

## **Anesthesia Adult, Pediatric and Obstetric Perioperative Guidelines for the Care of Confirmed/Suspected Patients with COVID-19 at UCSF**

Last Updated: 8/26/20

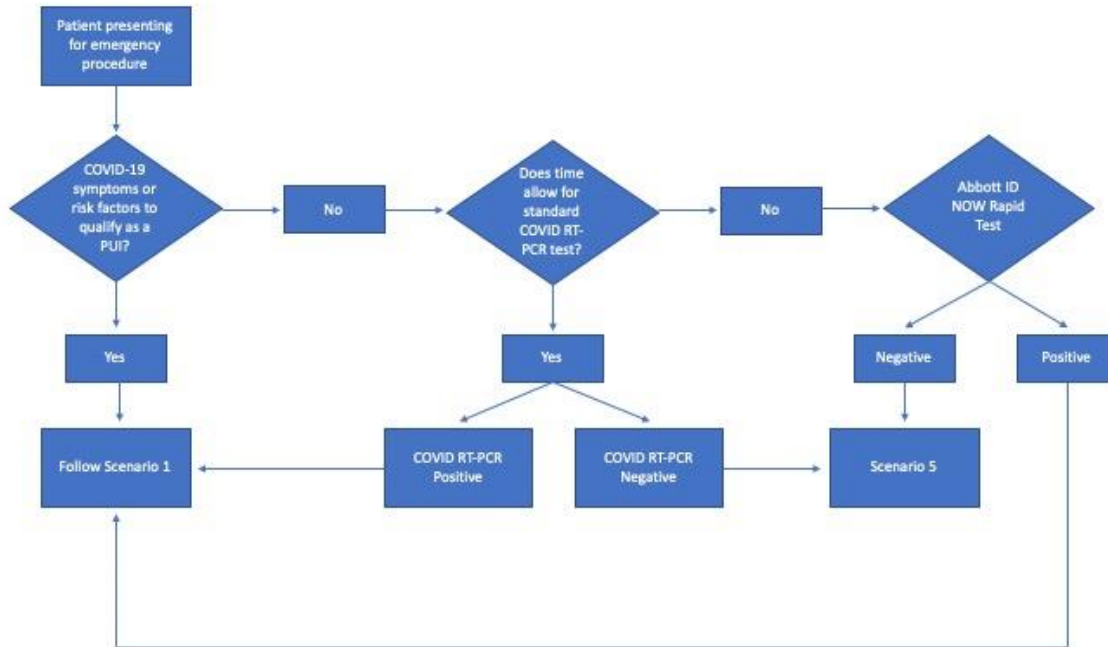
### **Disclaimer:**

As the COVID-19 pandemic evolves, there will likely be changes to these protocols based on new understanding of the virus and the risks posed to healthcare workers (HCWs). We have done our best to present a uniform message with our approach to the situation and will be regularly updating these guidelines to reflect current standards of practice.

### **COVID-19 Abbott ID NOW Rapid Testing:**

The Abbott ID NOW platform provides rapid molecular testing for COVID-19 in under 15 minutes. At UCSF, this test currently can only be used to “rule in” infection. That is, if the patient tests positive, they are to be treated as a confirmed positive (PPE Scenario 1). A patient with a negative test is NOT considered ruled out for COVID-19. Instead, assuming they are not considered a PUI, they are to be treated as an “asymptomatic with or without testing” according to the established perioperative Scenarios (2 through 4) for PPE and O.R. workflow purposes. In all cases, a confirmatory standard PCR test should always be sent. Essentially, this test may be used for urgent cases where standard PCR testing is unavailable in order to determine if the patient needs to be treated with via the Confirmed/PUI pathway (Scenario 1).

**Figure 1. Use of the Abbott ID NOW Platform for Determining PPE/O.R. Workflow**



**Personal Protective Equipment:**

**As of August 5, 2020** all patients who have confirmed COVID-19, have signs or symptoms concerning for COVID-19 and are undergoing evaluation (PUI), or have been exposed to a COVID-19 case must be placed on **Novel Respiratory Isolation**. [Click here for full guidelines.](#)

- PPE for all health care personnel will include an **N95 respirator with face shield (or PAPR)**, gown, and gloves .
- Order **Airborne Isolation** in addition to **Novel Respiratory Isolation** for patients who are receiving **continuous aerosol generating procedures (AGP)** (e.g., high flow oxygen, non-invasive ventilation, mechanical ventilation, tracheostomy in place), to guide room placement.
- Previously, N95 respirators (or PAPRs) were primarily required for the care of COVID-19 confirmed or suspected patients receiving AGPs
- Examples of AGPs: Intubation, extubation, airway suctioning/induced sputum, nebulizer medications, chest PT, endoscopy, TEE/ERCP, ECT, CPR, CPAP/BIPAP, Hi-Flow NC, any procedures on the airway, throat, mouth, nose or sinuses (otologic surgery with drilling, bronchoscopy, tracheostomy, glossectomy, laryngoscopy...etc), thoracic surgery/procedures.
- Keep in mind that **asymptomatic** patients without known exposures awaiting COVID-19 test results can continue to be placed on **Droplet Isolation** unless such a patient requires an AGP, in which case **Novel Respiratory Isolation** is required.

**Figure 2. Updated UCSF COVID-19 PPE and Isolation Requirements**

	Asymptomatic patient awaiting COVID-19 admission/pre-procedure test result	Clinical concern for COVID (PUI) or COVID-positive patient <b>NOT</b> needing continuous AGP <sup>1</sup>	Clinical concern for COVID (PUI) or COVID-positive patient <b>needing</b> continuous AGP <sup>1</sup>	Exposed to COVID (tested negative or not tested, but requires quarantine due to an exposure)
<b>Isolation sign on door</b>	Droplet Use “AGP in progress” sign <sup>2</sup> for AGPs	<b>Novel Respiratory Isolation</b>	<b>Novel Respiratory Isolation</b>	<b>Novel Respiratory Isolation</b>
<b>Isolation flags in Apex</b>	Droplet	<b>Novel Respiratory</b> (Droplet + Contact + N95/PAPR)	<b>Novel Respiratory</b> (Droplet + Contact + N95/PAPR) + <b>Airborne</b>	<b>Novel Respiratory</b> (Droplet + Contact + N95/PAPR) Add <b>Airborne</b> if requiring <b>continuous AGPs</b>
<b>Type of COVID flag</b>	N/A	<b>COVID pending or COVID confirmed</b>	<b>COVID pending or COVID confirmed</b>	<b>COVID exposed</b>
<b>Type of room</b>	Ideally private (negative pressure NOT needed)	Private (negative pressure NOT needed)	Negative pressure –order Airborne Isolation in addition to Novel Respiratory	Private: if no continuous AGP  Negative pressure room: if continuous AGP—order Airborne Isolation in addition to Novel Respiratory
<b>PPE needed</b>	Surgical mask + eye protection. If receiving an AGP, use N95 + eye protection (or PAPR) + gown and gloves during the procedure and when entering the room for 1 hr afterwards	N95 + face shield (or PAPR) + gown + gloves	N95 + face shield (or PAPR) + gown + gloves	N95 + face shield (or PAPR) + gown + gloves

<sup>1</sup>Continuous [AGPs](#) include high flow oxygen, non-invasive ventilation, mechanical ventilation, patient with tracheostomy in place. For patients on Novel Respiratory Isolation receiving intermittent AGPs, the “Aerosol Generating Procedure in Progress” sign is no longer needed.

<sup>2</sup>“Aerosol Generating Procedure in Progress” sign requires N95 respirator/eye protection (or PAPR) during and when entering the room for one hour after the intermittent/discrete AGP (e.g., administration of nebulized medications)

Please see [UCSF Universal Surgical Mask Policy](#) and [Expanded Use of Eye Protection Policy](#)

Please see the [Anesthesia COVID Box folder](#) to review Anesthesia-Specific and other current Infection Control guidance related to the care of patients with COVID-19:

<http://tiny.ucsf.edu/covid>

Please ensure that you are up to date on your **N95 fit testing** (e-mail [tyler.chernin@ucsf.edu](mailto:tyler.chernin@ucsf.edu) for info on available sessions) and have appropriately trained in **PPE donning and doffing** techniques (<https://infectioncontrol.ucsfmedicalcenter.org/novel-coronavirus-covid-19-videos> or watch our dedicated Anesthesia Grand Rounds from 3/18/20 <https://lecture.ucsf.edu/ets/Catalog/Full/f20671f24e204359a3fe7d19070f04e721>).

**PLEASE KEEP IN MIND THAT CHANGES MAY OCCUR TO PPE REQUIREMENTS**

Please access the following google spreadsheets to record your compliance with these measures:

**Fit Testing:**

[https://docs.google.com/spreadsheets/d/1YWlXoSpc0t7NWMg\\_LSbrd1CO09LCdLOUSgPXQ5Ob99M/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1YWlXoSpc0t7NWMg_LSbrd1CO09LCdLOUSgPXQ5Ob99M/edit?usp=sharing)

**PPE:** [https://docs.google.com/spreadsheets/d/1P67AIHVocZ8IS\\_koS5csnbEEa-WBcxPfBRSUaaboSic/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1P67AIHVocZ8IS_koS5csnbEEa-WBcxPfBRSUaaboSic/edit?usp=sharing)

### **COVID-19 Confirmed/Suspected/Exposed Patients for Surgery:**

When possible, procedures should be delayed until official results of COVID-19 testing are available (for suspected patients) or the patient clinically recovers. Whenever possible, procedures should be done at bedside in a negative-pressure ICU room. Staffing in these cases should be kept to a minimum and relief for breaks only as necessary. At all sites, the case should be scheduled as a “last case” whenever possible.

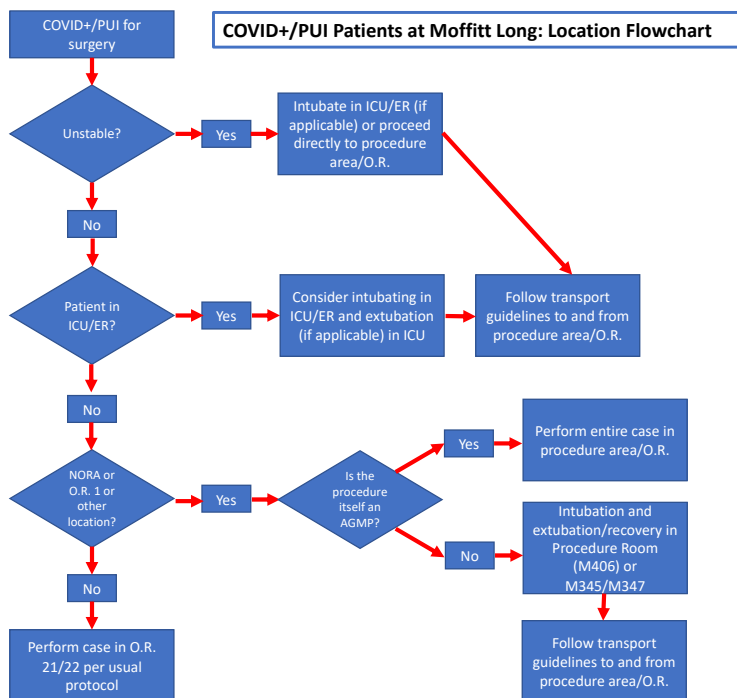
All staff should familiarize themselves with the following procedures. There are many important steps to follow and being familiar with them will help to avoid error.

#### **1-Pre-Patient Arrival:**

- Ensure that all members of the surgical, nursing and anesthesia teams are aware that a patient with confirmed/suspected COVID-19 is booked for a procedure.
- It is the responsibility of the E1 Anesthesia attending to discuss the upcoming case with PACU to ensure that nursing staff will be available to recover the patient in the O.R./procedure area, if applicable.

- A pre-procedure huddle must occur between all members of the surgical team to ensure that all requirements and preparations are in place before transporting a patient. Anesthesia personnel will lead the discussion of any planned AGMPs.
- Inform the anesthesia techs about the case and confirm the use of a dedicated COVID-19 O.R., depending on site (O.R. 11 at MZ, O.R. 11 or 12 at MB, O.R. 21/22/1/Procedure Room (M406)/M345/M347 at ML):
  - Currently, none of the O.R.s at either site provide a negative pressure environment. It is important to keep the doors closed as much as possible
  - Procedure Room (M406) and M345/347 are negative pressure environments and can be used for induction, intubation and extubation when necessary. Recovery can only occur via PACU RNs in M406 (see **Figure 3 and Figure 4 below for guiding location selection at ML and MB**).
- All entry points to the O.R./procedure area and ante-room must have clear signage on the doors to avoid inadvertent entry by staff not wearing appropriate PPE.

**Figure 3: Guiding Location Selection for COVID-19 Confirmed/Suspected Patients at ML**



**\*\*\*Specific considerations for OR 1 at ML\*\*\***

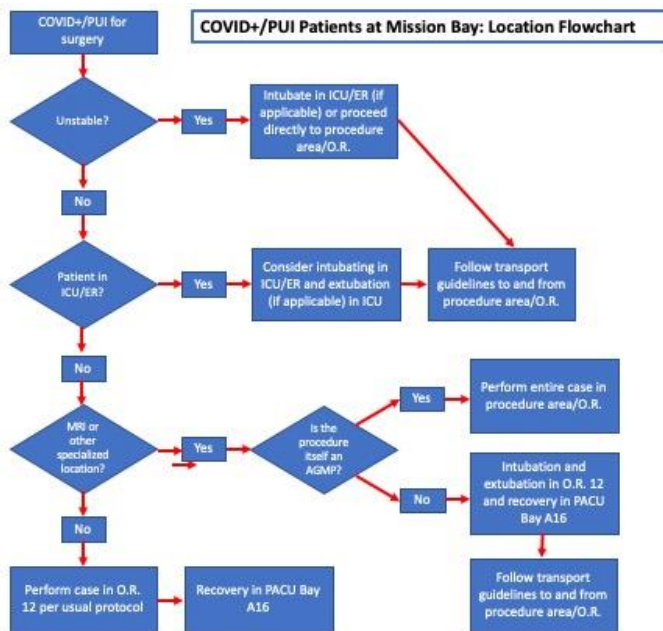
- The entrance to the ante-room is too small to transport a patient through, so patients will need to be moved in and out through the main double doors, unlike at MB and MZ.
- When possible, consider the use of Procedure Room (M406) for induction, intubation, extubation and recovery (see Figure 2 for guidance).
- In order to limit the potential spread of aerosol, **providers must wait 15 minutes** after the last AGMP before exiting O.R. 1 with the patient through the double doors.

- This would likely only be relevant for patients who are remaining intubated, as extubated patients will recover in the OR for a period of time undoubtedly longer than 15 minutes in most cases.
- However, if an extubated patient requires an AGMP post-extubation, that timing must be considered before exiting through the double doors.
- Providers should exit as quickly as possible to limit the amount of time the doors are left open.
- After completion of the case, the room should sit for one hour before undergoing a high clean. If anyone needs to enter before that time they must don Novel Respiratory Isolation precautions.

**\*\*\*Specific Considerations for the Use of M406 M345 and M347\*\*\***

- You will need to make sure that both the procedure room and the final procedure area/O.R. are set up to receive a COVID+/PUI patient.
  - Pay careful attention to the anesthesia machine set up with appropriate filters/in-line suction.
- M406 is a negative pressure environment with 45 minutes required for 99% air turnover.
- M345 and M347 are negative pressure environments with 30 minutes required for 99% air turnover.
- Providers may leave with the patient before 45/30 minutes has elapsed so long as they do so quickly and limit the amount of time the door is opened.
  - The room should then remain empty for one hour before undergoing a high clean.
  - Appropriate signage MUST be left in place at the entrance during this time.
- Providers should return to M406 or M345/M347 for extubation/recovery if applicable.
- Please note that PACU RNs cannot recover a patient in M345/M347.

Figure 4: Guiding Location Selection for COVID-19 Confirmed/Suspected Patients at MB



Please pay extra attention to proper hand hygiene when accessing the **anesthesia cart** for meds and supplies:

- Always perform hand hygiene and apply clean gloves before accessing the cart and ensure the drawers are closed when not in use.
- If you feel that an area of the cart became contaminated during the case or was grossly soiled, please inform the anesthesia techs so that the appropriate items can be discarded while the cart undergoes a thorough cleaning.
- **The drug box may be brought into the O.R. but ensure that strict hand hygiene is used when accessing it. Also make sure to wipe down the outside of the drug box at the end of the case:**
  - All medications, including narcotics, will be wasted in the COVID O.R. or in the patient's ICU room.
  - Waste must occur with another licensed provider (RN, CRNA, MD or pharmacist):
    - Account for the narcotic waste on the CSAR narcotic sheet in mcg/mg only, as is standard CSAR documentation requirements.
    - Second licensed provider must sign legibly.
    - In rare exceptions, if unable to obtain signature, write their name and credentials (MD, CRNA, RN...etc) on the CSAR narcotic sheet.

Make sure your **circuit, suction** and anesthesia **workspace** are prepared in the following way:

- Ensure that the anesthesia circuit has a high-efficiency filter at **BOTH** the wye piece and the expiratory limb.

- Filters add resistance. If this becomes a problem, you can consider removing the expiratory limb filter during a case only.
- Also make sure that the in-line ETT suction is set up and ready for use (see images).
  - The goal is to limit circuit disconnects when at all possible.
  - Can consider clamping ETT briefly between changes.
- Ensure that the gas sampling line is on the filtered end of the circuit.
- **If it is necessary to disconnect the circuit for patient positioning, turn off the ventilator, pause gas flow, and leave the distal filter attached to the ETT during the disconnect and consider briefly clamping the ETT**
- The Yankauer suction should be kept in an empty saline bottle or plastic bag between uses to avoid contaminating the environment.
- Ultrasounds and other devices should be sheathed and kept as clean as possible.
- Do your best to limit contamination of the environment and other re-usable equipment:
  - Leave unnecessary personal items outside (bags, fanny packs...etc).
  - Use O.R. telephone in speaker mode.
  - Pens and sharpies should be disposed of after each case.
  - Avoid stethoscope use, but if necessary, use disposable only.
  - Safely sanitize pagers, cell phones and other devices that are brought into room.

### 2-Patient Transport:

Bring the necessary PPE from the O.R. supply to the ICU/floor for donning in ICU/floor. Please see specific section on **Patient Transport and Disposition** for further details.

### 3-Intraoperative Management:

All members of the O.R. team must don full **Novel Respiratory Isolation** precautions throughout the procedure. PAPRs are preferable over N95 when available, but both are fully appropriate forms of protection for COVID-19 patients. Perform frequent hand hygiene and wear double gloves. Remember to limit repeated entry/exit from the O.R. during a case.

The **type of anesthetic** required will depend on the patient's clinical status and the nature of the procedure. However, some important considerations are as follows:

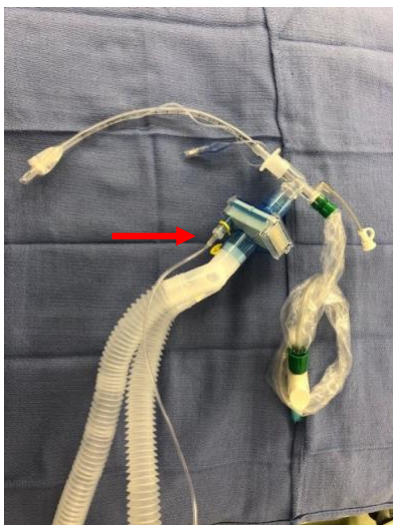
- Avoid LMA, deep sedation or awake fiberoptic techniques.
- Avoid any type of sedation that may lead to obstruction/hypoventilation requiring unanticipated/emergent intubation.
- If amenable, regional/local techniques can be employed:
  - Patient should wear nasal cannula at lowest possible flow and surgical mask throughout.
- Employ a lung-protective ventilation strategy:
  - **Low tidal volumes** =  $\leq 6$  cc/kg **PBW** (vs. 12)
    - [http://www.ardsnet.org/files/pbwtables\\_2005-02-02.pdf](http://www.ardsnet.org/files/pbwtables_2005-02-02.pdf)
  - **Permissive hypercapnia** =  $\text{pH} \geq 7.25$
  - **High PEEP** (>10, up to 20 cm H<sub>2</sub>O as hemodynamics allow)
    - if severe hypoxemia ( $\text{FiO}_2 \geq 0.6$ ,  $\text{PEEP} \geq 10$  with  $\text{PaO}_2/\text{FiO}_2 < 150$ )



- Consider continuous neuromuscular blockade if refractory hypoxemia/hypercapnia or high airway pressures.
- Target SpO<sub>2</sub> 88-92%

For **intubation**, two anesthesia providers or an anesthesia provider and a circulating nurse should be in the O.R. while the remainder of the team waits outside the O.R. **until 15 minutes after airway secure (for main O.R.s at ML/MB/MZ)**, unless surgical team is involved in airway management and donning the appropriate PPE. Anesthesia providers must double glove before any airway/oropharyngeal contact.

- If inducing in an induction room (M406/M345/M347), keep in mind that air turnover times are longer. Limit the amount of staff in the room during AGPs before transporting to final destination.
- Support staff in full, clean **Novel Respiratory Isolation** precautions should be available for assistance while waiting outside the O.R. and should be keeping an eye on the O.R. during induction and emergence for safety reasons
- Ensure filter is in place between mask and circuit (see images).
- Perform a full 5min pre-oxygenation. Patients with COVID-19 have been known to desaturate quickly and profoundly, so maximizing reserve is essential.
  - Avoid mask ventilation. If necessary, two-handed seal and small tidal volumes.
- Recommend video laryngoscopy to avoid proximity to face and confirmation of ETT.
- Once ETT secure, remove outer gloves and use them to sheath soiled airway equipment.
  - Do not interact with the environment until outer gloves removed.
- Place soiled airway equipment in sealed double bags for cleaning.
- Perform hand hygiene and don new double gloves.



Examples of in-line ETT suction and optimal locations of HME filters and gas sampling



Only consider **extubation** if the patient meets criteria and does not have or need ICU bed.

- Extubation is considered an AGP, so only anesthesia/necessary nursing staff should be present in O.R.
  - Consider temporary barrier methods over patient's face as ETT is removed.
- All other team members should wait to re-enter O.R. **until 15 minutes (main O.R.s at ML/MB/MZ) have passed** since extubation (note differences for M406/M345/M347 at ML)
- At **ML**, PACU staff will follow their recovery procedure guidelines:
  - Once the patient is stabilized, not coughing or vomiting, a PACU RN can enter O.R. to complete recovery process in **Novel Respiratory Isolation** precautions.
  - The patient should be moved to the transport bed and wear a surgical face mask for recovery phase.
- At **MB**, patients will be recovered in the negative pressure room in PACU (total of 3 negative pressure rooms: 1 adult side and 2 pedi side).
- At **MZ**, patients will be recovered in O.R. 11.
- Please see **Figure 3** for details on recovery location at **ML** and **Figure 4** for **MB**.

If the patient is **returning to ICU intubated**, make sure to properly doff and then don a **new gown and gloves** for transport.

- Assemble necessary transport supplies in large plastic bag and discard all materials after patient dropped off.
- Follow the same principles for transport for return to ICU.

For **Donning and Doffing**:

- Before the patient arrives, staff not involved in transport may don (and scrub) in ante-room.
- If in a location that does not have an ante-room, remove gown and gloves in location and follow the remainder of the steps below when outside the location.
- **Once the patient is in the O.R., the ante-room is considered "contaminated"**
  - Donning must then occur outside ante-room and no one should doff respiratory protection in the ante-room.
- For **Doffing**:
  - Doff gloves and gown in O.R., perform hand hygiene.
  - Exit O.R. and ante-room, perform hand hygiene.
  - If patient is to be **immediately transported**:
    - Keep N95/face shield/goggles/PAPR on and don new gown and gloves.
  - If **clinical duties are complete**:
    - Once outside ante-room, if wearing a face shield and N95 respirator, perform hand hygiene then carefully remove face shield by holding the elastic band and place on a designated "dirty" table for subsequent cleaning. Repeat hand hygiene, then carefully remove the N95 respirator and store if being reused or discard. Repeat hand hygiene. Wearing non-

sterile gloves, use disinfectant wipes to clean the face shield and place in designated “clean” area. Remove gloves and repeat hand hygiene.

- Once outside ante-room, if wearing a PAPR, perform hand hygiene then carefully remove the PAPR. Detach the PAPR face shield and place on a “dirty” table for subsequent cleaning. Repeat hand hygiene. Wearing non-sterile gloves, use disinfectant wipes to clean the outer surface of the PAPR and the PAPR face shield. Remove gloves and perform hand hygiene.

#### 4-Postoperative Management:

Once the **patient leaves**, the OR must be left unoccupied for **one hour** and then undergo a high level clean:

- Techs/Environmental service workers need to don PPE in accordance with their protocols for room cleaning.

### **Transportation and Disposition for COVID-19 Confirmed/Suspected Patients:**

**Do not transport any patient until the pre-procedure huddle is complete.** Patients with known or suspected COVID-19 should never be brought to holding areas or PACUs:

- Always consult with staff at destination to ensure they are prepared to receive the patient directly.
- Only transport patients for procedures or imaging studies that are deemed **absolutely** necessary.
  - When in doubt, pro-actively consult with care team to discuss risk/benefit scenario.

**Clean** stretcher handles and IV pole surfaces with wipes prior to exiting ICU room or O.R.

- When leaving a location, one team member wearing **clean** PPE (no gown or gloves) is designated to interact with the environment (elevator buttons, door controls...etc) but will maintain at least a 6 foot distance from the patient whenever possible.
- The other team members will also don **clean** PPE before transport and attend to the patient and avoid contacting environmental surfaces.
- Ensure that patient bed is wiped down before it is moved to hallway for definitive cleaning while patient in O.R. (exact procedures vary by site)

For **intubated ICU patients**, consider switching to a portable ventilator in the negative pressure ICU room (clamping ETT briefly during switch):

- Providers don clean **Novel Respiratory Isolation** precautions for transport.
- Providers interacting with the environment only will wear N95 with face shield/goggles or PAPR and will maintain at least a 6 foot distance from patient whenever possible.

- Assemble necessary transport supplies in large plastic bag and discard all materials after patient dropped off.
- Ensure a high efficiency hydrophobic filter is in place between the ETT and Ambu bag/Jackson-Reese or ventilator to avoid releasing infectious droplets to the surroundings.
- Do not use the single-limb transport ventilator.
- **Consider using the portable ventilator in the OR with TIVA to avoid disconnects.**

**Non-intubated patients** should wear a surgical face mask during transport:

- Providers don clean **Novel Respiratory Isolation** precautions for transport.
- Providers interacting with the environment only will wear N95 with face shield/goggles or PAPR and will maintain at least a 6 foot distance from patient whenever possible.

At **MB, MZ and ML O.R. 21/22**, providers should bring the patient to the designated O.R.s **through the ante-room**, allowing each door to close sequentially before the next door is opened. For **ML O.R. 1 and other locations without an ante-room**, providers will need to bring the patient through the double doors (see specific considerations for O.R. 1 above for transporting the patient at the end of a procedure).

- At **MB and MZ**, the patient transport bed will then remain in the O.R. for cleaning.
- At **ML**, the bed/gurney linens should be pulled and tossed into the soiled linen container and the bed/gurney wiped clean prior to moving into the hallway.
- This should occur before the patient is unmasked and ventilated (if not already intubated).

## **Obstetric Anesthesia for COVID-19 Confirmed/Suspected/Exposed Patients:**

### 1-Pre-Delivery:

- As noted above, UCSF has updated its PPE and isolation requirements for patients with **known exposure** to COVID-19 as well as those with **confirmed** or **suspected** (PUI) COVID-19.
- COVID-19 suspected/exposed patients will be isolated in triage, transported to delivery location with surgical mask.
- All care team members will be notified of case and location of delivery.
- Location should have clear signage at every entrance.

### 2-Labor Process:

- Early neuraxial is encouraged to reduce likelihood of general anesthesia.
- All members of the team must don **Novel Respiratory Isolation** precautions throughout the neuraxial procedure. PAPRs are preferable over N95 when available, but both are fully appropriate forms of protection for COVID-19 patients. Perform frequent hand hygiene and wear double gloves. Remember to limit repeated entry/exit from the labor room during a procedure.

- **DO NOT** bring the epidural cart into the patient's room (apply similar hygiene principles relating to the cart as in the O.R.).
- There is currently insufficient information about the cleaning, filtering, and potential aerosolization when using nitrous oxide in labor analgesia systems in the setting of COVID-19. As such, we have suspended its use in this population until further notice.

### 3-Operating Room Delivery:

- All providers must don **Novel Respiratory Isolation** precautions throughout the delivery, regardless of the type of anesthesia (general versus regional). PAPRs are preferable over N95 when available, but both are fully appropriate forms of protection for COVID-19 patients. Perform frequent hand hygiene and wear double gloves. Remember to limit repeated entry/exit from the operating room during an operative delivery,
- All OB O.R.s are positive pressure environments.
- A similar workflow as the General O.R. relating to the anesthesia carts will be employed (see previous).
- Patient transported to delivery operating room with regular surgical mask on. Oxygen therapy NOT recommended for abnormal fetal heart rate.
- For **neuraxial anesthetic**, oxygen should be provided via nasal cannula at the lowest flow possible, if necessary:
  - Patients should wear a surgical mask over the NC if feasible.
- If **general anesthesia** and **intubation** is required:
  - Follow same procedure as General O.R.
  - Once stable, not coughing or vomiting, can transport with surgical mask on patient.
  - Extubated patients will recover in their room, preferably a negative pressure airborne isolation room.
  - Patients with ICU beds should stay intubated and then extubated in ICU per protocol.

### **Primary Authors:**

Tyler Chernin, M.D.

Ron George, M.D.

Gabriel Sarah, M.D.

Marla Ferschl, M.D.

Lindsey Huddleston, M.D.