

ANESTHESIA OPERATING ROOM PROTOCOL

ANESTHESIA CHECKLIST

Select your own airway equipment and drugs

Check your back up equipment: Emergency Airway Box
second Video Laryngoscope
Bronchoscope

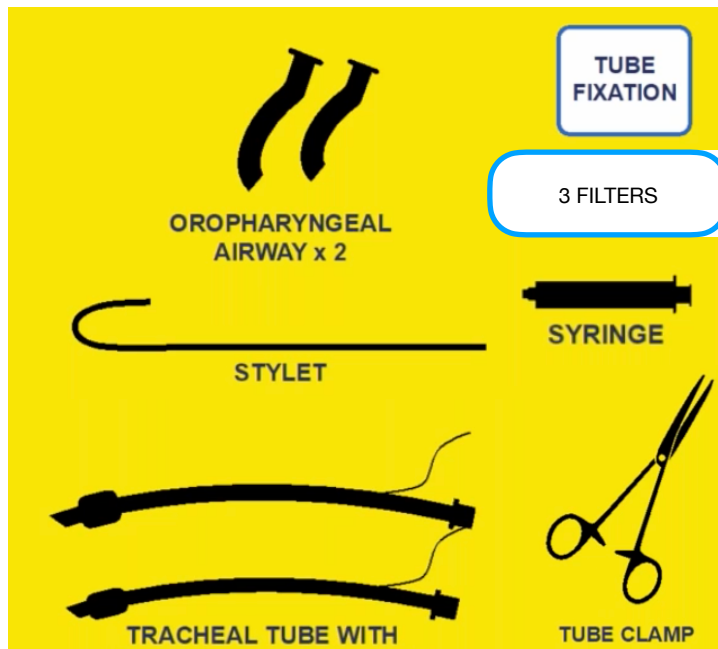
INTUBATION/ EXTUBATION BARRIERS: Plastic sheet/ The Box/ The Tent

Decide who your back up 2nd anesthetist or extra help (AA/ RT) will be and ensure they are aware and available prior to induction (in the Anteroom or in O.R.)

Team huddle: communicate roles, plan, back-up plans, equipment check

Check urgency of the case: if cannot delay surgical start **20 min** after intubation, then surgeon and nurses should wear airborne PPE with N95 to enter OR immediately after intubation

ANTI-FOG: cover inner side of goggles with layer of transparent hand sanitizer





EMERGENCY AIRWAY BOX

Direct Laryngoscope with Mac #3, #4 blades

LMA (green Aura) size 3, 4, 5

Muko/ lubricant for LMA

Syringe for LMA

Surgical Airway FONA kit: scalpel, bougie, #6 ETT

DRUGS

ARDS PATIENT:

In hypercapneic acidotic patient: caution with succinylcholine, risk hyperkalemia

DOSING

Ketamine 1-2 mg/ kg

Rocuronium 1 - 1.2 mg/ kg IBW

Succinylcholine 1 - 2 mg/ kg TBW

Avoid fentanyl prior to paralysis- may precipitate cough

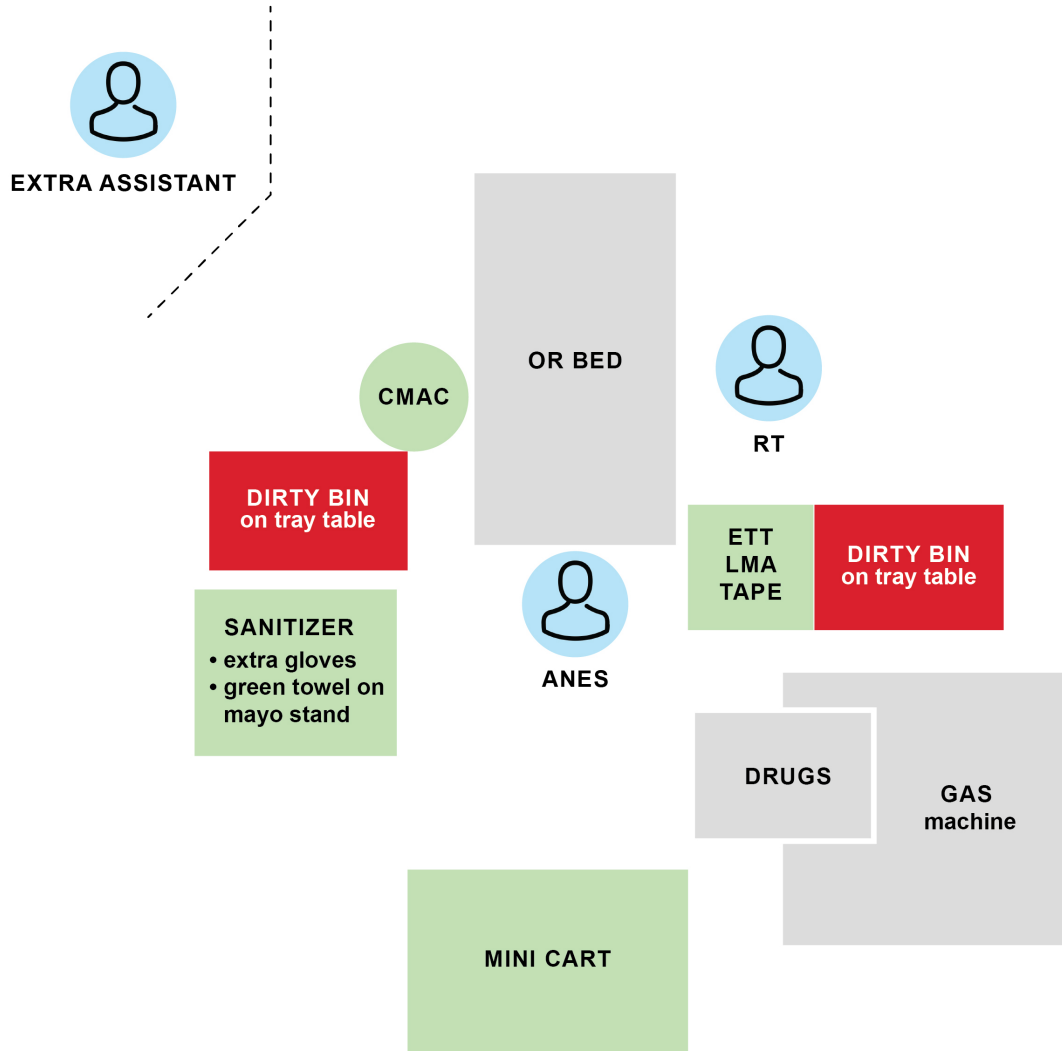
Pressors: bolus +/- infusion pump

NURSE AND RT CHECKLIST

- Post signage on the outside of all doors: COVID
- Lock main O.R. doors once patient is in the O.R.
- Back up airway equipment checked and in Anteroom
- Baby monitors for communication to outside
- Back up white board, papers, and markers
- Hand Sanitizers in OR: at least 3 bottles
- TWO Dirty Bins lined with ziplock bags on tray tables for airway equipment
- Designate 1-2 RUNNERS: when transferring items between OR and outside:
Supplies from outside to inside: runner picks up item, places on cart in Anteroom, leaves. RN leaves OR and enters Anteroom, picks up item from cart in Anteroom.

Items from inside to outside: RN leaves OR and places item on cart in Anteroom, then goes back into OR. Runner enters Anteroom, picks up item, leaves.
- Designate Safety officer to watch Donning and Doffing
- Soda Lime, all filters, breathing circuit, reservoir bag, mask, gas sampling line, water trap must be discarded after every case
- Check filters attached correctly
- Vapour filled
- CMAC blade and used airway equipment require double ziplock bags

OPERATING ROOM CONFIGURATION



FILTERS

WHERE DO THE FILTERS GO?



1. ON EXPIRATORY LIMB OF CIRCUIT



2. Between MASK and CIRCUIT



3. Between ETT and CIRCUIT



4. EXTUBATION:

Sandwich plastic sheet between mask and filter

Other options: box/ tent



Leave filter on ETT when disconnecting circuit

FOR THORACIC CASES WITH ONE LUNG VENTILATION:

Place one HME filter on the OPEN END of the DLT (non-vented lung)

A second HME filter is already between the DLT and circuit (vented lung)

PPE DONNING for ANESTHESIA with SPOTTER

- 1. Anti-fog:** apply hand sanitizer to inner side of goggles or face shield
- 2. Hand hygiene**
- 3. N95 mask:** press down on nose, check seal for leaks, breathe out and see if you can feel a leak around mask
- 4. Regular surgical mask** on top of N95
- 5. Goggles** (optional)
- 6. Bouffant** - pull down to cover your forehead, ears, and hair
7. If you need a **LEAD APRON** put it on now
- 8. Sterile green surgical gown**
- 9. Sterile long inner glove** - pull up over gown cuff
- 10. Face shield-** add clear **U-drape/ other neck protection**
- 11. Yellow isolation gown** - on top of bib
- 12. Sterile long outer glove** - pull up over gown cuff

INDUCTION

After time out - all staff leave O.R. except Anesthesia and Assistant

1. **PRE-OXYGENATE 5 MINUTES**

TWO HAND vice grip

2. Consider **Aerosolization barrier**

Plastic sheet/ The Box/ The Tent

3. RSI with CMAC: **AVOID BMV**

If low SpO₂ requiring BMV, use a barrier



Drop CMAC straight into dirty bin

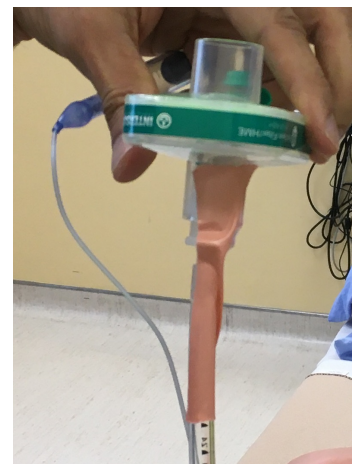
Remove outer gloves immediately after intubation



Do not auscultate

TAPE ETT: males 23 cm, females 21 cm

Tape ETT to filter



What if the patient is on High Flow Nasal Oxygen (ie Airvo/ Optiflow)?

Prior to the team entering, a critically unwell COVID-19 patient may be receiving high flow oxygen via nasal cannula, simple facemask or a non-rebreather mask. These devices should **NOT** be used for pre-oxygenation.

- Nasal cannula at **5 L per minute or less** maybe used to provide supplemental oxygen to the COVID-19 patient in respiratory distress **prior** to induction, but **not** for pre-oxygenation or apneic oxygenation. A surgical face mask can be used on top of nasal cannula.
- If the patient is receiving high flow oxygen, it should be **turned off** prior to removal of the face mask or nasal cannula to minimize aerosolization.
- Seal nasal cannula/ face mask in ziplock bag
- **Pre-oxygenation** should then be commenced immediately, using the best available face mask device, with a viral filter applied directly to the mask and ETCO₂ in the system. Added connections increase the opportunity for disconnection.
- **High flow nasal cannula (ie. Airvo/ Optiflow) are NOT** recommended for apneic oxygenation due to risk of aerosolization
- Standard nasal cannula for apneic oxygenation is not mentioned in CAS/ ASA/ CJA. At high flow rates has increased risk of aerosolization. At low flow rates may be acceptable 3 L/min (reference: ESA, SIAARTI), however must balance risk and benefit. At low flow rates may not achieve enough oxygenation to delay desaturation. Nasal cannula may cause impediment to adequate seal with BMV should it be required.
- Avoid nebulized medications
- Manual ventilation (which may cause aerosolization of the virus) should be minimized unless required for rescue oxygenation

ANTICIPATED DIFFICULT AIRWAY

- Balance risk of aerosolization and risk of can't intubate can't ventilate
- Consider all other options before awake intubation (ie. asleep fiberoptic/ combined videolaryngoscope + fiberoptic, 2nd generation LMA, etc)
- Consider regional technique/ local/ sedation
- Try to avoid awake bronchoscopy unless no other options
- If decision made to intubate spontaneously breathing consider awake nasal fiberoptic intubation - may be preferred as patient's mouth can be covered with a non-re-breather oxygen mask with virus filter
- Topicalize airway without aerosolization (avoid atomizer and nebulizer): use lidocaine paste/ gel, lidocaine soaked pledgets, etc. Caution as any technique may precipitate cough
- Consider ENT for surgical airway as first line
- If surgical airway required, do not BMV simultaneously from above as this will cause aerosolization through the cricothyroidotomy/ tracheostomy site

UNANTICIPATED DIFFICULT AIRWAY

1. **Bag Mask Ventilation:** at your discretion, may be required for severe hypoxemia
Use oral airway, consider 2 handed vice grip, low pressure, low tidal volume

2. **LMA:** 2nd generation disposable



-consider using CMAC to help placement of LMA by displacing tongue and minimizing contact with patient's mouth during LMA insertion, requires enough space in the oropharynx to fit both devices

- consider covering patient's mouth and nose with green towels after LMA is inserted to shield from aerosolization

-consider Aintree to intubate through LMA, consider rocuronium if not already given

2. **Combined Videolaryngoscope plus pediatric bronchoscope (asleep)**

3. **Asleep fiberoptic bronchoscope**

4. **Exit strategy:** return to spontaneous ventilation, reverse paralysis, wake up
- add plastic sheet on top, weigh risk of aerosolization vs risks of FONA failure

5. **Surgical airway kit (FONA):** scalpel, bougie, ETT

*Ensure continued paralysis to avoid coughing unless you intend to wake up patient

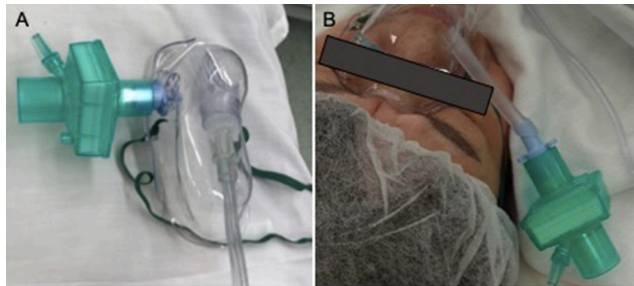
*Consider Sugammadex 16 mg/ kg for rapid reversal

REGIONAL ANESTHESIA

- Check **LAST** (local anesthetic toxicity) supplies available and inform runner of location
- Avoids airway management but leaves the airway open to the room: place **surgical mask on patient** then cover with **acrylic box**
- If requires supplemental oxygen use non-rebreather oxygen face mask with viral filter
- Minimize supplementary oxygen unless required (lowest flow possible)
- Minimize sedation (to decrease the risk of precipitating unplanned airway management) and maintain a safe minimum distance from the patient's airway.

ETCO₂ Monitoring

- attach filter to mask
- secure with pink tape



- Change the water trap after each case
- **Ultrasound:** cover with plastic sheet and dispose after use
use full length probe cover
- **Recover in O.R.**
- **Transport**
 - if no longer requires O₂, dispose of oxygen mask, filter, ETCO₂ line, water trap, and place surgical mask on patient
 - if requires O₂, keep filter on face mask

INTRAOPERATIVE ISSUES

FOR UNEVENTFUL RSI, NO BMV:

Scrub nurse and surgeon(s) should enter with regular OR mask/gown after ETT placed (droplet precaution PPE).

Allow sufficient time for aerosols to settle after intubation before entering:

20 minutes MINIMUM, consider longer duration at your discretion (based on MGH 20 air exchanges/ hr in OR)

If surgery must begin asap and cannot delay 20 minutes, team must don airborne PPE

AIRBORNE PPE (including N95) REQUIRED FOR ENTIRE TEAM IF:

Patient required bag mask ventilation, LMA used, or if operative airway procedures such as tracheostomy.

All staff keep full airborne PPE (N95,goggles,face shield) on throughout the procedure.

Anesthesia/ RT to inform team via baby monitor.

HAND HYGIENE should be meticulously performed according to standard guidelines, specifically after removing gloves; after contact with soiled or contaminated areas; before touching the anesthesia machine, the anesthesia cart or its contents and after every contact with the patient (e.g.: placement of thermometer, nasogastric tube)

RETRIEVING DRUGS/ EQUIPMENT FROM Anteroom:

Request items from Runner via baby monitor

Runner retrieves items kept in operating room next door, places item on cart in Anteroom, then leaves. Runner wears gloves and performs hand hygiene before and after. Circulating nurse leaves OR wearing PPE and enters Anteroom to retrieve item on cart.

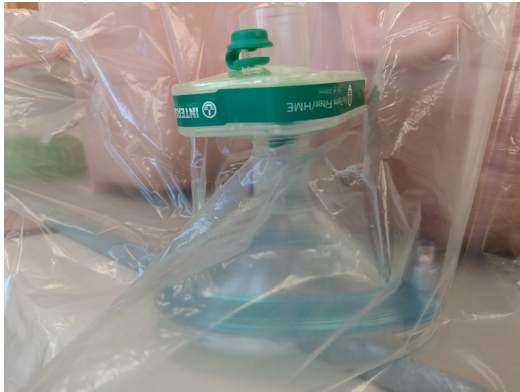
Avoid use of IV infusion pumps unless absolutely required

If used must be thoroughly wiped down (same for U/S machine)

ANTI-EMETICS: AVOID STEROIDS in Covid-19 patients due to immunosuppression

EXTUBATION

1. Pre-oxygenate 100% O₂
2. Pull trash bin close to patient
3. Assistant stays in OR with airborne PPE (N95), all other staff leave
4. Use barrier: plastic sheet/ box/ tent



Cut small hole in sheet for face mask
Sandwich the plastic sheet between the HME filter on top, and face mask below
TWO HME filters on: 1. ETT 2. Face mask



TRANSPORT TO ICU

***DO NOT DOFF** - KEEP ALL PPE ON FOR TRANSPORT, doff in designated area in ICU

If patient meets criteria to extubate, then extubate in OR prior to transport.
Do not keep patient intubated just for transport if they can be extubated.

If patient will remain intubated in ICU, ensure adequate sedation and paralysis.

USE AMBU-BAG for TRANSPORT

Call Security to clear path from OR to ICU

Use dedicated IPAC elevator

Ensure ICU team ready to accept patient

Transport team:

Anesthesia in full PPE from OR. Remove outer gloves and hand sanitize.

RN from OR

RT from ICU to manage **Ambu-bag**

Porter to open doors, elevators

1. **Tape** the ETT to HME filter as added security to prevent disconnection
2. Bring a **CLAMP** to use for transferring from gas machine ventilator to **Ambu-Bag**, and clamp again on transfer to ICU ventilator
3. When ready to transfer from one ventilator to another, place clamp on ETT after inspiratory breath, stop oxygen flow, disconnect from current circuit, keep HME filter on ETT in case of clamp failure
4. Reconnect to new circuit
5. Transport Team does not touch anything else other than patient, bed, equipment.



RECOVERY IN OR

Recovery Room Nurse:

- dons droplet precautions PPE
- enters O.R. after aerosols settle after extubation: **20 minutes MINIMUM, consider longer duration at your discretion**

For Day Surgery or Inpatient: recover in OR

- transport via dedicated IPAC elevator to designated ward with surgical mask placed on patient
- if patient requires supplemental oxygen, use non-rebreather oxygen mask with virus filter
- call Security to ensure path to designated ward and elevator is cleared prior to transport
- after hand over, porter and nurse will doff their PPE in designated doffing area before returning to OR



PPE DOFFING with a SPOTTER

If doffing in OR : wait 20 minutes after extubation

1. **Hand hygiene**
2. **Remove outer gloves** after extubation + **Hand hygiene**
3. **Remove yellow gown + Hand hygiene**
4. **Remove face shield with bib** - bending forward slightly looking down over trash bin, reach for strap from behind and pull over your head, do not touch front of face shield + **Hand hygiene**
5. **Remove green gown and gloves as one unit**- loosen gloves from hands and pull hands into sleeves of gown one at a time, roll it into a ball without touching the outside of the gown + **Hand hygiene bare hands**
6. Put on **NEW pair of gloves**
7. **Remove bouffant + Hand hygiene**
8. **Sit in a chair and disinfect shoes with a wipe + Hand hygiene**
9. **Remove gloves + Hand hygiene**

-----**STEP OUT OF O.R.**-----

10. **Remove goggles + Hand hygiene**
11. **Remove N95** - bending forward slightly and looking down over trash bin
 - A. do NOT touch the front of the face mask
 - B. reach for the lower strap behind your neck first, pull it very wide away from your neck, slowly pull the strap over your head and around
 - C. reach for the upper strap around your head, pull it very wide away from your head, slowly pull the strap over your head and around let the mask drop down into the trash bin
 - D. **Hand hygiene, then sanitize your neck and sides of face, do not touch mucous membranes - consider shower**

ECTs

- **Anyone who tests COVID positive should not have ECT**
- Recommended for only inpatient/emergent cases
- Use Face shield plus droplet precautions
- Non-emergent cases need to be reevaluated
- Avoid BMV -> ask patient to hyperventilate then two-handed seal on mask with an assistant performing low volume BMV with oral airway in place, only if BMV really needed (ref.) CAS
- Consider LMA for emergence to minimize BMV
- Alternative: place LMA after induction
Use LMA Unique plus bite block (green Aura LMA has hard bite block that can damage teeth)
- Cover with green towel if poor seal



Resuscitation (CPR)

- Filter with high flow O2
- Droplet/contact precaution with CPR
- No chest compressions unless everyone in room is wearing N95
- Defibrillation is low risk & just regular droplet/contact PPEs
- Clear on advanced directives: refractory MOF should have no CPR
- Unwitnessed asystolic arrest on ward (controversial point): don't intubate, low survival rate

What are aerosol generating medical procedures (AGMP)?

Lack of precision in definition of AGMP

"Aerosols are produced when an air current moves across the surface of a film of liquid, generating small particles at the air-liquid interface. The particle size is inversely related to the velocity of air. Therefore, if a procedure causes air to travel at high speed over the respiratory mucosa and epithelium, the production of aerosols containing infectious agents is a potential risk."

Definitely	Controversial
Intubation	CPAP, BiPAP, Optiflow
Tracheotomy	High flow dry gas (nasal cannula, simple mask)
Non-invasive ventilation	CPR
Manual ventilation	Endotracheal aspiration
	Open airway suction
	Nebulizers
	Bronchoscopy
	NG insertion
	Sputum collection

WHO Guidelines : Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care
 Tran et al. [PLoS One](https://doi.org/10.1371/journal.pone.0035797). 2012;7(4):e35797. doi: 10.1371/journal.pone.0035797. Epub 2012 Apr 26.



COVID-19



IMPORTANT POINTS TO REMEMBER

1. Induction and extubation with minimum required team members after surgery checklist
2. Always have doffing and donning coach
3. Keep HME filter on mask and ETT when disconnecting/ switching, use a CLAMP on ETT
4. Extubation with barrier as a clear sheet or towel
5. Full PPE for surgical team if aerosolizing procedure in OR room (cough, bagging with ETT)