

AORN Guidelines in the Era of COVID-19

It has been more than one year since SARS-CoV-2—the virus that causes coronavirus disease 2019 (COVID-19)—emerged, leading to a global pandemic and disrupting all facets of everyday life. Health care providers have responded and continue to care for patients in their communities as infection rates rise and fall. In perioperative services, team members have worked together to keep their patients and each other safe despite the fluctuating status of elective procedures and as urgent and emergent patients who are suspected or confirmed to have COVID-19 arrive for surgery.

Although there is still much to learn about COVID-19, a number of evidence-based practices are recommended to reduce the spread of infections in the perioperative setting, as detailed in AORN's *Guidelines for Perioperative Practice*. The *AORN Journal* recently spoke with members of the AORN Department of Nursing Practice about four specific guidelines:

- “Guideline for surgical attire,” authored by Lisa Spruce, DNP, RN, CNS-CP, CNOR, ACNS, ACNP, FAAN, director of Evidence-Based Perioperative Practice;
- “Guideline for environmental cleaning,” authored by Karen deKay, MSN, RN, CNOR, CIC, perioperative practice specialist;
- “Guideline for the design and maintenance of the surgical suite,” authored by Byron L. Burlingame, MS, BSN, RN, CNOR, senior perioperative practice specialist; and
- “Guideline for transmission-based precautions,” authored by deKay.

These experts discussed how to use evidence-based practice and the AORN guidelines to reduce the spread of COVID-19. They also shared where research gaps exist and questions that perioperative professionals are

asking AORN to help them practice safely as the pandemic continues.

SURGICAL ATTIRE

AORN Journal: Why is this guideline especially important in light of the pandemic?

Spruce: We know that SARS-CoV-2 can survive and persist on inanimate surfaces, but we do not know if that applies to OR attire. We do know that other types of potentially pathogenic organisms can contaminate surgical attire throughout the workday, and we need to pay particular attention to how surgical attire is worn and laundered.

When taking care of patients with COVID-19, it's best practice for perioperative personnel to remove their attire immediately following the case, or as soon as possible thereafter, and change—this means everything, including head coverings—and then leave the contaminated attire at the facility to launder. Since we don't know for sure about COVID-19, but we have studies on other viruses that have been known to survive on fabrics, it's best to err on the side of caution.

For laundering, if you send your laundry out to an accredited laundry facility or you keep it at the health care organization and they follow state regulatory or Centers for Disease Control and Prevention (CDC) laundering requirements, that provides control of the laundering process and helps ensure that effective laundering standards have been met. Home laundering is not monitored for quality, consistency, or safety; and home washing machines may not have the adjustable parameters or controls required to achieve the necessary thermal measures (water temperature), agitation (some of them are really gently agitating), or chemical measures (usually they neutralize the alkalinity of water, soap, and detergent to reduce microbial levels of scrub attire). If worn under scrub attire when caring for patients who are suspected or confirmed to

have COVID-19, personal attire should be laundered at the health care facility, too.

AORN Journal: Which specific recommendations are critical to follow for COVID-19?

Spruce: Perioperative team members who are caring for patients who are suspected or confirmed to have COVID-19 will be wearing their surgical attire under their personal protective equipment (PPE). Despite the fact that PPE should be protective, they should treat their attire as contaminated and remove it immediately or as soon as possible, place it in a designated area for facility laundering, and don clean attire.

In practice, this means that before the team member transports the patient to the OR, they would don the appropriate PPE that protects them from transmissible infections (eg, COVID-19). Usually it's a gown, eye protection, and respiratory protection (eg, an N95 respirator or a powered air-purifying respirator [PAPR])—and that PPE would be worn on top of their scrub attire. The “Guideline for transmission-based precautions” walks through the PPE donning and doffing sequence. After completing the patient's care, they would remove their scrub attire as previously described, put clean attire on, and then continue caring for other patients.

For a patient with COVID-19, the AORN e-book *Perioperative Care of the COVID-19 Patient* (also known as the *COVID-19 Perioperative Playbook*) covers special considerations for aerosol-generating procedures like intubation and extubation. There is a lot involved and certain steps that should be followed.

AORN Journal: Are there any specific recommendations you see changing or being emphasized differently?

Spruce: There have been reported shortages of disposable bouffant hats and scrub caps, so perioperative team members should adhere to facility policies, which should be based on interdisciplinary team decisions and may include freshly laundered cloth hats. Wearing a disposable bouffant hat over a cloth hat is not evidence-based and therefore is not needed. It is important to become more mindful about personal protection and protecting the community: team members shouldn't bring scrubs home to be laundered in a home washing machine, should remove scrubs before leaving the facility, and should have a dedicated

pair of shoes that are not being worn into the home or community.

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Before the 2020 update to the “Guideline for surgical attire,” we did not recommend cloth hats; however, AORN makes no recommendation for the type of head cover and leaves the decision to an interdisciplinary team at the facility. The team should include members of the surgical team and infection preventionists to determine the type of head covering worn at the health care organization.

Attire requirements, including head covering, should be addressed in the facility policy. Any member of the surgical team should be able to speak up and request that someone change their hat or tell them that it's soiled, that they see blood on it. Everyone should be empowered to speak up.

AORN Journal: Which research gaps need to be prioritized going forward?

Spruce: There are many gaps in the literature related to surgical attire, but in light of COVID-19, important questions to answer include whether SARS-CoV-2 lives on surgical scrub attire and, if so, what type of laundering is most effective. Also, what is the most effective type of hair covering in the perioperative setting? We need outcome studies linking surgical site infections (SSIs) to surgical attire.

Most of the available studies are simulated (ie, completed in a controlled environment), like mock surgeries. We also look at quality improvement studies and case studies. If you implement attire changes—like going from all disposable to all cloth hats—track your SSI rates to see if the attire changes impact those rates.

AORN Journal: What types of questions related to the guideline have you received recently (whether via the consult line, ORNurseLink, or a different channel)?

Spruce: The most common questions we've received are about removal and laundering of scrub attire and hair coverings. There have been some questions about shoes, too.

People are asking if they have to change their scrubs after taking care of a patient with COVID-19 and if they have to remove their head covering. As related to COVID-19, we get a lot of questions about covering cloth caps with disposable bouffants. I think inventory is being wasted by putting them on over cloth caps when there is no evidence-based recommendation to support that practice.

Perioperative team members should wear a dedicated pair of shoes in the OR and not wear those shoes home. Keep your dedicated shoes at the facility and don't store them in personal lockers. Also keep in mind that shoes should be clean – and *clean* just means no visible debris, blood, dirt, or anything else. Shoes that do have visible blood or dirt should be cleaned. Shoes worn at the facility should meet the health care organization's safety requirements. Most often this means not wearing a tennis shoe or a cloth shoe of any kind and instead wearing a leather or leather-type shoe that can be wiped down with a disinfectant wipe.

If you think you're going to get blood, other body fluids, or splashes or sprays on your shoes, you should wear a shoe cover, and you may want to consider wearing a shoe cover for patients with COVID-19. We consider shoe covers PPE, and when the case concludes, you should remove your shoe covers just like you do all your other PPE and discard them and perform hand hygiene.

ENVIRONMENTAL CLEANING

AORN Journal: Why is this guideline especially important in light of the pandemic?

deKay: The environment is the third component in the epidemiological triangle, which illustrates the elements required for disease transmission and includes a susceptible host, an agent or viable pathogen, and an environment that facilitates transmission. If we can take measures to reduce pathogens on environmental surfaces and patient care devices, we can assist in interrupting the infectious process or decreasing transmission.

The *environment* is the area surrounding the patient, the patient themselves, as well as any equipment or devices that we use on the patient. What can happen is when a health care worker touches that environment—in other words, the inanimate objects and the patient—then the pathogens are on their hands, and then their hands can transfer those pathogens to other surfaces or even to themselves (eg, if they rub their eyes, nose, or mouth). That's why it's so important whenever you enter a room or exit a room to perform hand hygiene.

AORN Journal: Which specific recommendations are critical to follow for COVID-19?

deKay: There are several recommendations in this guideline that are critical, including those for product selection and use, enhanced cleaning processes for special pathogens, room access for cleaning, and education and quality. Recommendation 1, product selection and use, states to use an Environmental Protection Agency (EPA)-registered and hospital-grade disinfectant that is applied for the appropriate contact time as indicated on the product's label. The EPA tests products against emerging viral pathogens for the amount of time that a product has to be in contact with a surface for it to be effective; List N: Disinfectants for Coronavirus (COVID-19), which can be found at <https://www.epa.gov/pesticide-registration/list-n-disinfectants-coronavirus-covid-19>, provides the products expected to kill SARS-CoV-2.

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Members of a hospital's environmental services department usually select disinfectants, but we recommend that an interdisciplinary team select those products. The team should include an infection preventionist, someone from perioperative services, and of course environmental services. A lot of times there's a product selection committee because they're trying to get the best price and the best product, but it's important that perioperative nurses and especially an infection preventionist have input. You want to make sure the

product is going to be effective, but the equipment in the OR is a lot different than the equipment in a patient room, so we need to make sure that a product isn't going to destroy our stainless-steel surfaces or electrical equipment.

Another recommendation is to make sure surfaces are clean prior to applying disinfectant. This is because if there's visible soil on a surface, the disinfectant won't be as effective because it can't contact the surface and sit there for the required contact time. There are disinfectant wipes that are from List N: Disinfectants for Coronavirus (COVID-19) that are considered both cleaning and disinfecting agents. So, if I see debris or soil on a surface, I'm going to use my disinfectant wipe to remove the debris or soil and then use a second wipe to apply the disinfectant to let it sit for the required contact time.

Recommendation 8 on special pathogens recommends following enhanced cleaning processes, which is cleaning that extends beyond routine, between-case cleaning to include all items touched during patient care—specifically, horizontal and high-touch surfaces. Items that may be included are light switches, door handles, push plates, chairs, and trash and linen receptacles. It's also recommended to minimize the supplies and equipment in the room before the start of the case, but there are some pieces of equipment that need to stay in the room. For instance, we need to have the electrosurgical unit in the room, but if blood or respiratory secretions are flying in the air, there's a tendency for them to land on that piece of equipment, so it would be really important to thoroughly clean all the nooks and crannies. Another option is to use a disposable, impervious material to cover work surfaces and then remove and discard or disinfect the material after procedures. If I take a piece of plastic and put it over that piece of equipment, then at the end of the case, I can get rid of that piece of plastic and know that it's clean underneath. Or I can wipe down that piece of plastic, which is an easier surface to clean than one with a lot of nooks and crannies.

Another recommendation is that room access for cleaning should be restricted until enough air exchanges have occurred to remove 99% of airborne particles from the air. The CDC has regulations for the OR and also for patient rooms about the number of air exchanges that have to occur per hour. What that's going to do is clear the air of those aerosols from the patient, and then personnel can enter the room without having to wear respiratory protection. If for

some reason you couldn't wait to go in, you would have to have the respiratory protection on. So, that's sort of been an adjustment for the ORs because of COVID-19, because normally we don't have to wait that time. Another concern with not waiting to clean is that the aerosols could still be circulating around and could land on the surfaces that we talked about. So, waiting also protects the next patient.

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Recommendation 11 on education and Recommendation 12 on quality are key during this pandemic to ensure environmental cleaning and disinfection procedures are followed consistently and correctly. Environmental cleaning processes should be standardized and may include the use of checklists. Personnel should participate in education and competency verification activities as well as continual monitoring of cleaning practices. The majority of the time it's going to be the environmental services department doing the cleaning, or it could be an OR nursing assistant, and so it's sort of two-fold there. So it may be helpful that the OR supervisor—or someone objective like an infection preventionist, which is actually a CDC recommendation referenced in our guideline—monitors. Of course if you're directly observing them they're going to do it right, so video monitors may be used in the room, and there are some products out there that you can use to swab the surface after it's been cleaned to see whether or not there's any debris or bioburden left. Another option is to put a fluorescent powder that the person cleaning can't see on the table; then I would go back in after they cleaned with a blacklight to see whether or not that fluorescent powder was gone. You want to make sure they're waiting the right amount of time before they go in, they're wearing the right PPE to protect themselves, and that they use the right product.

AORN Journal: Are there any specific recommendations you see changing or being emphasized differently?

deKay: There is a possibility of adding COVID-19 to the list of diseases requiring enhanced environmental cleaning and adding an “emerging viral pathogen” recommendation to use an EPA-registered and hospital-grade disinfectant with that claim. When this pandemic is over, there may be stronger recommendations put out by the CDC, and if they have to do with cleaning, then we would definitely try to address that.

We update our guidelines every four to five years, but we’re putting a new process in place that—if there’s some strong evidence or new studies out there—will alert us so we can look at the evidence and see if it’s strong enough. If so, we would make that addition to the guideline.

We also have a Guidelines Advisory Board, and the members on there are practicing OR nurses as well as representatives from other organizations (eg, anesthesia professionals, infection preventionists). So we get suggestions from them, and members call in to the consult line with questions or to tell us that they saw something and want to know about it.

AORN Journal: Which research gaps need to be prioritized going forward?

deKay: The three primary gaps related to this guideline are the effect of enhanced environmental cleaning on reducing transmission in the perioperative setting, determination of validated consensus benchmarks for cleanliness, and correlation of cleanliness measures with clinical outcomes (eg, patient colonization, infection). Studies on these topics may be performed as part of someone’s dissertation or thesis or maybe as infection prevention research. When we write our guidelines and identify gaps, we send research ideas to our director, Lisa Spruce, who oversees the AORN Nursing Research Committee, and she presents the ideas to them to see if they know someone working on a project or if they want to take on a project. There is also a member from the Association for Professionals in Infection Control and Epidemiology that sits on our Guidelines Advisory Board, so that may be a discussion we could have at our meetings.

AORN Journal: What types of questions related to the guideline have you received recently (whether via the consult line, ORNurseLink, or a different channel)?

deKay: The primary questions I get are about how long personnel cleaning the room must wait before entering the OR or procedure room to clean it and what PPE should be worn

by individuals cleaning the OR or procedure room. For these, I refer them to the guideline as well as our web site because both of these were addressed in our COVID-19 frequently asked questions. I also refer to the CDC web site. I give them the answer, but also provide where I got that answer so that they’ll have it in case someone else asks them.

DESIGN AND MAINTENANCE OF THE SURGICAL SUITE

AORN Journal: Why is this guideline especially important in light of the pandemic?

Burlingame: The “Guideline for design and maintenance of the surgical suite” describes the traditional measures to be taken to maintain the correct environmental conditions for the OR, including monitoring and maintenance of the heating, ventilation, and air-conditioning (HVAC) system. The guideline states that procedures should be performed in positive-pressure rooms, but when COVID-19 came along, procedures started being performed in negative-pressure rooms.

In a positive-pressure OR, the positive pressure will actually blow the virus out into the hallway and the surrounding areas every time the door is opened. Infectious agents can also be blown out through the gaps around the door. The reason for using a positive-pressure room basically is to keep the surgical site as clean as possible. If you have a negative-pressure OR—which is typically what is used for patients who are suspected or confirmed to have COVID-19—it sucks the air in from the hallway, so the dirty air enters the OR and can contaminate your patient. The interesting thing is, a positive-pressure OR protects the patient from infectious agents and a negative-pressure OR protects the staff members and the other people in the hallway from COVID-19. The ideal situation is truly the anteroom because it protects both.

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An anteroom is like a closet that is right outside of the door to the OR. In fact, they have portable ones where you

can push them up against the door and so it seals it all the way around the door. The anteroom is actually negative pressure to the OR and the hallway, so the air would blow out of the OR when the OR door was opened into the anteroom; then the anteroom sucks it outside and blows it away or it filters it before recirculating it so that it removes all of the virus particles.

AORN Journal: Which specific recommendations are critical to follow for COVID-19?

Burlingame: Recommendation 4.9 states you should have positive pressure in an OR, which enables the cleanest air to be blown over the surgical wound. This helps to protect the patient from SSIs. The problem when you are working with a patient who is suspected or confirmed to have COVID-19 is you are now in a conflicting environment because you are trying to protect the patient from getting an SSI and, at the same time, you are trying to protect the personnel in the room and the surrounding areas from getting COVID-19. To protect the personnel, you may use a negative-pressure OR. In this situation, to help keep the cleanest air over the patient, you may also use a freestanding unidirectional ultraclean air-delivery system. This system is intended to help protect the patient's wound from airborne contaminants.

There are two different sorts of these air delivery systems. One of them, if you had a positive-pressure OR, you could use the ultraclean air-delivery system to filter the air that is coming out of the patient by placing it near the patient's head during aerosol-generating procedures (eg, intubation, extubation) so that it would suck the air through the filters and blow it out into the rest of the OR. The second type is a system that blows highly filtered air over the top of the patient during surgery. You could actually use both if you're operating on a patient who is suspected or confirmed to have COVID-19 and you're in a negative-pressure OR. One would protect the team from contaminants coming out of the patient, and the other would help keep the air over the incision clean.

The team members actually in the OR would make the decisions whether to use the portable units or not, and an interdisciplinary team would have to get together to determine whether to change the pressurization of the

OR. It's not recommended to flip pressures back and forth because it causes lots of HVAC problems.

In preoperative and postanesthesia care unit settings, if they have a patient who is suspected or confirmed to have COVID-19, the patient should be in an airborne infection isolation room (AIIR) and stay there until they go directly to the OR. In an emergent situation, you do the best that you can with what you've got. If you've got a negative-pressure room, I would probably put that patient in there.

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AORN Journal: Are there any specific recommendations you see changing or being emphasized differently?

Burlingame: I see Recommendation 4.9 regarding pressurization of the OR growing to include the design and use of an anteroom and the use of a negative-pressure room. In the future, the document may also include the use of an anesthesia preparation room.

I described the benefits of the anteroom and negative-pressure OR previously. The primary drawbacks with building an anteroom include that it's a little harder to get the bed and the stretcher in and out. Another drawback is the increased square footage, and there are extra costs associated with having additional ventilation systems. With a negative-pressure room, the primary drawback is the use of these rooms will be limited because they should not be used unless it's for a patient who requires an AIIR for diseases such as tuberculosis and COVID-19.

With the anesthesia induction room—these are used in Europe and there are a couple of facilities in the United States using them—the patient is brought into this room, which is connected to the OR, and they are anesthetized

and intubated. This negates the need for intubation in the OR, which is a large contributor to airborne contaminants. These rooms can be negative pressure, and therefore anything that is airborne would be removed in these rooms. Another benefit is faster turnover rates because the induction of anesthesia can be done at the same time as the setup of the room. A primary downfall of it, of course, is it's more dollars per square foot.

AORN Journal: Which research gaps need to be prioritized going forward?

Burlingame: There are several questions that need to be answered.

- In a positive-pressure OR, how much contaminated air escapes when the door is open or when the door is closed and an aerosolizing procedure is being performed?
- What is the effect of the escaped air on people in the semirestricted areas?
- In a negative-pressure OR, how much contaminated air enters when the door is open or when the door is closed?
- What is the effect of the air that enters on the patient?
- What is the impact of airflow disruptions such as those caused by portable high-efficiency particulate air filtration systems used at the head of the patient during intubation to decrease the airborne contaminants during aerosolizing procedures such as intubation and extubation?
- Is there a distance that a person can stand safely away from the patient, thereby decreasing the risk of exposure to contaminants during aerosolizing procedures?
- What procedures are truly aerosol-producing, thereby releasing virus particles into the air?
- What effect does a high rate of air exchanges have on SSIs and on the risk of exposure to SARS-CoV-2 and other airborne contaminants?

Many of these research gaps focus on airflow. Studying these topics will help to truly justify the positive-pressure concepts and help us understand the effects of airflow. Based on that, we can look at whether we have to put better filters in the airflow system or whether we can actually save money and put fewer filters in the airflow system.

These types of studies are basically done with air sampling and air culturing by using simulations based on particle size. For example, you can use a smoke test. If you put so much smoke in the room, you can monitor how much escapes around the door. Then you correlate that to estimate how much of the virus would actually be escaping.

AORN Journal: What types of questions related to the guideline have you received recently (whether via the consult line, ORNurseLink, or a different channel)?

Burlingame: We have received questions regarding performing surgeries in a negative-pressure room; use of a portable high-efficiency particulate air filtration system during procedures (which is the same thing as the ultra-clean air-delivery system); use of an anteroom; use of a runner; and the amount of time to leave a room empty after an aerosolizing procedure. Questions about the negative-pressure room come up because we've always said you need to have positive pressure, so the question literally becomes whether you can perform surgery safely in a negative-pressure room. Yes, it's safe, but it's not ideal.

Similarly, we've always said that you cannot use portable fans and air filters in an OR except in these dire situations, and what we found was people were maybe looking at the design and maintenance guideline but not looking at the prevention of transmissible infections guideline, which says you can use the portable filters. Also, the "Guideline for sterile technique" provides recommendations related to the use of unidirectional ultraclean air delivery systems over the sterile field.

The questions about the anterooms were about how to use an anteroom, whether they must be used, and what the benefits are. One of the keys is consulting with interdisciplinary teams for these types of questions. You've got to get your infection control people and your plant operations or maintenance people—whoever manages the HVAC systems—involved, along with nurses and physicians, so that you can look at what you can and can't do safely within your facility.

Regarding using a runner: if you can staff a runner, definitely do. This is helpful so that you only have to open the door a crack to get a supply in and out versus opening the door all the way to get a human in and out, and to also

hopefully decrease the number of times the door has to be opened. Also, if you had to go in and out of the door yourself, you would have to remove any PPE you have on when you leave the OR and then put new PPE on before you come back in.

Regarding how much time a room should be left empty after an aerosol-producing procedure, the CDC has a table to help define how long it takes, depending on air exchanges, to remove 99% and 99.9% of airborne contaminants from the room. If you enter the room before they're all out, you have to go in with airborne infection isolation precaution PPE on. If you wait, you don't have to wear any PPE.

TRANSMISSION-BASED PRECAUTIONS

AORN Journal: Why is this guideline especially important in light of the pandemic?

deKay: This guideline provides guidance on protecting patients and personnel from transmission of infectious agents, such as SARS-CoV-2, in the perioperative environment. Transmission-based precautions are used when the route of transmission cannot be completely interrupted using standard precautions. For some diseases that have multiple routes of transmission, more than one transmission-based precaution category may be used.

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Any patient that we come in contact with could have an infectious disease that could be transferred, so we use standard precautions. If we're going to touch blood or other body fluids, we're going to wear gloves; if we think we're going to get splashed or sprayed, we would wear goggles and perhaps a gown. But sometimes that's not enough.

Specific diseases are transferred by specific routes. For instance, methicillin-resistant *Staphylococcus aureus* is

spread by contact. I used to say that if somebody has methicillin-resistant *S aureus*, imagine that they're covered in petroleum jelly because wherever you touch them with your hands, you're going to spread it. Other diseases are spread by droplets—respiratory secretions that get sprayed into the environment but then fall quickly—and wearing a mask is going to protect you from that. And then there's airborne transmission, which is from smaller particles that go longer distances. For those diseases carried in these manners, we need to go beyond standard precautions and wear a gown and gloves for preventing contact transmission; a mask for preventing droplet transmission; and a NIOSH [National Institute for Occupational Safety and Health]-approved, fit-tested, surgical N95 respirator or higher-level respirator for preventing airborne transmission.

The problem with COVID-19 is that it is highly transmissible, so we need to use more than one transmission-based precaution, along with standard precautions to include a gown, gloves, and eye protection. If you're not performing aerosol-generating procedures, just a regular mask is protective, but if you're going to have aerosols, then an N95 respirator needs to be worn. Most ORs have put testing into place before surgery, but in an emergency, you need to treat the patient as if they do have COVID-19.

AORN Journal: Which specific recommendations are critical to follow for COVID-19?

deKay: Several recommendations in this guideline pertain to treating patients who are suspected or confirmed to have COVID-19, including Recommendation 2 on proper donning and doffing of PPE (ie, gown, gloves, eye protection, mask, and respirator); Recommendations 3.3, 4.3, and 5.5 on transport of a patient within the hospital who is on contact, droplet, or airborne precautions; and Recommendations 5.6, 5.7, and 5.8 on precautions for aerosol-generating procedures in patients on airborne precautions.

There's a correct way to put on a mask and also to take off a mask so that you're not contaminating yourself. For instance, you want to take your gown and gloves off in the patient room or in the OR but leave that mask and face shield on until you get outside of the OR. When you take the mask off, you have to take it off in a way that you're not touching the outside of it—that you're not contaminating

yourself. There's an art to it, so you should have somebody watch you do it and tell you if they see you're about to contaminate yourself. The CDC has a lot of good videos that can be used for training; we reference the CDC and have some pictures in our guideline of how to perform donning and doffing.

With patient transport, it is important not to expose people in the hallway to what that patient has. For instance, if someone has COVID-19, then I'm going to put a mask on them and I'm also going to keep my mask on. I'm also going to take off my gown and gloves, perform hand hygiene, don gloves, and wipe down that stretcher so I can transport the patient without contaminating the stretcher or myself. Other considerations are keeping the hallway free, ideally, so try to use the patient-designated elevator instead of the visitor elevator—minimize the amount of people you come into contact with. But again, if that patient has a mask on, transmission risk is lessened.

AORN Journal: Are there any specific recommendations you see changing or being emphasized differently?

deKay: The CDC is considering adding some additional precautions for their isolation guidelines, and if they do, then we will look at them to possibly include in our specific guideline. The *universal pandemic precautions* consist of mask and eye protection for all direct patient contact, or at the very least, the use of a mask and eye protection for direct patient care if the patient is not able or willing to wear a mask. If this precaution is adopted, perioperative professionals wear masks anyway, and we should be wearing eye protection, so it probably wouldn't change life in the OR too much. It would probably affect us more on the floor, like when we go to get our patient in the holding area.

Right now, some health care organizations—such as Mount Sinai Health System in New York City—have developed an additional category because they don't have enough negative-pressure AIIRs for all the patients with COVID-19 that they're getting. *Special droplet precautions* or *special droplet/contact precautions* would entail use of a standard patient room (as opposed to an AIIR), the door of which must remain closed; before entering the room, the provider should don eye protection and a mask unless an aerosolizing procedure is performed, in which case a National Institute for Occupational Safety and Health-approved,

fit-tested, N95 respirator or higher-level respirator will be necessary.

The universal pandemic precautions consist of mask and eye protection for all direct patient contact, or at the very least, the use of a mask and eye protection for direct patient care if the patient is not able or willing to wear a mask.

The level of precautions (eg, contact, droplet, airborne, or a combination) should be determined in collaboration with an interdisciplinary team that includes an infection preventionist, an epidemiologist (when available), facility and perioperative leaders, surgeons, and anesthesia professionals based on the patient's COVID-19 status. Depending on the local situation and patient population, it may be ideal to have everyone in the OR wear respiratory protection for all patients regardless of COVID-19 status, but this decision should take into account not only your N95 respirator supply, but also your projected usage. This should be detailed in a guideline that the facility develops.

AORN Journal: Which research gaps need to be prioritized going forward?

deKay: We need to evaluate several things related to transmission-based precautions.

- Use of PPE by health care providers, perceptions of risk, and adherence to local guidelines. The participation of researchers with expertise in human behavior, ergonomics, psychology, and anthropology is needed.
- New PPE design and testing should be conducted because wearing N95 respirators universally is uncomfortable and potentially impedes team communication.
- We need to better understand the risk for transmission from aerosolized blood and body fluid. According to limited data from the CDC, COVID-19 has been detected in blood specimens, and it is unknown whether the virus is viable or infectious in extrapulmonary specimens.

For use of PPE and health care providers' perceptions, this is related to what's going on now with the general public. Some people think it's against their democratic rights to have to wear a mask. I know in the hospital when we had to get the flu vaccine, people were totally against that, and so we might say that people have to wear PPE, but are they adhering? Is there a better way to get people to wear the PPE properly or to get them to be more consistent, to get them to believe in it? Just because we say people should do it—are they really doing it and what are the reasons not to do it? How can we improve it?

For respirator design, we've all seen pictures of health care workers with the blisters on their faces from wearing tight masks for so long. Special lotions or ointments may protect the skin. There's some—they call them PAPRs or elastomer respirators—that aren't as tight, but the problem is that the exhaled air isn't filtered, so they're not good for use in the OR. That's why it's important to come up with something that's more comfortable and more fitting in the OR because of the sterile environment.

On the topic of aerosolized blood and body fluid—the virus has been identified in these fluids. So, if I have a patient with COVID-19 and they have a bowel obstruction and I'm performing a bowel resection, is that virus being transmitted through the air or through manipulation of their tissue? We at AORN are saying to be cautious. You should consider those ways of transmitting and, if possible, wear the N95 respirator and use a smoke evacuator, but we don't have concrete studies yet.

AORN Journal: What types of questions related to the guideline have you received recently (whether via the consult line, ORNurseLink, or a different channel)?

deKay: The questions I get for this guideline are around use of PAPRs in the OR, wearing an N95 respirator for all surgical procedures, what are considered aerosol-generating procedures, how and where to doff PPE, and when to discontinue transmission-based precautions for patients with COVID-19.

The reason nurses focus on these questions goes back to my explanation about what research needs to be done.

Additional Resources

Guideline for surgical attire. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021:1015-1032.

Guideline for environmental cleaning. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021:145-176.

Guideline for the design and maintenance of the surgical suite. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021:51-82.

Guideline for transmission-based precautions. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021:1097-1124.

Spruce L, Link T, Anderson MA, et al. *Perioperative Care of the COVID-19 Patient*. AORN eGuidelines+. <https://aornguidelines.org/books?bookid=2290> [subscription required].

COVID-19 (Coronavirus) AORN Tool Kit. AORN. <https://www.aorn.org/about-aorn/aorn-news-room/covid-19-coronavirus>. Accessed December 18, 2020.

Joint Statement: Roadmap for Maintaining Essential Surgery During COVID-19 Pandemic. AORN. <https://www.aorn.org/guidelines/aorn-support/roadmap-for-maintaining-essential-surgery-during-covid-19>. Accessed December 18, 2020.

There's no clear guidance from the CDC regarding what OR procedures are considered aerosol-generating. So, they just want to confirm with us, and again we refer them to the frequently asked questions on our web site. We err on the side of caution: if you're performing surgery in the upper airway, then for sure you want to protect yourself with an N95 respirator and, if you can, use a smoke evacuator. I think the frustration in the OR has been that the CDC isn't necessarily addressing surgical procedures but care of patients on the floor or in the intensive care unit, and so perioperative nurses are looking to us for some guidance on that.

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