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Evolution of COVID-19 Guidelines for University of Washington Oral and Maxillofacial Surgery Patient Care



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The emergence of coronavirus disease 2019 (COVID-19), caused by the SARS-CoV-2 (SC2) virus, in late December 2019 has placed an overwhelming strain on healthcare institutions nationwide. The modern healthcare system has never managed a pandemic of this magnitude, the ramifications of which will undoubtedly lead to lasting changes in policy and protocol development for viral testing guidelines, personal protective equipment (PPE), surgical scheduling, and residency education and training. The State of Washington had the first reported case and death related to COVID-19 in the United States. Oral and maxillofacial surgeons have a unique risk of exposure to SC2 and developing COVID-19 because of our proximity of working in and around the oropharynx and nasopharynx. The present report has summarized the evolution of COVID-19 guidelines in 4 key areas: 1) preoperative SC2 testing; 2) PPE stewardship; 3) surgical scheduling guidelines; and 4) resident education and training for oral and maxillofacial surgery at the University of Washington, Seattle, Washington.

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J Oral Maxillofac Surg 78:1136-1146, 2020

The emergence of coronavirus disease 2019 (COVID-19), caused by the SARS-CoV-2 (SC2) virus, in late December 2019 has overwhelmed healthcare institutions nationwide.¹ The modern healthcare system has never managed a pandemic of this magnitude, the ramifications of which will lead to lasting changes in policy and protocol development for viral testing guidelines, personal protective equipment (PPE), sur-

gical scheduling, and residency education and training.

On January 19, 2020, the first reported COVID-19 case in the United States was seen in an urgent care clinic in Snohomish County, Washington, and confirmed 2 days later on January 21, 2020.² Almost 6 weeks later on February 29, 2020, Seattle and King County public health officials confirmed the first

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The present study was supported in part by the Department of Oral and Maxillofacial Surgery's Laboratory for Applied Clinical Research and the Education and Research Fund.

Conflict of Interest Disclosures: Dr Dillon is the recipient of an Oral and Maxillofacial Surgery Foundation and an Osteo Science Foundation grant, outside the scope of the present study. Dr Dodson is a consultant to American Association of Oral and Maxillofacial Surgeons and provides service as Associate Editor of the *Journal of Oral and Maxillofacial Surgery*. None of the remaining authors have any relevant financial relationship(s) with a commercial interest.

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Received April 21 2020

Accepted April 22 2020

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0278-2391/20/30440-7

<https://doi.org/10.1016/j.joms.2020.04.034>

COVID-19–related death in the United States.³ Finally, as the virus spread worldwide, with 31 deaths from 374 confirmed cases in Washington state, the World Health Organization officially declared the coronavirus outbreak a pandemic on March 11, 2020.⁴

By March 12, 2020, the Centers for Disease Control and Prevention (CDC) had released recommendations postponing all nonurgent elective procedures and permitting only urgent or emergent cases to proceed. In addition, for dental healthcare workers, aerosol-generating procedures (AGPs) were only permitted in urgent or emergent settings with proper PPE, as emerging data demonstrated the high risk of viral transmission via respiratory droplets.^{5,6} In addition, Washington Governor Jay Inslee ordered the closure of educational facilities on March 13, 2020, instituted a stay at home order on March 23, 2020, and directed the closure of all nonessential services on March 25, 2020.⁷

The University of Washington (UW) oral and maxillofacial surgery (OMS) department carries the unique distinction of providing tertiary care for Washington, Wyoming, Alaska, Montana, and Idaho. In addition, the OMS department services 4 different hospitals in the Seattle area and the UW School of Dentistry (SOD). The UW SOD is the only dental school in the State of Washington. The states of Wyoming, Alaska, Montana, and Idaho have no dental schools. This has presented a unique challenge for the OMS service: to provide care for the patients in the direst need and ensure the safety of residents, staff, nurses, and clinical faculty.

With CDC guidelines cautioning against AGPs and the lack of precedent in operating during a pandemic, it became incumbent on the UW OMS department to develop a set of guidelines consistent with the UW School of Medicine (UW Medicine) to ensure the delivery of appropriate patient care, protect vital resources (eg, access to PPE and intensive care facilities), and protect providers and staff from unnecessary risk.

In the present report, we have summarized the evolution of COVID-19 guidelines for UW OMS patient care in 4 key areas: 1) preoperative SC2 testing; 2) PPE stewardship; 3) surgical scheduling guidelines; and 4) resident education and training.

Preoperative SC2 Testing

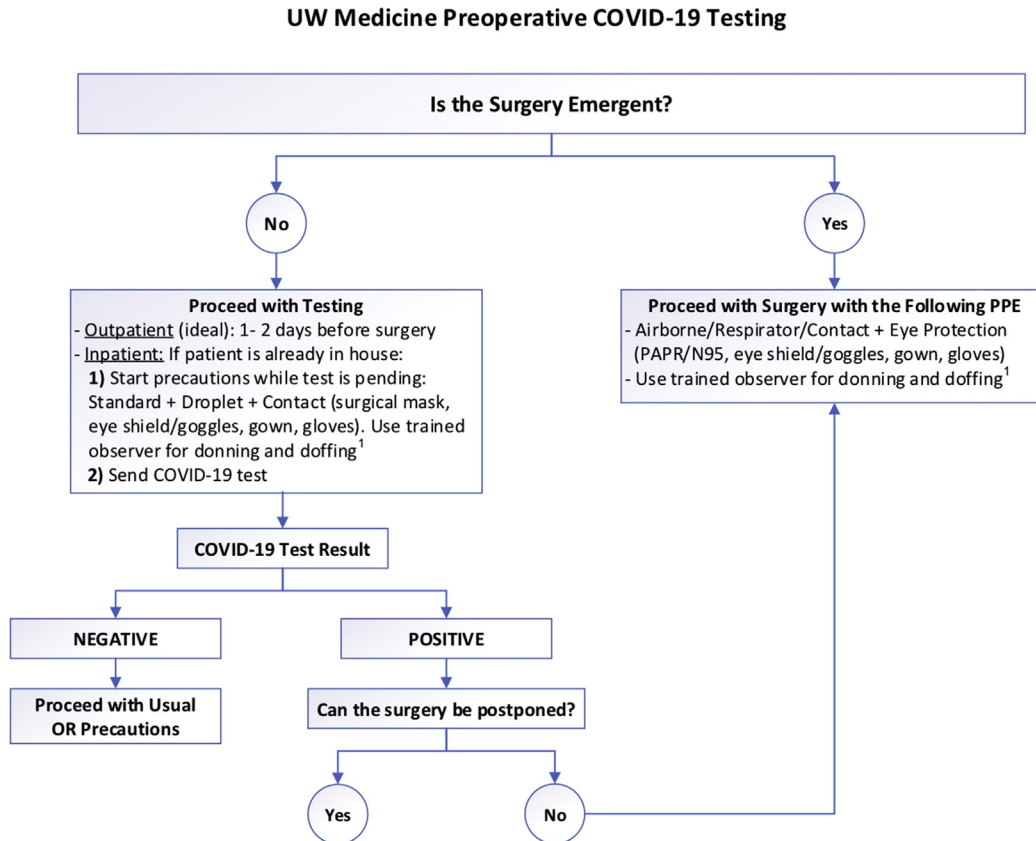
Initially, testing for SC2 relied on the real-time polymerase chain reaction (RT-PCR) test using a nasopharyngeal swab. The results were available within an average of 15 hours (range, 10 to 19 hours) at our institution.⁸ The UW virology laboratory has the capacity to run 4000 cases daily of a “non-rapid” SC2 test called “SARS-CoV-2 (COVID-19) qualitative PCR.” The results

are expected the same day for specimens received in the morning and the next day otherwise.⁸ In principle, the RT-PCR test has 100% sensitivity (true positive rate). However, because of sampling error or biology of the disease (eg, virus present in the lower, but not upper, respiratory tract), in the clinical setting, the test will result in some false-negative outcomes. A 2020 study compared chest computed tomography (CT) and RT-PCR for 51 patients in China. The Chest CT scan showed a sensitivity of 98% and the RT-PCR test showed a sensitivity of 71% from the first throat swab or sputum. Using the second RT-PCR, 23% of those initial negative results were positive, with the third test, 4% were positive, and with the fourth test, 2% were positive.^{9,10} The current clinical sensitivity and specificity for SC2 testing using RT-PCR at the UW has been reported to be high; however, the actual values are unknown, because no reference standard is available for COVID-19 status.

By March 21, 2020, the Food and Drug Administration approved the first rapid SC2 RT-PCR.¹¹ The rapid test available at our institution is currently performed every 2 hours on the even hour, with results available within 80 minutes.¹² Thus, if a specimen were submitted immediately after the 2-hour run, the result would be delayed accordingly. The capacity of this test is limited to 40 tests daily because of machine capabilities and supply of reagents and, thus, is reserved for inpatients developing new or worsening symptoms, select cases in the emergency department, and in preprocedural areas.¹² COVID-19 symptoms include new-onset fever greater than 100°F, cough, shortness of breath, myalgias, rhinorrhea, sore throat, anosmia, and aguesia.¹³ Given the limited number of daily samples that can be tested, providers must directly speak with the COVID-19 infection control physician on call to justify the necessity for the test and receive formal approval.

On March 23, 2020, the UW Medicine released an initial COVID-19 testing algorithm for preoperative surgical patients (Fig 1). The algorithm distinguished whether the surgery was emergent and then, according to the SC2 test results, recommended the appropriate PPE. The second and current iteration of the COVID-19 testing algorithm was released on March 31, 2020 (Fig 2). Given the rapidly evolving recommendation of managing operative treatment in the COVID-19 era, as of April 20, 2019, this algorithm had not changed.

The current process for the choice of operative venue (standard vs negative pressure operating rooms) and PPE (standard vs aerosolized transmissible disease [ATD] precautions) is based on 3 parameters: operative urgency, symptom status, and SC2 testing result (Fig 2). All operative procedures are limited to urgent or emergent cases. To qualify for urgent



¹**Trained Observation:** A trained observer (TO) is a staff member who has been trained in donning and doffing of personal protective equipment (PPE). **Donning:** You are required to have a TO visually inspect your PPE before you enter the OR (this process is also known as “PPE check”). **Doffing:** For your safety, a TO is also required for the doffing process to make sure you do not self-contaminate as you remove your PPE.

FIGURE 1. Initial University of Washington School of Medicine preoperative coronavirus disease 2019 (COVID-19) testing algorithm. OR, operating room; PAPR, powered air purifying respirator; PPE, personal protective equipment.

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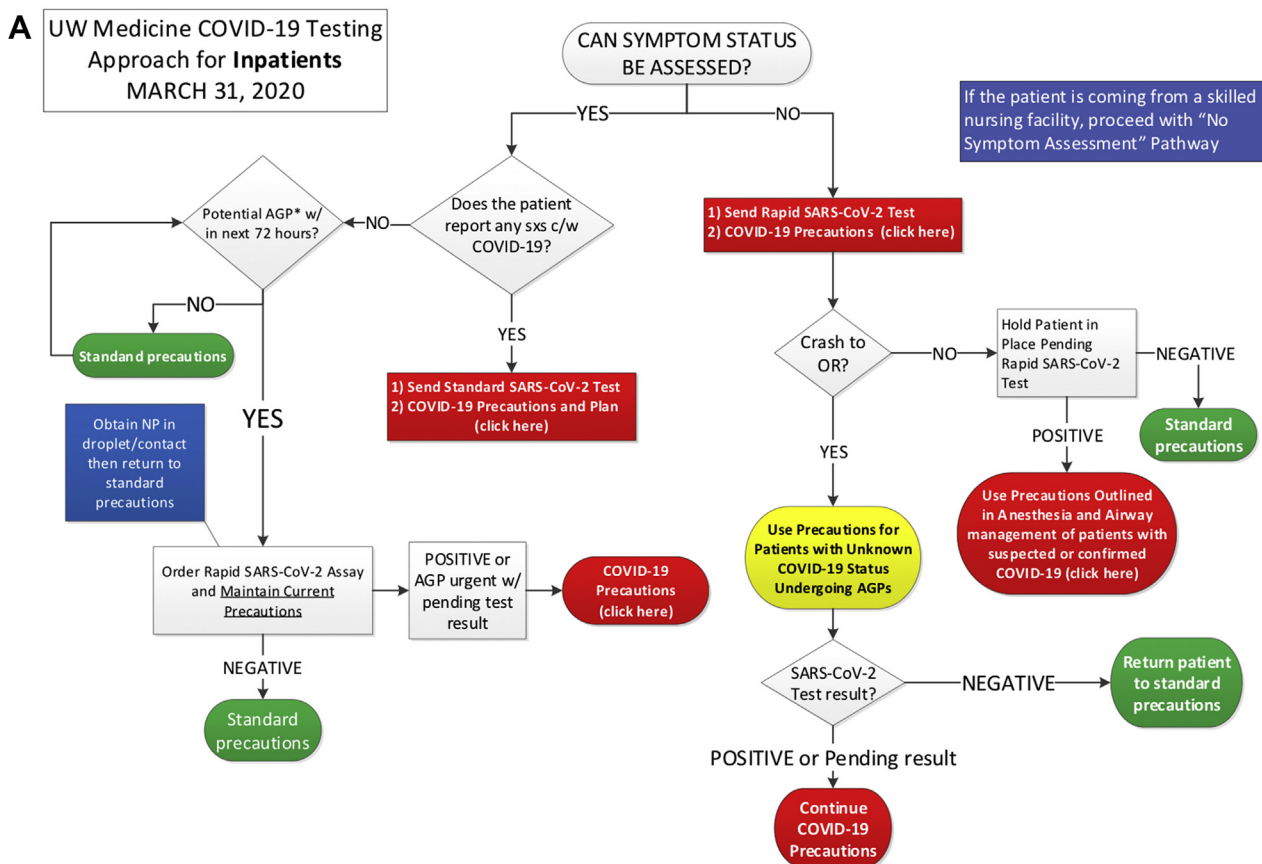
operative treatment, the patient must be asymptomatic and have had a negative SC2 test result within 72 hours before the procedure. If the same patient required reoperation more than 72 hours after SC2 testing, the patient would require repeat testing. Given an asymptomatic patient with a negative SC2 test result, standard precautions (ie, mask, face shield or goggles, gown, surgical cap, and gloves) would be used. For example, we performed surgery using the standard precautions for an asymptomatic and SC2-negative patient with a mandible fracture.

If the case were urgent, but the patient was symptomatic or had tested positive for SC2, the operation was deferred. If the case could not be delayed for 14 days, the emergent case limb of the algorithm was followed. If the case were emergent and the symptoms and SC2 test status could be ascertained, the emergent case limb of the algorithm was followed. If the symptom and test status could not be determined, ATD precautions were implemented (eg, airborne, respiratory,

and contact precautions, negative pressure room, powered air purifying respirators [PAPRs] or N95 respirators, eye shield or goggles, gown, gloves surgical cap, and a trained observer for donning and doffing).

Of special note was the definition of “urgent.” The concept of “urgency” is widely variable and dependent on the specialty and provider. However, with institutional prioritization of PPE preservation, urgent cases were defined as those for which the patient’s health outcome would be adversely affected within a specific timeline. At UW, this timeline was initially 2 weeks and was then changed to 4 weeks. As of April 13, 2020, consistent with Governor Inslee’s proclamation, UW Medicine changed the cutoff to 90 days.¹⁴ These changes reflected the COVID-19 projections within Washington and the need to conserve PPE and the availability of PPE.¹⁵

For special circumstances or questions, a COVID-19 resource clinician can be reached for testing



*Aerosol-generating Procedures (AGPs): Endotracheal intubation and extubation; entire ENT, OMFS and other airway manipulation cases; care of the intubated patient outside the OR setting (in case of inadvertent disruption of closed ventilator circuit); trach care and suctioning; sputum induction; bronchoscopy; endoscopy; TEE; open airway suctioning; high-flow oxygen therapy; noninvasive ventilation (BiPAP, CPAP); nebulizer treatment. The following are *not* aerosolizing procedures: Coughing, oral suctioning, non-rebreather use, humidification of oxygen

FIGURE 2. University of Washington School of Medicine (UW Medicine) coronavirus disease 2019 (COVID-19) testing approach for A, inpatients and (Fig 2 continued on next page.)

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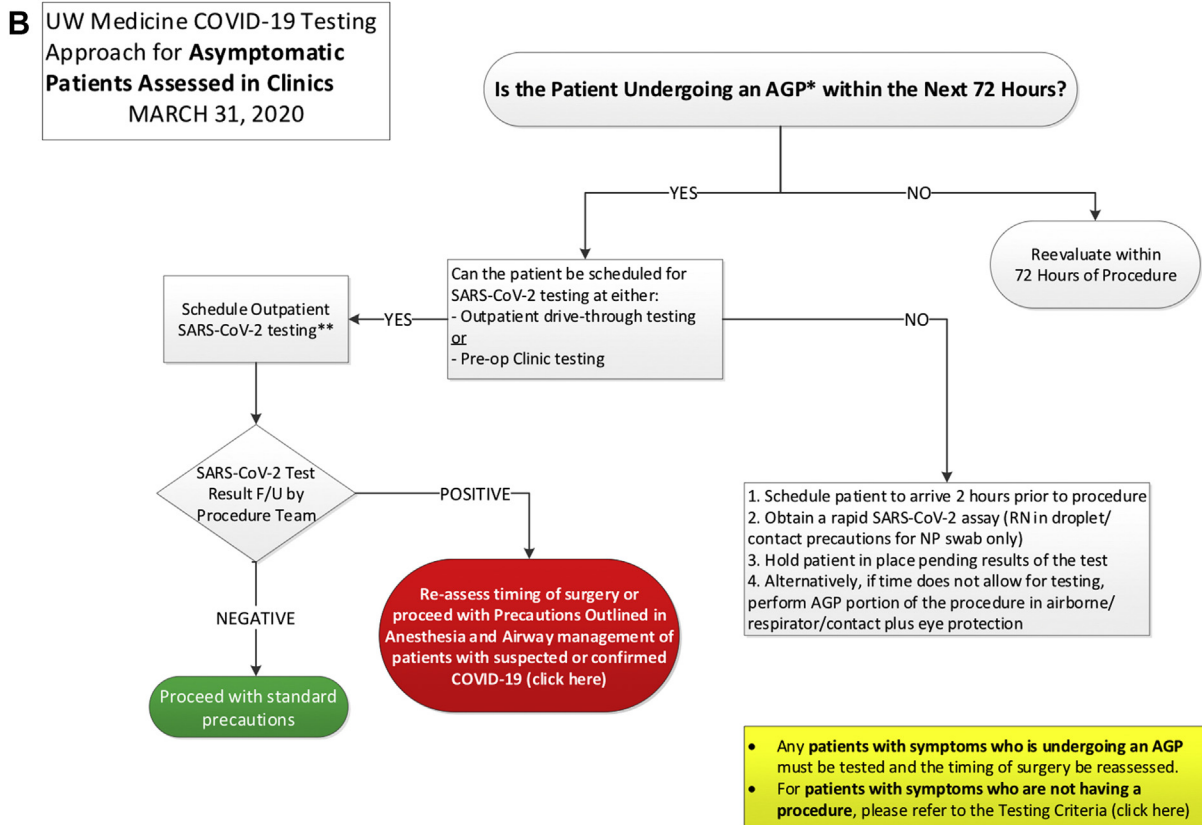
questions. In our experience, we had 1 patient with Le Fort II fractures and a displaced nasal fracture. Because of the risk of performing a nasopharyngeal swab, an anterior nasal swab was recommended, with the possibility that the more anterior sample would provide a false-negative result. In another case, a patient with a panfacial fracture and tracheostomy, a lower respiratory tract aspirate was acquired for testing.

Furthermore, preoperative testing of urgent or emergent operating room cases provided additional information. Of the first 240 asymptomatic patients tested, 2 tested positive (0.8%; (the upper limit of the 95% confidence interval was 3%). Of the symptomatic patients tested at the UW virology laboratory, the range of SC2-positive tests ranged from 3 to 15%. At present, among symptomatic patients, the frequency of SC2-positive tests has hovered around 10%.^{16,17} Finally, on April 13, 2020, UW Medicine initiated SC2 testing for all patients admitted to all 4 of its hospitals.

PPE Stewardship

From mid-January to early March, no official recommendations on PPE were in place to help providers reduce the risk of exposure to SC2. However, in March, various guidelines from the CDC were implemented. It was initially thought that if an AGP was performed on an asymptomatic patient with a negative SC2 test result, at a minimum, a N95 disposable respirator mask would be required.^{5,18} In addition, confusion was still present regarding the PPE required when a non-AGP was performed on an asymptomatic patient and whether that situation would only require standard PPE precautions. The need to conserve PPE complicated matters.

The current UW Medicine and OMS department protocol is to use standard PPE precautions (ie, no N95) when treating an asymptomatic, SC2-negative patient who has been tested within the previous 72 hours. The standard PPE precautions include a



*Aerosol-generating Procedures (AGPs): Endotracheal intubation and extubation; entire ENT, OMFS and other airway manipulation cases; care of the intubated patient outside the OR setting (in case of inadvertent disruption of closed ventilator circuit); trach care or suctioning; sputum induction; bronchoscopy; endoscopy; TEE; open airway suctioning; high-flow oxygen therapy; noninvasive ventilation (BiPAP, CPAP); nebulizer treatment. The following are not aerosolizing procedures: Coughing, oral suctioning, non-rebreather use, humidification of oxygen

**To schedule at HMC Testing Center, please call (206) 744-0400. To schedule at UWMC OPMC, please call (206) 520-8770. If testing in clinic, use droplet/contact while performing NP swab.

FIGURE 2 (cont'd). B, asymptomatic patients assessed in clinics. AGP, aerosol-generating procedure; BiPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; c/w, consistent with; ENT, ear, nose, and throat; F/U, follow-up; HMC, Harborview Medical Center; OMFS, oral and maxillofacial surgery; OPMC, outpatient medical center; OR, operating room; NP, nasopharynx; Pre-op, preoperative; RN, registered nurse; sxs, symptoms; TEE, transesophageal echocardiography; trach, tracheal; UWMC, University of Washington Medical Center.

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mask, face shield or goggles, gown, surgical cap, and gloves. The use of standard PPE applies to AGPs and non-AGPs. As of submission, no OMS provider at UW has had a known work-related exposure to SC2. If the patient is SC2 positive and treatment cannot be deferred, care is rendered in the operating rooms because our OMS outpatient clinics are not suitable environments to treat patients with ATDs. No OMS outpatient clinic within the 4 hospitals nor the UW SOD served by the OMS department has a negative pressure room.

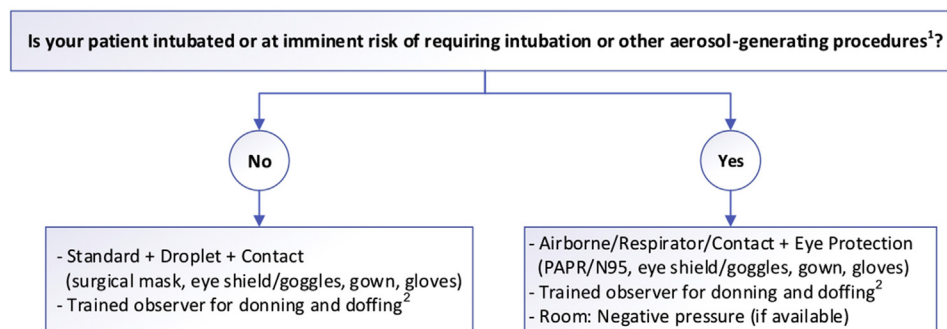
On March 23, 2020, UW Medicine began to implement operative COVID-19 PPE training seminars. These included both in-person PAPR training and an online video of donning and doffing a PAPR after use. In addition, a trained observer is required to monitor and aid in proper doffing to prevent contamination (Fig 3).

Manufacturers have released different styles of single-use face masks, surgical masks, and N95 disposable respirator masks with different levels of bacterial filtration effectiveness, particle filtration effectiveness, and fluid resistance in accordance with performance specifications from the American Society for Testing and Materials.¹⁹ In selecting the appropriate mask, one must consider what level of protection is required (Fig 4). A respiratory droplet averages 6 μm , and the size of a single SC2 virion is reported to be 0.1 μm .²⁰ In the case of SC2, mask levels 1 to 3 provide acceptable protection. For OMS, it is especially important to choose a mask that also provides adequate fluid resistance.

At our institutions, the current prevalence of a patient being asymptomatic and having a positive SC2 test is 0.03 (upper limit of the 95% confidence

March 23, 2020

Personal Protective Equipment (PPE) for Patients with Suspected or Confirmed COVID-19



¹ Aerosol Generating Procedures:

- Endotracheal intubation and extubation
- Care of the intubated patient (in case of inadvertent disruption of closed ventilator circuit)
- Sputum induction
- Bronchoscopy
- Open airway suctioning
- High flow oxygen therapy
- Noninvasive ventilation (BiPAP, CPAP)
- Nebulizer treatment

Please also note:

- Special Droplet/Contact is appropriate for coughing patients not requiring procedures described above
- Oral suction is not an aerosolizing procedure
- Humidification of oxygen does not alter the approach
- Non-rebreather is not an aerosolizing procedure but may indicate need for escalated therapies
- Move to Airborne/Respirator/Contact + Eye Protection if intubation, noninvasive ventilation, or other aerosol generating procedures are anticipated.
- Move back to Special Droplet/Contact once the aerosolizing procedures have concluded. Please allow appropriate room turnover time depending on location. For HMC and UWMC (including Montlake and Northwest campuses) that time is 1 hour.

² **Trained Observation:** A trained observer (TO) is a staff member who has been trained in donning and doffing of personal protective equipment (PPE). **Donning:** You are required to have a TO visually inspect your PPE before you enter the patient's room or care area (this process is also known as "PPE check"). **Doffing:** For your safety, a TO is also required for the doffing process to make sure you do not self-contaminate as you remove your PPE. The healthcare worker (HCW) will notify the TO when they are ready to exit the room and follow the instructions of the TO. It is expected that the TO will respond to the HCW's request to exit the room as quickly as possible, limiting the amount of additional time spent by the HCW in the patient room.

PPE for Specimen Collection: Since nasopharyngeal swabs often generate a strong cough reflex, Standard/Contact/Droplet precautions are required.

More Information: For testing criteria and detailed information about PPE for suspected or confirmed COVID-19 cases, please visit our [UW Medicine COVID-19 Website](#)

FIGURE 3. University of Washington (UW) personal protective equipment (PPE) algorithm. BiPAP, bilevel positive airway pressure; COVID-19, coronavirus disease 2019; CPAP, continuous positive airway pressure; HMC, Harborview Medical Center; PAPR, powered air purifying respirator; UWMC, University of Washington Medical Center.

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interval). Assuming a level 1 mask provides 95% or more effectiveness in limiting exposure to respiratory droplets, the risk of SC2 exposure from an asymptomatic patient while wearing a Level I surgical mask is estimated to be 15 (0.03×0.05) per 10,000 exposures. The risk of SC2 from a symptomatic patient is estimated to be 50 per 10,000 (0.10×0.05) exposures. Thus, compared with the risk from an asymptomatic patient, the risk of exposure to SC2 from a symptomatic patient is increased 3.3-fold.

Computations of exposure risk are based on the local estimates of disease prevalence and assumptions regarding mask leakage. Estimates of SC2 exposure should be determined by the local prevalence of SC2 and assumptions regarding mask leakage. As such, it is likely that readers will compute a different estimate of the risk of SC2 exposure and should adjust their behavior and PPE usage accordingly. Ultimately, 3 factors should be evaluated to assess the level of PPE required and ensure provider, patient, and staff safety:

1) procedure acuity (urgent or emergent); 2) symptom status (asymptomatic vs symptomatic); and 3) SC2 test results (positive vs negative).

Surgical Scheduling Guidelines

The initial surgical scheduling guidelines were sparse. After the CDC released its interim guidance on March 6, 2020 to postpone all nonurgent elective procedures, the UW SOD and UW Medicine began developing protocols regarding AGPs. Effective March 12, 2020, all of UW Medicine and the SOD limited care to urgent and emergent cases in the clinic and operating room. Washington state Governor Jay Inslee's current proclamation has suspended elective surgeries and procedures until May 18, 2020, although this is subject to change.¹⁴

The guidelines defining urgent or emergent procedures varied and progressed rapidly during the month of March across the United States. The American






ASTM Level	Indication ¹⁹	Filtration Effectiveness ¹⁹	Example Mask Type
Maximum filtration	High barrier, designed for procedures with a moderate to high amount of blood, fluid, aerosols, or spray; treating patients with airborne diseases (e.g., tuberculosis, influenza)	High Fluid Resistance: 160 mmHg Filtration Efficiency: PFE = 99.9% @ 0.1 micron	3M Health Care Particulate Respirator and Surgical N95 Mask ²³ 
Level 3	High barrier, designed for procedures with a moderate to high amount of blood, fluid, aerosols, or spray	High Fluid Resistance: 160 mmHg Filtration Efficiency: BFE ≥ 98% PFE ≥ 98% @ 0.1 micron	Medline Fluid-Resistant Surgical Face Mask with Eye Shield ²⁴ 
Level 2	Moderate barrier, designed for procedures with a light to moderate amount of blood, fluid, aerosols, or spray	Moderate Fluid Resistance: 120 mmHg Filtration Efficiency: BFE ≥ 98% PFE ≥ 98% @ 0.1 micron	3M Filtron High Performance Surgical Mask with Face Shield ²⁵ 
Level 1	Low barrier, designed for procedures with a low amount of fluid, blood, aerosol exposure, or spray	Low Fluid Resistance: 80 mmHg Filtration Efficiency: BFE ≥ 95% PFE ≥ 95% @ 0.1 micron	Halyard Level 1 Procedure Mask with Earloops ²⁶ 
Low performance	Simple barrier, designed for exams and visitations or for dry, short procedures with no fluid, blood, aerosol exposure, or spray	Physical Barrier Only No ASTM Performance Level* *Unless otherwise specified by mask manufacturer	Halyard Standard Cone Mask with Headband ²⁷ 

FIGURE 4. Comparison of mask levels, indications, and filtration effectiveness. ASTM, American Society for Testing and Materials; BFE, bacterial filtration efficiency; PFE, particle filtration efficiency.

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College of Surgeons (ACS) released guidance for triage of nonemergent surgical procedures on March 17, 2020, delineating elective surgeries into 3 tiers (low, intermediate, high), and further subdividing each tier into 2 categories (healthy or unhealthy).²¹ Examples of operative procedures were given; however, these were specific to general surgery.

The American Association of Oral and Maxillofacial Surgery (AAOMS) followed a bulletin from the American Dental Association (ADA) released on March 19, 2020.²² On March 26, 2020, the Arbeitsgemeinschaft für Osteosynthesefragen Craniomaxillofacial (AO CMF) released recommendations for maxillofacial procedures for facial trauma, oncologic care, and dental procedures.¹⁸ On April 13, 2020, the UW Medicine moved forward with scheduling patients for procedures if delaying the procedure or operation for more

than 90 days would adversely affect the patient's health outcome.¹⁴

The UW OMS department developed OMS-specific guidelines and provided these to all faculty and residents on March 23, 2020. Subsequently, incorporating the advice from local and national organizations, a surgical acuity scale was developed (Table 1).²³⁻²⁷ The data provided in Table 1 are adapted from the ACS surgery acuity scale. We synthesized the recommendations from the AAOMS, ADA, AO CMF, and the Commission of Dental Accreditation guidelines for OMS training programs. The procedures are subdivided into the domains of anesthesia, trauma, pathology, orthognathic surgery, and reconstructive or cosmetic surgery.²⁸ The decision to delay an operating room or clinic procedure was at the discretion of the attending OMS surgeon and based on a professional

Table 1. UW OMS SURGERY ACUITY SCALE

Tier	Definition	Location	Examples (per CODA OMS Residency Training Categories)	Action	COVID-19 Testing
1a	Low acuity surgery/healthy patient (ASA 1-2); outpatient surgery; not life-threatening illness	OMS OP; HOPD; ASC	Dentoalveolar surgery, asymptomatic; routine outpatient anesthesia; implant therapy; facial trauma (eg, arch bar removal); orthognathic surgery; cosmetic surgery; benign pathology; reconstruction; TMJ	Postpone surgery	NA
1b	Low acuity surgery/unhealthy patient (ASA 3-5)	OMS OP; HOPD; ASC	Dentoalveolar surgery, asymptomatic; routine outpatient anesthesia; implant therapy; facial trauma (eg, arch bar removal); orthognathic surgery; cosmetic surgery; benign pathology; reconstruction; TMJ	Postpone surgery or proceed with appropriate PPE* if medical history necessitates procedure	Negative within 72 hours
2a	Intermediate acuity/healthy patient (ASA 1-2); not life-threatening but potential for future morbidity and mortality within 90 days; requires hospital admission	OMS OP; HOPD; ASC	Odontogenic infection; dental extraction, symptomatic; facial trauma (eg, minimally displaced fracture, simple mandible fracture, closed condyle fracture, zygoma, and/or zygomatic arch); benign pathology; reconstruction	Postpone surgery (medical management) or proceed with appropriate PPE* and consider the following: trauma: closed reduction, self-drilling screws, limit drilling; delay complex reconstruction where possible (eg, free flaps)	Negative within 72 hours or consider rapid test
2b	Intermediate acuity/unhealthy patient (ASA 3-5)	Hospital	Odontogenic infection; dental extraction, symptomatic; facial trauma (eg, minimally displaced fracture, simple mandible fracture, closed condyle fracture, zygoma, and/or zygomatic arch); benign pathology; reconstruction	Postpone surgery (medical management) or proceed with appropriate PPE* and consider the following: trauma: closed reduction, self-drilling screws, limit drilling; delay complex reconstruction where possible (eg, free flaps)	Negative within 72 hours or consider rapid test
3a	High acuity surgery/healthy patient (ASA 1-2); life-threatening and/or high potential for future morbidity and mortality within 90 days; requires hospital admission	Hospital	Odontogenic infection; facial trauma (eg, comminuted open fractures, panfacial injury, ocular emergency, soft tissue injury); head and neck cancer	Proceed with appropriate PPE*; if nonoperative therapy is equivalent to surgery (eg, radiotherapy), nonoperative therapy is recommended	Negative within 72 hours or consider rapid test

Table 1. Cont'd

Tier	Definition	Location	Examples (per CODA OMS Residency Training Categories)	Action	COVID-19 Testing
3b	High acuity/unhealthy patient (ASA 3-5)	Hospital	Odontogenic infection; facial trauma (eg, comminuted open fracture, panfacial injury, ocular emergency, soft tissue injury); head and neck cancer	Proceed with appropriate PPE* if nonoperative therapy is equivalent to surgery (eg, radiotherapy), nonoperative therapy is recommended	Negative within 72 hours or consider rapid test

Data adapted from American College of Surgeons.²¹

Abbreviations: AGP, aerosol-generating procedure; ASA, American Society of Anesthesiologists; ASC, ambulatory surgery center; CODA, Commission on Dental Accreditation; COVID-19, coronavirus disease 2019; HOPD, hospital outpatient department; OMS, oral and maxillofacial surgery; OP, office-based clinic/practice; PAPR, powered air purifying respirator; PPE, personal protective equipment; SC2, SARS-CoV-2; TMJ, temporomandibular joint; UW, University of Washington.

* Appropriate PPE—for COVID-19 (SC2) test negative: standard precautions (ie, mask, face shield or goggles; gown, surgical cap, gloves); for COVID-19 (SC2) test positive or unknown: 1) for AGP—airborne respirator/contact precautions (PAPR, N95, eye shield or goggles, gown, surgical cap, gloves), trained observer for donning and doffing, negative pressure room, if available; 2) for non-AGP—standard plus droplet and contact precautions (surgical mask, eye shield or goggles, gown, surgical cap, gloves), trained observer for donning and doffing.

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determination that delay would not have a significant effect on the patient's health outcomes within the next 90 days.¹⁴

Resident Education and Training

By mid-March, the OMS department had transitioned to limited clinical services to minimize provider exposure and comply with the physical and social distancing recommendations. All residents and faculty underwent "fit" testing for N95s if not previously performed within the previous year. This "fit" test was used to confirm that the N95 (a disposable respirator mask) fit the user. At Harborview Medical Center (HMC), the chief resident coordinates and schedules for 1 to 2 junior residents to come to HMC and provide support for managing in- and outpatients, perform urgent clinical procedures, and, if needed, assist in operating room procedures. Performing rounds for inpatients was limited to the chief resident and attending to limit unnecessary personnel exposure and conserve PPE. No physical prerounds are performed. All prerounds consist of medical record reviews. The residents not on site are available on standby to be called to the hospital as needed. Visitors are restricted for clinical visits. Ideally, it would only be the patient. If a visitor needed to accompany the patient, the number was limited to 1 person. If possible, the accompanying visitor was asked to wait in the car.

We implemented telehealth consultations to ascertain the urgency of a patient's condition and develop a tentative treatment plan. The goal of telehealth consultations was to eliminate the physical exposure associated with an in-person clinical visit and limit the number of times a patient had to be physically present in the clinic. Additionally, a telehealth consultation allows for a single physical visit to render treatment. Follow-up appointments are executed using telehealth where possible. All postoperative patients are routinely telephoned 1 week after surgery in accordance with our regular clinical work flow.

Additionally, patients in our clinic are reassessed for new-onset COVID-19 symptoms at 1 week postoperatively because the incubation period for SC2 is up to 14 days. In accordance with the UW Medicine guidelines, in the event, a patient has new-onset symptoms, they are retested. If positive for SC2, the staff members and clinicians who might have been exposed to a SC2-positive patient are notified and asked to perform twice-daily temperature checks and assess for other COVID-19 symptoms. If any new-onset symptom develops, that staff member or clinician is tested. If the test results are negative for SC2, they are asked to self-isolate until symptom free for 72 hours. Once they have returned to work, they are required to wear a mask for 14 days after symptom onset.²⁹

In the unusual circumstance of performing an AGP on an asymptomatic patient with unknown SC2 status in the outpatient clinic, the recommended practice has been for the surgeon and assistants to wear, in addition to the standard precautions (ie, face shield or goggles, gown, surgical cap, and gloves), an N95 mask with a conventional surgical mask over the N95. The purpose of double masking was to conserve and permit the reuse of the limited N95 masks. The surgical mask prevented the N95 from becoming soiled, permitting its reuse. The covering surgical mask was discarded.

In addition, the hospitals issued residents and staff reusable protective eyewear that could be cleaned after use. At HMC, each resident received a plastic box labeled with their name to store reusable goggles and an unused appropriately sized N95 disposable respirator mask. The used N95 was subsequently placed into a breathable paper bag labeled with the user's name. If an N95 mask was not available, PPARs were available for use in the clinic and operating room locations. Once universal SC2 testing for all procedures became available, the PPE requirements were determined by the SC2 test results and symptoms status (see the "Preoperative SC2 Testing" section). The treatment of SC2-positive patients was deferred. If the treatment could not be deferred, it was performed in the operating room, not the outpatient clinic setting.

To allow for the OMS department's continued didactic and administrative functions, weekly meetings were transitioned to web-based video conferencing. Remote communication facilitated important departmental discussions and resident didactics. Resident operative exposure was decreased as a consequence of limiting operations to those deemed to urgent or emergent. The residents took advantage of this time to emphasize their didactic education through journal clubs, directed book readings, lectures, and research.

Discussion

It is an unfortunate truth that from the initial COVID-19 case on January 19, 2020 until March 13, 2020, the SC2 virus was spreading across Washington. Because of the lack of testing, dental, OMS, and other healthcare providers were performing AGPs with standard PPE. Among the medical community, oral and maxillofacial surgeons are at a high risk of contracting respiratory infections owing to our proximity of working in and around the oropharynx and nasopharynx.³⁰ The final number of preventable SC2 exposures will remain unknown. This 8-week period of unpreparedness has demonstrated the fundamental need for pandemic protocols to be developed proactively and rapidly implemented when needed.

For many academic institutions, ensuring the safety of providers is a priority. News reports detailed 1 OMS resident at Brooklyn Hospital Center in New York requiring intensive care unit admission after testing positive and, with great sadness, the death of another resident at Ascension Macomb Hospital in Detroit.^{31,32} The development of our department's protocol for virus testing, PPE stewardship, surgical scheduling, and resident didactics has ensured that the essential functions of the resident training program can continue in a safe, productive manner.

The lessons learned from this pandemic will shape our profession for years to come. The protocols and guidelines released during the month of March, although vital, demonstrate a medical community playing catchup in managing a once in a lifetime crisis. We must remain vigilant and ensure that the protocols developed during this pandemic continue to evolve to allow us to act proactively when, not if, the next pandemic strikes. It is our hope that the protocols developed at the UW Medicine will provide guidance for when that time comes.

As of April 19, 2020, Washington state had 12,085 confirmed cases and 652 deaths and had tested 141,011 individuals, with a positive rate of 8.6%.³³

Acknowledgments

Thank you to all the healthcare and essential workers in the United States and around the world who have continued to work selflessly, in some cases without proper PPE, to ensure the well-being and survival of their patients. Thanks also to UW Medicine and Laboratory Medicine for their tireless efforts in formulating the testing algorithms.

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