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## Interim Guidance For Dentist Anesthesiologists Practicing In The Office-Based Setting During The COVID-19 Pandemic

*Last updated 4/14/20*

### KEY POINTS

- The primary routes of transmission of SARS-CoV-2 (the causative agent of COVID-19) are through contact and respiratory droplets (particles 5-10  $\mu\text{m}$ ). Case reports suggest that certain procedures, particularly those in the nasopharyngeal region, may release virus-containing aerosolized particles (particles less than 5  $\mu\text{m}$ ) that can exist in the air for an unknown amount of time.
- In addition to our proximity to patients, dentists and anesthesia providers are at a higher risk of exposure due to aerosol-generating procedures (AGP) such as positive pressure ventilation, endotracheal intubation and many dental procedures.
- Current evidence shows that pre-symptomatic or asymptomatic individuals, including children, can transmit the virus. Dentist anesthesiologists should therefore treat all patients as potentially infected, particularly in places with ongoing community spread.
- This Interim Guidance is intended for the anesthesia provider *in the dental office setting* during the COVID-19 pandemic and will be updated as necessary. Dentist anesthesiologists can significantly reduce their exposure and community transmission by modifying existing protocols and following appropriate precautions.



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The American Society of Dentist Anesthesiologists (ASDA) considers the safety of dentist anesthesiologists to be of critical importance. This interim guidance specifically addresses dentist anesthesiologists practicing in an office-based setting. These recommendations are based upon information available as of 4/14/2020. Since COVID-19 is an emerging disease, new knowledge is added daily and guidance may change as the situation evolves.  
Please consult the CDC<sup>1</sup> website regularly for the most up-to-date information.

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## BACKGROUND OF PANDEMIC

### *Summary*

The current pandemic of respiratory disease spreading from person-to-person is caused by a novel coronavirus (SARS-CoV-2), which can develop into COVID-19 (coronavirus disease 2019). COVID-19 is the third novel coronavirus infection in two decades that was originally described in Asia, after Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). Coronaviruses are a large family of viruses that are common in humans and in many different species of animals, including camels, cattle, cats, and bats. Rarely, animal coronaviruses can cross species and infect people and then spread between people as occurred with SARS-CoV, MERS-CoV, and now with SARS-CoV-2<sup>2</sup>.

### *Clinical Course*

The complete clinical picture with regard to COVID-19 is not fully known. Reported illnesses have ranged from very mild (including some with no reported symptoms) to severe, including death. The most common symptoms are fever, dry cough, fatigue and dyspnea. Much less common symptoms are nasal congestion and diarrhea. The median time from symptom onset to the development of pneumonia is approximately 5 days and the median time from symptom onset to severe hypoxia and ICU admission is approximately 7-12 days.

The incubation period (the time from exposure to development of symptoms) of SARS-CoV-2 and other coronaviruses (e.g., MERS-CoV, SARS-CoV) ranges from 2–14 days. The onset and duration of viral shedding and the period of infectiousness for COVID-19, however, are not yet clear. This complicates the job of anesthesia providers as it must be assumed that all patients are capable of transmission regardless of symptoms.

Older people ( $\geq 65$  years old) and people of all ages with severe chronic medical conditions seem to be at higher risk of developing serious COVID-19 illness. Recent case reports have described severe hypoxemia without dyspnea.

### *Routes of Transmission*

Current evidence suggests that SARS-CoV-2 is primarily transmitted through droplets (particles diameter 5-10  $\mu\text{m}$ ). Person-to-person transmission largely occurs when an individual with the infection emits droplets containing virus particles while coughing, sneezing, and talking. These droplets land on the respiratory mucosa or conjunctiva of another person, usually within a distance of 6 ft (1.8 m) but perhaps farther<sup>3</sup>. The droplets can also settle on stationary or movable objects and can be transferred to another person when they come in contact with these fomites. Survival of the virus on inanimate surfaces has been an important topic of discussion. While there is a dearth of evidence, what is available suggests the virus can remain infectious on some inanimate surfaces at room temperature for up to 9 days. This time is shorter at temperatures greater than 86° F (30° C). The good news is that cleaning and disinfection are effective in decreasing contamination of surfaces, emphasizing the importance of proper infection control, particularly in dental offices.

Airborne transmission is different from droplet transmission as it refers to the presence of microbes within droplet nuclei less than 5  $\mu\text{m}$  in diameter, which can remain in the air for long periods of time and be transmitted to others over greater distances<sup>4</sup> ( $>1\text{m}$ ). In the context of COVID-19, airborne transmission may be possible in specific circumstances and settings, including those in which aerosolization occurs. Previous studies with SARS-CoV identified tracheal intubation as a significant risk factor for transmission of SARS to Health Care Workers (HCWs)<sup>5</sup>.

In a recent study of environmental sampling of rooms of patients with COVID-19, many commonly used items as well as air samples had evidence of viral contamination<sup>6</sup>. In the context of the heterogeneity in evidence and possibility of aerosolization of the virus during certain medical procedures, public health agencies, including the Centers for Disease Control and Prevention (CDC) recommend airborne precautions in situations involving patients with COVID-19. This evidence in addition to extrapolating data from SARS indicates that transmission through aerosols is likely, particularly with procedures such as endotracheal intubation, positive pressure ventilation and dental procedures. Without proper point-of-care testing available, it is prudent to practice airborne precautions with any aerosol-generating procedures because asymptomatic patients are known to contribute to the transmission of the virus.

## PREOPERATIVE CONSIDERATIONS

### *Dental Health Care Personnel (DHCP)*

Dental health care personnel (DHCP) includes all clinical and administrative staff working in the dental office. All DHCP should self-monitor by remaining alert to any respiratory symptoms (e.g., cough, shortness of breath, sore throat). Additionally, they should check their temperature twice a day, regardless of the presence of other symptoms consistent with a COVID-19 infection. If the temperature is  $\geq 100^{\circ}$  F, they should not be in the dental office. Dental offices should create a plan for whom to contact if an employee develops fever or respiratory symptoms to determine whether medical evaluation is necessary<sup>7</sup>.

### *Facility*

Dentist anesthesiologists commonly provide care in multiple offices so it is important for them to contact their operating dentists to help ensure the facilities they will be practicing in are following recommendations and mandates by appropriate state and federal agencies regarding SARS-CoV-2. Further, fitness of the facility to provide sedation or general anesthesia in a way that minimizes the risk of COVID-19 infection to the patient requiring treatment, subsequent patients and the clinical team must be determined. This includes factors such as the size, isolation and ventilation of the operatory, scavenging, the availability of all required personal protective equipment (PPE) and appropriate intubation armamentarium. Ideally, the dental procedure and recovery will take place in one room with a closed door to prevent aerosols from entering other sections of the office. When this is not possible, DHCP should wear, at a minimum, a surgical mask at all times in areas of the office other than the operatory following an aerosol-generating procedure.

Screening patients *prior* to entering the facility is important for all DHCP. Waiting rooms should provide supplies for respiratory hygiene and cough etiquette, including alcohol-based hand rub (ABHR) with 60-95% alcohol, tissues, and no-touch receptacles for disposal<sup>8</sup>. It may be prudent to have patients wait in the car until the clinical staff is ready for the dental procedure to minimize contact with staff or other patients.

### *Screening Patients and the Escort Prior to the Visit*

To limit direct patient interaction and exposure, pre-operative evaluation should be conducted via telecommunication (phone or video conference) as much as possible. It is important to screen patients and the escort who will be caring for them after the procedure.

People with COVID-19 who have completed home isolation can receive emergency dental care<sup>9</sup>. This is defined as:

- At least 3 days (72 hours) have passed since recovery (resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms), and at least 7 days have passed since symptoms first occurred.

OR

- For individuals with laboratory-confirmed COVID-19 who have not had any symptoms, at least 7 days have passed since the date of the first positive COVID-19 diagnostic test and no subsequent illness has developed.

## SCREENING RECOMMENDATIONS FOR PROSPECTIVE PATIENTS

- In the past 14 days, have you
  - Tested positive or been diagnosed with COVID-19?
  - Been under investigation for possible coronavirus infection?
  - Experienced a loss of taste or smell or flu-like symptoms such as fever, cough, shortness of breath, body aches or diarrhea?
  - Have you been in close contact with another person who has been diagnosed with or under investigation for COVID-19?

Patients who respond 'yes' to any of these questions should not come into the dental office and should be encouraged to contact their primary care physician (PCP) for treatment recommendations. They can also be referred to dental facilities with airborne precautions (e.g., dental schools or hospital dental services) for emergency dental care.

- On the day of the procedure, ask screening questions again and take the temperature of the patient and the escort
  - If 99-100° F, consider the source of the fever (e.g., dental infection) and decide clinical course
  - If  $\geq 100^\circ$  F, assess any difficulty with breathing
    - If none, send home and have the patient follow up with their PCP if things worsen
    - If breathing difficulty is observed, consider calling 911 or referring the patient to the emergency room

### *Special Considerations for Patients at Higher Risk for COVID-19*

Special considerations may be indicated for certain patient populations that have a higher risk of severe illness from COVID-19. This group includes patients 65 years of age and older and those with serious underlying medical conditions or who are immunocompromised. The most commonly reported underlying medical conditions associated with COVID-19 are cardiovascular disease including hypertension, obesity, chronic lung disease, and diabetes mellitus. According to data looking at the severity of disease among COVID-19 patients in the United States, the highest percentage of severe outcomes occurred in people 85 years and older<sup>10</sup>. As an added precaution, patients in these high-risk categories should be scheduled as the first patient of the day in the dental office in order to minimize the risk of exposure of SARS-CoV-2.

Patient who reside in nursing homes or long-term care facilities are also considered high-risk for COVID-19 due to a high incidence of medical compromise, increased age, and the need for significant personal interactions with this patient cohort. Screening and verification of suspected and confirmed positive COVID-19 contacts at the nursing facility will aid in risk assessment. Patients who reside in these facilities should be considered as the sole appointment of the day, if possible, due to their vulnerability to infection and potential for virus spread once they return to their facility.

Patients with intellectual/behavioral disabilities and special healthcare needs can also present challenges when determining urgency of dental treatment and proper screening for COVID-19. These patients may have significant dental needs, yet may be unable to adequately communicate whether they are in pain or having difficulty eating. Since many of these patients require sedation/general anesthesia for even routine dental examination, the dentist anesthesiologist, treating dentist, and patient caregiver should collaborate in advance to determine the risk and necessity of intervention. Those with significant medical disabilities may be at higher risk of developing severe illness following exposure to SARS-CoV-2 virus, and additional precautions should be taken for those residing in nursing homes or long-term care facilities, as noted above. It also becomes important to ensure that the caregiver bringing the patient to the dental office is also prepared to reduce community transmission, and that any additional consents required during this risk period to provide dental and anesthesia care are discussed with the legal guardian, if the patient cannot give consent of their own accord.

## *Local Resources*

Depending on the extent of community spread in the area where the dental office is located, local medical resources may be severely affected. The capacity at local hospitals and the availability of emergency department services should be taken into consideration when prioritizing dental procedures.

## *Justification and Consent (COVID-19 Specific)*

The added risk of transmission of SARS-CoV-2 during aerosol-generating procedures should be explained and disclosed to the operating dentist who should be encouraged to share this information with DHCP in that office. Acknowledgement and documentation of the added risk should be considered. Further, the discussion between the anesthesia provider and the operating dentist to prioritize emergent/urgent procedures should be determined on a case-by-case basis and documented as well.

(See Appendix A)

In addition to the standard anesthesia informed consent with the patient, a separate consent regarding the increased risk of transmission of SARS-CoV-2, the risks and benefits of various treatment options in regard to COVID-19 and the option to reschedule to a later date should be documented. It may also be useful to have the patient or, if the patient is a minor or unable to give consent, the legal guardian document the symptoms of their urgent dental need. (See Appendix B)

## **PRIORITIZING DENTAL PROCEDURES**

On March 27, 2020, the CDC recommended all United States dental facilities to postpone elective procedures and non-urgent dental visits, and to prioritize emergency and urgent cases for several weeks, pending the progression of the COVID-19 epidemic<sup>11</sup>. Prioritizing dental emergencies and urgencies can be a complex process that requires consideration of the patient, the patient's condition, dental office environment, professional personnel, and the status of COVID-19 in the community. The following information is taken from guidance documents issued by the American Dental Association<sup>12</sup>, The American Society of Anesthesiologists<sup>13</sup> and the Anesthesia Patient Safety Foundation<sup>14</sup>, and is provided to help the dentist anesthesiologist in determining the appropriateness of providing office-based sedation and general anesthesia for a situation believed to be a dental emergency or urgency.

### *American Dental Association (ADA) Recommendations<sup>15</sup>*

The rate of COVID-19 transmissions is on the rise in most states. The new interim ADA recommendation is in keeping with the recent CDC's recommendation to perform only emergency or urgent dental care until April 30, 2020 and must be taken seriously by all dental professionals. The ADA believes individual dentists should exercise professional judgment and carefully consider the risks outlined in the ADA's interim guidance and weigh those risks against any possible benefit to the patient, the practice employees, the community at large, and the practitioner. Critically important is the availability of appropriate personal protective equipment (PPE) to minimize any risk of transmission during emergency and urgent care. Due to the proximity of individuals during dental procedures, and the generation of aerosols, dentists, staff and patients are at high risk of transmission. The ADA also recognizes that existing and future local or state government mandates supersede ADA recommendations.

"Dental emergencies" are potentially life threatening and require immediate treatment. Examples include uncontrolled bleeding, cellulitis, trauma to facial bones and conditions that pose a threat to airway patency.

"Dental urgencies" include conditions that require immediate attention to relieve severe pain or arrest and prevent permanent dysfunction. Treatment should be conducted in a minimally invasive manner. Examples include severe dental pain from pulpal inflammation, pericoronitis, post-extraction alveolitis, abscess with localized pain and swelling, fractured teeth with associated soft tissue trauma, dental trauma with avulsion or luxation, final crown/bridge cementation if temporary restoration is lost or damaged and treatment required as part of ongoing critical medical procedures.

Treating emergent and urgent dental conditions in a thoughtful and judicious manner will help alleviate the burden on hospital emergency departments.

## *American Society of Anesthesiologists (ASA) and Anesthesia Patient Safety Foundation (APSF) Recommendations*

ASA and APSF support the recommendations of the Centers for Disease Control and Prevention<sup>16</sup> for facilities to reduce non-urgent surgical, diagnostic, and interventional procedures. Urgency of procedures exists along a continuum and those not time-critical should be rescheduled. Time-critical procedures must be prioritized according to patient need and the resources of the facility. Ambulatory settings for surgery should be considered to reduce demand on hospital resources.

ASA and APSF recognize that decisions to reduce non-urgent procedures are dependent on each facility's geographic location (e.g., the existing and expected community risk for COVID-19 infection), available personal protective equipment (e.g., N95 masks, respirators and body protection), and intensive care resources (e.g., facility and provider capacity). Elderly patients and those with serious chronic medical should postpone non-urgent surgery. Facilities should also consider social distancing and restrictions on patients and visitors who may be asymptomatic, and to monitor the well-being of their healthcare providers. Facility leaders should ensure that all clinical healthcare personnel have access to and training on the personal protection equipment (PPE). This includes availability of N95 masks, powered air purifying respirators, and other PPE, appropriately conserved for use by providers potentially exposed to aerosolized viral particles in clinical settings such as while performing endotracheal intubation and extubation.

### *Length and Scope of Procedure*

The American Dental Association recognizes a range of situations that might comprise dental urgencies. Common features of these situations include the presence or imminent risk of soft tissue infection, uncontrolled or poorly controlled pain, or the expectation that delaying treatment until community transmission of the SARS-CoV-2 virus is significantly reduced would risk producing an unacceptable outcome. Determining the scope and duration of dental treatment under office-based anesthesia can be a complex, multifactorial process. Important input is needed from both the treating dentist, the dentist anesthesiologist and the patient/legal guardian to make a fully informed judgment. The treating dentist should lead determinations of the diagnosis, prognosis and treatment plan as they will be responsible for the ongoing care of the patient in the future. The dentist anesthesiologist should be the ultimate authority for providing expert consultation regarding the safety and efficacy of providing anesthesia and sedation for the proposed care.

A complex but common situation involves the young child with severe early childhood caries (ECC) who presents with localized pain in one or two teeth but extensive dental caries on other teeth. It is often difficult to determine how rapidly dental caries will spread and lead to pain. It is possible, but rare, for severe ECC to develop into potentially life-threatening diffuse orofacial infections<sup>17</sup>, but it is relatively common for children with severe pain and localized infection from ECC to seek treatment in hospital emergency departments. Emergency room care most commonly consists of palliative measures and referral to a community dental office<sup>18</sup>. Most community hospitals lack the equipment and staff for definitive treatment of the child with pain and infection from ECC.

Full mouth dental rehabilitation of severe early childhood caries provides definitive and comprehensive treatment of the condition, and is among the most common indications for performing general anesthesia on young children in the United States<sup>19</sup>. However, a viable alternative is providing short, focused dental treatment to teeth currently causing pain during the COVID-19 outbreak, as this may minimize the risk of viral transmission to the patient, anesthesia team, dental team and subsequent patients. When one or two teeth are symptomatic in a child where extensive deep caries is present on multiple asymptomatic teeth, full mouth rehabilitation may be the best option. If only one or two teeth are symptomatic, and caries is otherwise not extensive, focused treatment may be the preferred option. Extraction of teeth may avoid an aerosol generating procedure and should be considered in lieu of pulpal therapy and crown placement. While community spread increases and available testing is difficult to obtain, each treating dentist, dentist anesthesiologist and the child's legal guardian must weigh the risk and benefits of opting for full mouth dental rehabilitation versus focused, limited treatment on a case-by-case basis.

### *Aerosol-Generating Procedures (AGPs)*

Aerosol-generating procedures are defined as medical and dental procedures that result in the production of airborne particles (aerosols) that create the potential for airborne transmission of infections that may otherwise only be transmissible primarily by the droplet route.

COVID-19 may be spread through aerosols produced by mask ventilation, instrumentation of the airway, numerous dental procedures using high and low speed handpieces (including surgical handpieces), ultrasonic scalers, air/water syringes,

and other irrigating devices, and during cardiopulmonary resuscitation. The ADA has promoted these recommendations<sup>20</sup> (abbreviated) as strategies to minimize aerosolization and transmission of COVID-19:

- Use 1.5% hydrogen peroxide or 0.2% povidone as a pre-procedural mouth rinse.
- Prioritize the use of hand instrumentation.
- Use rubber dams if an aerosol-producing procedure is being performed.
- Prefer the use of high-volume evacuators. DHCP should be aware that in certain situations, backflow could occur when using a saliva ejector, and this backflow can be a potential source of cross-contamination

## **CONSULTATION AND CONSENT RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS**

- Consult with the treating dentist to determine that a dental emergency or urgency exists and requires treatment that cannot be postponed.
  - Consultation should include discussion of alternative treatments such as antibiotic therapy, pain medication, and temporization.
  - Assess the current community spread of COVID-19 and available medical resources (e.g., emergency department, ICU availability).
  - The treating dentist should document degree of urgency, including potential consequences of delaying treatment on a case-by-case basis; this should also be included on justification documentation.
- Consult with the treating dentist on planned dental treatment under sedation or general anesthesia.
  - Discuss anticipated duration of treatment, recognizing that the risks associated with aerosolization is most likely directly related to the length of dental treatment.
  - Discuss possible modifications to treatment in relation to degree of aerosolization and risk of viral transmission.
  - Discuss special considerations for patients, caregivers and DHCP, especially those at higher risk for developing COVID-19 disease.
  - Utilize and prepare experienced dental staff for the purpose of minimizing the duration of the dental treatment.
- Determine the fitness of the facility to provide appropriate sedation or general anesthesia in accordance with current guidelines whereby the risk of transmission of COVID-19 to all patients and DHCP is minimized. Size and ventilation of the operatory, scavenging, disinfection measures and the availability of all required PPE should be considered.
- Discuss risks and benefits of dental treatment, including risks of COVID-19 transmission, with patient and/or patient's guardian. The option to postpone care should be presented. Document mutual consent of the patient, treating dentist and anesthesia provider to proceed with treatment.

## **INTRAOPERATIVE CONSIDERATIONS**

### *Standard Precautions*

- Adequate hand hygiene protocol should be utilized before and after donning/doffing gloves/other contaminated PPE, patient contact, contact with body fluids, and contact with potentially contaminated surfaces.
- Hand hygiene includes either cleaning hands with a 60-95% alcohol-based hand rub or with soap and water for at least 20 seconds.
- Alcohol-based hand rubs are preferred if hands are not visibly soiled.
- Refrain from touching eyes, nose, or mouth with gloved or non-gloved hands.

### *Personal Protective Equipment (PPE)*

COVID-19 is different from the flu, the common cold and SARS-CoV-1 and may require different precautions than dental teams have been employing since the early 1980s.

For procedures that are potentially aerosol producing, which includes intubation and extubation, but also the vast majority of dental procedures, dentist anesthesiologists should wear a properly fitted and seal tested N95 mask with a surgical mask over the N95 during the entire patient encounter and during disinfection of equipment following the procedure. N95 masks fulfill the filtering efficiency criteria of the National Institute for Occupational Safety and Health (NIOSH) and are approved for protection against droplet and airborne transmission of 95% of particles greater than 0.3  $\mu\text{m}$  in size. N95 masks are believed to offer protection against the contact and droplet spread of the coronavirus; however, they are likely not fully resistant to virus penetration in aerosol. Therefore, wearing a surgical mask offers additional protection while also preventing droplet deposition on the N95 if it will be reused in the future. Because most dental procedures are not true sterile procedures, N95 masks with an exhalation valve can be used and may allow for improved comfort during periods of continuous use. Although powered air purifying respirators (PAPRs) may be a preferred option to prevent virus inspiration, at the time of this writing, all PAPRs should be reserved for hospital use in dealing with critically ill patients in the hospital.

The inventor of the material used in the N95 mask, Dr. Peter Tsai, suggests that droplets and viable viruses will dry and no longer carry risk of transmission if the masks are not obviously soiled and are carefully stored in brown paper bags (so that air can circulate to them for drying) for at least 3 days<sup>21</sup>. The CDC supports this approach if necessary due to supply issues related to N95s and re-use but suggests a 5-day period of drying<sup>22,23</sup>. A practical application, if sufficient numbers of N95 masks are available, would be to allocate 5 masks to all anesthesia personnel, and then have them rotate the use and storage of these 5 masks in a cycle. The recommendations for approved respirators and their reuse are changing on a daily basis because of the limited PPE available nationwide. Check the CDC website for approved respirators and additional means for disinfection<sup>24,25</sup>.

Because N95 masks may be in short supply, options for anesthesia personnel have been promoted that are likely better than a simple surgical mask alone. Since most anesthesia providers have face masks and viral filters, one solution is described here: <http://www.childrenshospital.org/research/departments-divisions-programs/departments/surgery/surgical-innovation-fellowship>. The ASDA does not endorse any homemade devices but encourages dentist anesthesiologists to consider alternatives should N95 masks not be readily available in your area; however, use caution when purchasing non-FDA approved masks as many fraudulent products have been imported to the US.

In addition to wearing an N95 and surgical mask during aerosolizing procedures, eye protection (goggles or a disposable face shield that covers the front and sides of the face), a gown, head covering, and gloves should also be used. Due to aerosolization and droplet formation during most dental procedures, shoe coverings are strongly encouraged as shoes may act as a fomite.

For procedures that do not generate aerosol, all PPE as described above is recommended with the exception of the N95 respirator. A surgical face mask is appropriate for all members of the procedural team. Depending on concerns regarding residual airborne virus, an N95 mask can be considered at all times in the dental office.

Procedures for proper donning and doffing of PPE are critical but often overlooked and the use of a cognitive aid is highly encouraged (See Appendix C). Routine hand hygiene should be performed before donning gloves and immediately after doffing, as per usual protocol. Any PPE component that becomes heavily soiled during treatment should be replaced immediately<sup>26</sup>. PPE should be donned prior to entering the operator. All PPE should be removed prior to exiting the operator with the exception of the N95 respirator, only after room disinfection has taken place, since recovery should ideally take place in the treatment room. An alternative is to have a dedicated room adjacent to the treatment area where removal of PPE can take place. A link to a video demonstrating the CDC recommendations can be seen here: <https://www.utmb.edu/covid-19/health-care-workers/ppe-and-testing-information/don-and-doff-ppe>

Because the dentist anesthesiologist cannot be sure of the viral status of dental health care personnel within the office setting, it is recommended that at least a surgical mask be worn and standard distancing precautions be followed at all times. If this is not feasible, the N95 mask should be worn at all times in the dental office. This is especially true following any aerosol producing procedure as the number of air turnovers and status of the office ventilation system cannot be ascertained in most cases. Scrubs worn under PPE should be carefully removed and stored for transport before leaving the dental office.

**The number of people in the treatment room should be limited to those essential for patient care and procedural support with minimal exchange of staff for the duration of the case. Ideally the dental procedure and recovery can take place in one room with a closed door to prevent aerosols from entering other sections of the office.**

## PPE RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS

The minimum recommended equipment for aerosol-generating procedures (AGP) includes:

- N95 or higher-level respirator
- Use a surgical mask worn over the N95
- Eye protection-face shield or goggles with side shields (no personal glasses)
- Disposable head covering (e.g., bouffant, surgical cap)
- Disposable fluid-resistant long-sleeved gown
- Non-sterile gloves (double gloves are recommended during anesthesia procedures)
- Shoe coverings

### *Environmental Infection Control*

Proper environmental infection control is critical to the safety of dentist anesthesiologists and all dental health care personnel. Routine cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying an [EPA-registered, hospital-grade disinfectant](#) to frequently touched surfaces or objects for appropriate contact times as indicated on the product's label) are recommended for areas in which aerosol-generating procedures are performed. All areas within at least 6' of the source of aerosolization should be disinfected.

Potentially exposed unused consumables should be discarded or appropriately disinfected after treatment of each patient.

Single-use and disposable equipment are preferred and should be disposed of after treatment of each patient (e.g., anesthesia circuits/masks, filters, reservoir bags, gas sampling lines, video laryngoscope blade covers, etc.).

Dedicated equipment (e.g., anesthesia machine, stethoscopes, monitors, thermometers) should be cleaned and disinfected between use with an EPA approved disinfectant or 70% ethyl alcohol.

In an effort to minimize virus aerosolization during intubation, some suggestions include placing a clear plastic drape over the patient or utilizing an acrylic box. According to a recent NEJM study<sup>27</sup>, the use of a clear acrylic "aerosol box" is currently being researched as a possible means of limiting the amount of aerosol spread during AGPs. More research and testing are necessary to determine the feasibility of use in dentistry. A link to a video demonstrating its use can be seen here: <https://www.nejm.org/doi/full/10.1056/NEJMc2007589>

The amount of time required for aerosolized particles to settle in a dental procedure room is dependent on the hourly number of air changes, which could vary depending on the office. An NEJM paper<sup>28</sup> dated March 17, 2020, found COVID-19 in tiny particles even at three hours in the air (note: these were generated under a highly controlled and artificial laboratory setting and the actual time virus could be detected was not determined as the study was stopped at 3 hours). Some experts warn this has no relevance to the clinical setting for patients and does not simulate coughing in any way<sup>29</sup>. There are no studies to date to measure SARS-CoV-2 aerosolized viral particles in any dental procedure rooms.

Upon leaving the room, entry should be delayed until sufficient time has elapsed for enough air changes to remove aerosolized infectious particles<sup>30</sup>. It is unclear how long to wait for virus-containing aerosol deposition to completely descend to surfaces. Some authors have suggested as little as 30 minutes<sup>31</sup> while other recommend over 3 hours. Both the University of Washington (UW) School of Dentistry and University of California-Los Angeles (UCLA) School of Dentistry wait one hour between patients. University of Southern California School of Dentistry waits three hours between patients. Since each dental office has different characteristics (room size, ventilation, enclosed vs. open, etc), the dentist anesthesiologist should discuss with the dentist when the appropriate time for room disinfection should take place to allow for aerosol deposition on surfaces. If possible, a different treatment room should be considered to allow maximum time before disinfection takes place.

## *Anesthesia Equipment Considerations*

For intubated general anesthetics, a high-quality viral filter rated to remove at least 99.7% of airborne particles 0.3 µm or greater should be utilized in order to protect the anesthesia machine and gas analyzer from contamination by a potentially infected patient.

Using two filters will increase filtration efficiency, but at minimum, one viral filter should be positioned at either of two positions in the circle circuit system. A high-quality viral filter may be placed between the mask and anesthesia circuit and/or at the end of the expiratory limb to protect the anesthesia machine, if the gas analyzer is otherwise protected; several commercially available water traps provide viral filtration, while other systems depend on scavenging the analyzed monitor gas to an anesthesia machine scavenging system to the outside environment. A 0.2 µm drug injection filter may also be placed between the sampling line and the water trap. Alternatively, the viral filter may be placed at the Y-connector of the anesthesia circuit, proximal to the gas sampling line connection, such that patient exhalations are filtered prior to sampling. For spontaneously breathing patients, the work of breathing may be increased with the filter in this position. There is no evidence that the CO<sub>2</sub> absorber needs to be changed between patients if the anesthesia machine is protected by a viral filter. A viral filter should also be placed on emergency equipment such as the bag-valve-mask to protect the equipment from contamination, if used.

If a dental nitrous oxide-oxygen machine is being used, a filter may be placed between the tubing and the machine although special connectors may be needed depending on the brand of machine used. It may be preferable to use disposable nasal cannula or other oxygen delivery device. All tubing should be properly disinfected.

A heat and moisture exchange filter (HMEF) which also provides viral filtration may also be appropriate (a separate viral filter should be used in conjunction with HME units which do not provide filtration). Since the HMEF may increase dead space and is more easily clogged, positioning an HMEF between the patient's airway and circuit may significantly increase the work of breathing, particularly for pediatric patients. Of note, while humidification may be a significant benefit for patients undergoing prolonged anesthesia and the ASA/APSF recommends HMEFs while using anesthesia machines as ventilators during long-term ventilation of COVID-19 positive patients, it likely provides less benefit during shorter anesthesia cases in dentistry.

Gas sampling tubing should be changed after each patient case, but appropriate filter use should prevent the need to replace the water trap. The exterior of the water trap should be disinfected along with other dedicated anesthesia equipment. For non-intubated anesthetics, consider utilizing a filter on the gas sampling line or replacing the water trap after patient treatment. It is also a viable option to use a pretracheal stethoscope instead of capnography if supplies are limited, particularly for non-intubated cases where capnography is not as accurate in the dental setting (if permitted by state regulations).

The use of transparent plastic drapes is recommended to cover the anesthesia machine, infusion pump(s), monitor and anesthesia monitoring cables during AGPs to minimize the potential of COVID-19 contamination. Also consider plastic barriers for patient positioning devices (e.g., ramps, wrist restraints, gel cushions). These should be replaced after treatment of each patient, if disinfection cannot take place. Proper removal of drapes and barriers yields concern similar to that of PPE removal regarding viral transmission. These items should be disinfected or replaced according to the type and porosity of material following patient treatment.

### **ENVIRONMENTAL INFECTION CONTROL RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS**

- Routine cleaning and disinfection procedures are recommended for areas where AGPs are performed.
- Keep additional airway supplies in anesthesia cart until necessary for use (unless a difficult airway is anticipated).
- Single-use and disposable equipment are preferred.
- Potentially exposed unused consumables should be discarded or appropriately disinfected.
- The use of disposable transparent plastic drapes to cover anesthesia equipment likely limits contamination.
- Utilize a high-quality viral filter to protect the anesthesia machine from contamination.
- Gas sampling tubing should be changed after each patient case.

## *Anesthesia Record Keeping*

Electronic or paperless anesthesia charting is ideal due to the inability to properly disinfect paper with EPA-approved disinfectant after patient treatment. A tablet and input device can be used for electronic record-keeping. Photo editing software can be used to mark up an image of an anesthesia record, then it can be saved and exported. Many of the tablet and input device systems, such as the iPad® and Apple Pencil®, are capable of working through plastic barriers. Air water syringe sleeves can be placed over the input device and a plastic head barrier placed over the tablet. According to a University of Hong Kong study, no infectious virus could be detected from printed paper after a 3-hour incubation period<sup>32</sup>. The timeframe at which the virus titer is at a non-transmissible level on printed paper surfaces is, however, unknown.

## *Anesthetic Management – General Considerations*

Dentist anesthesiologists provide the full range of anesthesia options for dental procedures, the choice of which is based on multiple factors. For the foreseeable future, limiting the spread of COVID-19 virus will be an additional consideration. At this time, only emergency and urgent dental care should be provided.

For older children, adult patients and those able to at least partially cooperate with dental procedures, moderate sedation may be a preferred option as this allows easy distancing for the dentist anesthesiologist from the surgical field and may provide acceptable operating conditions for the dentist/surgeon and meet patient needs. Most urgent procedures that require advanced anesthesia techniques (e.g., single tooth extraction, incision and drainage) will generally be brief and may not produce significant aerosol. The use of nasal cannula oxygen should be used at the lowest effective flow rate since higher flows may increase exhaled patient gases.

For patients with extreme dental needle phobia but for whom IV access can be completed, a very brief period of general anesthesia may be considered for local anesthesia administration followed by maintenance of moderate sedation for the dental procedure.

For pre-cooperative or school age children unable to cooperate and patients with intellectual or behavioral disability that prevent the provision of dental care, general anesthesia is necessary. Due to the COVID-19 pandemic, additional considerations for airway management have arisen for these patients.

## *Airway Management*

Airway management is a critical consideration in efforts to reduce the spread of COVID-19 in the operating environment. No specific recommendations for anesthetic management for dental procedures have been provided by any major surgical or anesthesiology group. Recommendations from the ASA that are relevant include:

- If dispersion of potentially contaminated exhaled gases from an open airway is a risk, consider alternate anesthesia plans. Potential contamination of the workspace and room should be considered. The safety of healthcare providers is paramount.
- Endotracheal tubes provide the most secure airway for upper GI endoscopy procedures in patients suspected of having COVID-19.

It seems clear that the concern of potential increased exhalation of virus even in non-aerosolized procedures should be considered. The risk of virus spread during aerosolized procedures is thought to be significantly increased beyond normal breathing. Further, the ASA has promoted these recommendations (abbreviated) for intubation of suspected COVID-19 patients:

- Double gloves will enable one to shed the outer gloves after intubation and minimize subsequent environmental contamination.
- Perform a Rapid Sequence Induction (RSI) or a modified RSI as clinically indicated. If manual ventilation is required, apply small tidal volumes.
- After removing protective equipment, avoid touching your hair or face and perform hand hygiene.

Because most dental procedures, other than a simple tooth extraction, will likely generate significant aerosol, the following should be considered:

- Intubation with a cuffed endotracheal tube will result in decreased exhalation of patient gases and will therefore likely minimize virus aerosolization.
- Nasal intubation is not contraindicated. Virus will be introduced into the lung with both oral and nasal intubation. Although higher levels of virus are likely present on the endotracheal tube with nasal intubation, if high viral load is present in the nasopharynx, the course of the illness suggests the lungs will already have been affected. Additionally, nasal intubation allows for minimal ETT displacement, which can lead to airway irritation intraoperatively and postoperatively.
- A well-fitted rubber dam with individual holes punched for teeth in the area of operation will minimize virus aerosolization and limit patient gas escape in an open airway. Other isolation devices (e.g., Isolite®) likely provide some minimization of virus aerosolization but the degree of benefit is unclear.
- High volume evacuation should be used meticulously throughout the dental procedure to minimize aerosol spread.
- Consider a pre-procedural mouth rinse as disinfection of the oral cavity may minimize some viral transmission.

## AIRWAY MANAGEMENT RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS

- Consider a pre-procedural mouth rinse (1.5% hydrogen peroxide) for cooperative patients. If this is not possible, consider swabbing the oral cavity with hydrogen peroxide prior to the dental procedure.
- Intubation with a cuffed endotracheal tube will result in decreased exhalation of patient gases and is considered the most certain way to minimize virus aerosolization from patient exhaled gases.
- For short cases, especially if aerosolization will be kept to a minimum, a natural or open airway can be considered.
- Nasal intubation is not contraindicated.
- Double gloves will enable one to shed the outer gloves after intubation and minimize subsequent environmental contamination.

### *Induction*

For patients able to cooperate for IV access, either a moderate sedation or general anesthetic (non-intubated or intubated) may be a reasonable approach depending on the specific procedure(s), length of surgery, and degree of aerosolization expected. Since the intubation period is also a time of high aerosolization risk, the dentist anesthesiologist must weigh the risk and benefits of intubation vs. procedural risks of virus spread, particularly for short procedures.

An adequate period of preoxygenation will minimize or preclude the need for positive pressure ventilation at induction. Alternatives for preoxygenation should minimize exhaled patient gases, if possible (e.g., non-rebreather face mask, face mask attached to protected anesthesia machine).

The rapid sequence induction recommended by the ASA and the APSF<sup>33</sup> for the COVID-19 positive patient will need to be modified in the dental office setting depending on the advanced airway management skills of supporting staff and availability of airway equipment. Nasal intubation by definition is not a RSI technique; therefore, nasal intubation will by definition, lead to a modified RSI technique. An important aspect for many providing in-office anesthesia is to ensure the ability to ventilate prior to inducing apnea or using muscle relaxants. Although minimizing positive pressure ventilation is ideal, small tidal volumes to verify ventilation may be prudent.

For pre-cooperative or school age children unable to cooperate for dental care, patients with intellectual or behavioral disabilities, or severely phobic patients that prevent the provision of dental care or initiation of IV access, a mask induction or intramuscular ketamine sedation for IV initiation can be considered.

If a mask induction is chosen, the dentist anesthesiologist or a trained assistant should secure the mask using a two-handed technique to minimize aerosolization of exhaled gases. Sevoflurane in 100% oxygen may be considered for induction so that the patient is “pre-oxygenated” for a brief procedure, IV access or intubation. Once IV access has been obtained, propofol or other agents can allow for deepening of the anesthetic, if needed, to provide low tidal volume positive pressure ventilation, again if needed.

Intramuscular (IM) ketamine is an acceptable alternative although it should be appreciated that many patients may cry and/or scream and this will lead to potentially increased spread of droplet or aerosol. Thus, IM ketamine induction should

be provided in the treatment room. After securing IV access, a brief procedure, intubation or other manner of securing the airway may take place.

## **INDUCTION RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS**

- Consider moderate sedation instead of general anesthesia (or brief general anesthesia for local anesthetic administration followed by moderate sedation) if possible.
- Preoxygenate for an adequate period of time with 100% O<sub>2</sub> when possible.
- Depending on the clinical condition and planned airway management, the recommended rapid sequence induction will need to be modified. If manual ventilation is necessary, apply small tidal volumes.
- Ensure there is a high quality viral filter at either the expiratory limb connection to the anesthesia machine and/or between the facemask and breathing circuit. Ensure the gas sampling line is also protected.
- Video laryngoscopes may allow further patient distancing. Others have suggested clear plastic drapes or other barriers over the patient during intubation.
- Re-sheath the laryngoscope immediately post intubation (use outer glove in double glove technique).
- After removing PPE, avoid touching your hair or face and perform hand hygiene.

### *Maintenance*

Maintenance of sedation and anesthesia can be with either inhaled agents or TIVA. For longer cases, techniques that result in rapid awakening and early fitness for discharge, which the dentist anesthesiologist is expert in, may be preferred.

If an intubated approach is chosen, the dentist anesthesiologist may position him/herself as far as practical away from the surgical field.

If a non-intubated approach is chosen, the dentist anesthesiologist should try to position him/herself as far as practical away from the surgical field. If the patient requires airway support to maintain adequate ventilation, this places the dentist anesthesiologist at increased risk of viral transmission and consideration for intubation should be made. Supplemental oxygen administration by nasal cannula or via nasopharyngeal airway may increase exhaled patient gases and should be used at the lowest effective flow rate.

### *Emergence*

If an intubated approach is chosen, efforts should be made to minimize bucking on the endotracheal tube, coughing on extubation and post-operative sore throat, which may also lead to coughing. Although no approach will completely eliminate these risks in all patients, if deep extubation is considered an option (e.g., good mask airway, minimal intraoral bleeding), it should be considered. If awake extubation is indicated, adequate analgesia will increase the likelihood of a smooth extubation. If remifentanyl is available, this agent will allow for excellent analgesia for extubation and rapid offset of effect on discontinuation, but many other opioids are acceptable. Dexmedetomidine may also be considered.

In order to minimize virus transfer to surfaces, have a receptacle close to the patient where the extubated endotracheal tube can be immediately discarded.

## MAINTENANCE AND EMERGENCE RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS

- If a non-intubated general anesthetic is chosen and the patient requires airway support to maintain adequate ventilation, this places the dentist anesthesiologist close to aerosol generation and consideration for intubation should be made.
- A well-fitted rubber dam with individual holes punched for teeth in the area of operation will minimize virus aerosolization and limit patient gas escape in an open airway case. Other isolation devices (e.g., Isolite®) likely provide some minimization of virus aerosolization but the degree of benefit is unclear.
- High volume evacuation should be used meticulously throughout the dental procedure to minimize aerosol spread.
- If deep extubation is an option, it should be considered. If awake extubation is planned, adequate analgesia may prevent bucking, coughing and post-operative sore throat.
- In order to minimize virus transfer to surfaces, have a receptacle close to the patient where the extubated endotracheal tube can be immediately discarded.

### *Basic Life Support*

Although an unlikely event in dental office anesthesia, if cardiopulmonary resuscitation is required, early intubation should be considered in advanced life support efforts to decrease aerosolization associated with positive pressure ventilation. A viral filter should be placed on the bag-valve-mask to protect the equipment from contamination if used.

## POSTOPERATIVE CONSIDERATIONS

### *Recovery*

During emergence and recovery, it is important to keep a full coverage mask on the patient's mouth and nose to reduce virus aerosolization spread during any coughing or crying. In an effort to minimize contamination of multiple places within the dental office, use of the procedure room as the recovery area should be considered. All PPE should be removed prior to exiting the operatory with the exception of the N95 respirator, only after room disinfection has taken place. An alternative is to have a dedicated room adjacent to the treatment area where removal of PPE can take place.

Upon leaving the treatment room, entry should be delayed until sufficient time has elapsed for enough air changes to remove aerosolized infectious particles<sup>34</sup>. Due to the unknown suspension time of aerosolized particles (particularly when no air filtration system is used), it may be appropriate to change to another room for the subsequent patient. It is unclear how long to wait for virus-containing aerosol deposition to completely descend to surfaces. Some authors have suggested as little as 30 minutes<sup>35</sup> while other recommend over 3 hours<sup>36</sup>. Dental schools we have surveyed wait from 1 – 3 hours prior to seeing the next patient in that treatment room. Since each dental office has different characteristics (room size, ventilation, enclosed vs. open, etc), the dentist anesthesiologist should discuss with the dentist when the appropriate time for room disinfection should take place to allow for aerosol deposition on surfaces.

To mitigate the risk to patients and staff, subsequent patients should wait in the car until the initial patient is fully recovered and meets all discharge criteria.

## RECOVERY RECOMMENDATIONS FOR DENTIST ANESTHESIOLOGISTS

- Keep a full coverage mask over the patient's airway during emergence and recovery.
- Use the procedure room for recovery to avoid contaminating another space.
- If the responsible party comes into the contaminated procedure room, be sure they are part of the patient's quarantined circle (during this time of extreme social distancing).
- Wait for the aerosolized particles to descend (time frame is unclear - at least 30 minutes but likely at least one hour may be required) before disinfecting anesthesia equipment and supplies, as well as the procedure room by DHCP, with an EPA approved disinfectant while wearing appropriate PPE.
- Doffing all PPE (except for the N95) should be done prior to leaving the procedure room, only after room disinfection has taken place, since recovery should ideally take place in the treatment room.
- If the dentist anesthesiologist needs to leave the room before final disinfection, an alternative is to have a dedicated room adjacent to the treatment area where removal of PPE can take place.
- Be sure to maintain all necessary PPE if the patient is transferred to a dedicated recovery area.

### *Personal Care*

Dentist anesthesiologists should change from scrubs to personal clothing before returning home. Upon arriving home, take off shoes, remove and wash clothing (separately from other household residents), and immediately shower<sup>37</sup>.

Equipment should be disinfected prior to removal and transport from the office. Hand hygiene should be practiced throughout and after packing of equipment into vehicle.

## FUTURE CONSIDERATIONS

### *Point of Care Testing*

At the time of this writing, point of care testing is available; however, it is difficult to obtain.

Rapid diagnostic tests (RDTs) are being developed for detecting the presence of SARS-CoV-2, or the presence of antibodies to SARS-CoV-2. Although these RDTs provide two different types of information, both are anticipated to be useful to anesthesia providers at the point of care, specifically in the preoperative phase of treatment.

The first type of RDT detects the presence of viral proteins (antigens) expressed by the SARS-CoV-2 in a sample from the respiratory tract, usually the nasopharynx. If sufficient target antigen is present in the sample, it will bind to specific antibodies fixed to a paper strip enclosed in a plastic casing and generate a visual signal, typically within 30 minutes. The antigen(s) detected are expressed only when the virus is actively replicating; therefore, such tests are best used to identify acute or early infection. The accuracy of this test depends on several factors, including the time from onset of illness, the concentration of virus in the specimen, the quality of the specimen collected from a person and how it is processed, and the precise formulation of the reagents in the test kits. Based on experience with similar RDTs for influenza, the sensitivity of these tests might be expected to vary from 34% to 80%<sup>38</sup>.

Another, more common type of RDT detects the presence of antibodies in the blood of people believed to have been infected with SARS-CoV-2. Antibodies are produced over days to weeks after infection with the virus. The strength of antibody response depends on several factors, including age, nutritional status, severity of disease, status of the immune system, and certain medications that suppress the immune system. Studies suggest that the majority of patients develop antibody response only in the second week after onset of symptoms. Antibody detection RDTs may also cross-react with other pathogens, including other human coronaviruses, resulting in false-positive results. Lastly, there has been discussion about whether RDTs detecting antibodies could predict whether an individual was immunized to reinfection with the SARS-CoV-2 virus. There is no evidence to date to support this.

New information regarding these RDTs is evolving rapidly, and the guidance for the specific use of these tests is anticipated later this year. At this time, however, the World Health Organization does not currently recommend the use of antigen-detecting rapid diagnostic tests for patient care, although research into their performance and potential diagnostic utility is highly encouraged<sup>39</sup>. It is hoped that the positive predictive value of these tests will improve over time.

## *Vaccine*

The ultimate strategy for controlling this pandemic will depend on a safe and efficacious vaccine against SARS-CoV-2. However, only 3 vaccine candidates are currently in phase 1 human trials: a messenger RNA vaccine and 2 adenovirus vector-based vaccines. The estimated timeline for availability of an initial vaccine is early to mid-2021<sup>40</sup>.

## **ADDITIONAL RESOURCES**

American Dental Association (ADA):

[https://success.ada.org/en/practice-management/patients/digital-events/covid-19-transmission-and-emergency-care-q-and-a?utm\\_source=successadaorg&utm\\_medium=covid-resources-lp&utm\\_content=cv-pn-guidance-ga&utm\\_campaign=covid-19&\\_ga=2.155895283.934565018.1586586941-806905572.1585070320](https://success.ada.org/en/practice-management/patients/digital-events/covid-19-transmission-and-emergency-care-q-and-a?utm_source=successadaorg&utm_medium=covid-resources-lp&utm_content=cv-pn-guidance-ga&utm_campaign=covid-19&_ga=2.155895283.934565018.1586586941-806905572.1585070320)

American Society of Anesthesiologists (ASA):

<https://www.asahq.org/in-the-spotlight/coronavirus-covid-19-information>

ASA Covid-19 Resources From Other Organizations:

<https://www.asahq.org/about-asa/governance-and-committees/asa-committees/committee-on-occupational-health/coronavirus/additional-resources>

Anesthesia Patient Safety Foundation (APSF):

<https://www.apsf.org/novel-coronavirus-covid-19-resource-center/>

*Anesthesiology* journal special article series:

[https://anesthesiology.pubs.asahq.org/ss/coronavirus.aspx?\\_ga=2.223608219.1219618886.1586494103-580190068.1586494103](https://anesthesiology.pubs.asahq.org/ss/coronavirus.aspx?_ga=2.223608219.1219618886.1586494103-580190068.1586494103)

Centers for Disease Control and Prevention (CDC):

<https://www.cdc.gov/coronavirus/2019-ncov/index.html>

CDC Guidance for Dental Settings:

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>

Environmental Protection Agency (EPA):

<https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

Occupational Safety and Health Administration (OSHA):

<https://www.osha.gov/SLTC/covid-19/>

National Institute for Occupational Safety and Health (NIOSH):

<https://www.cdc.gov/niosh/>

Society for Ambulatory Anesthesia (SAMBA):

<https://sambahq.org/covid-19-resources-2/>

World Health Organization (WHO):

<https://www.who.int>

## APPENDIX

### APPENDIX A: Example of Justification During Pandemic

#### COVID-19 Pandemic Emergency Dental Treatment Justification

In an effort to mitigate the spread of COVID-19, both the Centers for Disease Control and Prevention (CDC) and the American Dental Association (ADA) recommend dentists nationwide postpone elective and non-urgent procedures until further notice. Further, the State of *(name of state)* has issued a proclamation that limits dentists to emergent and urgent care only. Dental emergencies are potentially life-threatening and require immediate treatment to stop ongoing tissue bleeding or to alleviate severe dental pain or infection. Urgent dental care focuses on the management of conditions that require immediate attention to relieve severe pain and/or risk of infection and to alleviate the burden on hospital emergency departments.

After careful consideration, I have determined that

\_\_\_\_\_ DOB: \_\_\_\_\_ needs emergent or urgent dental care under general anesthesia. \_\_\_\_\_ (Initial)

All staff members have been told by the anesthesiologist that positive pressure ventilation, intubation, and extubation are all aerosol generating procedures. Further, current studies indicate that many dental procedures can also produce aerosolized particles, which can linger in the air for minutes to hours and are transmissible. All Dental Health Care Personnel (DHCP) will use appropriate Personal Protective Equipment (PPE) during the induction, treatment and recovery for this patient. Each member of the Dental Health Care Personnel (DHCP) acknowledges and accepts this added risk of potential exposure and transmission of COVID-19. \_\_\_\_\_ (Initial)

Please describe the dental condition: \_\_\_\_\_

\_\_\_\_\_

Please explain what could happen to this patient if we do not provide the dental care today:

\_\_\_\_\_

\_\_\_\_\_

Surgeon/Operating Dentist:

Name (printed): \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX B: Example of Consent During Pandemic

### COVID-19 (Coronavirus) Disclosure/Consent

Patient Name: \_\_\_\_\_

The Centers for Disease Control and Prevention (CDC), the American Dental Association (ADA), and the (*name of dental board*) have both issued a strong recommendation to postpone any non-emergency dental care until further notice during the COVID-19 pandemic.

Current studies indicate that some dental procedures create aerosolized particles (similar to a sneeze), which can linger in the air for minutes to sometimes hours, which can result in transmission of COVID-19.

I understand and acknowledge these recommendations and hereby declare that I have an emergent or urgent dental condition that requires prompt care (or I have a child with an emergent or urgent dental condition). \_\_\_\_\_ (Initial)

I hereby affirm that my dentist/surgeon and (*name of anesthesiologist or entity*) have offered me the opportunity to reschedule dental treatment under general anesthesia to a subsequent date pending recommendation changes.  
\_\_\_\_\_ (Initial)

I also affirm that I have freely elected to proceed with the procedure due to pain/infection that are unmanageable at home with medications. I have consulted the treating dentist for other alternatives.  
\_\_\_\_\_ (Initial)

I fully understand that proceeding with the treatment to day increases my exposure/my child's exposure to the risk of contracting community acquired COVID-19 (Coronavirus) infection. Acquiring such infection can lead to severe symptoms such as fever, chest pain, shortness of breath and further respiratory complications. Advanced disease can also lead to: prolonged hospitalization, intensive care admission, mechanical ventilation, and/or possible death.

I also affirm that neither I/my child, nor any of my family members have been exposed to or had any of the following symptoms in the past 14 days:

- 1) Fever ( $\geq 100^{\circ}$  F).
- 2) Shortness of breath.
- 3) Dry cough.
- 4) Fatigue and body aching.
- 5) Chest pain
- 6) Confirmed or suspected COVID-19 (Coronavirus) infection.

I am consenting to this procedure with full understanding and disclosure of such risks and alternatives, and all my questions were answered to my satisfaction.

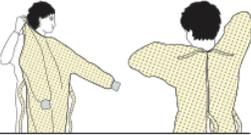
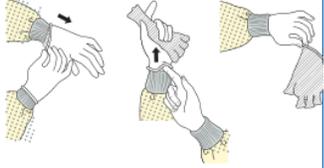
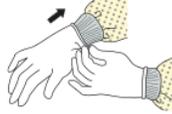
Name (printed): \_\_\_\_\_

Signature: \_\_\_\_\_

Relationship to patient (if applicable): \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX C: CDC Cognitive Aids-Donning/Doffing PPE

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)	SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)
<p>The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.</p> <p><b>1. GOWN</b></p> <ul style="list-style-type: none"> <li>Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back</li> <li>Fasten in back of neck and waist</li> </ul> 	<p>Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.</p> <p><b>1. GLOVES</b></p> <ul style="list-style-type: none"> <li>Outside of gloves is contaminated!</li> <li>Grasp outside of glove with opposite gloved hand; peel off</li> <li>Hold removed glove in gloved hand</li> <li>Slide fingers of ungloved hand under remaining glove at wrist</li> <li>Peel glove off over first glovet</li> <li>Discard gloves in waste container</li> </ul> 
<p><b>2. MASK OR RESPIRATOR</b></p> <ul style="list-style-type: none"> <li>Secure ties or elastic bands at middle of head and neck</li> <li>Fit flexible band to nose bridge</li> <li>Fit snug to face and below chin</li> <li>Fit-check respirator</li> </ul> 	<p><b>2. GOGGLES OR FACE SHIELD</b></p> <ul style="list-style-type: none"> <li>Outside of goggles or face shield is contaminated!</li> <li>To remove, handle by head band or ear pieces</li> <li>Place in designated receptacle for reprocessing or in waste container</li> </ul> 
<p><b>3. GOGGLES OR FACE SHIELD</b></p> <ul style="list-style-type: none"> <li>Place over face and eyes and adjust to fit</li> </ul> 	<p><b>3. GOWN</b></p> <ul style="list-style-type: none"> <li>Gown front and sleeves are contaminated!</li> <li>Unfasten ties</li> <li>Pull away from neck and shoulders, touching inside of gown only</li> <li>Turn gown inside out</li> <li>Fold or roll into a bundle and discard</li> </ul> 
<p><b>4. GLOVES</b></p> <ul style="list-style-type: none"> <li>Extend to cover wrist of isolation gown</li> </ul> 	<p><b>4. MASK OR RESPIRATOR</b></p> <ul style="list-style-type: none"> <li>Front of mask/respirator is contaminated — DO NOT TOUCH!</li> <li>Grasp bottom, then top ties or elastics and remove</li> <li>Discard in waste container</li> </ul> 
<p><b>USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION</b></p> <ul style="list-style-type: none"> <li>Keep hands away from face</li> <li>Limit surfaces touched</li> <li>Change gloves when torn or heavily contaminated</li> <li>Perform hand hygiene</li> </ul> 	<p><b>PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE</b></p> 

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<https://utswim.files.wordpress.com/2014/10/ppe1.png>

## REFERENCES

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- <sup>1</sup> <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
- <sup>2</sup> CDC Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings  
[https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html](https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html)
- <sup>3</sup> Bourouiba L. Turbulent gas clouds and respiratory pathogen emissions. *JAMA*. Published March 26, 2020. doi:10.1001/jama.2020.4756
- <sup>4</sup> Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. World Health Organization. Scientific Brief 29 March 2020.
- <sup>5</sup> Tran K, Cimon K, Severn M, Pessoa-Silva, C, Conly J. Aerosol Generating Procedures and Risk of Transmission of Acute Respiratory Infections to Healthcare Workers: A Systematic Review. *PLOS One*. 2012; 7(4): e35797.
- <sup>6</sup> Santarpia JL, Rivera DN, Herrera V, et al. Transmission potential of SARS-CoV-2 in viral shedding observed at the University of Nebraska Medical Center. *medRxiv*. Preprint posted March 26, 2020. doi:[10.1101/2020.03.23.20039446](https://doi.org/10.1101/2020.03.23.20039446)
- <sup>7</sup> CDC Interim US Guidance for Risk Assessment and Public Health Management of Healthcare Personnel with Potential Exposure in a Healthcare Setting to Patients with Coronavirus Disease (COVID-19)  
<https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html>
- <sup>8</sup> CDC Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings  
[https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html](https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html)
- <sup>9</sup> CDC Dental Settings  
<https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>
- <sup>10</sup> Morbidity and Mortality Weekly Report. Severe Outcomes Among Patients with Coronavirus Disease 2019 (COVID-19) — United States, February 12–March 16, 2020
- <sup>11</sup> <https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html>
- <sup>12</sup> <https://www.ada.org/en/publications/ada-news/2020-archive/march/ada-develops-guidance-on-dental-emergency-nonemergency-care>
- <sup>13</sup> <https://www.asahq.org/about-asa/governance-and-committees/asa-committees/committee-on-occupational-health/coronavirus/clinical-faqs>
- <sup>14</sup> <https://www.apsf.org/news-updates/perioperative-considerations-for-the-2019-novel-coronavirus-covid-19/>
- <sup>15</sup> [https://success.ada.org/~/\\_media/CPS/Files/Open%20Files/ADA\\_COVID19\\_Dental\\_Emergency\\_DDS.pdf?utm\\_source=adaorg&utm\\_medium=covid-statement-200401&utm\\_content=cv-pm-dental-emergency&utm\\_campaign=covid-19&\\_ga=2.67396305.1962687100.1586814139-806905572.1585070320](https://success.ada.org/~/_media/CPS/Files/Open%20Files/ADA_COVID19_Dental_Emergency_DDS.pdf?utm_source=adaorg&utm_medium=covid-statement-200401&utm_content=cv-pm-dental-emergency&utm_campaign=covid-19&_ga=2.67396305.1962687100.1586814139-806905572.1585070320)
- <sup>16</sup> <https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/guidance-hcf.html>
- <sup>17</sup> <https://abcnews.go.com/Health/Dental/story?id=2925584&page=1>
- <sup>18</sup> <https://www.pewtrusts.org/en/research-and-analysis/reports/2012/02/28/a-costly-dental-destination>

- 
- <sup>19</sup> Saxen MA, Urman RD, Yepes JF, Gabriel RA, Jones JE. Comparison of Anesthesia for Dental/Oral Surgery by Office-based Dentist Anesthesiologists versus Operating Room-based Physician Anesthesiologists. *Anesth Prog*. 2017;64(4):212–220. doi:10.2344/anpr-65-01-04
- <sup>20</sup> ADA Interim Guidance for Minimizing Risk of COVID-10 Transmission  
[https://www.ada.org/~media/CPS/Files/COVID/ADA\\_COVID\\_Int\\_Guidance\\_Treat\\_Pts.pdf?utm\\_source=cpsorg&utm\\_medium=covid-cps=virus-lp&utm\\_content=cv-pm-ebd-interim-response&utm\\_campaign=covid-19](https://www.ada.org/~media/CPS/Files/COVID/ADA_COVID_Int_Guidance_Treat_Pts.pdf?utm_source=cpsorg&utm_medium=covid-cps=virus-lp&utm_content=cv-pm-ebd-interim-response&utm_campaign=covid-19)
- <sup>21</sup> <https://www.apsf.org/news-updates/potential-processes-to-eliminate-coronavirus-from-n95-masks/>
- <sup>22</sup> <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html>
- <sup>23</sup> <https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html>
- <sup>24</sup> <https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html>
- <sup>25</sup> <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html>
- <sup>26</sup> Peng PW, Ho P-L, Hota SS. Outbreak of a new coronavirus: what anaesthetists should know. *British Journal of Anaesthesia*. 2020. doi:10.1016/j.bja.2020.02.008.
- <sup>27</sup> Canelli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier Enclosure during Endotracheal Intubation. *New England Journal of Medicine*. March 2020. doi:10.1056/nejmc2007589
- <sup>28</sup> Van Doremalen, N. et al. N Engl J Med online March 17, 2020. DOI: 10.1056/NEJMc2004973 2 Cheng, V. et al. *Infect Control Hosp Epidemiol*. 2020 Mar 5 [Epub ahead of print].
- <sup>29</sup> Response to Media Reports about COVID-19 Virus Being Airborne . Alberta Health Services. Dated March 23, 2020.
- <sup>30</sup> <https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#tableb1>
- <sup>31</sup> Harrel S, Molinari J. Aerosols and splatter in dentistry. *JADA*. 2004, Vol. 135, page 429-437.
- <sup>32</sup> Chin AWH, Chu JTS, Perera MRA, et al. Stability of SARS-CoV-2 in different environmental conditions. *The Lancet Microbe*. 2020. doi:10.1016/s2666-5247(20)30003-3
- <sup>33</sup> : <https://www.apsf.org/wp-content/uploads/news-updates/2020/apsf-coronavirus-airway-management-infographic.pdf>
- <sup>34</sup> <https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#tableb1>
- <sup>35</sup> Harrel S, Molinari J. Aerosols and splatter in dentistry. *JADA*. 2004, Vol. 135, page 429-437.
- <sup>36</sup> Van Doremalen, N. et al. N Engl J Med online March 17, 2020. DOI: 10.1056/NEJMc2004973 2 Cheng, V. et al. *Infect Control Hosp Epidemiol*. 2020 Mar 5 [Epub ahead of print].
- <sup>37</sup> ADA Interim Guidance for Minimizing Risk of COVID-19 Transmission  
[https://www.ada.org/~media/CPS/Files/COVID/ADA\\_COVID\\_Int\\_Guidance\\_Treat\\_Pts.pdf](https://www.ada.org/~media/CPS/Files/COVID/ADA_COVID_Int_Guidance_Treat_Pts.pdf)
- <sup>38</sup> Bruning AHL, Leeflang MMG, Vos JMBW, Spijker R, de Jong MD, Wolthers KC, et al. Rapid Tests for Influenza, Respiratory Syncytial Virus, and Other Respiratory Viruses: A Systematic Review and Meta-analysis. *Clin Infect Dis* [Internet]. 2017 Sep 15 [cited 2020 Apr 1];65(6):1026–32. Available from:  
<http://academic.oup.com/cid/article/65/6/1026/3829590/Rapid-Tests-for-Influenza-Respiratory-Syncytial>
- <sup>39</sup> <https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19>
- <sup>40</sup> When Will a Vaccine Be Available? The COVID-19 Pandemic in the USA Clinical Update. Saad B. Omer, MBBS, PhD<sup>1,2</sup>; Preeti Malani, MD, MSJ<sup>3,4</sup>; Carlos del Rio, MD<sup>5,6</sup>. *JAMA*. Published online April 6, 2020. doi:10.1001/jama.2020.5788