**Aerosol-Generating Procedures are Greatest Risk**

**Wear Appropriate PPE**

**Minimize Aerosolization**

*Greatest risks to health care workers (HCW) are in setting of performing aerosol-generating procedures (AGP) – the main principle behind all algorithms is to use appropriate PPE and minimize aerosolization*

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6. **Intubation of patients with suspected (PUIs) and confirmed COVID-19 infection**

**Personal Protection**

1. **Hand hygiene is a must**
2. **Assemble personal protective equipment (PPE)**
* **Either PAPR or N95 mask with full face shield** can be used
	+ PAPR is preferred to N95 mask
	+ If N95 mask is used, then full-face shield should be used
* Hair/ beard cover
* Disposable fluid-resistant long-sleeved surgical gown underneath isolation yellow gown
* Utilize trained observers to ensure proper donning-doffing
* Plan to have at least 5 minutes to apply all PPE plus additional time to prepare all equipment. In reality plan for longer
1. Overall approach:
* **Unit team will communicate to airway team early**
* Low thresholds for intubation to avoid uncontrolled emergency
* Primary team alerts CIP/ airway team to assess for potential intubation
	+ Screen for high risk of difficult airway
* **Avoid BiPAP/ CPAP** due to high risk of dispersion of aerosolized virus
* High-flow oxygen maybe used with surgical facemask over patients mouth/nose with flows no greater than 40 L/min flow and oxygen no greater than 40-50% FiO2. This threshold is provided to facilitate discussions between the unit team and airway team. Do not delay intubation if no improvement on HFNC
1. Procedure
* Goal is to **minimize aerosolization** of virus
* Perform hand hygiene before and after donning or doffing PPE. After completing doffing procedure, **soap and water** hygiene is preferred
* Don in the following order: gloves, PAPR or N95 mask (with full-face shield, hair/ beard cover), surgical gown, 2nd pair of gloves (long gloves with dict tape over them), yellow gown, third pair of gloves glove. If in BCU, changing into disposable scrubs and provided clogs may be required
	+ Applies to all clinicians involved with airway management
	+ Have other donned personnel available outside of the room to bring in additional equipment as needed
	+ Have service clinician available to manage the patient after intubation
* Request:
	+ **BCU/ unit attending/ resident contacts CIP via CORUS ahead of time**
	+ At the time of request CIP obtains patient location, airway history if known
	+ **Make sure unit prepares norepinephrine infusion and sedation plan is in place – discuss with treatment team starting support before induction in all hypotensive patients or those with cardiomyopathy**
* Consent: most intubations will be urgent (not emergent) in nature requiring consent. Preference is to avoid signing consent in the patient room. Consent is verbally obtained and consent form is then filled out.
* **WHO:** airway team
	+ At a minimum one nurse, one attending ACCM physician, and a respiratory therapist are recommended for endotracheal intubation
	+ Consider involving a 2nd anesthesia provider (resident/ CRNA). Under those circumstances discussion between the two providers should be explicitly held prior to entering the patient room (communication is more limited when wearing a PAPR)
	+ Consider involving physician from primary team to follow airway team into patient room with PPE so they are IMMEDIATELY available to manage patient following intubation
* **WHERE**: in negative pressure room or unit
* **WHEN**: sooner rather than later
* **WHAT**: assemble all necessary supplies prior to entering patient’s room. Identify location of backup supplies, difficult airway equipment (DART-Lite). No DART CART in BCU. DART CART from Meyer 9 is Meyer 8. All other locations have their identified DART carts

*Note: you may use either supplies from code bag or the ones provided by the unit*

Recommended list includes:

* + McGrath Video Laryngoscope with X-Blade, Mac #3 and #4 disposable blades
	+ Standard laryngoscope handle with Mac # 4, Miller #2 and #3 reusable blades
	+ One each 7.0 & 7.5 styletted endotracheal tube with subglottic suction port (when diagnostic bronchoscopy is planned use 7.5 ETT)
	+ One additional airway device (e.g. LMA)
	+ Eschman intubating stylette
	+ Medications – drawn into syringes before entry into room if possible:
		- Intravenous anesthetic
		- Muscle relaxant
		- Vasoactive medications
	+ Face-mask (#5) /bag-valve-mask and high efficiency hydrophobic filter (*provided by RT*)
	+ Yankauer suction tip and tubing
	+ Oral airways
	+ Oxygen tubing/ nasal cannula
	+ CO2 detector – colorimetric (use of CO2 detector is *optional* – see below on HOW)
	+ Double zip-locked plastic bag
	+ Ventilator and tubing
	+ *Have additional equipment ready outside of the room as needed (e.g. DART cart and DART-Lite… see ACCM Intranet)*
* **HOW**: to minimize spread of the virus
	+ Prepare all equipment ahead of time, place supplies next to patient
	+ Ensure patient is monitored according to ASA standards
	+ Assure free flowing venous line (PI, PICC, or CVIL) with either stopcocks or needless injection ports. Two stopcocks placed in-line, in tandem allows for one-handed, sequential administration of induction agent and paralytic without changing syringes.
	+ Assure functional suction with Yankauer tip in place
	+ Position patient in bed to optimize direct laryngoscopy
	+ Perform procedural time out if clinically possible – identify personnel, resources, and plans
	+ Preoxygenate for 5 minutes with 100% oxygen using BVM with filter but no positive pressure assistance
	+ Perform RSI whenever possible, wait for complete muscle relaxation
	+ Avoid fiberoptic intubation and atomized local anesthetic
	+ Avoid manual ventilation whenever possible – connect to ventilator directly after intubation
	+ **If necessary, to use facemask to ventilate the patient apply the high efficiency hydrophobic filter (*sourced from RT)* and only after all clinicians in the room have appropriate PPE on**
	+ Confirm tube placement in the airway with direct visualization via McGath scope video screen
		- Connect ventilator tubing to in-line CO2 in units where it is available
		- DO NOT bring in code cart to the room to only confirm intubation
		- Use colorimetric CO2 detector only if requested by the intubating provider in units not equipped with in-line CO2 detector (MICU, medicine floors). Use surgical clamp to clamp endotracheal tube when disconnection is required. DO NOT forget to unclamp
		- Observe bilateral chest rise, tube fogging
		- Due to limitations of PPE it will not be possible to listen for or hear breath sounds with a standard stethoscope. A digital stethoscope with disposable headphones may be used if available.
	+ When available, use ultrasound to confirm intubation and ETT position
* Decontamination:
	+ In units that provide their own McGrath laryngoscope (BCU) – place airway equipment in the outer glove, and then seal all airway equipment in double zip-locked plastic bag (our specimen/ pathology bags should suffice).
	+ In all other units when using ACCM-owned – the single use disposable blade should be removed and discarded, the body of the McGrath Laryngoscope should be cleared of visible contaminants and wiped with a cleaning wipe (Purple Sani-wipes)
		- Doffing and McGrath decontamination process:

Wipe down McGrath handle with purple-top Sani wipes

Remove first layer of gloves, hand hygiene

Remove yellow gown, hand hygiene

Remove duct tape and second layer of gloves, hand hygiene

Remove surgical gown, hand hygiene

Exit patient room, set down McGrath handle

Hand hygiene

Disconnect hose from PAPR hood, hand hygiene

Doff PAPR hood, hand hygiene

Remove PAPR pack, hand hygiene

Remove last set of gloves, hand hygiene

Apply new clean gloves for wiping down PAPR pack and hood

Use purple-top Sani-wipes to wipe down inside and outside of PAPR hood and let dry, hand hygiene

Wipe down PAPR pack, hand hygiene

Wipe down McGrath handle a second time, hand hygiene

Remove gloves, hand hygiene

Exit with PAPR hood, McGrath handle, and wash with soap and water

1. **Intubation during a code (for details please refer to Hopkins COVID-19 Cardiorespiratory Arrest Statement)**

**Major Practice changes**

* **Use Non-Rebreather Mask at 15 L/min with a jaw thrust to maintain airway patency – for "passive oxygenation” during compressions**
* **No bag-valve mask ventilation until intubation unless all responders have appropriate PPE**

Additional Notes:

* First responder will don appropriate PPE and activate code team
* Chest compressions only by bedside clinician until other donned personnel is available
* Hold chest compressions for intubation
* Intubate using the same approach as described under **I. Intubation of patients with suspected (PUIs) and confirmed COVID-19 infection**
1. **Intubation during a code and RRT of patients without known or suspected COVID-19 infection AND**
2. **Intubation of any patient undergoing surgical procedure not in other categories**
* Due to expected high prevalence in a population assume each patient is a high risk and wear at least face mask and a full-face shield in asymptomatic patients
* Use N95 mask, if fit-tested, and full-face shield or PAPR for any patient with respiratory symptoms

RSI and avoidance of positive pressure ventilation is preferred

**McGrath or other videolaryngoscope is NOT required if airway is not challenging; we need to conserve these resources for when they are needed. If you do choose to use a McGrath, consider Mac 3 or Mac 4 blades as appropriate; reserve X-blades for anatomically anterior difficult airways**

When the X-blade is used, use a malleable stylette and shape to the blade where the yellow ETT contact zone notation is labelled

When bag-valve ventilation is required consider using LMA until intubation is performed

1. **Use of LMA for elective procedure**
* Due to expected high prevalence in a population assume each patient is a high risk and wear at least face mask and a full-face shield
* Allow for spontaneous ventilation and place face mask over patient’s face