

## Protocol for Perioperative Management of Surgical Procedures During the COVID-19 Pandemic

This document addresses perioperative management of patients presenting for surgery during the COVID-19 pandemic, including those who are KNOWN or SUSPECTED (i.e. rule-out/PUI) COVID-19 positive and need urgent surgery.

**Guiding Principle:** While we continue to care for patients with urgent surgical issues, we must take every precaution to protect the safety and wellbeing of our staff during the transport to and from the OR suite, and during the case itself.

All patients undergoing surgical procedures will be prioritized for testing for COVID-19 within 3 days of the planned procedure. The process for ordering the test and communicating the process to the patient is found below. This applies to both inpatients and outpatients having surgeries and procedures regardless of suspicion or symptoms of COVID-19. If at all possible, the surgical procedure **should be delayed** until a result is available, in order to provide the best medical information to the operating team and to conserve PPE.

Asymptomatic patients (patients without symptoms or history suspicious for COVID-19) with a **negative test** and Level 1 cases that cannot be delayed for COVID testing will be done using **enhanced respiratory protection for OR team members including medical students and other trainees** (gown (for those in the sterile field), gloves, N95 mask, and face shield). Vendors should remain outside of the OR during intubation and extubation and stay out of the OR for 20 minutes after each event. If this is not feasible, vendors should be offered enhanced respiratory protection. The use of the N95 masks for these cases will be used at the discretion of each of the OR team members but will be encouraged during intubation or extubation of patients. Standard surgical and perioperative processes and transport procedures will still apply for these cases.

### ***I. Posting of cases and case urgency***

- A. Cases will be done in order of urgency; however, rapidly transferring a patient to the operating room (i.e. as we typically do for a Level 1 case) is not consistent with safe care for the staff. Every case will need some time to appropriately manage the infectious risk, particularly the donning of PPE. **To the extent that it is possible, cases should be posted early in the course of the surgical problem, not at the last minute. All cases posted for surgery should also have a COVID-19 assay performed. PLEASE NOTE: the type of order and test will vary based on the urgency of the case (see below).**
- B. Cases may be aggregated and staff consolidated as required for efficient room and staff utilization, cognizant of patient, faculty and staff needs.
- C. Every effort should be made by the surgical service when posting cases to clearly communicate the precise procedure and any requested equipment. This will reduce the need to enter/re-enter the operating room and reduce staff exposure.

- D. Minimally Invasive Surgery (MIS) procedures** provide benefit to patients by reducing postoperative pain and recovery time and benefit the healthcare system by reducing hospital length of stay. There are limited data regarding MIS procedures amidst the COVID pandemic. As community prevalence of COVID is decreasing and healthcare workers are increasingly becoming vaccinated, Minimally Invasive Surgery (MIS) procedures requiring pneumoperitoneum will be allowed in COVID positive or COVID suspected patients under the following conditions.
1. Special considerations for MIS procedures detailed below are followed.
  2. NOTE: Use of AirSeal (valveless) pneumoperitoneum remains PROHIBITED in COVID positive or COVID suspected patients.
- E. Exclusion for Obstetric Procedures:** Elective cesarean deliveries and other elective cases (i.e. cervical cerclage placement) performed in the DUH or DRH Labor and Delivery Operating Rooms will be excluded from the need for pre-operative COVID testing, as all obstetric patients will undergo a rapid point of care test (POCT) at the time of admission to labor and delivery. See DUHS policy titled, 'COVID-19 Point of Care testing – Labor and Delivery Units' for further information. Those obstetric patients having planned surgeries at the DUH or DMP main OR platforms (ie. women with placenta accreta, or those requiring other non-obstetric procedures in pregnancy) will have pre-operative COVID testing arranged by the PASS clinic staff.

## **II. Preoperative Testing for Coronavirus**

- A. This communication serves to provide instructions on how to order the proper test for **asymptomatic patients** who are being scheduled for surgery and who are NOT suspected as having COVID-19 *and have not had a positive COVID-19 test within the last 90 days*. Patients who have had a positive COVID-19 test within the last 90 days should not undergo pre-operative testing. If the patient has met criteria to discontinue Special Airborne Contact Isolation, (i.e., **Covid Recovered**) then the case should proceed according to the protocol for a test-negative asymptomatic patient. **See attached algorithm in appendix for criteria to be considered Covid Recovered**).
- B. THIS PROCEDURE APPLIES TO PERIOPERATIVE PATIENTS ONLY. THIS DOES NOT APPLY TO NON-PERIOPERATIVE PROCEDURALISTS AT THIS TIME
- C. Neonates
1. For neonates born to a COVID negative mother, perioperative testing would begin at 72 hours of life
- D. FOR ORDERING PROVIDERS
1. INPATIENTS: Test should be performed within 3 days of the procedure
    - a. **For Level 5 or Non-Levelled Cases**
      - The surgeon or proceduralist must place the following order for patients undergoing procedures:
        - CORONAVIRUS (COVID-19) SARS-COV-2 PCR PREOPERATIVE SCREEN [LAB9990]
        - The order should be placed 48 hours prior to the scheduled procedure or as soon as it is known that an OR case is scheduled

- DO NOT CALL INFECTION PREVENTION OR THE CLINICAL MICROBIOLOGY LAB TO EXPEDITE TESTING

b. **For level 2-4 cases**

- The surgeon or proceduralist must place the following order for patients undergoing procedures:
  - At DRH or DRAH: **CORONAVIRUS (COVID-19) SARS-COV-2 RAPID TEST [LAB9993]**
  - At DUH or Eye Center: **POC COVID-19 TEST (DUH PREOP ONLY) [POC113]**
  - The order should be placed as soon as it is known that an OR case is scheduled
  - The test will be performed for DUH patients in the DUH perioperative POC testing site. For DRH and DRAH, testing will be performed in the ED testing sites
  - POCT testing of **Duke Eye Center Urgent Clinic patients** (levels 2 – 5) should use this order and receive testing through the DUH Perioperative Service POC testing site

c. **For Level 1 cases**

- If time permits, it is appropriate to attempt POC testing for level 1 cases using the order process outlined for level 2-4 cases, however, **Level 1 cases should not be delayed awaiting coronavirus testing.**

2. OUTPATIENTS

- All pre-anesthesia patients who have not had a positive test for COVID-19 within the last 90 days are required to undergo COVID-19 testing within 3 days prior to the day of the procedure. Patients who have had a positive COVID-19 test within the last 90 days should not undergo pre-operative testing. If the patient has met criteria to discontinue Special Airborne Contact Isolation, then the case should proceed according to the protocol for a test-negative asymptomatic patient. See attached algorithm in appendix.
- b. All tests will be **ordered by the surgeon or their designee at the time that the case** is being posted for surgery using Lab9990 (Coronavirus (Covid-19) SARS-CoV-2 PCR Preoperative Screen) unless being performed at the outpatient Drive Thru the morning of the surgical procedure, in which case Lab9992 (Coronavirus (Covid-19) SARS-CoV-2 POCT) may be used
  - Only nasopharyngeal swabs are accepted
  - The Date of Surgery must be entered in the PCR lab order
  - Diagnosis 374651 (Screening for Viral Disease) or the Surgical Diagnosis ICD-10 should be entered
  - If the planned date of surgery is <7 days from the date the surgery is posted OR the date of surgery is changed, call DHAS

919-620-1294 to arrange for them to contact the patient to schedule a Drive Thru visit.

The following testing options are available:

- Duke Family Medicine Clinics in Durham and Wake County
  - Order: LAB9990 CORONAVIRUS (COVID-19) SARS-COV-2 PCR PREOPERATIVE SCREEN
  - Surgical team calls to schedule appointment—**do not share phone number with patients**
    - Adults and children – 919-620-1294
    - Roxboro Road open M-F (children 0-18 only)
    - Pickens Building open 7 days per week (adults and children)
- Out of Town Laboratories with **Results Scanned into EPIC Prior to Surgery**<sup>1</sup>
  - The surgical team is to arrange for **nasopharyngeal swab for RT-PCR** testing at a CLIA (Clinical Laboratory Improvement Amendments) certified lab.
  - Any nucleic acid assay (PCR or POCT from a nasopharyngeal sample within 3-days prior to the date of the procedure (expiring at midnight the 3<sup>rd</sup> day)
  - Fax the entire laboratory report to the receiving hospital. **Please ensure the patient name and date of birth are included in the faxed documentation.** The numbers to use for this electronic records process are:

Duke University Hospital	919-385-7541
Duke Regional Hospital	919-385-9739
Duke Raleigh Hospital	919-385-9740

- For Patients Who Cannot Travel for Testing Prior to the Day of Surgery (>2 hrs. away) and do not have access to approved external laboratory testing:
    - Day before surgery outpatient test (Option #1, above). For travelers traveling >2 hours, who are willing to come in for testing prior to 16:30 the day before surgery, the turnaround time of this test is <15 hours and will be result for 1<sup>st</sup> start cases.
    - Day of Surgery Point of Care Testing (POCT) at Duke Family Medicine Clinic in Durham (opens 08:30 am)
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- These patients cannot be 1<sup>st</sup> cases and should be scheduled for after 10:30 cases
- Order: LAB9992 POC Coronavirus (COVID-19) SARS-Cov-2 Rapid Test
- Surgical team calls to schedule appointment—***do not share phone number with patients*** 919-620-1294
- ***Un-resulted/Missing tests will delay patient's entry into Preop and Case Cancellation unless outpatient POCT can be arranged on the day of surgery***
- **DN/DMP Pre-Anesthesia POCT limited to Level 1-4 Inpatients & Eye Center Level 1-5 Order: POC113 POC Covid-19 Test (DUH Preop Only)**
- Call DN Preop to arrange Nasopharyngeal swabbing and POCT 919-684-4718

### 3. ED PATIENTS REQUIRING SURGICAL PROCEDURES

- Testing for pre-operative/ pre-procedural patients in the ED being posted for level 2-5 cases should be coordinated with the procedural team. In general, the ED team should enter the order as per the ED POC testing process for other ED patients.
- If there are logistical limitations that prevent access to ED POC testing (e.g. the machine or test kits are unavailable), the ED team can request that the proceduralist enter the order and proceed with testing using the perioperative test resources and process used for inpatient leveled cases.
- If the patient has had a negative COVID test within 3 days, the test should not be repeated unless there are clinical concerns for COVID infection (new onset fever, shortness of breath, cough, worsening respiratory status that is unexplained)

### 4. SCRIPT FOR PRE-OP SCREENING PATIENTS:

- You have no signs or symptoms of COVID infection. However, you are being tested for COVID prior to your upcoming procedure so that we can make the best plans for your safety and the safety of our healthcare team.
- INPATIENTS:
  - The results of your test should return within 24 hours and you will be notified of your test results. If your test is positive, you will be isolated according to our hospital protocols.
- OUTPATIENTS:
  - You should continue to follow the following practices:
    - Wash hands frequently with soap and water or use alcohol sanitizer that contains >60% alcohol
    - Physically distance yourself from other individuals
    - Avoid public gatherings

- Please report any new symptoms including fever, cough, shortness of breath, sore throat, runny nose, myalgias, diarrhea prior to your upcoming procedure.
- INSTRUCTIONS FOR INPATIENT NURSING STAFF:
  - We have begun a new procedure to screen asymptomatic patients prior to high-risk procedures. The results of the screening tests will be used to inform the level of PPE needed for the procedure and the subsequent care of patients. Because patients are ASYMPTOMATIC, they do not need to be isolated unless the test returns positive.
  - The tests should be obtained by the designated team member at your facility. Please follow procedures for obtaining an NP swab:
    - [https://covid-19.dukehealth.org/sites/covid-19.dukehealth.org/files/NP%20Swab%20Collection%20and%20Transpo%20Instructions\\_3.20.20\\_APPROVED.pdf](https://covid-19.dukehealth.org/sites/covid-19.dukehealth.org/files/NP%20Swab%20Collection%20and%20Transpo%20Instructions_3.20.20_APPROVED.pdf)
- E. INSTRUCTIONS FOR PERIOPERATIVE NURSING STAFF:
  - In an effort to conserve our PPE resources, we have started implementing a process whereby nearly all patients, whether inpatient or outpatient, should have a COVID-19 test done and result prior to rolling back to the OR. Emergency cases such as level 1, 2, 3 and potentially 4 may have to proceed without COVID-19 testing.
  - Pre-op nursing on the day before procedure/surgery should check for the presence of testing order and/or results
  - On morning of surgery, before sending for patient from ward or preoperative waiting area, pre-op nursing will confirm that the patient has a negative COVID 19 test.
  - If the test is not back, we should delay sending until test is reported, unless the urgency of the case dictates otherwise. In this situation, please inform anesthesiologist and surgeon involved in the care of this patient, that we are lacking an order or pending a result.
  - In the event of a positive COVID-19 result, the surgery will be rescheduled. If the patient is in-house at the time of the result the need for surgery/procedure will be determined. If the surgery needs to proceed, we will follow the COVID-19 positive pathway.
  - Rooms and staff may need to be consolidated and case order altered to conserve PPE.
  - Pre-Operative Screening Prior to Non-Emergent Surgical Procedures for Patients Who Have Previously Tested Positive for COVID-19
  - Re-testing is no longer required for patients who have had a positive COVID-19 test within the last 90 days. If the patient has met criteria to discontinue Special Airborne Contact Isolation, then the case should proceed according to the protocol for a test-negative asymptomatic patient. See attached algorithm in appendix.

- Pre-anesthesia testing for COVID-19 in asymptomatic outpatients and same-day admit patients from prisons, nursing homes, and long or short term care facilities will be performed as follows:
- For non-DN/DMP Preop patients, POCT will be done the morning of the procedure at drive through facility located at Pickens Family Clinic (Durham) or Covid Testing DRAH – MOB8 (Raleigh)
- For DN/DMP Preop patients, POCT will be done the morning of the procedure in an isolation room in the DN/DMP Preop area

### **III. Enhanced Respiratory Protection for COVID-19 Negative Tested Patients**

- A. All OR team members, including all trainees, will be encouraged to wear enhanced respiratory protection for all surgical cases, especially during the high-risk period of intubation and extubation and other aerosolization generating procedures (e.g., sino-nasal, oral, laryngeal, tracheal and lung parenchymal surgeries; endoscopy and transesophageal echo).
- B. Vendors should remain outside of the OR during intubation and extubation and stay out of the OR for 20 minutes after each event. If this is not feasible, vendors should be offered enhanced respiratory protection.
- C. Enhanced respiratory protection will include gloves, N95 masks & face shields. Gowns will be worn as is standard for all surgical cases.
- D. All Operating Room staff, including trainees on official rotations requiring access to the OR, will be supplied with a 1-month supply of N95 masks. The number of the masks provided at each surgical site should be determined by the number of shifts/week performed at that site. These masks will be used on a rotational basis, so for example, if you have five shifts per week at a surgical site, the provider should be supplied with five N95 masks. A mask should not be reused until you have worn all your other masks in sequential order.
- E. N95 masks should not be used again within 3 days.
- F. For staff working at multiple locations, it will be up to all surgical sites to only issue the number of N95 masks that are required at their site. Every effort needs to be made to avoid duplication of N95 mask distribution at multiple locations.
- G. Since these alternate N95 masks contain an expiratory valve, surgical masks must be worn over these N95 masks.
- H. At the end of the month, the old N95s will be disposed as they are not recyclable and a new 1-month supply will be issued to staff
- I. Surgical sites will be responsible for supply chain and distribution management
- J. Lost, broken, and soiled N95 masks will be replaced as required.

### **IV. Designated Operating Rooms**

- A. Specific ORs shall be used as general COVID rooms on each platform. These rooms have the appropriate anteroom that will be needed for donning/doffing PPE.
  - 1. OR 48 will be the primary COVID room on the platform.
  - 2. OR 56 is primary COVID room for cardiothoracic patients.

3. Obstetrics will use Delivery Room 1 on the 5th floor for Cesarean deliveries, with DN OR 4 as backup.
  4. ORs 6 and 8 will be the designated COVID rooms at DRAH. These rooms have a substerile room for donning and doffing PPE, though it will not accommodate a bed.
  5. OR 2 will be the primary designated COVID OR at DRH. It has an anteroom. OR 1 is designated as DRH alternate.
  6. Cases requiring hybrid capability that can be performed in a COVID room using a C-arm will be performed in a COVID room with a C-Arm.
  7. For complex cases that require a hybrid room (e.g. aortic dissection or ruptured AAA) for a COVID positive or suspected patient, DUH room 53 will be used with all COVID precautions observed.
  8. EP2 is the designated EP lab.
- B. Special airborne/contact precaution signs will be hung on all entrances to these ORs to alert staff that appropriate PPE is required.
- C. All CT surgical cases will be performed in OR 56.

**V. Room/Equipment/Team Preparation for COVID positive or suspected patients**

- A. The roles of each team member should be clearly agreed upon prior to the start of case, especially as it relates to who will perform the initial transfer and airway management, intraoperative portion of the case, and transfer of the patient to the floor/ICU.

**B. Marshal:**

1. In addition to the team carrying out the clinical care, an additional team member (designated as the “marshal”) will be stationed in the corridor/anteroom. The marshal’s role will be to:
  - a. Facilitate communication with the team in the OR using a walkie-talkie. The OR anesthesia team will hold the other walkie talkie and be able to communicate needs and questions from inside the OR to the marshal.
  - b. Direct traffic flow and door control through the anteroom. This is a small area and there is potential for contamination if personnel are trying to exit/enter at the same time. In addition, the anteroom should be treated like an “air-lock”, meaning that at no time should both sets of doors be open at once.
  - c. Assist team members in carefully and slowly doffing their PPE. The marshal can direct the doffing procedure and read off the checklist, as required.

**C. Room Cabinets:**

1. The cabinets are not required to be emptied.
2. Masking tape will be applied to across the door handle and on to the OR wall as a reminder not to open the doors during the case.
3. Staff should make available all needed equipment before sealing the cabinets or be prepared to retrieve these items from outside of the room.
4. Cabinets should not be opened until after the 15 minute wait-time for air exchange as a part of COVID OR cleaning protocol.
5. The used tape should be destroyed.



6. Contents of any unsealed cabinets (or one that was opened once the patient enters the operating room) should be inventoried and then destroyed at the end of the case. The inventory should be given to the OR charge RN.
- D. **Room Computers and PIN stations:**
1. Room computer and Pin Stations should be draped with protective plastic sheets.
  2. These plastic sheets can be found in the PPE cabinets in the anterooms.
  3. These plastic sheets should be removed after the 15 minute wait-time for air exchange as a part of COVID OR cleaning protocol.
- E. To the extent possible, equipment that is not essential to carrying out the case will be removed from the OR. Case carts should be kept out of the OR if possible.
- F. The anesthesiology team will set up equipment, fluids and medications for each case posted that will be sufficient for that case and place these in the operating room. Eliminating the anesthesia cart/Omniceil in the room reduces contamination and potential exposure.
1. A “grab-and-go” bag of medications will be available at the DMP pharmacy. There will be separate bags for general cases, pediatric cases, obstetric cases and cardiac cases. These bags and any unused medications will be disposed of in the OR. Controlled medications will need to be checked out from pharmacy separately.
  2. The adult airway equipment pack will include: McGrath videoscope with blades, disposable laryngoscope, LMA 3/4/5, cricothyroidotomy kit.
  3. The pediatric airway equipment pack will be constructed by the pediatric team on a case by case basis prior to initiating patient transport and based on patient age/size.
- G. Ambu disposable fiberoptic scopes (3.8mm Storz scopes) will be available outside these ORs in case airway emergency.
- H. Disposable equipment will be used whenever possible.
- I. Portable HEPA filter units are NOT required as the air exchange rate is sufficient to remove airborne contaminants quickly
- J. The anesthesia circuits are already pre-fitted with HEPA filters. Anesthesia machine covers will be available 4/20/2020.
- K. Special Considerations for MIS Procedures
1. **In COVID negative patients:**
    - **AirSeal Mode (valveless laparoscopy) is allowed**
  2. **In COVID positive or COVID suspected patients:**
    - All standard precautions for surgery in Covid positive patients are to be followed.
    - **AirSeal in AirSeal Mode (valveless laparoscopy) is prohibited** as this relies upon an AirSeal access port (valveless port) and thus allows free gas exchange through the abdominal wall.
    - All cases should utilize a filtered suction of pneumoperitoneum such as the AirSeal unit specifically in “smoke evacuation” mode or Stryker “PneumoClear” insufflation units as these will give greatest risk reduction during a case. Each hospital has access to these units.
    - Smokeless (smoke evacuating) electrocautery should be used for all cases.

- A gasless method for specimen extraction and closure is recommended. For MIS cases that involve specimen extraction (such as gallbladder, hysterectomy, bowel resection, appendectomy, etc), significant CO<sub>2</sub> gas is lost around the specimen during extraction and during fascia closure with laparoscopic fascia-closure devices. Therefore, prior to removal of the specimen, all the CO<sub>2</sub> gas should be evacuated through the filtered port, and then the specimen extraction site can be enlarged, as necessary, under direct visualization to remove and also close via open technique.
- Surgeons should maximize the use of filtered and controlled, suctioned release of intraperitoneal CO<sub>2</sub>. They should minimize the release of pneumoperitoneum into the operating room when possible.
- Hand-assisted laparoscopy should be avoided due to the prolonged and repetitive exposure of uncontrolled release of pneumoperitoneum into the operating room.

**VI. Perioperative Protection for HCWs for COVID positive or suspected patients**

- A. Hand hygiene should be performed by all team members prior to donning of PPE.
- B. PPE for all OR staff involved in these cases includes: 2 pairs surgical gloves, N95 mask, face shield or goggles, gown, shoe covers. For cases requiring a Stryker hood, modified Stryker hood with N95 may be worn as an alternative to a face shield
- C. The exception to this:
  1. The anesthesiologist managing the airway (i.e. the COVID airway team), due to their role in managing, and proximity to, the airway. They will wear a PAPR with surgical mask underneath to prevent sterile field contamination rather than the N95 mask.
  2. During specific open airway cases (including sino-nasal, middle ear, oral and pharyngeal cases, bronchoscopy, laryngoscopy, tracheostomy, or lung transplantation procedures with significant airway or parenchymal airleak) ENT/thoracic surgeons should wear PAPRs or equivalent. For non-PUIs, a PAPR is not required.
  3. For surgical cases requiring surgical loops, either a modified Stryker hood with N95 may be worn as an alternative to a face shield, or the surgeon may choose to wear protective goggles.
  4. For surgical cases requiring an operative microscope, the surgeon may choose to not wear eye protection for non-airway cases while the microscope is being used.
- D. If patient is to be transported down from ICU intubated, the anesthesiology team should wear 2 pairs surgical gloves, N95 mask, face shield or goggles, gown, and shoe covers. A PAPR device is not required for transport of these patients.
- E. OR staff should be limited to just those who are absolutely required to safely carry out the procedure. Recommended numbers:
  1. 1 anesthesiologist at a time (one on deck for relief) and 1 CRNA/resident/fellow
  2. 1 surgeon/proceduralist if possible
  3. 1 circulating nurse in the OR
  4. 1 circulating nurse outside the OR (in the core as a runner)
  5. 1 scrub nurse/tech

6. 1 perfusionist and 1 respiratory therapist (for CTOR)
- F. N95 masks without exhalation valves will be placed in marked containers for sterilization using vaporized hydrogen peroxide.
- G. Operative staff who follow PPE guidelines when operating on a COVID-19 patient are NOT considered exposed and do not need to be quarantined.
- H. Personal cloth hats should not be worn.
- I. Door control:
  1. The OR/corridor (“Main”) door should only be used twice: once to bring the patient in, and once to bring the patient out. Metal magnetic bars should be used to remind personnel not to use this door to enter the OR.
  2. The anteroom should be seen as an “air-lock”. At any given time, only one door leading to the anteroom should be open. If both the OR and corridor doors are open, the risk of contaminating both the anteroom and corridor increases.

**VII. Patient transfer for COVID positive or suspected patients**

- A. In general, there will be two anesthesiology teams with distinct roles:
  1. The anesthesia care team (OR Team). These providers will wear standard PPE (2 pairs surgical gloves, N95 mask, face shield or goggles, gown, and shoe covers) and will provide continuous care of the patient from transfer to OR until transfer to floor/ICU, EXCEPT for the intubation and extubation procedures.
  2. The Airway Team. These providers will be informed of the case when posted, and will prepare to be called when the patient is in the operating room and ready for induction. The two providers will wear PAPR hoods along with standard PPE, and will induce and secure the airway with the OR Team waiting in the anteroom. Once the airway is secured, the OR Team enters the OR, and the Airway Team leaves and doffs appropriately.
  3. The OR team then carries out the rest of the intraoperative anesthetic care until the patient is transferred to the stretcher and ready for extubation, at which point the Airway Team will enter and carry out extubation and recovery (see point 5.m.). During extubation, the OR Team is outside the room preparing to receive the patient in the corridor for transfer.
- B. Universal time-out (blue hat) will be done on the floor/ICU/ED.
- C. Unless there is a compelling reason (as determined by the anesthesiology team) to secure the airway on the floor/ICU, the patient should be transported to OR with a surgical mask and induction and intubation performed in the OR. This reduces contamination of the unit, hallways, and other personnel in the hospital.
- D. Within the patient room, a disposable facemask should be placed on the patient to contain secretions during transport. If patients are on high-flow oxygen, place the oxygen mask over the disposable facemask.
- E. Once the patient’s droplets are contained with facemask in place, clean the side rails and handles of the bed with Avert bleach/Oxivir TB wipes or other approved disinfectant effective against COVID-19.

- F. The transfer team (surgical team/ED team if Level 1; anesthesiology team if Level 2 or greater) will be wearing 2 pairs surgical gloves, N95 mask, face shield or goggles, gown, and shoe covers, and will proceed directly into the OR without pausing in the anteroom.
- G. The circulating nurse will interview the patient in the OR upon their arrival (unless patient is intubated or unresponsive).
- H. The remaining OR team (surgeon, circulating nurse, scrub tech) may be present during induction and intubation and should be wearing PPE as describe in section 4.
- I. The patient's bed/stretchers should remain in the OR throughout the procedure, if possible. If not possible, it should be wiped down with bleach wipes, and placed in the anteroom, or if no anteroom the adjacent hallway and labeled as COVID positive.
- J. If possible, the staff should not be relieved unless the duration of the case makes this impractical.
- K. Specimens (if applicable) should be passed out the door into a clean double bag. A COVID sticker should be affixed to the specimen and the lab made aware that the specimen is on the way.
- L. At the conclusion of the case, the patient should be transferred to the bed/stretchers prior to extubating. The surgeons/nurses/techs will exit via the anteroom (at DRAH the sub-sterile room, at DRH, the hallway with PPE disposed of in the OR at the door) and proceed with doffing as per protocol. This may be done at the same time, or in sequence, depending on the size and configuration of the anteroom. Sufficient time should be taken for this step—there is no rush.
- M. The anesthesiology team will extubate the patient alone in the OR if this is felt to be safe. If determined that the circulating nurse should be present for patient safety, he/she can remain in the OR. The circulating nurse should stay at least 6 feet from the patient during extubation and for the duration of the recovery time, if at all possible. The patient will then be recovered for at least 15 minutes while the air exchange occurs. If the patient is to be transferred to the ICU intubated, the patient can be transferred immediately.
- N. During the 15 minutes following intubation:
  - 1. The doors to the anteroom, corridor and sterile core must not be opened, unless there is an absolute emergency
  - 2. Other team members must not enter or leave the operating room, unless there is an absolute emergency
- O. Readiness for discharge will be per the White Fast-Track Score criteria.
- P. The anesthesiology or nursing team will call report to floor nurse prior to transfer to the next unit.
- Q. Stretcher side rails should be wiped down before transferring patient. The patient should be wearing a disposable facemask.
- R. Once ready for transfer to floor/ICU, the OR doors leading to the corridor will be held open and the stretcher/bed will be pushed out into corridor, where a fresh anesthesiologist & surgeon (Transfer Team) wearing standard PPE (N95 mask and face shield, gloves, gown) takes over and transfers the patient. The in-room anesthesiology team then exits via the anteroom (DRAH, the sub-sterile room; at DRH, the hall) and begins the doffing procedure.

- S. If transferring to/from the OR intubated, ensure adequate neuromuscular blockade to prevent spontaneous respiration and/or coughing and use N99 filter on the BVM.
- T. When transferring an intubated patient, a portable ventilator will be used. Intubated patients should not receive manual ventilation with an Ambu-bag.

**VIII. Anesthetic management for COVID positive or suspected patients**

- A. Both general or regional anesthesia may be safely used for patients with suspected/confirmed COVID, depending on the type of surgery and the individual patient's need. If regional anesthesia is planned, the anesthesiology team should carefully assess the risk of intraoperative coughing/bucking, which can generate airborne material and droplets; if the risk of this is likely (e.g. due to viral pneumonia), we recommend proceeding with general anesthesia and planned, careful securement of the airway. If not intubated, a surgical mask must be applied to the patient throughout the length of stay in the operating room. If supplemental oxygen is required, an oxygen facemask should be applied over the surgical mask.
- B. Always keep a HEPA/HME filter connected to the endotracheal tube during patient transfer and disconnection from the BVM or anesthesia circuit. This isolates the patient from the outside environment and reduces contamination.
- C. Spinal anesthesia is still recommended as the primary choice of anesthesia for cesarean delivery in a mother with COVID, unless respiratory compromise and/or other contraindications to a spinal. The mother must wear a surgical mask at all times.
- D. Induction should only occur after complete satisfactory check of PPE. This should have occurred prior to patient transfer.
- E. Double gloves should be worn when touching the patient/airway apparatus. When the anesthesiologist needs to contact the computer/telephone/anesthesia machine/etc., the outer gloves should be taken off slowly and disposed of in the trash. A fresh outer pair should be applied when touching the patient again.
- F. RSI should be used for induction
  1. Preoxygenation is critical for preventing desaturation as bag-mask ventilation is not recommended during induction.
  2. Use sufficient neuromuscular blockade to prevent coughing/bucking. Succinylcholine is ideal. If there are any contraindications, rocuronium can be used, but should have sugammadex immediately available for a CI/CV situation.
  3. Oral intubation with videoscope is preferred.
  4. Immediately after intubation, remove outer gloves and dispose of them in the trash bin. Then put fresh outer gloves on.
  5. Auscultation is not practical with PAPR. Rely on ETCO<sub>2</sub>, bilateral chest rise and, if necessary, ultrasonographic evidence of lung sliding on both sides of chest.
  6. If anticipated difficult airway, FOBI after induction ("asleep fiberoptic") is recommended to reduce the likelihood of coughing/shedding. Awake intubation should be avoided unless there is no other option. If awake intubation is indicated, ensure complete topicalization and sedation before proceeding.
- G. If transferring to/from the OR intubated, ensure adequate neuromuscular blockade to prevent coughing and use N99 filter on the BVM.

**IX. Post-anesthesia Equipment Care and Medical Waste Disposal for COVID positive or suspected patients**

- A. Independent of whether the patient was recovered in the OR or transferred intubated, the room should undergo a 15 minute air exchange, followed by a terminal clean and Tru-D UV light disinfection.
- B. The anteroom/substerile room should also be terminally cleaned following the case.
- C. All disposable supplies should be disposed of immediately per standard protocol.
- D. CO2 absorber canisters should be replaced between cases.
- E. Surface of the anesthesia machine/ventilator and any other surface should be completely wiped down with bleach wipes.
- F. All OR equipment will be wiped down with bleach wipes. All trash and linen will be handled per our normal process.

**References:**

1. Bowdle A, Munoz-Price LS. Preventing infection of patients and healthcare workers should be the new normal in the era of novel coronavirus epidemics. *Anesthesiology* 2020 (epub ahead of print)
2. Park J, Yoo SY, Ko J, et al. Infection prevention measures for surgical procedures during a Middle East Respiratory Syndrome outbreak in a tertiary care hospital in South Korea. *Sci Rep* 2020;10:325
3. Greenland JR, Michelow MD, Wang L, London MJ. COVID-19 Infection: Implications for perioperative and critical care physicians. *Anesthesiology* 2020 (epub ahead of print)
4. Chen X, Liu Y, Gong Y, et al. Perioperative management of patients infected with the novel coronavirus. Recommendation from the Joint Task Force of the Chinese Society of Anesthesiology and the Chinese Association of Anesthesiologists. *Anesthesiology* 2020 (epub ahead of print)

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**Appendix**

*Symptom-based Strategy for Discontinuing Special Airborne Contact Isolation (i.e., Covid Recovered)*

Special airborne contact isolation can safely be discontinued when the following criteria are met. If the patient never had a fever or other symptoms (as is the case with asymptomatic patients), they automatically fulfill criteria A4, A5, B3 and B4. Patients should be placed into category A or B.

**A. 10-day criteria for discontinuing Special Airborne Contact isolation:** Applies to “immunocompetent” patients who are asymptomatic or have mild, or moderate illness

Criteria	Met?
1. Patient was never hospitalized, or if hospitalized, was hospitalized at DUHS, required <6L oxygen during their illness, AND did not require ICU care for COVID-19 infection	
2. Patient does not have a severe immunocompromising condition*	
3. At least <b>10 days</b> have passed since the date of the positive test	
4. At least 24 hours have passed since last fever without fever-reducing medications	
5. Symptoms (e.g., cough, shortness of breath) have improved	

***If all the above criteria are met, special airborne contact isolation can be safely discontinued for this patient population.***

**B. 20-day criteria for discontinuing Special Airborne Contact isolation:** Applies to severely immunocompromised patients with any level of disease (including asymptomatic infection), or an immunocompetent patient with severe or critical illness

Criteria	Met?
1. Patient was hospitalized outside of DUHS, required ≥6L oxygen during their illness, required ICU care for COVID-19 infection, OR is severely immunocompromised OR pregnant	
2. At least <b>20 days</b> have passed since the date of the positive test	
3. At least 24 hours have passed since last fever without fever-reducing medications	
4. Symptoms (e.g., cough, shortness of breath) have improved	

***If all the above criteria are met, special airborne contact isolation can be safely discontinued for this patient population.***

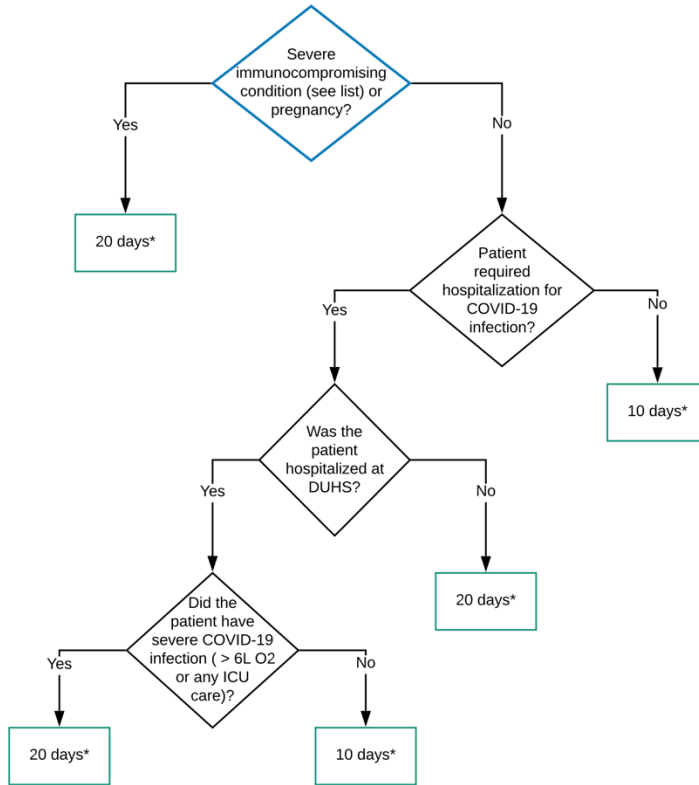
**Note:** In patients with multiple diseases processes, criteria A4, A5, B3 and B4 are intended to reflect COVID-related symptoms only. Therefore, patients who have a fever or other symptoms with a clear alternative diagnosis may still meet criteria to come off Special Airborne Contact precautions (i.e., Covid Recovered).



### Decision tree for Discontinuing Special Airborne Contact Isolation (Covid Recovered)

The following decision tree represents the same information contained in the table form above. Please note, Infection Prevention will continue to review all inpatient cases and will continue to support all teams with questions.

#### Discontinuing SAC



- Severe Immunocompromising Conditions:**
- Primary immunodeficiency
  - Active solid organ cancer on chemotherapy
  - Hematologic malignancy
  - Hematopoietic stem cell transplant recipient
  - Solid organ transplant recipient
  - Poorly controlled HIV (CD4 < 200)
  - Steroids >20mg per day for >2 week
  - Other immunosuppressive medications (e.g. infliximab, etc.)

\*Earliest date of eligibility for discontinuing SAC isolation = date of positive test + 10 or 20 days depending on characteristics as long as patient is clinically improving and has been fever free for 24 hours without anti-pyretics.