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Overview of the document:

The document discusses the implementation of preoperative SARS-CoV-2 testing at a single academic institution. The authors describe the experiences and challenges faced during the pandemic and how they managed to maintain high levels of compliance through preoperative testing.

1. Introduction

Preoperative testing for SARS-CoV-2 is an important part of today’s healthcare strategy from a public health and patient safety perspective as well as an individual institutional perspective. The American Society of Anesthesiologists (ASA) and Anesthesia Patient Safety Foundation (APSF) joint consensus statement on perioperative testing for SARS-CoV-2 was recently released on April 29, 2020. The joint task force states that all patients undergoing non-emergent procedures should be both screened for symptoms and undergo nucleic acid amplification (i.e., reverse transcription polymerase chain reaction or rt-PCR) testing. This presents a challenge for many health care systems that are beginning to accelerate. By mid-June, the prevalence locally in Charleston and throughout the state exponentially climbed. The state of South Carolina, with an estimated population of 5.2 million, has a projected infection rate of 2295 per 100,000 by August 22nd, 2020 as compared to the observed rate of 442 per 100,000 in mid-June. As of August 10th, Charleston County (where MUSC is located) has a current estimated infection rate of 889 per 100,000 as compared to a rate of 265 per 100,000 on June 15th. Despite this rapid growth in positive cases and hospital admission rates, MUSC continues to achieve an over 90% percent success rate for preoperative rt-PCR testing for a surgical and procedural volume of near normal levels (Figure 1).

While there have been several reports and recommendations for preoperative testing amongst different surgical specialties such as

**ABSTRACT**

**Background:** Preoperative screening and testing for SARS-CoV-2 are important aspects of reopening perioperative and procedural sites to elective cases after the initial wave of the novel coronavirus pandemic. However, given that modern healthcare has never experienced a pandemic of this magnitude, rapid operationalization of mass testing presents unique challenges. We aim to highlight our experiences and challenges for preoperative SARS-CoV-2 testing.

**Methods:** We describe implementation of widespread screening tools and preoperative polymerase chain reaction (PCR) testing in a single, academic medical center.

**Results:** As of August 2020, we have been able to achieve an over 90% success rate in preoperative SARS-CoV-2 PCR testing for both outpatient and inpatient procedures. However, there are certain challenges in obtaining high levels of compliance both on individual and institutional levels.

**Conclusions:** Instituting preoperative SARS-CoV-2 testing and maintaining high levels of compliance is possible in the midst of a fluctuating pandemic.
otolaryngology,3 cardiothoracic surgery,4 and urology,5 there have yet to be many published reports on the implementation processes and operational challenges of rapidly instituting widespread testing. The purpose of this paper is twofold: to present our current operational processes to achieve a high level of preoperative testing across our hospital system as well as present our patient- and institutional-related challenges with preoperative testing.

2. Role of Preoperative Clinic

As hospital systems begin to increase the volume of elective surgical procedures in the COVID-19 era, the role of outpatient SARS-CoV-2 PCR testing must be addressed. Hospital leaders within various departments, including perioperative services, anesthesiology, infectious disease, infection control, nursing staff, and surgical and procedural specialties must collaborate to determine who will be responsible for ordering and scheduling outpatient PCR testing. Many hospital systems such as MUSC have created drive-through PCR testing centers in which patients complete a nasopharyngeal swab while remaining in the vehicle. Such sites may be utilized to test asymptomatic pre-procedural patients. In March of 2020, MUSC Health launched a virtual urgent care platform in combination with drive-through SARS-CoV-2 testing. Currently within the MUSC system, we operate five drive-through centers throughout the state of South Carolina (Lancaster, Marion, West Ashley, downtown Charleston, and Florence). Additionally, we have now started to contract with several private free-standing urgent care centers in Myrtle Beach, Greenville, Columbia, and Beaufort to improve access for our patients who do not live in close proximity of the MUSC-run drive-through centers. All of these samples collected throughout the state are delivered by a courier services within a 24 hour window to be run by the MUSC Charleston laboratory on our three in-house PCR machines. Moreover, all of these drive-through centers require a “virtual visit” during which patient symptoms are assessed via a telehealth platform. Those patients who qualify for testing then have orders placed and are given an appointment for drive-through testing. Preoperative patients present a challenge for such centers as these patients do not always require a virtual visit prior to testing. Rather, this population requires routine testing, regardless of symptoms, prior to surgery as well as symptom screening the day of surgery in order to proceed safely to the operating room.

The preoperative anesthesia clinic is uniquely situated to assist with SARS-CoV-2 PCR testing for operative patients. A workflow can be created, either automated through the Electronic Health Record (EHR) or manually driven, that allows preoperative clinic staff to order PCR testing prior to surgery, schedule an appointment at a drive-through testing center, and follow up on test results. In order for such a system to be successful, adequate staffing must be instituted to ensure that ownership of the testing process does not deter from the usual preoperative clinic duties of patient optimization prior to surgery, especially as operative case volumes approach pre-COVID-19 levels. The importance of adequate clinic staffing cannot be understated and likely requires the hiring of additional staff or reallocation of current staff members to address this new role. Alternatively, individual surgery departments can coordinate testing and arrange testing appointments.

Figure 1. Graphical representation of our most recent rate of preoperative rt-PCR testing as of August 9th, 2020. The graph on the right shows that the percentage of surgical patients tested prior to surgery currently is above 90%.
when the date of surgery is scheduled. This approach requires individualization of the process to the various surgical departments, as the staffing model for each department may vary.

Logistically, there are several considerations that must be taken into account when establishing a system of routine preoperative testing in a large academic center. First, one must determine if the institution-operated drive-through centers have a testing capacity that can accommodate the surgical population. While it is likely easiest to order and follow up on testing performed at centers owned and operated by one’s hospital system, these centers may not have the staffing to accommodate this additional volume. In addition, patients who do not live near a drive-through center operated by the academic center present a challenge. In such scenarios, the alternative of partnering with privately operated testing centers should be considered. If the academic center has the capability to perform on-site PCR testing, swabs can be collected at privately owned centers and couriered to the larger institution’s lab to ensure adequate result time. This system has worked well at MUSC. Nearly 50% of surgical patients live outside of a 60 miles radius of the MUSC main campus; therefore, patients are often unable to drive to MUSC-operated testing centers due to cost, time, and transportation constraints. MUSC’s partnership with local urgent care centers and efficient courier system allows for a fairly consistent 48 hour turnaround time on lab results regardless of where the patient lives relative to the main MUSC campus.

The Preoperative Assessment Clinic (PAC) at MUSC held responsibility for preoperative SARS-CoV-2 testing for all OR and non-OR anesthesiology (NORA) sites, with the exception of adult and pediatric endoscopy and interventional cardiology sites, from March until mid-June 2020, at which point individual surgery departments assumed this role under the guidance of PAC leadership. This decision was made by organization leadership after considering the long term nature of the required testing as well as the existence of approximately 125 dedicated surgery schedulers already employed by the institution. It was estimated that at least 10 new staff hires would be required if PAC were to continue arranging all testing, given a yearly surgical volume of 32,000 OR cases and 15,400 NORA cases in fiscal year 2020 with expected growth in 2021. Schedulers within individual surgery departments now coordinate testing and arrange testing appointments when the date of surgery is scheduled. Senior PAC staff created educational tools, including training videos and “quick tip” sheets, to assist with the transition, and private virtual training sessions were held with each surgical department to train staff and ensure workflows utilized team members effectively given the variation in staffing models among departments.

PAC has retained responsibility for testing patients in certain NORA sites, including adult and pediatric radiology (including vascular and neuro-interventional), pediatric dental, and pediatric oncology sites. In addition, PAC is responsible for daily follow-up of all OR and NORA patients to ensure testing was completed and results are available. Any re-scheduling of testing due to missed appointments or invalid samples are arranged by PAC. Three additional staff members were hired by PAC to address these goals. Changes to the EHR have allowed creation of icons on the surgery status boards that allow immediate identification of a patient’s testing status and reflects a collaborative effort between Information Solutions and Perioperative Services. Such EHR integration facilitates timely identification of positive and incomplete results to ensure patient and staff safety (Figure 2).

### 3. Testing for the Adult Outpatient Population

Many hospitals are now open for elective procedures and surgeries. This includes ambulatory surgical centers (ASCs), non-operating room anesthesia (NORA) sites, and office-based anesthesia sites. Notably, whether real or not, some patients may feel safer undergoing procedures at smaller ambulatory locations outside of a larger hospital that may have cared or continue to care for patients with SARS-CoV-2. However, as the risk of viral transmission does not decrease in the outpatient environment, patients still need preoperative symptom assessment and testing.

A review of symptoms for COVID-19 should occur by a preoperative nurse or anesthesia provider when testing is scheduled and by the anesthesia provider on the day of the procedure. At both of these times, patients are carefully asked if they have experienced “any of the following symptoms now or at any time in the last 14 days” (Table 1). Patients answering “yes” to one of the questions require further exploration of symptoms and may need to have their procedure rescheduled. Importantly, patients answering “yes” on the day of the procedure when they previously answered “no”, require further investigation even after a negative PCR test. Preoperative PCR testing for elective outpatient procedures at MUSC is currently required within 96 hours prior to the procedure, with the patient asked to quarantine after the test. The 96 hour window was selected based on expertise from our infectious disease colleagues in conjunction with our perioperative services leaders using criteria such as prevalence in the community, historical turnaround time on test results, as well as allowing time for patient notification of a positive result prior to day of surgery. In addition, this testing window allowed for flexibility to get all patients tested at our testing locations that are open six days a week but close on Sundays. However, some subspecialties performing procedures with continuous aerosolization (e.g, otolaryngology, oral maxillofacial surgery, pulmonary) may request testing within 24 to 48 hours of the planned procedure. This shortened window can present additional challenges for testing if patients are traveling from distant locations. Our general testing algorithm for our ambulatory surgical sites is attached in Figure 3.

Preoperative testing presents additional challenges in the ambulatory setting. ASC, NORA, and office-based anesthesia practices often thrive with the rapid turnover or numerous cases in short amount of time. Symptom assessment, additional time to disinfect procedure areas, donning and doffing PPE, and even wait times after intubation and prior to starting procedures can dramatically slow down an ambulatory practice. Similarly, patient arrival and preoperative patient preparation may need to be staggered to optimize patient and staff social distancing, which may be challenging for small office-based practices or ASCs.

While our goal is to test all patients 24-96 hours prior to their procedure, inevitably, some patients will be unable to complete testing prior to the day of surgery for various reasons. While rapid PCR testing is available, it remains a limited resource and should be reserved for patients that are unable to complete testing several days prior to surgery or require more urgent procedural care. Currently, several of our preoperative nursing staff have been trained to obtain nasopharyngeal samples for PCR testing and are able to send these samples off for rapid testing the day of surgery. Results typically return in approximately 2 hours; however, they can occasionally take two hours or more from collection to result time. Thus, if rapid testing is needed day of surgery, both case orders and patient arrival times should be altered the day prior to minimize OR inefficiencies. Unfortunately, many ASC and NORA locations do not have lab facilities on site in which to perform rapid testing. Consequently, many ambulatory centers may still require completed testing prior to arrival.

Both the results of symptom screening combined with preprocedural PCR testing drive our intraoperative and intraprocedural protocols with regard to aerosol-generating medical procedures (e.g., intubation and extubation) as well as the type of personal protective equipment (PPE) worn by anesthesia staff, nursing staff, and our environment services staff (Figure 4). In order to communicate to all who enter the room during a procedure, we have created laminated cards that show which scenario is currently being utilized. This helps facilitate communication with regard to correct PPE to all staff who may enter and exit the room during a case.
4. Testing for the Adult Inpatient Population

At the time of implementation of our inpatient testing algorithm (Figure 5) in March 2020, the local prevalence of SARS-CoV-2 was low. Accordingly, the initial decision to test an inpatient was based on the presence of symptoms or in anticipation of an aerosol generating procedure (AGP) within 96 hours of admission. For patients unable to reliably participate in a symptom assessment (Table 1), SARS-CoV-2 testing was performed as soon as possible and COVID-19 precautions maintained until a negative SARS-CoV-2 test result was obtained. Asymptomatic patients expected to require a non-urgent AGP were also tested as soon as possible. Early testing allowed for a reduction in PPE utilization, improved procedural efficiency, decreased healthcare provider labor utilization, and improved healthcare worker satisfaction.

The first alteration of the inpatient testing algorithm occurred when rapid testing, with a one to two-hour result time, became available at our institution. The assays currently available at our institution are rapid testing, with a one to two-hour result time, became available at our institution. These assays, in practice sample collection, transport the laboratory, and preparation of the sample all impact the resulting time. For the purpose of the testing algorithm, a “rapid” test is expected to result within two hours, a standard test within 12-24 hours, and an outpatient test within 24-72 hours. Selective use of rapid testing (Figure 6) for patients unable to be assessed for symptoms and/or who were to undergo urgent AGP allowed for further optimization of resource utilization and improved efficiency, as many patients were able to be removed from COVID-19 precautions earlier in their hospital stay. The use of rapid testing also expedited the performance of unanticipated, non-urgent procedures during the inpatient period. This gain in efficiency was crucial in decreasing hospital length of stay for invasive diagnostic and therapeutic procedures.

Finally, the most recent change to our hospital policy is the requirement of SARS-CoV-2 testing for every patient admission. This decision was made in early July given the rapid increase in prevalence within the state of South Carolina and the Charleston region. As every inpatient now receives a standard test the day of admission that typically results within 24 hours, this policy has decreased the amount of rapid testing we need to perform for patients who then require a procedure or surgery during their admission stay.

5. Testing for the Pediatric Population

Testing for coronavirus in the pediatric perioperative setting presents additional challenges to those already considered for adult populations. The first challenge is addressing the concerns and desires of the parents. Parents may refuse or resist having their child tested pre-operatively. This may be due to concern with having their child undergo an additional procedure, the discomfort of the nasopharyngeal swab, difficulties with test scheduling or transportation, and obtaining an adequate specimen for collection. It is known that an accurately performed nasopharyngeal swab decreases the percentage of false-negatives test results; therefore, patient and parent cooperation is important. At MUSC, approximately 85% of our pediatric patients are screened via our off-campus testing sites. A patient with a negative test is accepted as negative for 96 hours from the time of the test. When a patient presents on the day of surgery without being screened (15% of patients), a rapid test that results within 2 hours is performed and resulted prior to their procedure. As the availability of our rapid tests have become in shorter supply, we are increasingly working to identify untested patients prior to arrival and work with families to remove

The manufacturers have published resulting times for the individual assays, in practice sample collection, transport the laboratory, and preparation of the sample all impact the resulting time. For the purpose of the testing algorithm, a “rapid” test is expected to result within two hours, a standard test within 12-24 hours, and an outpatient test within 24-72 hours. Selective use of rapid testing (Figure 6) for patients unable to be assessed for symptoms and/or who were to undergo urgent AGP allowed for further optimization of resource utilization and improved efficiency, as many patients were able to be removed from COVID-19 precautions earlier in their hospital stay. The use of rapid testing also expedited the performance of unanticipated, non-urgent procedures during the inpatient period. This gain in efficiency was crucial in decreasing hospital length of stay for invasive diagnostic and therapeutic procedures.

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The first alteration of the inpatient testing algorithm occurred when rapid testing, with a one to two-hour result time, became available at our institution. The assays currently available at our institution are XPert® Xpress SARS-CoV-2 (Cepheid Inc, USA) which allows for the rapid 2 hour test, Alinity m SARS-CoV-2 (Abbott Laboratories, USA), and Abbott RealTime SARS-CoV-2 (Abbott Laboratories, USA). While

the manufacturers have published resulting times for the individual assays, in practice sample collection, transport the laboratory, and preparation of the sample all impact the resulting time. For the purpose of the testing algorithm, a “rapid” test is expected to result within two hours, a standard test within 12-24 hours, and an outpatient test within 24-72 hours. Selective use of rapid testing (Figure 6) for patients unable to be assessed for symptoms and/or who were to undergo urgent AGP allowed for further optimization of resource utilization and improved efficiency, as many patients were able to be removed from COVID-19 precautions earlier in their hospital stay. The use of rapid testing also expedited the performance of unanticipated, non-urgent procedures during the inpatient period. This gain in efficiency was crucial in decreasing hospital length of stay for invasive diagnostic and therapeutic procedures.

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barriers to outpatient preoperative testing. If the parent refuses testing and the patient is asymptomatic on our screening questions (Table 1), we will proceed without testing and don full PPE (N95 mask, hood, goggles/face shield, gown, gloves) for the portions of the procedure that are aerosol generating. The most common reason we see for parent refusal is when a patient returns for an additional procedure within a short time frame yet still outside of our 96-hour testing window.

Several specific pediatric populations present additional considerations or concerns. Patients with congenital heart disease are sometimes thought of as a “fragile” population. There may be concerns from physicians surrounding the discomfort and stimulation from an accurately performed nasopharyngeal swab causing adverse hemodynamic consequences in patients with severe ventricular dysfunction, arrhythmias, or other tenuous physiology such as neonates awaiting surgery, infants with Hypoplastic Left Heart Syndrome who have completed Stage 1 Palliation, or patients with unrepaired Tetralogy of Fallot or other cyanotic lesions. Additional concerns may be expressed by anticoagulated patients and the perceived potential for the nasopharyngeal swab to cause uncontrolled bleeding. Outpatients with congenital heart disease needing testing should be considered on a case by case basis to determine if their nasopharyngeal swab should be performed in a monitored setting. Despite concerns for hemodynamic deterioration, most patients with congenital heart disease should be able to undergo preoperative coronavirus testing without consequence.

In fact, the Congenital Cardiac Anesthesia Society recommendations do not list any contraindications to testing. At MUSC, this process has gone through several stages due to both surgeon and cardiologist concerns surrounding this patient population. After several group discussions over the course of a few weeks, we have now been able to transition to getting 99% of the cardiac patients tested preoperatively. Patients coming from home are tested via rapid testing in a monitored setting in our pre-op area the day of or the day before their procedure. Inpatients are tested in our step-down unit or the intensive care unit.

The last pediatric patient population needing extra consideration is inpatients, including neonates. Due to the likely lack of vertical transmission of Coronavirus from parturient to fetus, a neonate is typically presumed to be negative if the mom was tested negative prior to delivery. At MUSC, a neonate is considered negative for 7 days after birth if the mother’s COVID test was negative prior to delivery. After the 7 days, neonates require testing prior to a procedure. As for other inpatients, the presumed negative test is often accepted for a longer period of time until testing would be required prior to a procedure. The rationale involved in extending this window includes our current hospital policy regarding visitor limitation and consequent limited exposures inside the hospital. At MUSC, two visitors or parents are allowed for each patient. Our current testing algorithm is attached in Figure 7.

6. Institutional Challenges for COVID-19 Testing

A successful SARS-CoV-2 testing program cannot be created and executed without the support of institutional leadership. Recognition of the importance of SARS-CoV-2 testing to safely resuming normal procedural operations is essential. Given the recent publications in the Lancet and the Journal of American Medical Association (JAMA) describing increased morbidity in patients with COVID-19 undergoing surgery, it is imperative to test as many patients as possible prior to surgery. Institutional leadership at MUSC supported our perioperative
plan to test patients to optimize safety, operational efficiencies and conservation of PPE. Their support manifested itself in three important ways: development of testing infrastructure, acquisition and main-tenance of testing supplies and support of laboratory services. The maintenance of their support, however, has had its challenges requiring MUSC to pivot at multiple points along this process.

The ability to quickly develop a testing infrastructure required collaboration across many areas of our institution. Leaders from telehealth, ambulatory services, disaster planning, nursing, infection prevention and laboratory services worked as a team develop a streamlined process. This process includes how a patient enters the system for testing, consistent execution of the nasopharyngeal swab, staffing of the testing facilities six days a week, supplies to maintain testing, maintaining a courier service from the testing site to the lab, and adequate staffing in the lab to keep 2-3 PCR machines running continuously. Since implementation nearly 5 months ago, we have had challenges in each area of the process. We quickly recognized the need to train more in-patient nursing staff to collect a high-quality nasopharyngeal sample for SARS-CoV-2 testing. MUSC quickly created a core group of nursing educators and deployed them to train both inpatient and perioperative nursing staff to facilitate timely and consistent SARS-CoV-2 testing. For staffing challenges of the lab and testing facilities, leadership worked quickly to re-deploy staff working in areas with decreased productivity due to COVID-19. When our PCR machines have malfunctioned or we have been short in supplies, our senior leadership has worked tirelessly with contacting the companies for technical and supplies support.

Dedication from institutional leadership has kept the process moving forward.

Our initial testing tent concepts have been very successful, but recently, we have had to rethink our long-term plan for testing locations. On several occasions, MUSC and its affiliated sites closed testing tents for bad weather, both heat and rain, which required rescheduling of pre-procedural patients for SARS-CoV-2 testing and move them outside of the preferred 96 hour window. In addition, we initially struggled to

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**Table: MUSC PERIOPERATIVE COVID-19 PPE GUIDELINES 7-22-20**

| Scenario | Anesthesia Provider PPE | Surgery/Nursing/Scrub PPE | Cleaning Crew (EVS/Anes tech) PPE | Notes |
|----------|-------------------------|---------------------------|----------------------------------|-------|
| 1. COVID+/PUI or untested patient for ANY procedure | Single-use N95 + face shield or goggles | Single-use N95 + face shield/goggles | Surgical mask | PPE to be worn by all team members throughout procedure |
|          | Hood                    | Double head covering      | Face shield/goggles             | Minimize number of providers present and door openings |
|          | Gown                    | Double gloves             | Gown                             | Dofficer and runner mandatory |
|          | Shoe covers             | Shoe covers               | Gloves                           | For high risk procedures and/or GA the door must remain closed for 21 min after the last AGP | |
|          |                         |                          |                                  | EVS can enter immediately. | |
|          |                         |                          |                                  | Non-AGP procedures-The teams may exit the room immediately and EVS may enter after 21 min. | |
| 2. Asymptomatic* patient with NEGATIVE COVID test for limited procedures | Standard PPE can be worn for intubation and extubation | Standard PPE can be worn for intubation and extubation | Surgical mask | PPE to be worn by all team members throughout the entire surgical procedure |
|          | For provider in the room during the procedure | During the procedure | Face shield/goggles | Minimize number of providers present and breaks/door openings after procedure starts and until 15 min after procedure complete |
|          | Single-use N95 + face shield/goggles | Single-use N95 + face shield/goggles | Gown | Dofficer and runner preferred |
|          | Gown                    | Gown                     | Gown                             | |
|          | Double gloves           | Double gloves            | Gloves                           | |
| 3. Asymptomatic* patient with NEGATIVE COVID test for all except limited procedures | Standard PPE | Standard PPE | Standard PPE | If patient is newly symptomatic before testing, discuss retesting with Surgeon or follow scenario 1 (retesting strongly encouraged) |
|          |                         |                         |                                  | If procedure fails under limited procedures* follow scenario 2 |
| 4. COVID+ but cleared by MUSC clearance algorithms | Standard PPE | Standard PPE | Standard PPE | If it has been greater than 90 days since PCR +, then pt should be retested |
|          |                         |                         |                                  | If procedure fails under limited procedures*, the surgical attending may recommend following scenario 2 |

*Asymptomatic patients are those without the following: Fever, cough (dry or productive), shortness of breath/difficulty breathing, sore throat/laryngitis, headache, fatigue, myalgias, diarrhea/nausea, sudden loss of taste/smell.

1. ENT cases involving intranasal, paranasal sinuses, otologic drilling, intraoral mucosa, ECT, OMFS, Bronchoscopy, Thoracic surgery, TEE (non-intubated patient), Upper and Lower Endoscopy procedures, Esophageal surgery, Laparoscopic cases invading mucosa (refer to surgeon), CS deliveries, Vaginal delivery during 2nd stage of labor, endotracheal intubation and extubation

2. ENT cases involving intranasal, paranasal sinuses, otologic drilling, intraoral mucosa, OMFS, Dental

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**Figure 4.** PPE guidelines and scenarios based on COVID-19 screening and testing for operating room and procedural areas. PPE = personal protective equipment. PUI = person under investigation. EVS = environmental services.
arrange testing for patients without reliable transportation. To address this issue, MUSC created a walk up testing on our main hospital campus in July, which allows for preoperative patients to walk up or be dropped off for testing. Additional walk-up sites and mobile testing units are being developed. These new testing concepts will ideally improve access while also allowing care team members safe haven from the elements.

As institutions move towards their pre-COVID-19 volumes, both in the procedural areas and clinics, staffing of all areas may become a challenge. The MUSC testing sites were initially staffed by nurses from ambulatory clinics that closed at the onset of the pandemic. MUSC has now returned to baseline procedural volumes, and ambulatory clinics are now open. MUSC is now faced with the difficulties of staffing reopened clinical areas and new areas necessary for managing operations safely and effectively. Our first step in addressing this issue is to bring back furloughed employees to maintain adequate staffing. We have also created more flexible pools of staffing, particularly within nursing that allows staff to float between sites as patient volume varies between the clinics, testing sites and inpatient areas. However, this continues to be a challenging area that requires attention.

Figure 5. Algorithm for COVID-19 screening for our inpatient population. AIIR = Airborne Infection Isolation Room; AGP = Aerosol Generating Procedure.

Figure 6. Algorithm for rapid PCR testing. As our rapid tests are currently in short supply, this guideline serves to assist the operating room coordinators in deciding whether utilizing a rapid PCR test is appropriate. Level 1 cases are defined as a life or limb threatening emergency requiring OR access within 30 minutes. Level 2 cases are defined as a life or limb threatening emergency if not in the OR within 2-6 hours. IOP = Institute of Psychiatry
7. Conclusion

Preoperative screening and testing for the SARS-CoV-2 virus is now a part of our routine preoperative screening protocol and will likely be part of our system until there is an effective vaccine. Given the rapidly changing nature of the virus as well as rapidly fluctuating levels of prevalence throughout individual cities and regions of the state, our need for streamlined, integrated testing will only continue. Our goal of highlighting the processes and problems with our current testing system will hopefully allow other centers to gain some knowledge from our experience. We anticipate seeing many more published papers with regard to institutional-related testing processes in the months to come.

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Declaration of Competing Interest

None

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