London Health Sciences Centre

Guidelines ADULT CRITICAL CARE* for Aerosol Generating Medical Procedures (AGMP) for Failed ARI Screen or Unable to Assess or Confirmed COVID-19

*Refer to IPAC Guidelines for all other areas

This guideline applies to patients in CRITICAL CARE with a failed Acute Respiratory Infection (ARI) screen or Unable to Assess with pending viral screen or confirmed COVID-19. Refer to the IPAC website for other respiratory illnesses or for patients who do not have pending or confirmed COVID-19 results.

INDEX TO TOPICS IN THIS DOCUMENT:

A. Definition for Aerosol Generating Medical Procedures (AGMPs)

Aerosol-generating medical procedures (AGMPs) are interventions that can produce aerosols as a result of artificial manipulation of a person's airway. Additional precautions over and above baseline precautions are required when providing AGMPs.

B. *Minimum* Baseline Precautions for Patients with Failed ARI/Unable to Assess or Confirmed COVID-19

1. Adult Critical Care

Droplet + Contact + Enhanced PPE (N95 + Full Face Shield, Level 2 gown and gloves)

2. **Precautions when performing the following AGMPs (SEE BELOW FOR HIGHEST RISK AGMPs that require PROTECTED Droplet-Content-Enhanced).**

   Droplet + Contact + Enhanced PPE (N95 + Full Face Shield, Level 2 gown and gloves) for the following:

   - Bag-mask-valve ventilation (with a filter)
   - CPAP or Non-Invasive Ventilation
   - High Flow Nasal Cannula (HFNC)
   - Tracheostomy insertion/tube change/decannulation
   - Use of cough-assist device (breath stacking or MIE)
   - Open suctioning
   - Any procedure that may cause a breach in ventilator circuit
   - Ventilator circuit change (clamp the ETT momentarily when changing circuit or switching from manual ventilation to mechanical ventilation)
   - Inhaled anaesthetic
   - Extubation – Self-assess for additional googles and bouffant for COVID positive

C. Guiding Principles for Patients with Failed ARI/Unable to Assess or Confirmed COVID-19

1. AGMPs should only be performed when medically necessary. Treatments should be selected that minimize aerosol generation.

2. AGMP precautions should be warn when caring for patients who may require AGMPs. When humidified oxygen is necessary, a non-rebreather mask with filter should be considered. This is particularly important during transport.

3. Limit the number of health professionals who are present in the patient's room during an AGMP. Only those necessary to safely perform or assist with the procedure should be present. This is important to limit staff exposure and conserve PPE.

4. Procedures should be performed by the most experienced health care professional.

5. For complex or prolonged AGMPs such as intubation or CPR, alternate health professionals should be on standby. They should be dressed in the appropriate PPE and ready outside the patient's room to provide assistance or relief as required.

6. Use MDI inhalers rather than nebulizer treatments.

7. Use filters with non-rebreather masks, bag-valve-mask apparatus and LMA (**See Appendix C for photos**). Bag-valve-masks come with a white filter. This filter is equivalent to the green filter (use the white filter, do not switch to green). The non-rebreather masks on the arrest cart have a filter attached.

   High Flow Nasal Oxygen (HFNO) and Non-Invasive Ventilation (NIV) may be considered for patients with COVID-19. Negative pressure room is preferred and droplet-contact-enhanced precautions are used. Whenever possible use a ventilator with a dual limb circuit and non-vented mask.

Patients may be proned (or self-prone) while on HFNO or NIV. Lower PaO2 levels may be accepted if work of breathing is not increased. Use of a ROX Index may be considered to monitor work of breathing. ROXI = (SpO2 / FiO2) / RR ROXI < 4.88 may indicate need for intubation.

8. PPE must be worn in the room following completion of the AGMP to allow for air clearance. An OR room requires 15 minutes of air clearance. All other rooms require 30 minutes of air clearance

D. HIGH RISK AGMPs THAT REQUIRE *PROTECTED* DROPLET-CONTACT-ENHANCED PRECAUTIONS FOR ALL COVID AND NON COVID PATIENTS

1. Intubation
2. Bronchoscopy (including insertion of percutaneous tracheostomy)
3. CPR (for those within 2 metres of airway)
   Those > 2 metres away require Droplet + Contact + Enhanced (fit-tested N95 with full face shield)

E. *PROTECTED* PRECAUTIONS FOR HIGH RISK AGMPs:

1. Negative pressure room if available
2. Level 4 fluid impermeable gown (level 3 is acceptable if available but is currently on backorder)
3. Extended cuff nitrile gloves or sterile gloves which cover wrists
4. Fit tested N95 mask
5. Eye covering (Face Shield AND Disposable Goggles)
6. Blue hair bouffant

F. TRANSPORTING PATIENTS WITH/AT RISK FOR URGENT AGMPs

1. If patient is not intubated, ensure bag-valve mask has a filter and oxygen is delivered by non-rebreather with filter.
2. Don additional precautions if patient is at risk for imminent intubation or may need manual ventilation.
3. Notify cleaning staff to decontaminate elevator or other areas along pathway.
4. Sending team should review patient's travel from point of entry to transfer to critical care and initiate appropriate cleaning precautions.
5. Bring antiseptic wipes to clean elevator buttons, door entries and other areas of contact.
6. Determine safest method for transport of patient on case-by-case basis that considers urgency, provider expertise and activity level in sending and receiving units. Decisions should also consider PPE conservation strategies by limiting the number of healthcare providers who will need to don PPE.

   It might also be most appropriate for an experienced intubation team who is already wearing Protected PPE to inset central venous and arterial lines prior to transport.

G. INTUBATION

General Principles:

1. Early controlled intubation is favored over intubating a rapidly deteriorating patient
2. Video assisted intubation is preferred, to maximize distance of HCP from the patient
3. Use intubation team (page 55555 for urgent intubation or call switchboard and have them paged for elective intubations).
4. Use procedural checklist (NS 7368)

Setting

1. The patient should be transferred to a negative pressure isolation room, if available, before aerosol generating procedures are initiated
2. If there is competition for use of the negative pressure rooms, patients with HFNC or NIV should get priority. Intubation can be done in a single room with door closed if necessary.
3. Airway management (intubation) should occur in the critical care unit or in a negative pressure room before transfer whenever possible.
4. Do not postpone intubation for transport if patient is at risk of deterioration during transport. For person who fails ARI/Unable to Assess or with confirmed COVID-19, consider early intubation prior to patient decompensation. Transport patients on oxygen using filtered non-rebreather with patient wearing surgical mask whenever possible.

Planning for Intubation

1. Ensure all equipment is available and functioning before starting the AGMP
2. Discuss your airway plan in advance with the team (Preinduction pause from critical care intubation checklist – **Appendix A**)
3. Limit the number of HCW in the room; including an experienced RRT, Physician and RN
4. Have an additional RN and RRT outside the room who are donned and available to assist during performance of AGMP

Principles for Intubation

1. Utilize an observer to assist with donning of PPE if not familiar with procedure
2. Don appropriate PPE (See **Appendix B**)
3. Provide five minutes of preoxygenation (100% via non-rebreather mask) to avoid manual ventilation
4. The most experienced HCW should attempt the intubation to maximize chances of first pass success
5. Utilize rapid sequence induction (RSI) when possible
6. Utilize video assisted intubation when possible
7. Avoid awake intubation and use of atomized anaesthetic
8. Avoid manual ventilation. If necessary, small tidal volumes should be applied
9. Ensure high efficiency hydrophobic filter for non-rebreather/bag-valve-mask/ventilator (**Appendix C)**
10. Wait until balloon on cuff has been inflated before auscultation or initiation of ventilation
11. Clamp endotracheal tube momentarily during switch from bag-mask-ventilation to ventilator
12. If intubation fails, insert LMA or ventilate with BVM with filter attached (see **Appendix C**)
    OR

Consider 2 person BVM with PERSON #1 dedicated to proper positioning of the airway while ensuring seal of mask and PERSON #2 bagging with low volume breaths

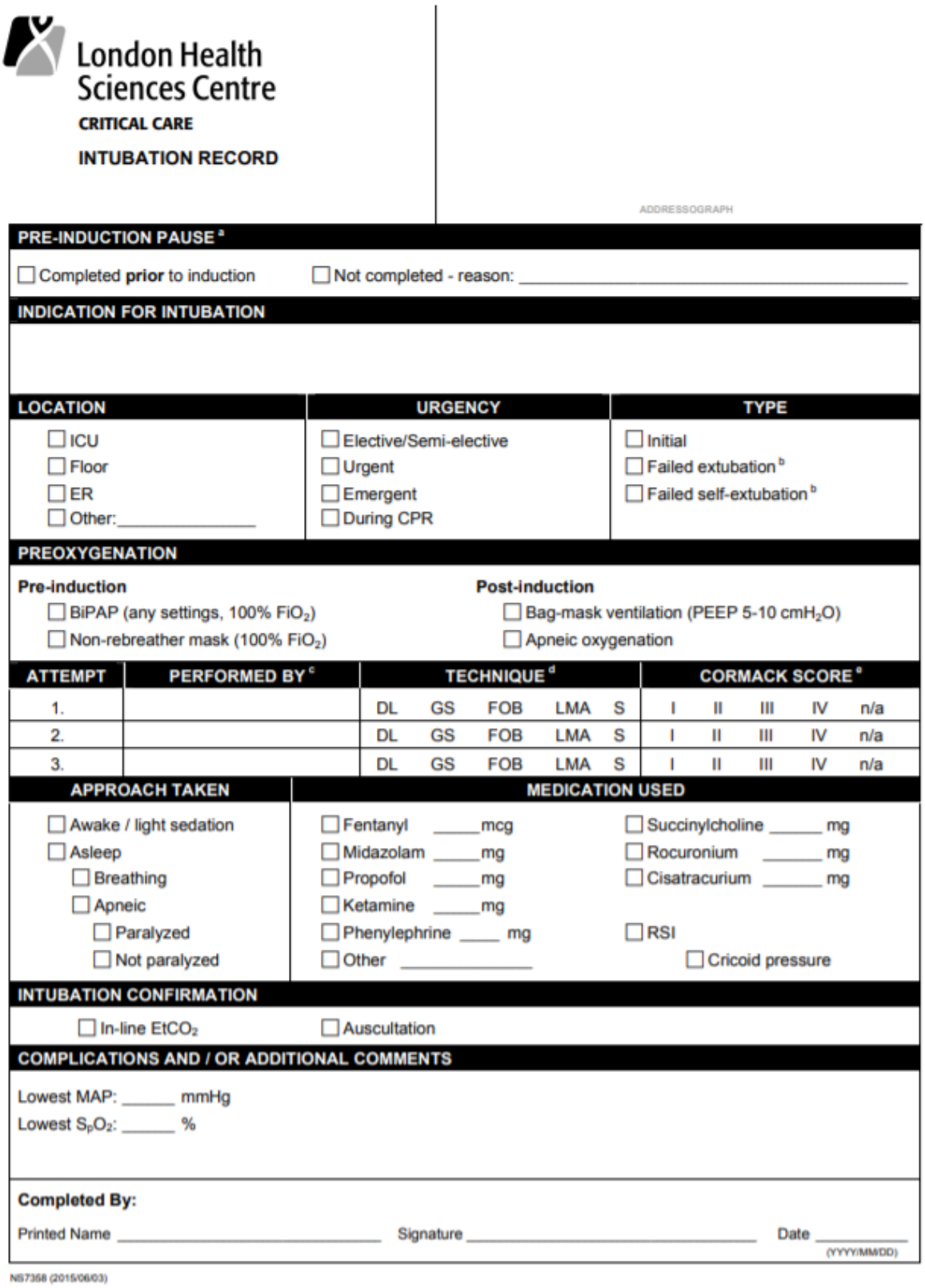
Additional Notes:

1. If patient is intubated in the ED or other area of the hospital and is probable/confirmed COVID-19 positive, consider completing an X-ray once transported to Critical Care.
2. Decrease the room temperature when possible as it gets very hot wearing PPE.

Doffing and Doffing for High Risk AGMPs:

Refer to **Appendix B** for checklist

Appendix A: Intubation Record for Critical Care



London Health Sciences Centre

CRITICAL CARE

INTUBATION RECORD

ADDRESSOGRAPH

PRE-INDUCTION PAUSE [a]

☐ Completed **prior** to induction ☐ Not completed - reason: _____

INDICATION FOR INTUBATION

LOCATION	URGENCY	TYPE
☐ ICU	☐ Elective/Semi-elective	☐ Initial
☐ Floor	☐ Urgent	☐ Failed extubation [b]
☐ ER	☐ Emergent	☐ Failed self-extubation [b]
☐ Other:_____	☐ During CPR	

PREOXYGENATION

Pre-induction

☐ BiPAP (any settings, 100% FiO_2)

☐ Non-rebreather mask (100% FiO_2)

Post-induction

☐ Bag-mask ventilation (PEEP 5-10 cmH_2O)

☐ Apneic oxygenation

ATTEMPT	PERFORMED BY [c]	TECHNIQUE [d]					CORMACK SCORE [e]				
1.		DL	GS	FOB	LMA	S	I	II	III	IV	n/a
2.		DL	GS	FOB	LMA	S	I	II	III	IV	n/a
3.		DL	GS	FOB	LMA	S	I	II	III	IV	n/a

APPROACH TAKEN

☐ Awake / light sedation

☐ Asleep

- ☐ Breathing
- ☐ Apneic
  - ☐ Paralyzed
  - ☐ Not paralyzed

MEDICATION USED

☐ Fentanyl _____ mcg

☐ Midazolam _____ mg

☐ Propofol _____ mg

☐ Ketamine _____ mg

☐ Phenylephrine _____ mg

☐ Other _____

☐ Succinylcholine _____ mg

☐ Rocuronium _____ mg

☐ Cisatracurium _____ mg

☐ RSI

☐ Cricoid pressure

INTUBATION CONFIRMATION

☐ In-line $EtCO_2$ ☐ Auscultation

COMPLICATIONS AND / OR ADDITIONAL COMMENTS

Lowest MAP: _____ mmHg

Lowest S_pO_2: _____ %

Completed By:

Printed Name _____ Signature _____ Date _____ (YYYY/MM/DD)

NS7358 (2015/06/03)

CRITICAL CARE INTUBATION RECORD

LEGEND

[a] Pre-induction pause

Mandatory:

- ☐ Two experienced operators present
- ☐ Airway assessment
- ☐ Suction at head of bed
- ☐ Bag valve mask connected to O_2
- ☐ Oral airway
- ☐ Glidescope & LMA
- ☐ IV line running at least 500 ml/hr
- ☐ Phenylephrine
- ☐ Plan verbally communicated to team

Considerations:

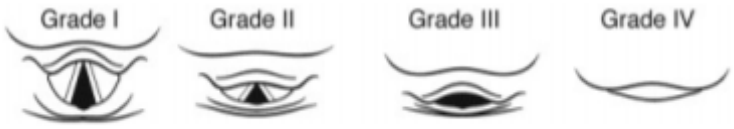
- ☐ Other desired airway adjuncts in room? (Bronchoscope, etc.)
- ☐ Positioning optimized? (Bed height, dentures removed, ramping, etc.)
- ☐ Fluid bolus or vasopressor infusion *prior* to induction?
- ☐ Patient-specific variables that might affect intubation taken into account?
- ☐ Using succinylcholine? If yes, check contraindications (see reverse)
- ☐ BiPAP for preoxygenation?
- ☐ Nasal prongs on for apneic oxygenation (15 L/min O_2 by nasal prongs during intubation)?

[b] Defined as ≤ 48 hrs from extubation

[c] Name, rank, and program
E.g. John Doe, Gen Surg PGY2

[d] Technique
DL – Direct laryngoscopy
GS – Glidescope
FOB – Fibreoptic bronchoscopy
LMA – Laryngeal mask airway
S – Surgical

[e] Cormack Score



Appendix A: Donning and Doffing PROTECTED Droplet-Contact-Enhance PPE

DONNING PPE for PROTECTED Droplet-Contact-Enhance PPE (Failed ARI/Unable to Assess/COVID +)	√
Assemble required PPE: Level 4 fluid impermeable gown (Level 3 is acceptable if available) Long cuff nitrile/sterile gloves which cover cuff of gown Fit tested N95 mask Eye covering (Face Shield **AND** Disposable Goggles) Blue hair bouffant **Utilize an observer** to assist with donning of PPE if not familiar with procedure	
Step 1: Perform Hand Hygiene Use alcohol-based hand rub when hands are not visibly soiled ***OR*** Use soap and water when hands are visibly soiled	
Step 2. Put on Gown I. Put on Level 3 or 4 impermeable gown. Gown opening to the back to fully cover torso from neck to knees and wrapped around the back. Arms should be covered to end of wrists. II. Ensure ties are fastened at the back of neck and waist of gown	
Step 3. Put on N95 Respirator Mask I. Remove eye glasses, if applicable, prior to donning N95 Respirator II. Select respirator according to fit testing III. Place over nose, mouth and chin IV. Fit flexible nose piece over nose bridge V. Secure on head with top, followed by bottom elastic VI. Adjust to fit VII. Perform a fit check: • During inhalation, the respirator should collapse • During exhalation, check for leakage around face VIII. If eye glasses were removed to don respirator, put glasses back on now	
Step 4: Put on Head and Eye Protection (bouffant, goggles and face shield) I. Position goggles over eyes and secure to the head, adjust to fit comfortably II. Position face shield over face and secure, ensure the shield is not tented outward III. Put on Blue hair bouffant last	
Step 5: Put on Gloves i. Select correct type and size of gloves either Long cuff nitrile or sterile gloves ii. Extend gloves over cuffs of Level 4 gown	

DOFFING PPE for PROTECTED Droplet-Contact-Enhance PPE (Failed ARI/Unable to Assess/COVID +)	√
Utilize an observer to assist with doffing of PPE if not familiar with procedure **Remove all PPE in the ante room** **If there is no ante room**, remove all PPE except N95 before leaving patient's room (2 metres away) * *If wearing N95 for extended use, leave N95 in place and perform hand-hygiene. Replace N95 if damaged, soiled or difficult to breathe through.	
Step 1: Remove Gloves Outside of gloves are contaminated. Remove gloves in the following sequence: i. Grasp outside of glove with opposite gloved hand; peel off ii. Hold removed glove in gloved hand iii. Slide fingers of ungloved hand under remaining glove at wrist iv. Peel glove off over the first glove v. Discard gloves into waste container	
Step 2: Clean Your Hands i. Use alcohol-based hand rub when hands are not visibly soiled ***OR*** ii. Use soap and water when hands are visibly soiled	
Step 3: Remove Gown Gown front and sleeves are contaminated. Remove gown in the following sequence: i. Unfasten ties and peel gown away from neck and shoulder touching the inside of the gown only ii. Turn outside toward the inside iii. Fold or roll into a bundle and discard into waste container	
Step 4: Clean Your Hands i. Use alcohol-based hand rub when hands are not visibly soiled ***OR*** ii. Use soap and water when hands are visibly soiled	
Step 5: Remove Head Protection (bouffant) i. Grasp bouffant at crown of head (top and toward the back) to remove and discard into waste container	
Step 6: Clean Your Hands i. Use alcohol-based hand rub when hands are not visibly soiled ***OR*** ii. Use soap and water when hands are visibly soiled	
Step 7: Remove Eye Protection (face shield and goggles) i. Grasp top elastic of face visor and lift away from face while holding the elastic and discard in waste container ii. Grasp ear pieces or strap of goggles and lift away from face place into waste container iii. If removing personal eye glasses to clean, take care not to place on contaminated surfaces. Clean with 70% alcohol to avoid streaking of lenses. Perform hand hygiene before putting cleaned glasses back on.	
Step 8: Clean Your Hands i. Use alcohol-based hand rub when hands are not visibly soiled ***OR*** ii. Use soap and water when hands are visibly soiled	
Step 9: Remove N95 Respirator Mask i. Lift the bottom elastic over your head first ii. Then lift off the top elastic iii. Lift away from face while holding the elastic and discard into waste container	
Step 10: Clean Your Hands i. Use alcohol-based hand rub when hands are not visibly soiled ***OR*** ii. Use soap and water when hands are visibly soiled	

Appendix C: Application of Filter

The white filter comes packaged with the bag-valve-mask. The non-rebreather mask on the cardiac arrest cart has a filter attached. There is no difference between the green and white filter (no need to switch to green).

Figure 1: *Filter between face mask and ambu bag*

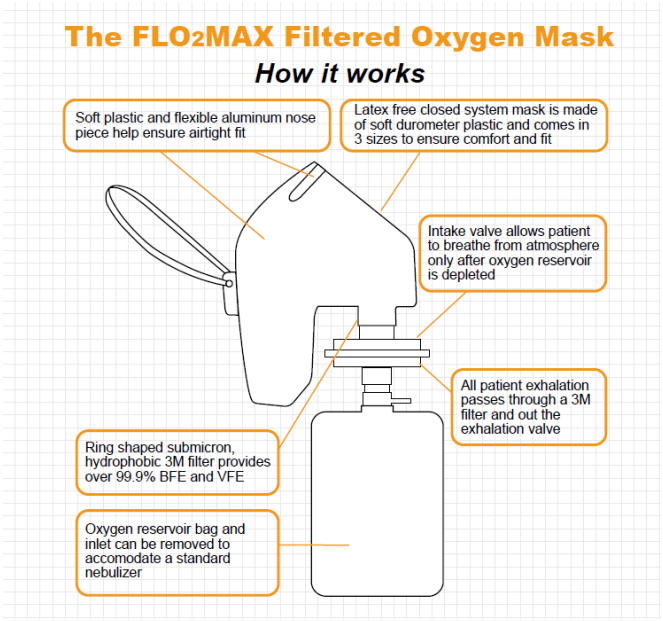
Figure 2: *Filter between resuscitation bag and endotracheal tube*

Figure 3: *Filter between resuscitation bag and LMA*

Figure 2: *Filter between resuscitation bag and endotracheal tube*

Figure 5: *Non-Rebreather Mask with filter. On arrest cart. Available in adult and paediatric sizes. Bacterial and viral filter. Deliver 30-99% oxygen.*

Figure 6: *Filter on Non-Rebreather Mask*



3M Flomax is a non-rebreather that delivers 30-99% oxygen. An optional nebulizer can be added to provide closed system drug delivery.

One way valve allows patient to breathe from atmosphere only if oxygen reservoir is depleted and all exhalation passes through a 3M filter.

The TAVISH mask is a new product to LHSC that has been ordered to manage backorders of 3M product

It minimizes the transfer of viruses, bacteria and airborne medication from Patients health care professionals and others nearby.

Tavish® filter masks can be used for either oxygen or aerosol therapy and provide a heightened level of concern for health care professionals and others nearby.

Respan® Tavish® Filter Masks are equipped with light weight high efficiency viral/bacteria filters attached to the mask side ports:

- Minimizing free airborne aerosol mist
- Minimizing the absorption of excess medications by others
- Minimizing disease transfer and reducing the risk of infections by effectively filtering patient exhalation

APPENDIX D (May 22, 2020)

PRECAUTIONS *DURING AGMP*s in CRITICAL CARE

Precautions A	Precautions B	Precautions C
PROTECTED Droplet + Contact + Enhanced • Fit-tested N95 Respirator • Disposable goggles • Full face shield • Hair Bouffant • Level 3 gown or higher • Extended cuff nitrile gloves or sterile gloves that cover wrists	**Droplet + Contact + Enhanced** • Fit-tested N95 Respirator • Full face shield • Level 2 gown or higher • Gloves	**Droplet + Contact** • Procedure/surgical mask • Protective eyewear (e.g. attached visor or face shield) • Long-sleeved gown (Level 2 if low to moderate fluid exposure risk) • Gloves
Negative pressure (if available)		

Following Aerosol Generating Procedures:
PPE must be worn for 30 minutes after completion of an AGMP. AGMP PPE should be worn in rooms where there is a likelihood of AGMPs being performed.

Aerosol Generating Medical Procedures (AGMP)	**Precaution Category:** Failed ARI AND COVID-19 pending * testing not indicated on outpatients ***OR*** COVID-19 positive ***OR*** Unable to assess ***OR*** Household contact of confirmed case	**Precaution Category:** COVID-19 negative NOT suspect COVID-19
Intubation	**A**	**A**
Bronchoscopy (includes perc tracheostomy)	**A**	**A**
CPR	**A**	**A**
Extubation	**B (self-assess for +goggles +bouffant)**	**C**
Bag-valve-mask ventilation	**B (with filter, self-assess for +goggles+bouffant)**	**C**
Open Circuit/Airway Suctioning	**B**	**C**
CPAP/ NIV/High Flow Nasal Oxygen	**B (negative pressure room if available)**	**C**
Ventilator or circuit change	**B (clamp ETT momentarily)**	**C**
Tracheostomy tube change/decannulation	**B (self-assess for + goggles + bouffant)**	**C**
Nebulizer treatments	**B (meter-dosed with spacer recommended)**	**C**
Sputum induction, cough-assist, breath stacking	**B(+ goggles + bouffant)**	**C**
Chest tube insertion with potential air leak	**B (Level 3 gown and sterile gloves as part of sterile procedure; + goggles +bouffant)**	**C**
All upper GI procedures	**B**	**C**
Other endoscopic procedures	**B**	**C Routine Practices**

Updated: May 22, 2020

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