE TEAM</b>	<b>Check</b>
<b>RN Support (in PPE ready to enter and assist INSIDE Team)</b>	
Monitor communications IN room	
Charts	

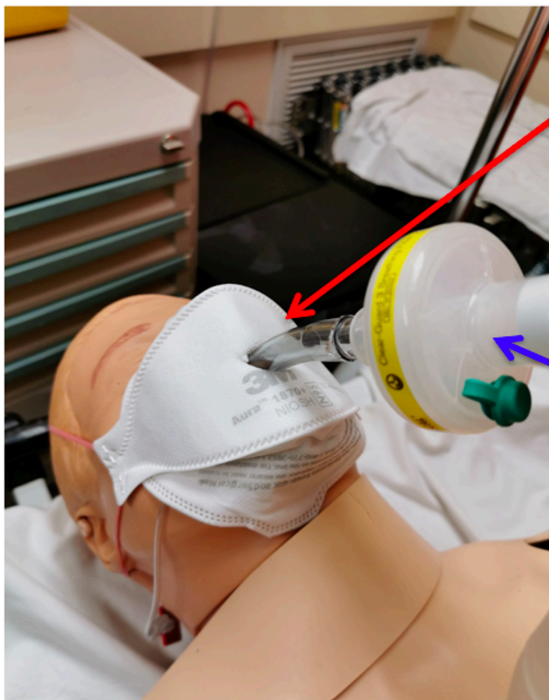
Takes orders for drugs and equipment then assigns runner to get them	
<b>Alternate Intubator (in PPE ready to enter and assist INSIDE Team.</b>	
Supports Team leader by being ready to act as alternate intubator or provide patient care advice.	
<b>Runner</b> (may be RN, PA or anyone who can procure what is asked for) PPE optional based on risk of exposure	
<b>SAFETY OFFICER:</b> watch for breaches and Supervise inside team DOFFING If IPAC is present they can act as the Safety officer. If IPAC is not available RN Support or Alternate Intubator share that role	
<b>NOTE IF PATIENT COMES WITH EMS Alter Team/Plan accordingly</b>	
<b>TEAM HUDDLE</b>	
Review Strategy: Proper PPE; Patient positioning; No aerosol generation; Confirm drugs equipment and team ready; Speaker Phones or baby monitors connected;	
INSIDE Team Enters room. Close Door	
<b>SECURE AIRWAY (ABCs) and RUN Arrest</b>	
<b>DOFF UNDER SUPERVISION</b>	
<b>DEBRIEF</b>	

## WHAT TO DO IF YOU DON'T INTUBATE BUT CAN PUT IN a Laryngeal Mask Airway (LMA) or Supraglottic Airway Device (SGA)?

e.g. Pre-hospital setting or small or remote setting where the ability to intubate is not available.

LMAs and SGAs are very easy to insert and many EMS services consider this a basic life support skill. The value is securing the airway this way, it is fast and 2 people are not required, as are for 2 person BVM.

There is concern however that using a supraglottic device may still generate aerosols. You can cut a hole in a towel, drape etc. and cover the patient's nose/mouth to trap these. Do not use an N95, or now even a surgical mask because of shortages.



LMA inserted AND secured

Tube exits through hole in ~~N95~~ to Capture any aerosols

*Can't afford to use N95 or even surgical masks now. Use a drape or towel with a hole in it*

Hepa filter on tube

*If available. Shortages are everywhere.*

## Triggered Cough from doing Mid Turbinate Swab. Reducing Risk.

It is impressive how much patients may cough when taking swabs!

Stand beside or slightly behind the patient and get them to put up their mask and turn their head away from you if they need to sneeze or cough.

Should we teach them to self-test, while we watch from a camera or through a window?

Would this preserve PPE and be lower risk to staff?

V 6.Mai 23.2020

**ECUUS**  
 @e\_cuus

## PROTECTED CODE BLUE

Run a safe resuscitation  
in COVID-19 cases

Adapt to your local PPE recommendations  
and available equipment

### ID HIGH RISK PATIENTS FOR EARLY INTUBATION

High Risk: FiO2 requirements > 50% to keep sat> 90 or  
<50% + resp fatigue +/-evidence of hemodynamic instability  
Consult ICU in anticipation of need for early intubation.  
**Avoid** BVM, CPAP/BIPAP, High Flow Nasal Prongs, Nebulizers

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**Intubation Options:**  
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