

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 48 hours 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** will be done using **standard PPE** (gown, gloves and a standard surgical facemask) using standard surgical and perioperative processes and transport procedures.

Urgent/emergent **non-open airway** cases involving **asymptomatic** patients who cannot wait for a test result should be done with the intubating team wearing a N95 and faceshield/goggles. The remaining OR team should distance themselves from the patient during the intubation/extubation and only require standard PPE during the case. Urgent/emergent **open airway** cases involving asymptomatic patients who have not been tested should be done with **all** team members in the room wearing a N95 for the entire procedure.

1. 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.**
- 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 requiring pneumoperitoneum should NOT be posted for COVID positive or COVID suspected patients.
 - i. At present, MIS cases will be allowed for patients who do not meet the clinical criteria for suspected COVID infection, however, these patients should be tested preoperatively to rule-out COVID-19. This may change as community prevalence of the virus changes.
 - ii. Specific precautions for all MIS cases will be followed as detailed below.
- e. **Exclusion for Obstetric Procedures:** Elective cesarean deliveries and other elective cases (i.e. cervical cerclage placement) performed in the DUH or DRH Operating Rooms will be excluded from the need for pre-operative COVID testing, except for cases known to require a general anesthetic or are at high risk of needing a general anesthetic (e.g. abnormal placentation). The vast majority of surgical procedures on the Labor and Delivery units are performed using regional anesthesia techniques with less than 5% of obstetric patients requiring general anesthesia. Furthermore, of all surgical procedures performed on these Labor and Delivery units, the scheduled “elective” patients are the lowest risk population for requiring general anesthesia. Most surgical procedures on Labor and Delivery are leveled, non-scheduled procedures. Therefore, given our current testing capabilities, the majority of the obstetric surgical patients would NOT be screened through the current pre-operative COVID scheduled testing program. With these facts in mind, and to avoid two different classes of care for obstetrical patients, for surgical procedures on our DUH and DRH Labor and Delivery units:
 - i. It is recommended that for asymptomatic women undergoing an obstetric surgical procedure requiring general anesthesia, that the anesthesia providers would wear an N95 mask and face shield. This equipment will be readily available in the OB ORs. Other members of the surgical team will wear routine OR protective equipment.
 - ii. COVID positive or suspected obstetrical patients will be managed as outlined below
 - iii. Until a rapid, in-house COVID testing option is available to all women on the DUH and DRH Labor and Delivery platforms, routine testing of asymptomatic women scheduled for procedures on Labor and Delivery will be on hold. Once a rapid, in-house COVID testing option is available to all women admitted to the DUH and DRH Labor and Delivery units, we will then implement outpatient pre-operative COVID testing for all scheduled obstetric procedures.

2. 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.
- b. THIS PROCEDURE APPLIES TO PERIOPERATIVE PATIENTS ONLY. THIS DOES NOT APPLY TO NON-PERIOPERATIVE PROCEDURALISTS AT THIS TIME
- c. FOR ORDERING PROVIDERS

i. INPATIENTS

- For Level 5 or Non-Leveled 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
 - At this time, there is not a mechanism to expedite testing for level 1-4 cases. We are actively working with the clinical microbiology lab to determine the feasibility and, if possible, the mechanism to do this. An update will be provided in the coming days.

ii. OUTPATIENTS

- The PASS clinic or surgical provider must place the following order for patients undergoing procedures: CORONAVIRUS (COVID-19) SARS-COV-2 PCR PREOPERATIVE SCREEN [LAB9990]
- PASS clinic or surgical provider calls 919-620-1294 for drive thru appt 2 calendar (not 2 business) days prior to the scheduled procedure. Please do not share this number with patients.
 - Durham Co. – request Duke Family Medicine Erwin Rd.
 - Wake Co. – request Duke Raleigh drive thru
- NOTE: the drive-thru test sites are open 7 days a week

d. 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.

e. 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%20Transport%20Instructions_3.20.20_APPROVED.pdf

f. 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 resulted 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.

3. 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.
 - i. OR 5 will be the primary COVID room on the Duke North Platform with OR 4 as backup.
 - ii. OR 47 will be the primary COVID room on the DMP platform with OR 48 as backup.
 - iii. OR 56 is primary COVID room for cardiothoracic patients.

- iv. Obstetrics will use Delivery Room 1 on the 5th floor for Cesarean deliveries, with DN OR 4 as backup.
 - v. 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.
 - vi. OR 2 will be the primary designated COVID OR at DRH. It has an anteroom. There is no secondary determined, as other ORs at DRH do not have an anteroom.
 - vii. 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.
 - viii. For complex cases that require a hybrid room (e.g. aortic dissection or ruptured AAA) for a COVID positive or suspected patient, DUH room 33 will be used with all COVID precautions observed.
 - ix. 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. In general, patients originating from the DN patient care floors will be done in ORs 5 and 4, and those from the DMP done in ORs 47 and 48, in order to reduce transport distance and the risk of exposure. All CT surgical cases will be performed in OR 56.
4. 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. 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:
 - i. 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.
 - ii. 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.
 - iii. 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. Built-in wall cabinets will be emptied of all supplies.
 - d. 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.
 - e. 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/Omnicell in the room reduces contamination and potential exposure.

- i. 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.
 - ii. The adult airway equipment pack will include: McGrath videoscope with blades, disposable laryngoscope, LMA 3/4/5, cricothyroidotomy kit.
 - iii. 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.
- f. Ambu disposable fiberoptic scopes (3.8mm Storz scopes) will be available outside these ORs in case airway emergency.
- g. Disposable equipment will be used whenever possible.
- h. Portable HEPA filter units are NOT required as the air exchange rate is sufficient to remove airborne contaminants quickly
- i. The anesthesia circuits are already pre-fitted with HEPA filters. Anesthesia machine covers will be available 4/20/2020.
- j. Special Considerations for MIS procedures (note, MIS techniques will be avoided in COVID positive or suspected patients)
- i. No laparoscopic or robotic procedure are to be done using AirSeal Mode, which relies upon an AirSeal access port (valveless port) and thus allows free gas exchange through the abdominal wall.
 - ii. All cases should utilize either AirSeal “smoke evacuation” mode or Stryker “PneumoClear” insufflation units. This will give greatest risk reduction during a case. Each hospital has access to these units.
 - iii. If unable to utilize the above due to resource limitation, the next recommendation is to use filtered plume evacuators (ConMed /Stryker /Medtronic available) connected to wall suction during a case to redirect aerosolized particles to the filtered suction device.
 - iv. Refrain from standard single direction insufflation units during this time.
 - v. Smokeless (smoke evacuating) electrocautery should be used for all cases.
 - vi. Surgeons should maximize the use of filtered and controlled, suctioned release of intraperitoneal CO₂. They should minimize the release of pneumoperitoneum into the operating room when possible.
 - vii. A gasless method for specimen extraction and closure is recommended. For MIS cases that involve specimen extraction (such as gallbladder, hysterectomy, bowel resection, etc), significant CO₂ 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 CO₂ 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.

- viii. Unless the patient has had a negative COVID-19 test in the previous 48 hours, hand-assisted laparoscopy should be avoided due to the prolonged and repetitive exposure of uncontrolled release of pneumoperitoneum into the operating room.
5. 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.
 - c. N95 masks are now being decontaminated using vaporized hydrogen peroxide. Team members should refrain from wearing makeup as it is not removed by this process.
 - d. The exception to this:
 - i. 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.
 - ii. 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.
 - e. 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.
 - f. OR staff should be limited to just those who are absolutely required to safely carry out the procedure. Learners and extra assistants who are not essential should be excused. Recommended numbers:
 - i. 1 anesthesiologist at a time (one on deck for relief) and 1 CRNA/resident/fellow
 - ii. 1 surgeon/proceduralist if possible
 - iii. 1 circulating nurse in the OR
 - iv. 1 circulating nurse outside the OR (in the core as a runner)
 - v. 1 scrub nurse/tech
 - vi. 1 perfusionist and 1 respiratory therapist (for CTOR)
 - g. N95 masks will be placed in marked containers for sterilization using vaporized hydrogen peroxide.
 - h. Operative staff who follow PPE guidelines when operating on a COVID-19 patient are NOT considered exposed and do not need to be quarantined.
 - i. Personal cloth hats should not be worn.
 - j. Door control:

- i. 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.
 - ii. 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.
6. Patient transfer for COVID positive or suspected patients
 - a. In general, there will be two anesthesiology teams with distinct roles:
 - i. 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.
 - ii. 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.
 - iii. 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:
 - i. The doors to the anteroom, corridor and sterile core must not be opened, unless there is an absolute emergency
 - ii. 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 faceshield, gloves, gown) takes over and transfers the patient. The in-room anesthesiology team then exits via the anteroom (DRAH, the substerile 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.

7. 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
 - i. Preoxygenation is critical for preventing desaturation as bag-mask ventilation is not recommended during induction.
 - ii. 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.
 - iii. Oral intubation with videoscope is preferred.
 - iv. Immediately after intubation, remove outer gloves and dispose of them in the trash bin. Then put fresh outer gloves on.
 - v. Auscultation is not practical with PAPR. Rely on ETCO₂, bilateral chest rise and, if necessary, ultrasonographic evidence of lung sliding on both sides of chest.
 - vi. 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.

8. 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:

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