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Patients, procedures, and PPE: Safe office-based anesthesia recommendations in the COVID-19 era

Steven Young, M.D., Anesthesiology Resident a, Brian M. Osman, M.D., Assistant Professor b, Richard D. Urman, M.D., M.B.A., Associate Professor c, d, *, Fred E. Shapiro, D.O., Associate Professor a, d

a Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, USA
b Department of Anesthesiology, Jackson Memorial Hospital, University of Miami Health System, Jackson, FL, USA
c Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA
d Institute for Safety in Office-Based Surgery, Boston, MA, USA

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The growth of office-based surgery (OBS) has been due to ease of scheduling and convenience for patients; office-based anesthesia safety continues to be well supported in the literature. In 2020, the Coronavirus Disease 19 (COVID-19) has resulted in dramatic shifts in healthcare, especially in the office-based setting. The goal of closing the economy was to flatten the curve, impacting office-based and ambulatory practices. Reopening of the economy and the return to ambulatory surgery and OBS and procedures have created a challenge due to COVID-19 and the infectious disease precautions that must be taken. Patients may be more apt to return to the outpatient setting to avoid the hospital, especially with the resurgence of COVID-19 cases locally, nationally, and worldwide. This review provides algorithms for screening and testing patients, selecting patients for procedures, choosing appropriate procedures, and selecting suitable personal protective equipment in this unprecedented period.

* Corresponding author. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA.
E-mail address: urmanr@gmail.com (R.D. Urman).

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Introduction

It is 2020, the year of the pandemic: Coronavirus Disease 19 (COVID-19). People are quarantined in their “pod”, to reduce the risk of unnecessary contact and possible COVID-19 infection. Imagine that a child is outside in the yard, playing, when she falls and breaks a tooth, or picture teenagers playing tennis and twists awkwardly, causing a high ankle sprain. What if someone trips on the steps going into their house and lacerates their forehead deeply, or a patient had an outpatient, elective procedure two days ago and now has developed a hematoma, or a suture opens. Even though COVID-19 has arrived and caused people to quarantine, these common minor emergencies will continue to happen. There are a few options to deal with these situations: emergency room, urgent care center, or in the office.

Decreased cost, better convenience, and ease in scheduling have been the driving forces for the allure and growth of office-based surgery (OBS) and procedures over the past 25 years [1,2]. With this rapid expansion for outpatient surgeries and procedures, safety concerns due to lack of regulation, increase in complexities of patients and procedures, and anesthesia/sedation practices by both anesthesia and non-anesthesia personnel have been highlighted by high-profile media events. Recent literature has validated the safety of OBS due to proper patient and procedure selection, facility accreditation, safety checklists, and state and specialty society guidelines [3–5]. However, COVID-19 has brought forth a new issue in the ambulatory setting: a unique infectious disease concern, especially in the setting of performing largerly elective procedures. This article will summarize existing local, federal, and specialty society guidelines for office-based practices to highlight important quality and safety initiatives. These considerations will likely continue to apply until a safe, reliable COVID-19 vaccine is available and/or there is herd immunity within the country.

Coronavirus Disease 19

In December 2019, an unknown pneumonia was reported in Wuhan, China to the World Health Organization (WHO), with a rapid spread to 100,000 cases globally by March 2020 [6]. This pneumonia was named COVID-19, caused by the Severe Acute Respiratory Coronavirus 2 (SARS-CoV-2). As of Aug 16, 2020, there have been more than 21,500,000 cases worldwide, with over 770,000 deaths; within the United States, there are over 5,300,000 cases and over 169,000 cases [7,8]. SARS-CoV-2 is spread by via asymptomatic or symptomatic carriers, primarily through respiratory droplets, in extended exposures (at least 15 min) in close intimate settings (less than 6 feet), with possible transmission via fomites on contaminated surfaces [9]. There can be a pre-symptomatic period of about 5 days on average before an infected person begins to show symptoms, such as fever, dry cough, and dyspnea. In fact, reports of asymptomatic carriers have been shown to infect others [10]. In patients who do show symptoms, the vast majority (97.5%) become symptomatic by 11–12 days. The current “gold standard” for diagnosis is a rapid polymerase chain replication (PCR) test after swabbing the nasopharynx, though there can be a false negative rate of 20–67%.

As the COVID-19 cases surged in the US, there was a variable state-to-state shut-down of the economy, including elective office visits and procedures in March [11]. Starting in April through June, as states re-opened the economy, state and national medical specialty societies and public health departments gave recommendations on re-opening elective visits and procedures [12–14]. Unfortunately, most of the guidelines are related to in-hospital surgeries and procedures, with few guidelines existing regarding OBS and procedures.

How to resume office-based practices?

Offices may need to take into consideration current Centers for Disease Control (CDC) guidelines, as well as specialty and state-specific guidelines and regulation. Offices that want to resume visits and procedures will need to take into consideration how well the local city, county, and state have been controlling the spread of COVID-19. There should be at least two weeks of plateauing or reduction of
the infection “curve” [15]. Hospitals in the local area should be able to care for all COVID-19 patients without having to ration care. If hospitals are at surge capacity, then OBS and anesthesia should not be performed. Office-based procedures should be triaged and, if urgent, performed in the hospital setting where there are additional resources (personnel and protective equipment) [16].

Local public health trends of COVID-19 cases may evolve over time and will inform the rollouts of the various phase of reopening by local city and state public health departments. For instance, Massachusetts Department of Public Health categorizes low-risk communities as <4 cases per 100,000 population, but high-risk communities as >8 cases per 100,000 population [17]. Furthermore, the CDC categorizes low-risk countries for travel as <1.5 cases per 100,000, but high-risk countries as >3 cases per 100,000 [18]. Hence, it is critically important to adhere to local and state risk categories when using the algorithms for personal protective equipment (PPE) choice in low- and high-risk COVID-19 communities.

When considering resuming OBS and procedures, the office-based practice should develop a practice plan with a multidisciplinary team, and follow local and state guidelines, with consideration for their specialty organization guidelines [19]. Some basic principles include: choosing the right patient, ensuring adequate PPE for healthcare workers in the office, adequate spacing or barriers for patients who arrive in the office, consideration for extended hours or days of operation to space out patient contact, and having adequate staffing to cover the possibility of a healthcare worker becoming COVID-19 positive or needing to self-quarantine (see Table 1). Models of staffing may need to change on the fly depending on what percentage of the staff become infected with or exposed to COVID-19, in order to ensure adequate staffing of patients within the office-based practice, particularly if patients are recovering after sedation or anesthesia [20]. Areas with high contact should be cleaned often [12]. When feasible, a contact-tracing plan should be developed to control any exposures to COVID-19. Understand that every additional patient that comes through the office is another potential exposure source for office staff.

Office-based surgery: patient selection

With the reduction of in-office visits for patients and an increase in telehealth visits, patients’ medical conditions may or may not be stable. Patients with significant comorbidities and immunosuppression are more likely to suffer consequences or death from COVID-19 [21]. It is more important than ever to ensure that patients who are showing up to the office for a surgery or procedure have stable medical conditions, are symptom-free from COVID-19, have not had “close contact” with a COVID-19 patient (within six feet for longer than 15 min), and have a negative COVID-19 test within 72 h of the procedure with self-isolation after testing until day of procedures [22] (see Fig. 1). These testing considerations may evolve as the number of COVID-19 cases wax and wane in the local, state, and federal setting. Special care should be paid to ensure that office testing guidelines adhere to the latest protocols as dictated by city, state, federal, and specialty societies. Patients with unstable medical conditions, higher American Society of Anesthesiologists (ASA) Physical Status, and morbid obesity, among other conditions, may be at a higher risk for complications after OBS and therefore possibly better suited for the hospital setting [23–25]. Table 2 lists possible patient inclusion and exclusion criteria for the office-based setting. Office staff should screen patients for symptoms of COVID-19 (anosmia, fever, cough, myalgias) as well as possible exposure to someone who may be COVID-19

Table 1

| COVID-19 Case Prevalence: | Reference local, state, and medical society guidelines |
|--------------------------|--------------------------------------------------------|
| PPE:                     | Ensure adequate PPE is available and conservation measures are in place |
| Patients:                | Careful patient selection, with stable medical conditions, a negative COVID-19 test, and a negative symptom screen are key to reducing patient harm. |
| Procedures:              | Appropriate decontamination of medical equipment is essential, especially aerosol-generating procedure equipment |

Legend: PPE = personal protective equipment.
positive or symptomatic within the past 14 days [9,26]. Patients who do test positive should be encouraged to seek care at a nearby hospital if they are symptomatic, or to self-quarantine for at least two weeks if asymptomatic. Patients who cannot self-isolate due to social circumstances (e.g. unstable housing) may be at a higher risk of infection and their negative tests should be interpreted with caution; their procedures may be better suited to be performed in a hospital setting or delayed, if acceptable from a medical standpoint.

Not only should patients be screened routinely who need a procedure in the office, but also any staff who may come into contact with patients (physicians, staff, housekeeping, etc.) should be screened for symptoms [13,19]. A contact tracing system should be developed in the circumstance that a COVID-19
exposure occurred within the office. This may include designating a staff member to be the COVID-19 liaison or coordinator, confirming the number of individuals (patients and staff) who may have had contact with a COVID-19 exposure, and notifying the local public health department [27].

Offices may want to have a contractual relationship with the local labs or hospitals that are testing patients, so that the office-based practice has timely access to COVID-19 test results. Ideally patients should be in a stable state of health; offices should try to evaluate patients in a contactless manner via a tele-triage program, screening patients for symptoms at least 24 h before they arrive or longer, giving enough time to undergo COVID-19 testing and result reporting [28]. Telemedicine can reduce the travel time for patients, limit the amount of PPE that must be used in the office (less face-to-face encounters), and limit unnecessary face-to-face encounters between patients and healthcare providers [29].

With regard to patient flow, walk-in visits may not be advisable, depending on local COVID-19 prevalence. Visual posters, reminders, and signs may be helpful at doors and entrances in English as well as any other appropriate languages to remind everyone about proper hand and respiratory hygiene and mask requirements [30]. Offices may want to create a virtual appointment system to limit the traffic within the office, such as having patients wait in their cars for their appointment time [31]. When patients arrive, they should ideally report to the office alone, but may have up to one additional person, as long as that person also has a negative symptom screen and negative COVID-19 test [32]. Special consideration may be given to having additional staff members accompany patients who may need additional assistance to reduce outside exposures. If possible, office-based practices should create one-way traffic, utilizing barriers and dividers, to reduce the likelihood of unnecessary face-to-face encounters between patients and/or staff members [19]. Patients and additional accompanying persons should arrive with a mask to protect others within the vicinity.

**Office-based surgery: procedure selection**

Over the last 20 years, non-operating room surgery and anesthesia has grown exponentially. From 2010 to 2014, there has been over a doubling of growth in ambulatory procedures, from under 600,000 to nearly 1,200,000 procedures, of which office-based procedures are a part of, as reported in the National Anesthesia Clinical Outcomes Registry (NACOR) database [33]. Within this category, there are ambulatory (i.e. hospital-based, free standing surgicenters) and OBS facilities. Examples of commonly performed procedures in the office include: endoscopic procedures, plastic surgeries, colonoscopies, knee arthroscopies, therapeutic procedures in muscles and tendons, oral and dental services, other therapeutic operations on the skin, decompression of peripheral nerves, hysteroscopies, other procedures on the cervix, and upper gastrointestinal endoscopies [34,35]. These non-hospital and non-operating room environments are “nontraditional” and take the anesthesiologist out of the operating room; a non-anesthesiologist may be providing or supervising sedation. These locations may be more isolating with less resources to call upon and less familiar with regard to available equipment.

| Table 2 |
| --- |
| Suggested patient inclusion and exclusion criteria in the office-based setting. |
| **Inclusion Criteria** | **Possible Exclusion Criteria** |
| Adults >18 years | Active infection, sepsis |
| Able to position supine or prone, and lay still for up to 45 min | Congenital or therapeutic coagulopathy |
| ASA PS > 3 | Veno-thromboembolic disease |
| Able to hold anticoagulation pre-procedure | Major cardiovascular or cerebrovascular co-morbidities |
| | Obstructive sleep apnea |
| | Morbidly obese: BMI >40 kg/m² |
| | Cardiac arrhythmias with BMI >35 kg/m² |
| | Insulin-dependent diabetes or diabetes with complications (neuropathy, retinopathy, chronic kidney disease) |
| | Hypertensive at time of surgery |
| | Anxiety |
| | Local anesthetic allergy |

Adapted from Seligson et al. ASA PS: American Society of Anesthesiologists Physical Status; BMI: body mass index.
Larger numbers of patients with ASA Physical Status II, III and even IV are having their procedures done outside of the hospital [33].

As offices are reopening and restarting office-based procedures, proper procedure selection will be even more important during the COVID-19 pandemic. Aerosol-generating procedures, such as upper endoscopy, laryngoscopy, nasal procedures, dental procedures and lasering will likely require higher levels of protective equipment for the proceduralist [32,36,37]. Non-aerosol-generating procedures may only require standard precautions, though consideration should be given to the local prevalence of COVID-19 and patient symptoms and COVID-19 status.

Office-based procedures may need to be prioritized based on the level of urgency [38]. Common minor emergencies often are not aerosol-generating, so there is less risk for COVID-19 spread. However, the patient's COVID-19 status may not be readily available when they report to the office. Their symptom screening and the local prevalence of COVID-19 may be even more important to reduce the risk of infection spread.

Additionally, as offices ramp-up elective procedure volume, it may be tempting to address the backlog of cases that built up during the shutdown. Before rushing to schedule these cases, it may still be beneficial, and possibly required in accordance with local city and state regulations, to have a multidisciplinary review team to evaluate cases based on urgency and to phase in the ramp-up process [39]. Surgeries and procedures that are medically necessary and time-sensitive should be given the higher priorities to proceed, with consideration for disease factors and patient factors [40].

In the times of COVID-19, scheduling of procedures may need to focus on infectious disease control over efficiency. This means that what may have been originally a 20- or 30-min procedure block may need to expand to a 40- to 60-min procedure block, to ensure adequate cleaning and decontamination of the procedure room and any medical equipment.

**Office-based surgery: PPE selection**

Proper PPE selection and adequate PPE supplies will be necessary to office-based procedural care. Social distancing is a “free” PPE, ideally greater than six feet, which can reduce the chance of infection from 12.8% to 2.6% [41]. There may be greater benefit with increasing distances, but this may not be feasible within the office-based setting; even six feet may be difficult to adhere to in some cases. In that regard, healthcare providers and patients should not spend very long within the six-feet zone, i.e. “close contact”. Face masks and eye protection can reduce the chance of infection from 17.4% to 3.1% and from 16% to 5.5%, respectively [41]. The type of mask may make a difference, with good evidence that fitted respirators, like N95 or equivalent masks and powered air-purifying respirators (PAPRs) do a better job at protecting the wearer (as they capture small aerosolizing particles), compared to a surgical mask or a cloth mask. However, 12-to-16-layer cloth masks may be better than 1-to-2-layer cloth masks within the community. Masks can prevent the spread of droplets and aerosols [42]. If aerosol-generating procedures are being performed, then it is recommended that the healthcare provider wear a fitted respirator, with consideration of PPE supplies within the office and COVID-19 prevalence within the community, symptoms of the patient, etc. Offices should consider protocols to extend the use of PPE, including N95 or equivalent masks, when necessary, per the CDC [43].

When selecting PPE, offices should take into consideration the local prevalence of COVID-19. If the prevalence is low and patients are asymptomatic and have a negative COVID-19 test, then standard precautions may be all that is required for non-aerosol-generating procedures (see Fig. 2). If there are aerosol-generating procedures, then N95 or equivalent masks could be considered. If the prevalence of COVID-19 is high, then this may tip the balance in favor of having N95 masks regardless of the type of procedure, given the possibility of asymptomatic carriers of COVID-19 even with a negative test and no symptoms (see Fig. 3).

Office staff not involved with procedures and who may contact patients should use standard precautions, such as performing hand hygiene, wearing a surgical mask, gloves, protective eyewear or face shield, performing environmental disinfection, and decontaminating and reprocessing of any reusable medical equipment between patients [36,44]. They should be trained on proper donning and doffing of PPE, especially when using an N95 or equivalent mask, and in the presence of a patient who has a positive COVID-19 test or positive symptoms [45]. If the local prevalence of COVID-19 is high, or the
patient has a positive COVID-19 test, or has no COVID-19 test, or has positive symptoms, staff should consider switching to an N95 or equivalent mask. Offices may want to have a system in place to rotate staff or replace staff members who become exposed to COVID-19 [19].

Office staff involved with procedures, especially aerosol-generating procedures, should use standard precautions as well as fitted respirators and a gown [50]. If PPE supplies are low, such as in times of austerity, and need to be reused and conserved, they should be cleaned with agents that will kill SARS-CoV-2. Gowns, if not disposable, should be cleaned in accordance with infectious disease control guidelines. Use of a respirator mask with an exhalation valve is not recommended as they may not provide a source control in someone who may be an asymptomatic COVID-19 carrier.

Surfaces that are frequently touched within the office, equipment used for procedures, and PPE will need to be cleaned and decontaminated, respectively [46]. High-contact surfaces should be cleaned regularly and frequently, with agents known to kill SARS-CoV-2 [47]. Pre-COVID-19 era waiting-room high-frequency touch items, like magazines and newspapers, may need to be switched out to single-use items, items with plastic/silicone covers that can be cleaned easily, or eliminated entirely. Medical equipment used for procedures, especially aerosol-generating procedures, should be decontaminated in a manner that will eliminate the SARS-CoV-2.

If a patient with COVID-19 does have a procedure or surgery done in the office, then there should be consideration to terminally clean the room that the patient was in [48]. After the procedure is completed, the room should remain empty for a period, with consideration to placing a high efficiency particulate air filter machine in the room to help ventilate it. Staff involved with terminally cleaning the procedure room should also wear PPE [47]. They should use cleaning agents known to kill SARS-CoV-2.

**Conclusion**

In March 2020, the unprecedented pandemic caused by the SARS-CoV-2 disrupted the fragile healthcare system, especially perioperative system, from hospitals to surgery centers to offices. From partially shutting down in March to resuming in May, the medical field has learned a great deal in the past few months: screening and testing, patients at risk of complications from COVID-19, infectious disease guidelines, PPE, mask wearing, and social distancing. With the increased number of ambulatory and office-based procedures come appropriate concerns, with the recent literature demonstrating effective strategies to improve outpatient safety.
COVID-19 has added a different dimension to providing OBS with regard to testing (days in advance of surgery or procedure, sensitivity of tests), spread (symptomatic or asymptomatic carriers), and appropriate PPE (for face-to-face interactions, non-aerosol or aerosol-generating procedures). While awaiting a safe and effective COVID-19 vaccine, cases continue to rise in the US, with over 8.1 million cases and over 210,000 deaths, as of October 18, 2020 [49]. State, federal, and specialty guidelines continue to evolve with emerging evidence. States continue to be in various phases of re-opening. Given the spread of cases, we suspect that COVID-19 will remain prevalent within the population for the foreseeable future. In general, we recommend screening and testing all patients, ensuring patients self-isolate after a COVID-19 test, using appropriate PPE, using hand hygiene, social distancing, cleaning high-frequency touch surfaces, enforcing universal mask wearing, disinfecting medical equipment, especially aerosol-generating equipment, and developing staffing and contact-tracing plans.

COVID-19 may provide an incentive for further growth of outpatient procedures to avoid burdening hospitals. The allure of reduced costs, better convenience, and ease of scheduling for office-based procedures (nasal, dental, minor emergencies, colonoscopies, etc.) may attract patients as they avoid going to hospitals. Thus, we thought it necessary to present guidelines for office-based anesthesia safety in the COVID-19 era to provide a safe, comfortable, and pleasant experience for everyone: patients, anesthesiologists, surgeons, proceduralists, and office staff.

### Practice points

- Best work practices include social distancing as much as possible, wearing high-quality masks, surveillance testing based on community positivity rates, contact tracing, post-exposure isolation until antigen tests are negative after a reasonable post-exposure interval, and thoughtful cleaning paradigms.
- The psychosocial implications of COVID-19 can be detrimental. Panic, fear, anxiety, uncertainty, depression, and other adverse psychological issues can result from this.
- Alternative strategies such as telemedicine have quickly taken hold in healthcare facilities globally and are helping to offset the toll that the pandemic has taken on the care of non-COVID-19 conditions.
- Compliance with infection control paradigms and recommended behaviors are expected to decline with fatigue, potentially increasing the risk for disease acquisition by the individual and those sharing the workspaces.

### Research agenda

- Investigate the value of telemedicine in reducing infection rates while maintaining the highest quality of care.
- Examine how operational deficiencies exposed by COVID-19 have prompted healthcare organizations around the world to invent new essential care for patients.
- The economic impact of COVID-19 on US and international hospitals, academic and community hospitals, healthcare facilities, surgery, and surgical outcomes.

### Declaration of competing interest

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References

[1] Gregory JM, Wetzig AM, Wayne CD, et al. Quantification of patient-level costs in outpatient total shoulder arthroplasty. J Shoulder Elbow Surg 2019;28:1066–73. https://doi.org/10.1016/j.jse.2018.10.006.
[2] Koenig L, Doherty J, Dreyfus J, et al. An analysis of recent growth of ambulatory surgical centers, prepared for ASC Coalition. 2009.
[3] Shapiro FE, Punwani N, Rosenberg NM, et al. Office-based anesthesia: safety and outcomes. Anesth Analg 2014. https://doi.org/10.1213/ANE.0000000000000313.
[4] Young S, Shapiro FE, Urman RD. Office-based surgery and patient outcomes. Curr Opin Anaesthesiol 2018;31:707–12. https://doi.org/10.1097/AOA.0000000000000655.
[5] Shapiro FE, Everett LJ, Urman RD. Quality management in outpatient surgical care. Int Anesthesiol Clin 2014;52:97–108. https://doi.org/10.1097/AIA.0000000000000006.
[6] World Health Organization. Events as they happen. 2020.
[7] Johns Hopkins University. COVID-19 dashboard by the center for systems science and engineering. CSSE) At Johns Hopkins University (JHU). 2020. https://coronavirus.jhu.edu/map.html. [Accessed 16 August 2020].
[8] Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis 2020;20:533–4. https://doi.org/10.1016/S1473-3099(20)30120-1.
[9] Wiersinga WJ, Rhodes A, Cheng AC, et al. Pathophysiology, transmission, diagnosis, and treatment of Coronavirus disease 2019 (COVID–19). J Am Med Assoc 2020;324:782. https://doi.org/10.1001/jama.2020.12839.
[10] Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Engl J Med 2020;382:970–1. https://doi.org/10.1056/NEJMoa2001468.
[11] Cleveland Metro. 50 states of coronavirus: how every state in the U.S. has responded to the pandemic. 2020. https://www.cleveland.com/metro/2020/03/50-states-of-coronavirus-how-every-state-in-the-us-has-responded-to-the-pandemic.html. [Accessed 16 September 2020].
[12] Centers for Disease Control and Prevention. Framework for healthcare systems providing non-COVID-19 clinical care during the COVID–19 pandemic. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/framework-non-COVID-care.html. [Accessed 16 September 2020].
[13] American College of Surgeons. Local resumption of elective surgery guidance. 2020. https://www.facs.org/covid-19/clinical-guidance/resuming-elective-surgery.
[14] American Society of Anesthesiologists. Joint statement: roadmap for resuming elective surgery after COVID–19 pandemic. 2020. https://www.asahq.org/about-asa/newsroom/news-releases/2020/04/joint-statement-on-elective-surgery-after-covid-19-pandemic. [Accessed 16 September 2020].
[15] American Society of Plastic Surgeons. Considerations for the resumption of elective surgery and visits: ASPS statement. 2020. https://www.plasticsurgery.org/for-medical-professionals/covid-19-member-resources/resumption-of-elective-surgery. [Accessed 16 August 2020].
[16] American College of Surgeons. COVID-19: recommendations for management of elective surgical procedures. 2020. https://www.facs.org/covid-19/clinical-guidance/elective-surgery.
[17] Massachusetts Department of Public Health. Weekly COVID–19 public health report- thursday oct 22, 2020. 2020. https://www.mass.gov/doc/weekly-covid-19-public-health-report-october-22-2020/download. [Accessed 5 November 2020].
[18] Centers for Disease Control and Prevention. How CDC determines the risk level for COVID–19 travel health notices. 2020. https://www.cdc.gov/coronavirus/2019-ncov/travelers/how-level-is-determined.html. [Accessed 5 November 2020].
[19] Centers for Medicare and Medicaid Services. Centers for medicare & medicaid services (CMS) recommendations Re-opening facilities to provide non-emergent non-COVID–19 healthcare. 2020. https://www.cms.gov/files/document/covid-recommendations-reopening-facilities-provide-non-emergent-care.pdf. [Accessed 16 August 2020].
[20] Mascha EJ, Schober P, Scheffold JC, et al. Staffing with disease-based epidemiologic indices may reduce shortage of intensive care unit staff during the COVID–19 pandemic. Anesth Analg 2020;131:24–30. https://doi.org/10.1213/ANE.0000000000004849.
[21] Imam Z, Odish F, Gill I, et al. Older age and comorbidity are independent mortality predictors in a large cohort of 1305 COVID–19 patients in Michigan, United States. J Intern Med 2020;288:460–76. https://doi.org/10.1111/joim.13119.
[22] Society for Ambulatory Anesthesia. Society for ambulatory anesthesia (SAMBa) statement on COVID-19 testing before ambulatory anesthesia. 2020. https://sambahq.org/wp-content/uploads/2020/05/SAMBa-Statement-on-COVID-19-Testing-Before-Ambulatory-Anesthesia-4-30-20.pd. [Accessed 16 August 2020].
[23] American Society of Anesthesiologists. Statement on sedation & anesthesia administration in dental office-based settings. 2017. https://www.asahq.org/standards-and-guidelines/statement-on-sedation-anesthesia-administration-in-dental-office-based-settings. [Accessed 21 September 2020].
[24] American Society of Anesthesiologists. Guidelines for office-based anesthesia. 2019. https://www.asahq.org/standards-and-guidelines/guidelines-for-office-based-anesthesia. [Accessed 21 September 2020].
[25] Seligson E, Beutler SS, Urman RD. Office-based anesthesia. Curr Opin Anaesthesiol 2019;32:756–61. https://doi.org/10.1097/ACO.0000000000000789.
Anesthesia Patient Safety Foundation. ASA and APSF joint statement on perioperative testing for the COVID-19 virus. 2020. https://www.aspf.org/news-updates/asa-and-apsf-joint-statement-on-perioperative-testing-for-the-covid-19-virus/, [Accessed 23 October 2020].

Centers for Disease Control and Prevention. Case investigation and contact tracing in non-healthcare workplaces: information for employers. 2020. https://www.cdc.gov/coronavirus/2019-ncov/community/contact-tracing-nonhealthcare-workplaces.html. [Accessed 21 September 2020].

American Medical Association. COVID-19: a physician guide to keeping your practice open. 2020. https://www.ama-assn.org/delivering-care/public-health/covid-19-physician-guide-keeping-your-practice-open. [Accessed 16 August 2020].

Duffy S, Lee TH. In-person health care as option B. N Engl J Med 2018;378:104–6. https://doi.org/10.1056/NEJMp1710735.

Centers for Disease Control and Prevention. Guidance for dental settings interim infection prevention and control guidance for dental settings during coronavirus disease 2019 (COVID-19) pandemic. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html. [Accessed 23 October 2020].

Centers for Disease Control and Prevention. Interim infection prevention and control recommendations for healthcare personnel during the coronavirus disease 2019 (COVID-19) pandemic. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html. [Accessed 10 September 2020].

American Dental Association. CDC guidance for dental settings echoes ADA guidance: organizations recommend how to move forward with dental care during pandemic. 2020. https://www.ada.org/en/press-room/news-releases/2020/archives/may/cdc-guidance-for-dental-settings-echoes-ada-guidance. [Accessed 16 August 2020].

Jani SR, Shapiro FE, Gabriel RA, et al. A comparison between office and other ambulatory practices- analysis from the national anesthesia clinical outcomes Registry. J Healthc Risk Manag 2016;35:38–47. https://doi.org/10.1002/jhrm.21223.

Campbell K, Torres L, Stayer S. Anesthesia and sedation outside the operating room. Anesthesiol Clin 2014;32:25–43. https://doi.org/10.1016/j.anclin.2013.10.010.

Marhalik-Helms J. Providing anesthesia services outside of the hospital: how compliant are you? ASA News 2015;79:50–3.

Centers for Disease Control and Prevention. Clinical questions about COVID-19: questions and answers. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html. [Accessed 10 September 2020].

American Academy of Otolaryngology- Head and Neck Surgery. Guidance for return to practice for otolaryngology-head and neck surgery: Part Two. 2020. https://www.entnet.org/sites/default/files/uploads/guidance_for_return_to_practice_part_2_final_05122020.pdf. [Accessed 16 August 2020].

American Gastroenterology Association. AGA/DHPA joint guidance for resumption of elective endoscopy. 2020. https://gastro.org/news/aga-dhpa-release-guidance-for-resuming-elective-endoscopy/. [Accessed 16 August 2020].

American Gastroenterology Association. How we managed our GI practice during COVID-19 in San Francisco. 2020. https://www.gastro.org/news/how-we-managed-our-gi-practice-during-covid-19-in-san-francisco/. [Accessed 16 August 2020].

Prachand VN, Milner R, Angelos P, et al. Medically necessary, time-sensitive procedures: scoring system to ethically and efficiently manage resource scarcity and provider risk during the COVID-19 pandemic. J Am Coll Surg 2020;231:281–8. https://doi.org/10.1016/j.jamcollsurg.2020.04.011.

Chu DK, Akl EA, Duda S, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet 2020;395:1973–87. https://doi.org/10.1016/S0140-6736(20)31142-9.

Anfinrud P, Stadnytskyi V, Bax CE, et al. Visualizing speech-generated oral fluid droplets with laser light scattering. N Engl J Med 2020;382:2061–3. https://doi.org/10.1056/NEJMoa2007800.

Centers for Disease Control and Prevention. Optimizing personal protective equipment (PPE) supplies. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/index.html. [Accessed 10 September 2020].

Centers for Disease Control and Prevention. Core infection prevention and control practices for safe healthcare delivery in all settings –recommendations of the HICPAC. 2020. https://www.cdc.gov/hicpac/recommendations/core-practices.html. [Accessed 10 September 2020].

Ortega R, Gonzalez M, Nozari A, et al. Personal protective equipment and covid-19. N Engl J Med 2020;382:e105. https://doi.org/10.1056/NEJMc2014809.

American Dental Association. As Dental Practices Resume Operations, ADA offers Continued Guidance: recommendations of the HICPAC. 2020. https://www.cdc.gov/hicpac/recommendations/core-practices.html. [Accessed 10 September 2020].

Beth Israel Deaconess Medical Center. Room turnover for suspected or confirmed COVID 19 patients. 2020. https://anesthesia.bidmc.harvard.edu/AnesPortal/Documents/2020_Covid_19/Room Turnover for ORs.pdf. [Accessed 15 September 2020].

Johns Hopkins University. COVID-19 dashboard by the center for systems science and engineering (CSSE) at. Johns Hopkins University [JHU]; 2020. https://coronavirus.jhu.edu/map.html. [Accessed 18 October 2020].

Herman JA, Urits Ivan, Kaye AD, Urman RD, Viswanath O. COVID-19: Anesthesia management recommendations. J Clin Anesth 2020 Apr 23;109840. https://doi.org/10.1016/j.jclinane.2020.109840.