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Hope Springs Eternal for a Return to Normal

As I write, we are hopefully emerging from the holiday surge. By the time you read this, who knows? Coronavirus disease 2019 (COVID-19) surprises us time after time, and not pleasantly. Last month, I gave a hearty pat on the back to the pharmaceutical companies for developing multiple effective vaccine candidates in just 9 months in a truly incredible feat.

Since that time, we have learned about several COVID-19 variants that could threaten that efficacy. But even within these pages, there are notes of optimism. As Editorial Advisory Board (EAB) member Kevin Kavanagh, MD, MS, pointed out in a recent posting on Infection Control Today’s website, “the fact that all 3 of these lineages [for 3 COVID variants] came up with the same mutation means that a single vaccine or booster shot may be able to neutralize, or at least have some activity against, all these strains.” We’ll take it.

Although it’s hard to predict what the pandemic’s status will be by the time you read this, it’s a pretty safe bet that infection preventionists (IPs) will be in the thick of things. And not just in hospitals, as our cover story by EAB member Sharon Ward-Fore, MS, MT(ASCP), CIC, makes clear on page 18. IPs are also needed in a number of non–health care facilities, such as schools, restaurants, gyms, local health departments, you name it. COVID-19 certainly proved just how important airflow is, not only in hospitals but in all buildings, as Cedric Steiner shows in his article on page 22.

IPs will certainly be involved in vaccination efforts at hospitals. You can find out just how that’s playing out in an article by Anjali Bisht, MPH, CIC, on page 32.

COVID-19 also underscores how essential hand hygiene is. Health care workers have long understood its importance, in theory, but adherence rates have been dismal. A combination of technology and old-fashioned monitoring methods might be the way to solve this problem. Read Jan Dyer’s article on page 24. Kavanagh sees some hopeful signs, but in our Q&A on page 28, he also says that we’ll need to find a way to coexist with COVID-19 for a very long time.

There is a lot of quality content in this issue, not just for IPs but for all health care professionals. Please send your ideas, comments, or questions to Editorial Director Alexandra Ward at award@mjhlifesciences.com.

Thank you for reading.

Mike Hennessy Sr
Chairman and Founder
Safeguarding the Patient Environment
Through Enhanced Infection Protocols with Electrostatic Technology

Healthcare facilities face numerous challenges when it comes to maintaining the safety of the patient environment. From common infection-causing viruses like influenza to multi-drug resistant organisms (MDROs) to healthcare-associated infections (HAIs) like *Clostridium difficile* (*C. difficile*), there are innumerable opportunities for patients’ well-being to be put at risk. As a result, healthcare facilities need a comprehensive approach to infection control to help maintain patient and worker safety.

**THE CHALLENGE: MAINTAINING THE SAFETY OF THE PATIENT ENVIRONMENT AGAINST THE SPREAD OF INFECTIONS**

Disinfecting surfaces in hospitals is challenging and time-consuming work, and no matter how meticulous Environmental Service (EVS) teams are some pathogens can still resist or hide out in hard-to-reach places.

In fact, research suggests only 50 percent of surfaces in patient rooms and operating rooms are effectively disinfected.[i] Proper disinfection of portable and shared medical equipment is also an important component of infection prevention as this equipment frequently becomes contaminated and often has irregular and difficult-to-clean surfaces.

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A recent study published in the *American Journal of Infection Control* showed how The Louis Stokes Cleveland Veterans Affairs Medical Center, a 215-bed acute care facility, used the Clorox® Total 360® System to help decontaminate portable equipment and waiting rooms, achieving statistically significant reductions (p < .01) of pathogens including *C. difficile*.

Use of Clorox Healthcare® Spore10® Defense™ Cleaner Disinfectant through the Clorox® Total 360® System proved to be as effective as bleach wipes in reducing *C. difficile* spores on wheelchairs, but could applied in one-fourth of the time, providing healthcare facilities with a rapid and effective means to reduce spore contamination on surfaces like never before.[ii]

The Clorox® Total 360® electrostatic sprayer works by charging and atomizing Spore Defense, delivering a powerful flow of charged particles that are attracted to surfaces with a force stronger than gravity.

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“When it comes to the cleaning and disinfection of shared and portable medical equipment such as wheelchairs and gurneys, thoroughness of cleaning is often suboptimal and application can be challenging and time-consuming,” said Curtis Donskey, MD, Infectious Disease Specialist. “This is what makes the development of this sporicidal solution and its ability to be used with electrostatic technology a substantial innovation — it helps provide a solution for healthcare facilities that wasn’t previously possible.”

---


10 *Clostridium difficile* spores only
A lot has changed this year. The way you work, the work you do, and what essential means to us all. Disinfection is now an important part of clean, and clean means confidence, safety and peace of mind for everyone who walks through your door.

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Together, we’re ready for anything.
I’m all about comebacks. I rampaged through the world in the 6th, 14th, and 19th centuries, and I can do it again. Are you afraid of coronavirus disease 2019 (COVID-19)? Well, if I return, I might just be able to dodge the miracles of modern antibiotics. That’s what we bacteria do. Think of superbugs, a term coined in 1966—just yesterday, in history—when scientists realized that bacteria have been adapting and surviving for billions of years before humans even arrived. Talk about a head start.

Yes, if I make a comeback, you’ll flee like Godzilla just came to town. I can kill millions. I have killed millions. I’m still a threat. The National Institute of Allergy and Infectious Diseases (NIAID) has never forgotten me, and I’m on the category A pathogen list. I’m in with the in-crowd, those organisms or biological agents that pose the greatest risk to public health.

I originate in warm-blooded vertebrates such as rats, mice, birds, ferrets, rabbits, squirrels, and even dogs and cats. The fleas feed on the infected critters. I go into the fleas, then the fleas carry me to you. I multiply in the flea’s esophagus until I block the proventriculus, just in front of the stomach. That makes the flea throw up infected blood when it tries to feed on the host. So, from rodents, to fleas, to humans: ick!

I work fast once I get under your skin. I travel through lymphatic vessels to lymph nodes (usually the ones closest to where the flea bit you). The lymph nodes swell, and in 1 to 7 days you’ll come “down with the flu,” or so you may think. You’ll experience fever, headaches, and vomiting. If I kill you, it’ll take me about 10 days, and I kill anywhere from 30% to 90% of those I infect. Historians and scientists estimate that when I made my rounds in the 14th century, I killed about 50 million persons.

Some historians believe that my economic impact might have been as great as my biological one. I wiped out so many working people that employers had to raise wages and compete for labor. I also made life seem cheap, which some historians think may have made warfare, crime, revolution, and persecution more inviting.

NIAID, along with other federal agencies, has been trying to find an effective vaccine against me, but so far, no go. Some antibiotics do work (dang it!), including gentamicin, doxycycline, streptomycin, ciprofloxacin, levofloxacin, moxifloxacin, and chloramphenicol.

Your physician can diagnose me by taking blood, lymph node liquid, or mucus samples. If they spot me, you’ll immediately be admitted to the hospital, where you’ll get a strong dosage of one of the above medicines.

Between 2010 and 2015, I caused 3248 cases and killed 548 individuals, according to the World Health Organization (WHO). The countries I infected most were Peru, the Democratic Republic of the Congo, and Madagascar. One of NIAID’s concerns is that I could be used as a biological weapon. Well, it wouldn’t be the first time. In the Middle Ages, armies laying siege to cities would sometimes catapult an infected cow over the walls. So, if I come back, ignore Bart Simpson and don’t have a cow, man.

Who am I?
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LITERATURE REVIEW

Asymptomatic Carriers May Play a Huge Part in COVID-19 Surge

BY FRANK DIAMOND

The winter of 2020-2021 can’t end soon enough for infection preventionists and other exhausted health care professionals battling coronavirus disease 2019 (COVID-19). It is a winter that has seen spikes in COVID-19 infections, hospitalizations, and deaths. Back in early November 2020, experts were telling Infection Control Today® (ICT®) that the public needed to greatly curtail their participation in social gatherings over the upcoming holidays. That might have happened to some extent, but not to the extent needed to avoid what has turned out to be one of the most brutal stretches in the history of US public health care.

Experts have also been telling ICT® for a long time that asymptomatic carriers make the disease particularly difficult to control. Linda Spaulding RN, BC, CIC, CHEC, warned her fellow infection preventionists back in April 2020 that they might become unknowing carriers of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). “[We] could possibly give it to our coworkers and everybody we’re around and we’re never going to know we’re an asymptomatic carrier,” she said.

The role of asymptomatic carriers continues to be explored in 2 recent studies in the American Journal of Infection Control. In 1 of the studies, investigators with the University of Louisville in Kentucky found that 37% of patients presenting at a hospital are asymptomatic carriers of SARS-CoV-2. “The proportion of asymptomatic patients admitted with SARS-CoV-2 was significant,” the authors conclude. “Identifying and isolating asymptomatic patients likely prevented exposure and development of hospital-acquired COVID-19 cases among health care workers and other patients, supporting the universal surveillance of all admitted patients.”

In the other study, investigators with Autonomou University of Zacatecas in Mexico found that 34 (42%) contacts in the study were positive for SARS-CoV-2. Twenty-three (67.6%) manifested less than 2 respiratory symptoms, and 5 (14.7%) remained asymptomatic...The average of positive contacts by index COVID-19 case (R0) was 4.3 and the mean of time of positive COVID-19 test at sampling time was 18.9 days. Positive antibody test against SARS-CoV-2 was observed in 16% of the participants."

In the University of Louisville study, investigators collected data from patients who had tested positive for COVID-19 and were admitted from April 9 to July 1, 2020, to UofL Health, an acute care hospital in Louisville. “All patients admitted to the hospital with positive SARS-CoV-2 RT-PCR tests were identified,” say the authors. “The patients who had COVID-19 symptoms on admission were analyzed separately from those who were asymptomatic.”

Of the 103 patients who tested positive for the coronavirus, 65 were symptomatic and 38 were asymptomatic. “The proportion of SARS-CoV-2 patients who were asymptomatic varied over the duration of the study, but trended up from 20% at the onset of the study period to 60% at the end,” the investigators write.

Assume that everybody in a hospital setting might be an asymptomatic carrier of COVID-19. This will better protect not only patients but infection preventionists and other health care workers as well.

“An important strategy to protect health care workers and other patients is to perform a surveillance test on all patients admitted to the hospital,” the University of Louisville investigators state. “In addition...
Infection Control Today 

Environmental Services Workers Not Feeling the Love

BY FRANK DIAMOND

Environmental services (EVS) teams play a crucial (but often unsung) role in preventing infection at hospitals and long-term care facilities (LTCFs). However, they are not trained as well as they should be and see themselves as having a low social status, according to findings from a study in the American Journal of Infection Control. Investigators with Clemson University carried out a systematic literature review of English language studies about EVS conducted between 2000 and 2009.

Although environmental services workers (ESWs) felt they provided little value to the organizations they worked for, most nonetheless believed that the work itself was important in keeping patients safe from infections. The problem is that ESWs are not trained in any systematic and ongoing manner, the investigators note.

“To sustain improvements in disinfection practices, education/training sessions need to be continuous,” they write. “The long-term commitment of an organization is also essential for continuous improvement in disinfection outcomes. While knowledge transfer is critical for behavior change, education/training also needs to focus on the skills and perceptions of ESWs.”

On reviewing 31 studies, the investigators noted that although ESWs know how to do their jobs, that knowledge “does not address many of the barriers identified by ESWs, such as high work demands, ‘me/us versus them,’ interruptions, low status or value for ESWs, and lack of communication.”

ESW training should focus not only on organizational and work environment elements, but on intrapersonal and interpersonal skills. “Even in a skills-focused field like environmental services, leadership, self-management, conflict resolution, communication, emotional intelligence, and other ‘soft skills’ are necessary to perform the job effectively,” the investigators state.

But how to measure how well ESWs perform? In the best of all worlds, that

REFERENCES
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The correct way to draw blood from patients using central venous and short peripheral catheters can be found in Infusion Nurses Society (INS) standards, but the society has no official standards for the use of midline catheters (MCs). According to the authors of a study in the *Journal of the Association for Vascular Access*, that’s because there simply aren’t enough data yet for the INS or any other organization to create standards for MCs.

### Gauging Performance of Midline Catheters

**BY FRANK DIAMOND**

The correct way to draw blood from patients using central venous and short peripheral catheters can be found in Infusion Nurses Society (INS) standards, but the society has no official standards for the use of midline catheters (MCs). According to the authors of a study in the *Journal of the Association for Vascular Access*, that’s because there simply aren’t enough data yet for the INS or any other organization to create standards for MCs.

Many members of environmental services teams feel underappreciated and these health care professionals are not trained in any systematic and continuous way.

At any rate, training about pathogens and microbials should be handled with care. “Many ESWs may not be able to understand advanced microbiology, so information in some areas (eg, pathogens) should be simple.” Rather than giving detailed descriptions of what pathogens are, for example, educators should focus on how they can spread in hospital environments and the procedures ESWs can implement to prevent their spread.

Investigators also noted a dearth of data about EVS at LTCFs, which have been a nexus for the coronavirus disease 2019 (COVID-19) pandemic. Only 1 study looked at the role of EVS in LTCFs.

“Long-term care facilities have been reported to pay considerably less attention to disinfection than hospitals, perhaps because of limited staff, insufficient infection prevention education, and staff perception of isolation and contact precautions,” say the investigators.

According to findings from the 31 studies, ESW training involved presentations, instruction booklets, photographs, checklists, and online education modules. Training interventions covered the importance of environmental disinfection, importance of disinfecting frequently touched objects, and transmission of health care–associated pathogens and infections. “Opportunities for providing feedback during the intervention was reported as a motivational strategy in many studies to improve performance,” write Clemson University authors.

The main point of the current study is that hospitals and LTCFs must make more of an effort to train ESWs and make them feel welcome.

“Even with the ongoing COVID-19 pandemic highlighting disease transmission in health care facilities, environmental services is still an occupation that receives little attention in society, and carries low occupational prestige in the United States,” the authors note. “In the United States, many ESWs are immigrants, people of color, and receive low wages. The reviewed studies identified many ESWs who feel limited respect, appreciation, or positive feedback at work, yet ESWs consistently identified the need to do the job well. They are concerned about patient safety, which forces them to do a good job even if it takes too much time and they are possibly underappreciated.”

### REFERENCES


Investigators with Orlando Regional Medical Center (ORMC) in Florida gathered data in a prospective, observational, mixed methods study. They measured outcomes from blood samples drawn by MCs, then examined them in the facility’s laboratory.

The authors collected data from 378 patients over 3 months. ORMC uses an MC manufactured by BD, a company that makes medical devices.

“While studies have been reported on outcomes of use with midline catheters, such as dwell time, complications, completion of therapy, and recommended processes for maintenance and administration of fluids and medications, little was known or reported about procedures for blood collections or outcomes from performance for this function,” BD said in a press release.

The ORMC investigators measured the following when MCs were used:

- Number of red blood cells ruptured or destroyed;
- Outcomes in an acute care setting, such as dwell time and performance during blood sampling; and
- What nurses who used the MCs thought about using the tool.

“Findings indicated that blood withdrawal from one specific type of MC had low rates of hemolysis, increased dwell time, and completion of therapy,” the authors state.

In addition, “in 338 patients who received therapy through their MC (n = 338), 87% completed intended therapy: 88% with blood withdrawal and 81% without blood withdrawal. Qualitative analysis from focus groups demonstrated wide variation in practice for blood sampling from MCs, and most learned techniques from their preceptors, other nurses, or patients.”

Lead Investigator Daleen Penoyer, PhD, RN, said in the BD press release, “Our findings demonstrated that blood samples were successfully withdrawn from this type of midline catheter with very low rates of hemolysis. While recognizing that this was a single site study, this data may further support the use of midlines for the purpose of blood sampling and could potentially reduce unnecessary repeated venipunctures.”

According to the study authors, “Hemolysis rate when the MC was used for blood withdrawal was 0.69% in 1021 tests. More than half [of patients] had blood specimens drawn through the MC, and the time known for the successful withdrawal was on average 64 ± 85 hours. Mean dwell time for all MCs was 108.5 ± 98 hours. … When MCs were used for blood withdrawal, mean dwell time was 127.19 ± 109.13 hours and for MCs not used for blood withdrawal, 88.34 ± 79.86 hours (P < .001).”

If further studies come to similar conclusions, the midline catheter option could “reduce need for direct venipuncture in patients who have midline catheters with ongoing or frequent blood collection for testing...” the study states.

We Want to Hear From You!

Do you have opinions about concerns raised in any of the articles in this issue? How has your hospital been handling COVID-19? Have any IP success stories? Let us know!

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Health Care Workers Can Get COVID-19 Twice (at Least)

BY INFECTION CONTROL TODAY® EDITORIAL STAFF

As the coronavirus disease 2019 (COVID-19) pandemic continues, the need for infection preventionists and other health care professionals to man the front lines against the novel coronavirus grows every day. When health care professionals are infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), if the symptoms are manageable, they are quarantined for 7 or 10 or 14 days, as the US Centers for Disease Control and Prevention (CDC) adjusts guidelines. Then many of those professionals—they’ve been called heroes with good reason—get right back in the battle. Because they have already had the disease, they’re now immune. But for how long?

About 5 months for nearly 17% of those workers, according to a study by Public Health England (PHE). Findings from the study, of approximately 20,000 health care workers in Great Britain, show that “antibody protection a/f_t_liga  er infection lasts for at least 5 months, on average, and scientists are currently studying whether protection may last for longer,” PHE said in a press release. “This means that many people who contracted the disease in the first wave may now be vulnerable to catching it again.”

Infection preventionists and other health care workers who caught COVID-19 in the first wave could be reinfected.

The SIREN (SARS-CoV-2 immunity and reinfection evaluation) study investigators examined data of health care workers collected from June 18 to November 24, 2020. They found 44 reinfections—2 classified as “probable” and 42 as “possible”—among 6614 workers who had tested positive for antibodies. That’s an 83% protection rate from being reinfected by COVID-19.

However, asymptomatic carriers continue to be a major cause of COVID-19 spread. And despite the fact that 83% of health care workers appear to be immune from reinfection after 5 months, those who work, live, or gather with them may not be so lucky. These findings represent only the first stage of the SIREN study.

According to the PHE press release, “although those with antibodies have some protection from becoming ill with COVID-19 themselves, early evidence from the next stage of the study suggests that some of these individuals carry high levels of virus and could continue to transmit the virus to others.”

Just how much protection the COVID-19 vaccines provide and for how long were not part of the investigation. As is the case with nearly all expert advice about avoiding COVID-19 infection, the SIREN investigators emphasize that the so-called low-tech methods of infection prevention still need to be followed: hand hygiene, social distancing, and masking.

“We now know that most of those who have had the virus, and developed antibodies, are protected from reinfection, but this is not total and we do not yet know how long protection lasts. Crucially, we believe people may still be able to pass the virus on,” said PHE. “This means even if you believe you already had the disease and are protected, you can be reassured it is highly unlikely you will develop severe infections, but there is still a risk that you could acquire an infection and transmit to others. Now more than ever it is vital we all stay at home to protect our health service and save lives.”

REFERENCES AVAILABLE AT INFECTIONCONTROLTODAY.COM
Can We Stop Wasting the COVID-19 Vaccine?

BY PARTH MEHTA, MD, MPH, FHM

Coronavirus disease 2019 (COVID-19) has killed hundreds of thousands of people in the United States and, as I write this, hospitalization, infection, and mortality rates continue to rise. Amid this depressing scenario, there is some ray of hope in the form of COVID-19 vaccines. Many of us on the front lines have actually had the vaccine and some of us have already received our second doses as well.

Although that is great, we are not doing so well when it comes to the vaccine rollout to the general public. Inefficiency, limited cold storage capacity, stringent prioritization guidelines, and a lack of innovative approach throughout the system, which is supposed to roll out the vaccine smoothly, have led to several million doses lying on shelves, expiring.

What we really need is more vaccine doses to reach more people more quickly. The goal of the vaccine is to prevent additional infections, hospitalizations, and deaths; help us attain herd immunity; and control the pandemic. Eventually, we may get there, but the way things are going it will take a very long time. Some reports suggest it could take 10 years. Such estimates suggest that this approach can reduce the number of new infections by 34% to 42%.

Also, the vaccines that have shipped already and those that are shipping soon are usually cleared for 30 days’ storage. However, most states don’t have the infrastructure to store them at the ultracold temperatures necessary to extend their shelf life. This means that if those doses are not used due to strict phasing guidelines, they will expire and be thrown away.

We are in the midst of a deadly pandemic, but fortunately we received the vaccines a few months earlier than anticipated. We can’t afford to waste these precious doses. State governments need to make sure that frontline and essential workers and elderly patients are prioritized for receiving the vaccine, and they must ensure they avoid letting additional doses expire. They also must consider alternatives for rolling out more first doses and find ways to tackle the problem of those individuals who do not wish to receive the vaccine.

As a nation, our overall response to COVID-19 has been disastrous. Not only were we caught unprepared, but the pandemic has completely exposed our already broken system. The least we can do now is get our act together, execute our nationwide vaccination campaign efficiently and smartly, and prevent this pandemic from becoming an even bigger disaster.

PARTH MEHTA, MD, MPH, FHM, SFHM, FAPCR, is a hospitalist and the chief medical information officer at UnityPoint Health in Peoria, Illinois. He also serves as an elected member of the International Medical Graduates Governing Council at the American Medical Association.

To read more, visit https://bit.ly/3itnDPx.
Interactive

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Pressure’s on to Build Negative Pressure Facilities
Cedric Steiner: “But the nursing home…. One could make an argument that [infection control is] more important there in some ways, because have you those residents in smaller spaces. You have a lot of visitors coming in and out. You have health care workers, and one of the problems is sharing of health care workers. A lot more sharing of health care workers happens in nursing homes then it does in hospitals.”

Better Protection from COVID Needed for Providers
Kristy Warren: “We may need to add some additional barriers when we’re doing these procedures. Not to mention when we’re doing these procedures, we’re also in very close proximity to the patient’s face, if not inches from the patient’s airway. And this is why the [SARS-CoV-2] virus is so dangerous.”
WATCH: https://bit.ly/3BFqP2S

Q&A: ‘It’s Far Worse Than COVID’
Ravi Starzl, PhD: “If you’re constantly focused on trying to escalate the war of destruction, I think that the bacteria will always win that war.”

To see more interviews with expert clinicians and healthcare professionals, visit www.mjhlifesciences.com/news-network

Notable Quotables

Currently, US states and hospitals are working to identify their rollout plans. For many in health care though, the question will be—who goes first? Part of this will involve infection prevention efforts and insights—who are those most at risk and involved in exposures? One piece will be to involve those working on designated COVID-19 units and high-risk areas, like emergency departments and urgent care clinics.

—SASKIA V. POPESCU, PHD, MPH, MA, CIC, INFECTION CONTROL EXPERT
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It’s almost hard to believe the United States has been dealing with coronavirus disease 2019 (COVID-19) since January 20, 2020. The virus is still raging around the world. Health care is still struggling to keep up. Many businesses, large and small, have closed for good. Everyday activities such as getting your hair cut, going to the grocery store, gathering with friends, going to school or work, and eating at your favorite restaurant have changed drastically. These struggles and changes, in the health care and non–health care sectors, may affect things forever, at least in some ways. Fortunately, COVID-19 vaccine distribution has already started for frontline workers and long-term care/congregate facilities. Essential workers will be next in line for vaccination to help to revive the struggling non–health care sector. However, it will be too late for many working in restaurants and other businesses that lacked the same resources and level of preparedness as the health care industry.

Those working in health care have learned a lot during the pandemic about keeping patients and staff safe; managing supply chain items such as personal protective equipment (PPE), disinfectants, and other critical supplies; and preparing for shortages of staff and their emotional needs. Preparedness planning was something most facilities reviewed annually. Now, they are reviewing plans to determine when it might be safe to resume elective surgeries and other procedures placed on hold, as the pandemic becomes more manageable due to vaccination. Health care relies on specific guidance from the Centers for Disease Control and Prevention (CDC), and state and local agencies. They have plenty of resources available, including staff such as infection preventionists (IPs) to safely guide them along the journey to reopening and fully resuming care.

Dentists and Veterinarians
Dentistry has a very strong COVID-19 program guided by the CDC in collaboration with the American Dental Association (ADA). And they should have, as most of what they do involves performing aerosol-generating procedures, placing dentistry into a high-risk group category. The ADA offers a robust Return to Work Interim Guidance Toolkit and a COVID-19 Hazard Assessment & Checklist with recommendations for before, during, and
after appointments to protect dentists, patients, and staff. Dentists and their staff were already well versed in using PPE and cleaning and disinfecting patient care equipment. Typically, they designate someone as their infection control person who can answer questions and provide guidance and training. They were able to ramp up procedures and see patients safely, gradually resuming the provision of dental services.

The American Veterinary Medical Association (AVMA) also had a tremendous number of resources for safely managing their practices and patients during the pandemic. They produced a comprehensive risk management guide, Resuming Veterinary Practice Operations During the COVID 19 Pandemic (described as a “playbook to help our veterinary practices recover by addressing specific issues that relate to your team, patients and clients, property, and the practice’s profitability”).

The CDC also provided additional guidance for veterinarians, including specific recommendations about companion animal practice, recommending screening companion animals for exposure to people with COVID-19. Additionally, veterinarians are familiar with PPE use, cleaning, and disinfection, and had many resources to guide practice and answer questions. Their practices were up and running fairly quickly with mitigation procedures in place to keep staff, clients, and pets safe.

Health care, be it for animals, humans, or teeth, had plenty of experience with the nuts and bolts of providing care. They had PPE use, disinfectants, and a wealth of resources at their fingertips, including financial ones.

However, the non–health care sector—corporations, schools, fitness centers, libraries, hair salons, restaurants, and other businesses—was not so fortunate. They did not have access to an abundance of resources, exposing a huge, glaring knowledge and resource gap that threatened their existence. Very few, if any, had a preparedness plan. Their guidance has been general, mostly “one size fits all,” at best, from the CDC, the World Health Organization, and state and local agencies.

This is not to fault any agency, because saving lives was and still is the priority; health care was overwhelmed with patients, so resources were naturally directed to patient care. But the non–health care sector was left to struggle more or less on its own, interpreting guidelines that were ambiguous at best, with terminology and processes that few were familiar with, such as contact time and PPE. Their experience was not in PPE or pandemics but in cutting hair, preparing food, providing fitness classes, teaching children, and helping you find a good book. And we thought health care had been turned on its head!

As an IP, I was shocked and worried about my safety and others’ when I ventured out to a grocery store or small business. I saw single-layer bandanas open at the bottom, gaiters soaked in water in hopes of preventing virus spread, a homemade face shield made from a plastic page protector attached to a cloth headband, face shields without masks, welding helmets, and even a swim mask with a snorkel attached—I kid you not. The vast, creative interpretation of PPE took my breath away. And everyone seemed to touch or adjust their mask every few seconds. It was maddening. And don’t get me started on social distancing.

They had no one trained in hand hygiene, respiratory etiquette, cleaning and disinfection, or PPE selection and how to wear it, and who could work with their staff. There was no one to call or page in the middle of the night with questions. They were essentially figuring it out for themselves to the best of their abilities. As the pandemic wears on, the toll it has taken on businesses of every kind, both large and small, is enormous. Livelihoods are at stake. The non–health care sector needs more than a bunch of guidelines to help them.

In response to this need, some programs became available for businesses or individual employees, such as an online course covering what COVID is and how
it spreads; masking, hand hygiene, and cleaning; and basic safe workplace practices. Upon completion of one 50-minute course you can be “COVID certified.” These basic courses are a good start but may also lead to a level of competency that isn’t really there. Passing a computerized course, putting what was learned into place, and making sure it “sticks” are not easy to do.

As an IP, I know that practices drift, not everyone learns in the same way, and auditing practices are vital, especially those you are unfamiliar with.

What is required is a more robust program specifically fine-tuned to a particular business. A relationship such as the one IPs have with their units—one someone designated to guide them, answer questions, and be there for them—would be ideal. And there are IP consultants who work with non–health care sectors in exactly this way.

They provide hands-on training, auditing, and protocols, and act as a resource to help those in the non–health care sector operate safely during the COVID-19 pandemic.

I spoke with Phenelle Segal, RN, CIC, FAPIC, the president of Infection Control Consulting Services, LLC, to get her take on the challenges of the non–health care sector. She said, “The challenge for the non–health care industry has been the extensive volume of guidance coming from nationally recognized agencies. Guidelines are often confusing, and the non–health care sector has done a good job of interpreting general guidelines and adapting them to the best of their ability. The gray areas subject to interpretation and finer details are definitely challenging, and that is where external assistance is needed.

“Our experience has been very positive as these industries rely on our expertise to guide them to... keep their employees and customers or clients as safe as possible. We are amazed at the conscientious approach of our non–health care clients and their level of involvement to do the best for their employees and customers or clients. Several clients had already implemented policies and procedures... and needed us to validate and provide further guidance.” This is what is needed to help the non–health care sector survive and thrive during COVID-19—an ongoing relationship with an expert who is there for them every step of the way.

An Opportunity
Unfortunately, there will be other pandemics and outbreaks in the future. So, I see this as an opportunity for IPs, specifically, to use what they have learned in their health care roles to help guide the non–health care sector to success. IPs have the skill set to provide guidance beyond the health care setting. We know how to select PPE and how to use it. Cleaning and disinfection are like breathing to us. Issues concerning construction and renovation, including heating, ventilation, and air conditioning systems and the importance of air exchanges, are something we deal with all the time. We routinely train others, answer questions, and provide guidance and resources. We can and should begin to look at helping the non–health care sector so they can safely thrive now and in the future. Perhaps, working with our local public health departments, we can model the approach health department inspectors use for restaurants, salons, schools, and businesses, focusing on COVID-19 mitigation and staff training. We can visit businesses and help them make a plan. The need is there: we can help guide the non–health care sector and validate their best practices so they can safely open their business, school, or church during the pandemic. Their employees need us. Our economy needs us. We should think about how we can step up and help because this is what we are good at. We can do this.

SHARON WARD-FORE, MS, MT(ASCP), CIC, is an infection prevention consultant located in Chicago, Illinois. She is also a member of the Infection Control Today® Editorial Advisory Board.

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OUR SHARED PURPOSE: SAFE SURGERY TOGETHER
COVID-19 Pandemic Proved Importance of Airflow in Buildings

BY CEDRIC STEINER

The airflow in your facility may have been overlooked prior to coronavirus disease 2019 (COVID-19) but that has changed. When it comes to infection control and prevention, it’s time to focus on this critical element for patient and provider safety. Take a moment to consider where the air supply directly overhead comes from. Infectious agents or suboptimal environmental conditions, perpetuated by the air supply, will exacerbate infections.

To manage a highly transmittable disease such as COVID-19, organizations have used altered airflows, or more specifically negative pressure, within their facilities to increase air exchanges and optimize fresh outdoor air. I first became involved in such a project while serving at a skilled nursing facility. To manage the oncoming crisis and uncertainty associated with admissions, quarantine procedures, and hospital capacities, I worked with Shelly Miller and a group of colleagues at the University of Colorado to convert a rehabilitation hallway into a negative pressure space. We performed computational fluid dynamics and particle-based modeling to test containment. The isolation space was successful both in our model and in practice at controlling transmission between residents and staff.

Outbreaks such as the Ebola virus disease of 2014-2016 encouraged the thinking behind building designs to include the capability of achieving negative pressure over large areas. Engineers at Children’s Hospital of Philadelphia foresaw a looming pandemic and designed their buildings with the ability to respond. Hospital officials can convert several floors into airborne infection isolation (AII) rooms, more commonly termed negative pressure rooms, with the flip of a switch. In the most recent pandemic, this innovation and foresight has proved to be tremendously beneficial.

According to Rachel McCarthy, vice president of plant operations at Children’s Hospital of Philadelphia, the hospital’s newest design has the ability to convert 2 floors, 3 wards, and more than 150 rooms to AII rooms. The building management system (BMS) uses computer software to adjust the mechanical and electrical equipment throughout the building to achieve the desired results. At the request of administration and the infection control and prevention team, this system can be turned on to achieve the desired airflows throughout the building. But this requires the necessary infrastructure. Controls, equipment, and sensors need to be installed and building management must be trained. I’m convinced these improvements should be a future investment in public health that should not only be in hospitals but in other health care settings, such as skilled nursing facilities. As McCarthy puts it, “Managing a pandemic without a problem requires [personal protective equipment], testing, and negative pressure,” a 3-pronged approach.

Officials at Children’s Hospital of Philadelphia have the ability to convert several floors into airborne infection isolation (AII) rooms, or negative pressure rooms, with the flip of a switch.
In a recent conversation, he outlined some innovations and challenges currently being explored in new building design across transportation, manufacturing, and health care. “Smart building,” or building automation, is used to denote buildings with integrated controls and data collection. This often involves the automation of multiple interrelated systems such as heating, ventilation, and air conditioning, electrical, lighting, access control, and security systems through a BMS. Imagine taking this a step further where patient data and health care provider information are integrated into the building. Clements discussed a scenario in which future infections would be identified rapidly before they could spread. This could be done through a BMS that contained integrated patient data and diagnostic technologies employed in monitoring airflows.

For example, microfluidic systems and biosensors, used for clinical diagnostic purposes, could be integrated into a building system to provide clinical data. One type, the local evanescent array coupled (LEAC) biosensor, uses optical immunosensor sensors that permit the detection of up to hundreds of target biomolecules and viruses. The chemical and biological engineering program at Colorado State University has a group focused on this technology. These sensors require no reagents, are low cost, and operate as a lab-on-a-chip with integrated circuits.

These diagnostic tools could alert building occupants and confirm the spread of an infection. An integrated BMS that contains pressure monitors could also adjust pressure zones and air supply, further protecting a region within a hospital. When combined with patient and health care tracking, this information could be used to identify the source of an infection. According to Clements, “the challenges of a smart building require the whole organization to innovate.”

**Regulations**

In a truly integrated BMS, many monitors and systems need to feed back into the control platform. Currently, these systems are often standalone or siloed in a BMS and require a control engineer to integrate the data—a significant burden. A cloud-based system could alleviate difficulties in staffing information technology technicians and data management scientists.

The current COVID-19 pandemic will spur innovation most likely in the direction of vaccines, testing, and airflows. When it comes to airflows, keep an eye on ANSI/ASHRAE/ASHE Standard 170-2017, which currently details guidelines for environmental controls within health care facilities. The standard, which establishes the parameters for ventilation of health care facilities, will need to guide decisions between infection control teams and building management. Standard 170-2017 allows retrofits to be made to convert standard patient rooms into AIr facilities. Infection control teams should be in discussion with facility management on these possibilities if we are to expect any future improvement in managing infectious agents similar to COVID-19. I expect the future holds some exciting building management tools for the infection control preventionist.

CEDRIC STEINER is a licensed nursing home administrator in Lancaster County, Pennsylvania. Contact him at steiner@gshhc.com to learn more about the use of negative pressure for immediate or future COVID-19 roles.

REFERENCES AVAILABLE AT INFECTIONCONTROLTODAY.COM
A clinician walks out of a patient’s room. Seconds tick by. The clinician takes a bit too long to clean his hands. “Please sanitize,” a calm voice says. It’s coming from his belt, apparently.

Actually, it’s coming from the badge attached to the belt. The badge reel contains Bluetooth technology, which communicates with sensors affixed to soap and sanitizer dispensers parked in various places around the patient care area.

If hospital administrators could have one wish, it might be to have 100% adherence with hand hygiene protocols. So, they are doing everything they can to encourage adherence, which is particularly critical now when people (including 3142 health care workers as of January 7, 2021) are still dying of coronavirus disease 2019 (COVID-19).1

Electronic monitoring, sensors, and voice prompts aren’t new, and the technology keeps evolving. The Clean Hands–Safe Hands system allows users to customize the audio file reminder with their preferred voice and content, such as an infection preventionist (IP) or a child.

Personalized touches like that are born of experience. Hospital experts know that monitoring alone doesn’t change behavior. In fact, technology alone isn’t always the answer either. Some of the most effective systems are a hybrid of the latest technology and traditional methods such as rewards and recognition.

**Computer Screensavers**

Take the solutions they came up with at Sentara Healthcare, a not-for-profit integrated health care system based in Norfolk, Virginia. With 12 hospitals, 4 medical groups, and more than 30,000 employees, it’s Virginia’s largest health care system. Nearly 10 years ago, after a large group of health care professionals there did some brainstorming about best hand hygiene practices, Sentara hired QualPro, a quality control consultancy, to test and analyze 21 interventions. Eventually, Sentara decided on interventions that included computer screen savers encouraging hand hygiene and awarding Hero of the Month titles to employees with high adherence rates. Other low-tech interventions included red stop signs to remind staff to wash their hands and random quizzes.

They didn’t stop there. Sentara’s adherence rates “are generally in the 90s, but ‘secret shopper’ audits show lower adherence that varies,” says Linda Estep, manager of infection prevention and control. “This is driving the push for electronic auditing that captures all opportunities we set up, and measures adherence more widely and accurately. Our manual audits are time-consuming and may not cover all shifts consistently. Currently, we’re reviewing electronic hand hygiene monitoring to expand our ability to capture a wider picture of adherence across all shifts.”

In fact, methods such as secret shoppers have underscored the need for more advanced methods of monitoring adherence. Study findings have shown that direct observation captures only a small percentage of all events. What’s more, it can massively overstate actual adherence.

Sentara’s ongoing hand hygiene campaigns are very successful, Estep says. “We update our approach regularly and we pay careful attention to our rates, as well as what we see when rounding on patient care...
units.” Keeping the message fresh is important, she notes.

Sentara not only has a top-down approach led by divisional leaders, but also peer-coaching efforts that address and overcome the “authority” gradient. “Sentara has a solid, long-standing culture that infection prevention is everyone’s job,” Estep says.

That means getting everyone on board. One of Sentara’s most successful campaigns is All Hands On Deck (AHOD). AHOD is Sentara’s code word to remind staff they forgot to clean their hands when required. “It’s a fun way to deliver the reminder,” Estep remarks. Leaders also model the correct response: Thank the person for the reminder and immediately sanitize hands. “Negative responses prevent our more shy staff from stepping up to coach,” Estep says. “We’re all responsible for creating a culture that promotes coaching.”

The Johns Hopkins Hospital in Baltimore, Maryland, has also found that the personal touch helps keep an adherence program from running out of steam. The hospital doubled rates of adherence with hand hygiene protocols between 2007 and 2008, and increased adherence again by 27% between 2008 and 2009. How? How? With a hospital-wide communication and education campaign called WIPES:

- Wash/clean hands
- Identify and isolate early
- Precautions use (eg, gowns, gloves, and masks)
- Environment kept clean
- Share the commitment, raise your hand

Hanan J. Aboumatar, MD, MPH, a family practitioner focusing on behavior change and an assistant professor at Johns Hopkins School of Medicine and Johns Hopkins Bloomberg School of Public Health, and Polly Trexler, MS, CIC, director of operations for the Department of Hospital Epidemiology and Infection Control at The Johns Hopkins Hospital, started the program “because there was a lot of work to do.” They spent about a year planning, looking at behavior, and researching how to change it. They used focus groups with hospital staff and leaders to understand the issues and which behavior models to support.

Accountability Matters

The WIPES project included the usual steps of putting up posters and hosting sessions about the importance of using sanitizers. “The program helped increase adherence significantly,” says Trexler. “Then we stalled for a while. People were lagging behind. So, about 5 years into the project we added [the component of] direct feedback. We hired someone in addition to secret shoppers to address those employees who were a little

Using Technology to Stay Safer

In 1999, Kevin Ashton, of Procter & Gamble, coined the term “Internet of Things” to describe that universe of computers communicating with each other almost independently of humans.

In 2015, in an interview with Smithsonian Magazine, he said, “In the 20th century, computers were brains without senses—they only knew what we told them. That was a huge limitation: There is many billion times more information in the world than people could possibly type in through a keyboard or scan with a barcode. In the 21st century, because of the Internet of Things, computers can sense things for themselves.”

Consequently, we now have GPS; smart phones, TVs, and refrigerators; and devices that know when we’re home and when we aren’t.

We also have systems that can tell when health care personnel are washing their hands and when they aren’t—and reminds them when they don’t. The data those systems provide also help hospital managers understand transmission risk. In this coronavirus disease 2019 (COVID-19) pandemic, knowing where hotspots might be lurking is critical.

Here’s a brief look at some of the technological tools available:

- **Clean Hands-Safe Hands** (CHSH) technology helps hospitals identify the most efficient path to improving hand hygiene. Its patented process, which includes gamification, “nurture a culture of proactive HAI [health care–associated infection] prevention.” According to CHSH, hospitals that have used its technology and followed its process for at least 6 months have seen a decrease in HAIs of between 45% and 81%.
  
  [https://cleanhands-safehands.com/technology/](https://cleanhands-safehands.com/technology/)

- **AUVS’ KR615 UV-C Germicidal Enclosure** has been named a “Best Infection Prevention Product” by Newsweek, in association with the Leapfrog Group. Its 55-second disinfection “UV Box,” used throughout more than 700 hospitals and hospital groups, provides up to 99.999% disinfection. According to AUVS, the surface disinfection technology in its products is similar to the technology used in the air systems at the US Pentagon to protect against bioterrorism.
  
  [www.advanceduvsystems.com/](www.advanceduvsystems.com/)

- **BioVigil**, with a configurable dashboard, provides on-demand intelligence and actionable insights about adherence and clinical workflows. The insights are color coded and available in easy-to-read graphs, making it simple to track adherence history. The company says study results have found its use reduces HAIs and staff absenteeism due to illness.
  
The **DebMed Electronic Hand Hygiene Adherence System** is, according to the company, the only research-based, badge-free system that tracks adherence based on the World Health Organization’s 5 Moments, the Canadian 4 Moments, and the Centers for Disease Control and Prevention’s (CDC) hand hygiene standards. The system can capture 100% of hand hygiene events and opportunities, beyond just room entry and exit. Having an accurate number of hand hygiene opportunities and comparing them to 100% of all hand hygiene events collected, the system provides true adherence rates, providing actionable feedback for the group “without singling out individuals.”

www.debmed.com/electronic-monitoring-system/

**SwipeSense** is a cloud-based sensor network that runs multiple applications simultaneously and monitors core metrics in one place. It does this “without the burden of logging in to multiple systems,” and with “little involvement from IT teams,” the company says. The system is compatible with existing or new wall dispensers. At-a-glance insights include time series comparisons, day vs night shifts, and soap vs sanitizer use. According to the company, because SwipeSense relies on proven behavior change methodologies rather than short-term gimmicks such as alerts or reminders, it leads to hospital-wide adoption. www.swipesense.com/hand-hygiene

**The Vitalacy SmartBand** was recently recognized in Newsweek’s Best in Healthcare 2020 as one of the best monitoring products for infection prevention. The band measures proximity to other SmartBands in the office. If they’re “too close for too long,” the users are notified by Vitalacy that they may have been exposed. The product does not track user location and keeps all user data anonymous from other team members and their employer. The company says the band is also the only adherence-monitoring wearable that records true adherence rates, providing actionable feedback for the group “without singling out individuals.”

www.vitalacy.com/hand-hygiene-monitoring-technology

**REFERENCE**


Hand hygiene is always important, but during this pandemic it’s crucial to preventing transmission. Now technology is making it possible for hospitals not only to monitor adherence, but also potential viral exposure.

The traditional methods—positive reinforcement, educational posters, reminders, rewards, recognition, secret shoppers—help keep the day-to-day level of adherence up, but technological innovations can make it easier for administrators to spot and calibrate for weak areas. An online reporting tool allows managers to collect data entered into a phone or iPad. “It’s real-time data that can be pulled up by hospital, service, unit, health care worker type, and timeframe,” Trexler says.

At Johns Hopkins, adherence is rewarded with the old-fashioned kind of positive reinforcement—compliments and congratulations—but also with data-based reinforcement. Taylor McIlquham, MPH, an infection control epidemiologist at The Johns Hopkins Hospital, says, “We present data to supervisors, then a talk with the supervisor, and up the chain of command. Nonadherence after 6 observations in the year means termination. But “we never go over 3 observations,” Trexler says.

Nonadherence after 6 observations in the year means termination. But “we never go over 3 observations,” Trexler says.

A successful program includes accountability, she believes, referring to “a new buzzword: Just Culture.” That is, applying discipline in a fair way to be sure staff understand expectations. But it’s also important to make it possible for them to adhere easily, for example, by having dispensers everywhere. “We set expectations to clean hands on entry and exit, changing the behavior of only cleaning on entry and then thinking ‘I didn’t touch anything’ so not cleaning on exit,” Trexler says. “We did it on purpose to create habits, and to make it simple to keep the new habits.”

The accountability model also includes escalating consequences for nonadherence, beginning with a note to the employee, a note to the supervisor, then a talk with the supervisor, and up the chain of command. Nonadherence after 6 observations in the year means termination. But “we never go over 3 observations,” Trexler says.

COVID-19 has intensified just about everything to do with infection control, including the need to find the right tools for the right situations. According to McIlquham, Johns Hopkins has spent the past 2 years looking into electronic monitoring systems, made by everyone from GE to smaller startups. Time constraints make it hard to rely on secret shoppers, she says. “We have over 50 clinical units to observe each month. Also, it can create bias [in the data] if staff begin to recognize the secret shopper.” Badges and digital monitors take out the human element, she adds. “We’re interested in technology primarily to reduce bias and understand what the
numbers actually are, to be as accurate as possible. And to use data to target which interventions improve outcomes.”

“It’s a big undertaking. “Even just doing studies, it’s a huge, huge infrastructure,” says McIlquham. “Think about thousands and thousands of people on our campus who would need the badges and monitoring tools. But we’ll continue exploring. We were doing short-term trials. Right before COVID-19 we were just about to do another but put it on the back burner for now.”

**COVID-19 Factor**

Hand hygiene is always important, but during this pandemic it’s crucial to preventing transmission. Now technology is making it possible for hospitals not only to monitor adherence, but also potential viral exposure.

SwipeSense, which initially was intended to track whether staff were washing their hands correctly, has a new application: contact tracing. Via sensors added to staff badges, managers can create a virtual “historical” map of staff whereabouts. If someone has received a COVID-19 diagnosis, administrators can better identify where the person was and who might have been in contact with them.

SwipeSense CEO Mert Iseri is fully aware of the implications of the monitoring, but in a recent interview with CNBC insists the company is “taking steps to alleviate the ‘creep’ factor.” For example, the system doesn’t track people throughout their day. Acknowledging the potential for misuse, he said, “We have to be really thoughtful about the technology we’re building.”

Used wisely, the technology is a benefit in fighting COVID-19 spread. At Edward-Elmhurst Health in Illinois, where more than 3000 workers agreed to wear the SwipeSense badge, the data populated a dashboard that, by the end of March 2020, could help administrators monitor exposures. In 1 case, they determined that 75 employees had been in the room of a patient who tested positive, so they tested those workers and isolated them for 72 hours. One tested positive and was further isolated, and the virus was contained.¹

Hazard Appalachian Regional Healthcare (ARH) in Kentucky is also using the SwipeSense technology for contact tracing. “We are 1 of only 3 hospitals in the nation who are currently utilizing this technology for contact tracing,” James J. Hensley, MLS (ASCP), CIC, system director of infection prevention for ARH, wrote in a blog on the hospital’s website.² In addition to contact tracking for staff, ARH attaches radio-frequency identification asset tags to mobile equipment such as ventilators. Through the SwipeSense Asset Tracking app, the hospital can virtually map and track equipment throughout the facility.

“This helps us identify equipment that may need [to be] assessed, cleaned, and even quarantined,” Hensley said. “The facility has location hubs connected all over, including in common areas, which ‘talk’ to staff badges and asset tags to log data for asset tracking and also for contact tracing.”¹

Sentara’s Estep says, “The pandemic has reaffirmed our focus on correct, consistent use of personal protective equipment and hand hygiene to prevent exposures. We’re compliant with the Virginia Emergency Temporary Standard for the prevention of SARS-CoV-2 [severe acute respiratory syndrome coronavirus 2], which has a high focus on staff training, including correct hand hygiene technique. We created a training video, Safe at Sentara, that covers all aspects of COVID-19 prevention, and we plan for it to become an annual educational requirement.”

Sentara also continues to explore adherence-enhancing technology. “This will not only emphasize our commitment to 100% hand hygiene adherence,” Estep says, “but also our willingness to identify gaps and opportunities and commit to the technology cost of such a project. We’re also using the more stringent Leapfrog requirements to justify electronic monitoring, since receiving additional points involves a much higher volume of audits than we can achieve manually.” (The Leapfrog Group is a national watchdog organization focused on health care safety.)

The original WIPES program at Johns Hopkins increased adherence in hand hygiene to more than 80%; the enhancements have boosted it to the 90% range, and COVID-19 has made it critical. “Adherence is higher this year than ever before,” Trexler says. “People are more conscientious. We’re hoping this habit will bleed over after the pandemic.” She sees reason for optimism. “COVID-19 will have one benefit: changing behavior.”

Hospitals might get their wish for 100% adherence granted after all.

**REFERENCES AVAILABLE AT**

**WWW.INFECTIONCONTROLTODAY.COM**

JAN DYER is a writer and editor specializing in clinical topics. She lives in Suffern, New York.

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That coronavirus disease 2019 (COVID-19) might be here to stay doesn’t mean the United States and the rest of the world can’t return to something closely resembling pre-pandemic life, says Kevin Kavanagh, MD, MS. However, the fact that animals can catch COVID-19 is just one reason why the disease is endemic, he notes. “We really do need to learn to live with the virus,” Kavanagh tells *Infection Control Today®* (ICT®). “Things will get much better, but I don’t think we’re going to be able to eliminate this virus off the face of the earth, similar to what we did with smallpox.” On the other hand, Kavanagh, a member of the ICT® Editorial Advisory Board, says he believes the new COVID-19 vaccines will be effective against the variants of the disease that have recently cropped up. Because, as he points out, “a vaccine causes a myriad of antibodies to be formed to that spike protein, and a virus would have to evade every single one of them to be successful. And that’s a tall order.”

**ICT®:** The appearance of the new COVID-19 strains made many people wonder what they might have to fear from these mutations. What are your thoughts?  
**Kavanagh:** Well, I think it was because it was timed with the vaccine that people started to pay attention to these mutations. But actually, these mutations have been going on since March 2020. And I wish at that time people [had] said, “Hey, we need to slow down the spread of this virus,” and really observed social distancing, wearing masks and obeying public health advice. You need to remember that the first mutation of significance was probably the D614G mutation, which came to the United States from Europe. That’s the prevalent strain, and it is also thought to be more infectious. This mutation just ratchets up the infectivity of this virus, which is of course a major concern. The more people get infected, the more people will potentially die or become disabled from this disease. However, currently, there’s no indication that the disease it produces is more severe. The jury’s still out on whether or not it can avoid vaccines. But looking at the science, that’s a tall order for the virus..., and it probably will not do that at this point.

**ICT®:** You mentioned people who might “die or become disabled from this disease.” What disabilities might result from COVID-19?  
**Kavanagh:** Well, one of the things that’s really frustrated me with this epidemic and pandemic is that people are totally focused on dying. In other words, who is going to have a fatality or a fatal result. But in actuality, the disabilities are much, much more concerning because [they are] even affecting the young people. And [COVID-19] can be chronically disabling to people. I’m not saying death isn’t a terrible factor or a terrible outcome, but the disability can be long term. You’ve heard the term long-haulers. And people who are hospitalized oftentimes are discharged with chronic lung, chronic kidney, and chronic heart disease. As you know, I’ve written an article in *Infection Control Today*® that advocated that, in many ways, COVID-19 is a heart and lung virus because it can have asymptomatic mild carditis, which can present decades later as a cardiac myopathy. This is to me very concerning. And as with any disease, as we learn more and more about [COVID-19], unless people die, those individuals who escaped death are often severely sick and have chronic long-lasting effects…. We really do need to also focus on that. In other words, what is the true toll on our society?  

**ICT®:** How many mutations could we possibly see with severe acute respiratory syndrome coronavirus 2?  
**Kavanagh:** There’s literally been thousands of mutations with this virus. If you go to nextstrain.org, you can see them plotted over time, and over distance and location. But only the mutations which affect either infectivity or affect the spike protein which causes attachment of this virus to the ACE2 enzyme...are important. [They’re] the ones which are discussed in the media and tend to be tracked. This is an RNA virus. It mutates quite a bit. We shouldn’t be surprised at that. But the important mutations are ones of concern and they need to be followed. Now, I should add that infectivity is a lot easier for the virus to mutate than to mutate away from a vaccine. Because as you know, a vaccine causes a myriad of antibodies to be formed to that spike protein. And a virus would have to evade every single one of them to be successful. And that’s a tall order, because in that evasion, the virus also still needs to maintain the ability of that spike protein to attach to the ACE2 inhibitor. Otherwise, it trades survival from the vaccine for loss of being able to infect and reproduce itself within the cell. This is kind of the situation we see with the measles virus, where it does a lot of mutations. But it can’t mutate out of the vaccine’s coverage because if it does, it can’t become infectious.

Now, as far as for monoclonal antibodies, or monoclonal cocktails, where you just have a small number of different types of antibodies the virus...
could evade…. There are some strains now, [including] one that I believe was detected in Scotland and in Romania, ...able to mutate and evade, for example, a single monoclonal antibody. But that's different than evading the whole vaccine. Of course, it's still possible. And if it does happen, that will be a grave concern. Luckily, with the new types of vaccines we have, they're kind of printed out in the lab. They’re not cultured, they’re not grown. You type in the sequence of that new spike protein, and out comes an mRNA, which can be inserted into the vaccine. It really is revolutionary, and it adds to safety. That would take 4 to 6 weeks to do. But nevertheless, the big problem is how do you revaccinate the entire world? We need to slow down the spread of the virus so we can slow down its mutations. That is of utmost importance. I think they have to be able to articulate this message to the public, to give this as another reason why they shouldn't be out and about and gathering. You have to remember, it's not the vaccines which prevent disease, it's vaccinations. And we don't have enough vaccinations that have been performed [yet]. And so, they need to do that. And they also need to remember that if they do see something strange, or they do see a spike in cases, or they see people…developing reinfection, they need to culture that virus and get it genetically sequenced. Contact the local health department. I'm sure they’ll... have instructions on how to do that. And certainly, the state and the CDC [Centers for Disease Control and Prevention] would be interested, because you want to make sure that a spike in reinfections is not being caused by a viral mutant. So that's going to be of utmost importance, and something they need to be looking out for. [The vaccines] will still be effective. That's what the good money is on. Can't guarantee it, but certainly, that is the likelihood and what is expected to happen. But that doesn't mean we should keep spreading around the virus, because eventually the virus may find a combination that can both maintain its attachment to the ACE2 receptor plus evade the vaccine. It's just not good to do. This is another reason why this whole philosophy of herd immunity is just rubbish and magical thinking. We're going to have to learn to live with the virus. We've talked about this before. We're not going to have everybody taking the vaccine, and the virus has already showed up in the animal population of multiple species. It is unlikely that we're going to totally eliminate the virus. I think getting a vaccine may become a yearly or every-other-year type of ritual that [we’ll] have to start to undertake.

ICT®: Why do you think herd immunity is magical thinking?
Kavanagh: Herd immunity is where there are enough infected individuals who will stop the spread of the virus, and the percentage will depend upon the infectivity of the virus. The more infectious the virus is, the more people who need to be immune. The problem is, if you have animal hosts, if your immunity drops—and it will over a couple of years—they'll just reinfect you. You won't be able to truly wipe out the virus. It's not a good strategy of getting over this, we really do need to learn to live with [it]. Things will get much better, but I don't think we're going to be able to eliminate this virus off the face of the earth, similar to what we did with smallpox. And the reason for that is it has an animal host. The idea of going out getting infected and the virus will go away, that's not going to happen. It'll get better, infections will drop dramatically, [and] we can return to a more normal life. But I think right now, it's going to be pretty much endemic either in animals or in ourselves. And that will see it reoccurring in spots or in areas. And if we all let down our guard and let down our ability to fight off the virus by not getting vaccinations, we may go through this again a decade from now. We do need to follow public health advice. And we really need to get vaccinated at this point, especially if you're a frontline worker. And it’s not if, but when you’ll come down with COVID-19.

ICT®: It seems you’re describing something like the measles and also, in a way, something like influenza [flu] that comes back every year.
Kavanagh: Well, it’s going to be kind of like the flu in that it can mutate and come back, although maybe not mutate quite as fast as the flu. It’s unlike the flu in that it affects every organ of the body. And I think it’s the people who are asymptomatic who have the primary heart and vascular involvement. Although it's asymptomatic, it still can be affecting those organs. And as you know, they account for up to 50% of the transmissions. And so, in that way, it’s very different. We’ve really never seen anything quite like this. And I believe it’s definitely deadlier than the flu…back in 1918. There are 2 reasons

“One of the things that’s really frustrated me with this epidemic and pandemic is that people are totally focused on dying… But in actuality, the disabilities are much, much more concerning because [they are] even affecting the young people.”

— KEVIN KAVANAGH, MD
Let others [go] in front of you because you’re responsible for creating the predicament...we’re in. So that is another area that I think is very frustrating.

Kavanagh: Isn’t that the crux of the situation? Human nature, isn’t that what we’re up against here?

Kavanagh: Oh, yeah, it’s all human nature, but it drives the public crazy. But this virus doesn’t care. The best example I know of is what happened at the Louisville Zoo [in Kentucky] with the snow leopards. I think I mentioned this in my article. The snow leopards, they’re very good at enforcing physical distancing, not so good at wearing masks, and they caught COVID-19. You have to do both. The virus doesn’t care. If you congregate, you give it a chance, and it’s going to spread. Your best defense right now is following public health advice. And when the vaccines are available, please get the vaccine.

Kavanagh: Any final words of advice for infection preventionists?

Kavanagh: Just that they should reassure people at this point to get the vaccine. The vaccine will in all likelihood be effective because, again, it’s very difficult for the virus to evade the myriad of antibodies that your body will produce to the spike protein, and at the same time maintain its infectivity and ability to attach to the receptor on the cell. So please message your patients not to panic but to...be diligent and follow public health advice, because an even more infectious virus can cause more deaths and is more dangerous. But the good news is, the vaccine still should work [despite the new strains], as should social distancing and wearing masks make you safer. Although this is not good news, it’s not anything I feel panic over. But it is something that should increase our diligence in following public health advice.

REFERENCES AVAILABLE AT INFECTIONCONTROILTODAY.COM
Online Resources at InfectionControlToday.com have a new look!

As you enjoy the print edition of *Infection Control Today*®, take a minute to go to our updated website for in-depth coverage and timely news and information.

Check out the Spotlight feed in the upper left corner that currently features:

**Spotlight**
- Bug of the Month
- COVID
- Mask Respirator

**Updated features include:**
- Simple and flexible interface
- Enhanced search
- Multimedia options
- Streamlined navigation
The approval of the Pfizer and Moderna coronavirus disease 2019 (COVID-19) vaccines for emergency use authorization in the United States has brought much attention and focus to the vaccination process. Because of the high demand for and low initial supply of the vaccines, the government has sought to prioritize them for individuals at highest risk for complications from COVID-19, and those who hold essential service roles that are vital to a functioning economy and health care system.

By all accounts, the rollout is still a work in progress. On January 12, Alex Azar, former head of the Department of Health and Human Services, said that focusing on health care workers and long-term care facilities has led to a vaccine distribution bottleneck. Azar issued a directive saying that people aged 65 years and older and those 16 years and older with a comorbidity should be considered priorities for vaccination. That, in effect, pushed about 163 million more people—about half the population—to the front of the vaccine line.

Yearly Occurrence
But back to health care systems. What many people outside the health care realm do not realize is that vaccination logistics and planning is in the yearly wheelhouse of hospital systems. Vaccinations to combat a variety of diseases are given every day, from the first-dose hepatitis B vaccine given to a newborn, to the tetanus, diphtheria, and acellular pertussis (Tdap) booster given after one scrapes against a rusty nail, to the yearly influenza vaccination.

The role of an infection preventionist (IP) in vaccination efforts is important, both to patients and providers, regardless of whether the setting is a large hospital system or a small provider’s office. IPs can help to provide best practice recommendations on immunization, from explaining sterilization techniques, to educating health care staff on the importance of vaccination, to working with occupational health in tracking rates of vaccination.

Not all IPs can administer the vaccine directly as some lack a health care degree, but they can be subject matter experts in the logistics of large-scale vaccinations. As such, it is important they participate in multidisciplinary projects involving vaccination efforts.

Proper infection control practices in vaccine administration are critical to ensuring safety and efficacy. Vaccine vials must be disinfected with sterile alcohol prep pads prior to each withdrawal and a new, sterile needle and syringe used for each injection.

A common misconception about vaccine administration is that gloves must be worn. Per Occupational Safety and Health Administration regulations, gloves are not required when administering vaccines unless the individual administering the vaccine has open lesions on their hands or is likely to come in contact with a patient’s body fluids. If gloves are worn during vaccine administration, they must be removed between each patient and hand hygiene.
Infection preventionists can coordinate with physicians and other subject matter experts on common areas of vaccine hesitancy among staff, and work with key stakeholders to address them.

As vaccine rollouts begin, IPs can also partner with occupational health teams to track and trend adherence with vaccination.

Vaccine hesitancy is another area in which IPs can aid departments in helping alleviate fears and answering questions. Whether it be the influenza or the COVID-19 vaccine, the misconceptions surrounding them or fear of what may occur post vaccination are just 2 reasons that individuals may choose to not receive the vaccine.

Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO). IPs can also coordinate with physicians and other subject matter experts on common areas of vaccine hesitancy among staff, and work with key stakeholders to address them.

As vaccine rollouts begin, IPs can also partner with occupational health teams to track and trend adherence with vaccination. Regarding annual influenza vaccination of health care staff, hospitals must report adherence rates to the National Healthcare Safety Network. Often, IPs may be the only individuals who have access to this website, so it is vital they work with occupational health to obtain accurate counts of adherent and nonadherent staff. Trending health care vaccination rates by department or role type can also be valuable indicators for how to focus education efforts during the following years to increase adherence.

Although we do not yet know if the COVID-19 vaccine will be recommended yearly or whether it will offer longer immunity against severe acute respiratory syndrome coronavirus 2, health care facilities will continue to provide the influenza vaccine yearly to employees. They will also be prepared to modify their processes to help increase adherence rates, and IPs can collaborate in these efforts as well.

ANJALI BISHT, MPH, CIC, is the lead infection preventionist at an academic medical center that comprises a number of hospitals and an extensive primary care network in the Los Angeles region in California.

REFERENCES AVAILABLE AT INFECTIONCONTROLTODAY.COM

Miss anything? Check out these Q&As online!

- **Variants Make COVID-19 Testing More Problematic**
  The genomic tests now being administered might not give definitive answers.

- **Approaches to Disinfection in COVID-19 Era**
  Evidence suggests that SARS-CoV-2 could possibly be transmitted from surfaces.

- **Be Creative With COVID-19 Vaccination Efforts**
  Infection preventionists need to keep the lines moving safely.

Watch our interview online with APIC President Ann Marie Pettis
Taking Hand Hygiene Adherence Hopefully to New Level

The problem with low adherence with hand hygiene protocols among health care professionals has been documented over the decades. The coronavirus disease 2019 (COVID-19) has certainly made everybody more cognizant of hand hygiene but, as health care experts point out, practices drift. When the pandemic ebbs will hand hygiene still be at the top of every caregiver’s to-do list? A company called SwipeSense hopes to make that goal more attainable. The company says in a press release that its device helped one hospital reduce health care acquired infections (HAIs) by 55% in 1 year. One of the problems with hand hygiene is that busy health care providers sometimes forget.

“When a caregiver cleans his/her hands, a hygiene sensor located below a soap or sanitizer dispenser recognizes the employee’s unique badge identification and a green light flashes to indicate the data was transmitted,” the company says in a press release. “SwipeSense captures information when users enter/exit a patient room and when they clean their hands, only recording hygiene opportunities and events associated with patient room visits. The data is fed to the SwipeSense platform where managers can view hand hygiene adherence data at the facility, department, unit, room, and employee levels via an online dashboard.”

In the press release, SwipeSense’s CEO Mert Iseri notes that “hospital staff are constantly juggling multiple priorities and systems. Our platform helps reduce the number of point products staff need to learn, manage, maintain and report on, providing actionable insight in a single, comprehensive solution.”

swipesense.com/hand-hygiene

Device Takes Aim at Germs on Handheld Items

Handheld devices such as cell phones, tablets, handheld computers/bar code scanners, and TV remotes certainly make life easier, except for infection preventionists (IPs) at hospitals and other health care facilities. Such devices, along with other frequently touched items like car keys and eyeglasses, are germ magnets that health care professionals carry with them from patient to patient. A company called AVUS (Advanced Ultra-Violet Systems) says that its KR615 UV-C Germicidal Enclosure, or the UV Box as it’s often called, offers a way to keep these items pathogen free.

“Using a patented application of germicidal UV-C (254 nm), the UV Box has been independently proven by an FDA consulting lab to disinfect 99.995% of the most difficult to treat contaminants, including C. diff and MRSA [methicillin-resistant Staphylococcus aureus], and 99.999% of Norovirus, all in less than 60 seconds,” AVUS says in a press release. “Its UV-C output of 200 mj/cm2 is many times the energy needed to kill coronavirus.”

More than 700 hospitals throughout the United States use the UV Box, which has been named by Newsweek, in conjunction with the Leapfrog Group, as one of the best infection prevention products. The company also says that the device has been clinically proven to reduce health care-acquired infections (HAIs). Chemical free and environmentally friendly, in addition to hospitals, the UV Box is used by law enforcement, dental practices, doctor offices, food processing plants, and emergency medical services. The company adds that the UV Box was designed and made in the US, based on technology currently protecting the Pentagon from bio-terrorism.

advanceuvsystems.com

MiQLab Promises to Quickly Detect COVID-19 Variants

As the world struggles with the variants of coronavirus disease 2019 (COVID-19), a company called LexaGene thinks it has found a way to allow providers to know just which strain of the coronavirus that they’re dealing with at point of care. The company says that its MiQLab, for which LexaGene is seeking emergency use authorization (EUA) from the US Food and Drug Administration, will be able to analyze a patient’s sample for up to 27 different pathogens in about an hour without having to take the sample to a reference laboratory.

Variants of SARS-CoV-2 include B.1.1.7, first detected in the United Kingdom, and 501.V2, first detected in South Africa. Both strains appear to be about 70% more infectious, and the South African strain, as of this writing, appears to be able to partially ward off the antibodies thrown at it by COVID-19 vaccinations.

In a press release, Jack Regan, LexaGene’s CEO and founder states that “it is hard to estimate the impact of a new variant that can re-infect those who have already been infected or vaccinated. It is critical that we have the capability to not only detect whether the patient is COVID-19 positive, but also whether they are, in fact, infected with a new variant. We need to be able to more quickly and accurately identify new strains at the point-of-care....”

lexagene.com

www.infectioncontroltoday.com
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Learn more at www.DefendwithProfend.com