

# Infection Control TODAY<sup>®</sup>

March/April 2025

Vol. 29 No. 2

**VETERINARY INFECTION PREVENTION**

## **GUARDIANS OF ANIMAL HEALTH**

### Who Are Veterinarian Infection Preventionists?



**HAND HYGIENE**

Bug of the Month:  
Rising From the Rainforests

**CONFERENCE COVERAGE**

Chicago Dental Society  
Midwinter Conference

**PREVENTION**

H5N1 Avian Flu Crisis:  
A Growing Threat

**STERILE PROCESSING**

Complex Instruments: Are We  
Keeping Up With Innovation?

**HAND HYGIENE**

The 5 Critical Moments for  
Environmental Disinfection

**OPERATING ROOM**

Preventing Surgical Site Infections  
in Ambulatory Surgery Centers



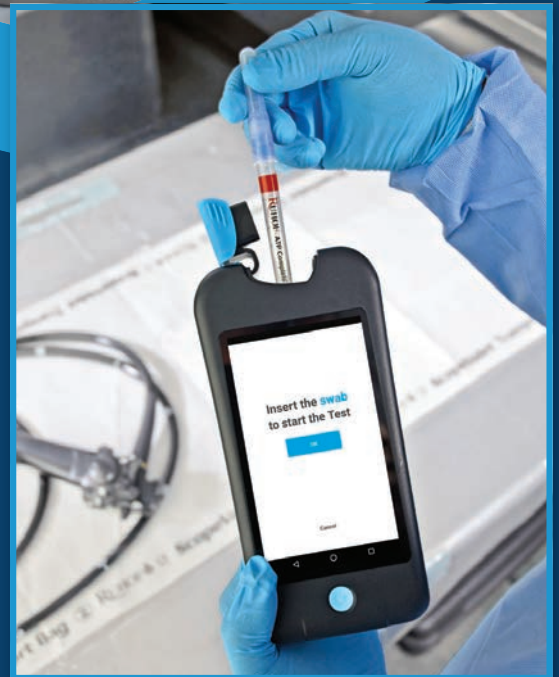
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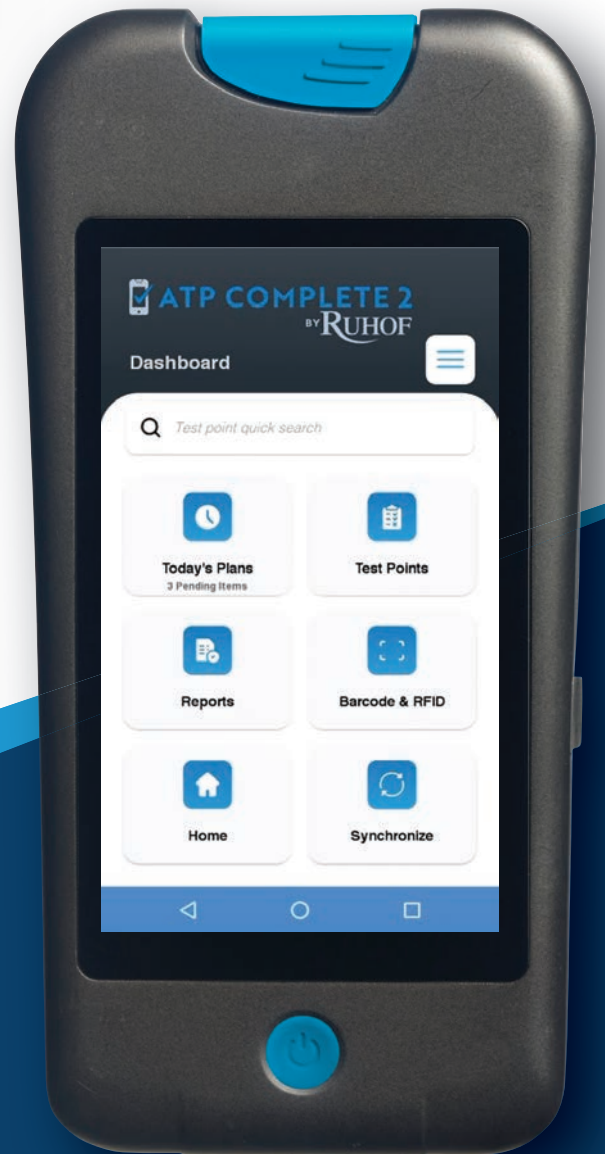


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# Sixty-Two Years of Measles Prevention

## A Critical Reminder for Infection Preventionists Amid Misinformation

This year marks the 62nd anniversary of the first measles vaccine, a monumental milestone in public health and infection prevention.<sup>1</sup> As infection prevention and control (IPC) professionals, you recognize vaccines' profound impact in reducing the burden of infectious diseases. Before 1963, measles was a leading cause of childhood morbidity and mortality, with nearly 500,000 cases reported annually in the US. However, with widespread vaccination, cases declined dramatically, and measles was declared eliminated in the US by 2000.<sup>2</sup> Yet, today's resurgence of vaccine misinformation and hesitancy poses a direct threat to this progress, making your role as IPC professionals more critical than ever.

Measles is among the most contagious viruses, with an  $R_0$  value between 12 and 18<sup>3</sup>—far higher than influenza or SARS-CoV-2.<sup>4</sup> It spreads through airborne transmission and remains viable in a room for up to 2 hours after an infected person leaves. A single case in an underimmunized population can lead to widespread outbreaks, underscoring the necessity of high vaccination coverage.

However, recent years have seen a troubling decline in measles immunization rates due to vaccine misinformation, particularly false claims about vaccine safety. As trusted voices in health care, IPC professionals must actively counteract disinformation and reinforce the importance of vaccination.<sup>5</sup> This includes educating staff, supporting evidence-based policies, and working with health care providers to ensure robust immunization programs within health care facilities and communities.

Every anniversary of the measles vaccine serves as a

powerful reminder of what can be achieved through science and vaccination. It also reinforces the ongoing need for vigilance in infection prevention. By advocating for high vaccination rates, addressing misinformation head-on, and emphasizing the consequences of vaccine-preventable diseases, IPC professionals play a crucial role in preventing the resurgence of measles and protecting vulnerable populations. This anniversary is not just a celebration—it is a call to action for all IPC professionals to reinforce the value of vaccines and stand against the spread of misinformation that threatens public health.

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## Dear Infection Prevention Champions,

Ah, St Patrick's Day—the season of shamrocks, lucky charms, and chasing rainbows in search of that elusive pot of gold. But let's be honest: What would wait at the end if an infection preventionist (IP) followed a rainbow?

Instead of gold, our treasure trove would be filled with the real gems of infection control: a perfectly stocked supply closet with an endless stash of hand sanitizer, disinfectant wipes that never dry out, and gloves that magically fit every time. There would be hand hygiene adherence rates soaring to 100% and people who always remember to sneeze into their elbows (because that is just good public health practice).

Imagine a utopia where no one ever double-dips at potlucks, elevator buttons are always pressed with elbows instead of fingers, and no one forgets to wipe down their workstation at the end of a shift. At the end of our rainbow, personal protective equipment supplies are plentiful, policies are always followed, and pathogens know they don't stand a chance. Picture a world where every doorknob is freshly sanitized, shared keyboards and phones are wiped down after each use, and break room refrigerators are always free of forgotten, moldy leftovers. A place where hand sanitizer dispensers are never empty and where no one ever comes to work while “just a little under the weather.”

Of course, every IP knows that the real treasure isn't gold—it's the satisfaction of keeping patients and staff members safe, stopping outbreaks before they start, and knowing that every effort makes a real difference. So, this St Patrick's Day, may your gloves be intact, may your hand sanitizer be plentiful, and may you always find a lucky 4-leaf clover on the path to infection prevention excellence. I hope you are lucky in your endeavors to bring a new practice or product into your facility this March. Whether implementing a fresh hand hygiene initiative, introducing innovative disinfecting technology, or reinforcing best practices, may your hard work be met with enthusiasm and success.

Stay safe, stay sanitized, and may luck be on your side in all your infection prevention efforts!

### WITH DISINFECTED HIGH FIVES, ISIS LAMPHIER, MPH, MHA, CIC

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for *Infection Control Today* ■



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# Rising From the Rainforests

BY HEATHER STOLTZFUS, MPH, RN, CIC

**T**ick. Tock. Tick. Tock. You notice the clock on the wall, the seconds ticking away, but something else has caught your attention. A fever. A headache. Swollen glands. A sense that something is...off. Very off. And then, the rash appears....

I thrive in the shadows of your history books, lurking possibly for centuries among animals before stepping into the human spotlight when you least expected it. You may think of me as a relic of the past, a virus belonging to another era, but I am very much here, evolving and adapting, making my presence known across the globe.

I am a double-stranded DNA virus from the Poxviridae family and *Orthopoxvirus* genus, closely related to a virus you once feared but have now eradicated. Unlike my infamous cousin, I'm still here, spreading, and waiting for my moment to shine.

## A Legacy of Pustules and Pain

My story begins in the rainforests of Central and West Africa, where I quietly made my home among animals—rodents, primates, and other creatures you don't often think about. Despite my old name, monkeys are not my true reservoir, but they were the first to be blamed for my mischief when I was discovered in a research laboratory in Denmark in 1958. The first recorded human infection came later in 1970 in the Democratic Republic of the Congo.

For decades, I mostly kept to myself,

causing small outbreaks in rural communities. But then something changed. Airplanes. Urbanization. Globalization. Humans are moving and interacting more, giving me opportunities to spread in ways I never had before. In 2022, I saw my chance and took it: spreading beyond my endemic regions, making headlines, and reminding the world that I was still a force to be reckoned with.

## How Do I Spread?

Unlike some of my viral peers, I prefer a more intimate approach. No need for sneaky aerosolized tactics like the flu or COVID-19; I require close, prolonged contact to spread: skin-to-skin, face-to-face, or even through contaminated objects and linens. If you've touched someone with my signature rash, especially in its later stages, you might be carrying me.

But I don't stop at physical touch. Respiratory droplets can do the trick in close quarters, and I may be able to transmit through mucosal contact, such as through sexual transmission. I take my time once I've found my way in—an incubation period of 5 to 21 days—before making my grand entrance.

## The Rash That Defines Me

First, I lull you into a false sense of security. Fever. Chills. Swollen lymph nodes.

Muscle aches. Nothing too alarming. Nothing too unusual. But then the real show begins. Lesions start appearing: raised, fluid-filled pustules that transform, scab over, and eventually fade, leaving scars as a reminder of my visit.

Unlike my cousin, I prefer variety. My rash doesn't always follow the same rules. Sometimes, it starts on the face and spreads outward. At other times, it appears in more sensitive areas first. But one thing is certain: Once you've seen my work, you won't mistake it for anything else.

## How Do You Stop Me?

First, there is no specific antiviral treatment for me. However, I do have a weakness: smallpox vaccines. If you've been vaccinated against smallpox, you might have some protection against me. However, for younger generations who never received smallpox vaccination, I'm a more significant threat.

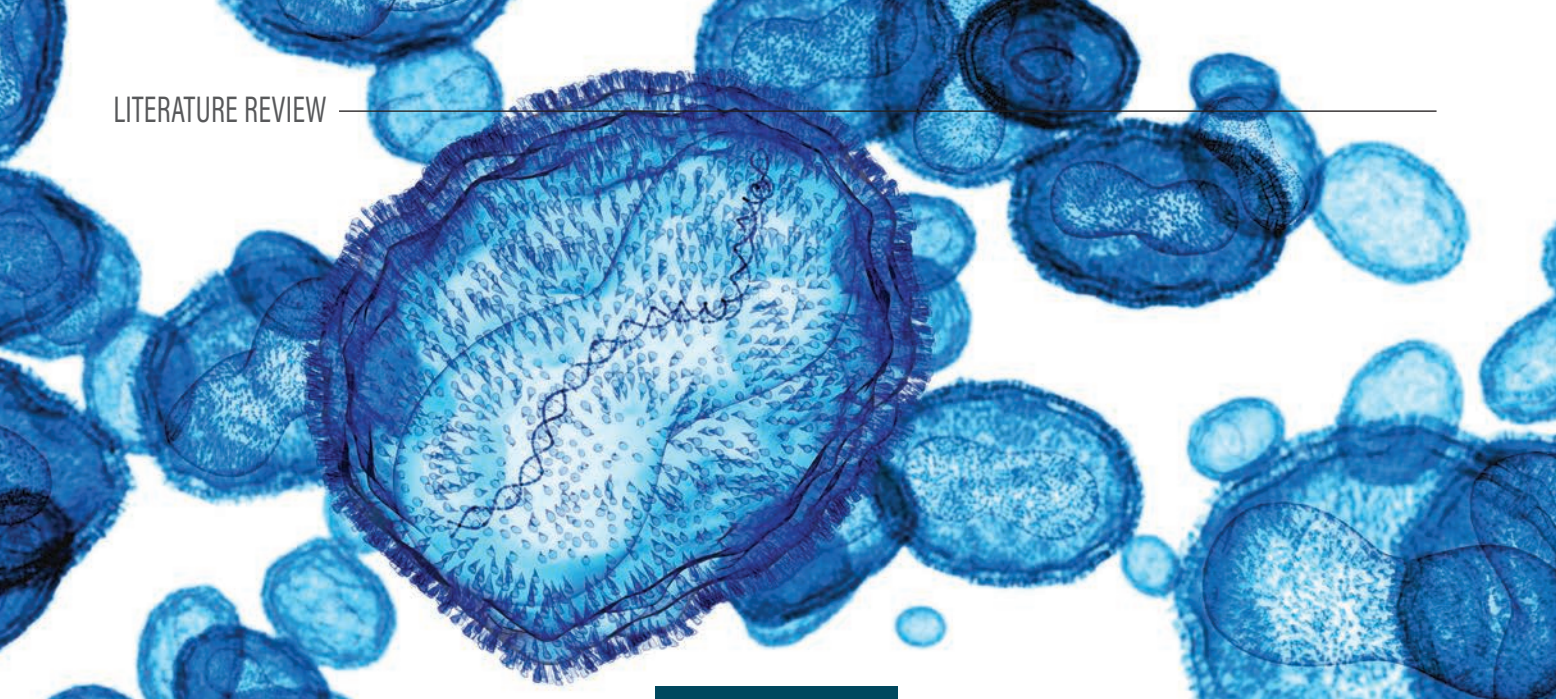
To slow me down, you will need:

- Isolation of infected individuals to prevent further spread
- Personal protective equipment for health care workers and caregivers
- Cleaning and disinfection of contaminated surfaces, bedding, and clothing
- Vaccination strategies, such as the Jynneos and ACAM2000 vaccines, that can be used in an outbreak response

I am patient and waiting. My outbreaks are a warning—an opportunity for you to take control before I evolve further.

Who am I? ■

To discover who I am, visit  
[infectioncontroltoday.com/  
 view/March-2025-bug-month](https://www.infectioncontroltoday.com/view/March-2025-bug-month)



## Long-Term Care

# Mpox Exposure in Long-Term Care: A Case Study in Infection Prevention Success

BY INFECTION CONTROL TODAY EDITORIAL STAFF

**P**reventing infections in long-term care facilities (LTCFs) is a constant challenge, especially when health care workers unknowingly work while having a contagious disease. Protecting the vulnerable patients and the rest of the staff is crucial, whether it is a cold, influenza, or mpox.

“LTCFs are a challenging infection prevention environment because of congregate living of older, possibly immunocompromised residents who might have loss of skin integrity,” the authors of a recent study wrote. “Additionally, LTCFs frequently face staffing shortages, possibly leading employees to work while infectious with a communicable disease. Staffing pressures might inadvertently encourage ‘presenteeism,’ the practice of working while sick. Certified nursing assistants [CNAs] work closely with residents, engaging in physical contact through assistance with hygiene, feeding, and dressing.”<sup>1</sup>

The study, published in the *American Journal of Infection Control* and titled “Lack of Mpox Transmission in a Long-Term Care Facility Despite Widespread Exposure: Kentucky, 2023,” highlights a significant infection control challenge in LTCFs involving a CNA who worked 3 shifts while infectious with mpox virus (MPXV). No secondary infections were detected despite direct contact with nearly all 56 LTCF residents. This case provides valuable insights for infection prevention and control (IPC) professionals on mitigating transmission risks and reinforcing standard precautions in health care settings. What went right in this case, and how can health care facilities strengthen their defenses against infectious disease threats? Let’s explore the key takeaways.

## Key Takeaways for IPC Professionals

### 1 The Role of Standard Precautions in Preventing Transmission

The absence of secondary cases suggests that consistent compliance with standard precautions, particularly glove use, was crucial in preventing MPXV transmission. To prevent pathogen spread in LTCFs, IPC professionals should emphasize the importance of standard precautions, including hand hygiene, proper glove donning and doffing, and avoiding direct skin-to-skin contact with individuals with potential infection. Routine compliance monitoring and staff education on infection prevention strategies should be prioritized.

### 2 Infection Risks in Long-Term Care Settings

LTCFs present unique infection control challenges due to shared living spaces, frequent physical contact between staff and residents, and a high prevalence of immunocompromised individuals. Residents often require assistance with personal care, increasing the likelihood of exposure to infectious agents. IPC teams should conduct regular risk assessments to identify potential vulnerabilities in infection prevention protocols, particularly in settings where high-contact care is common.

### 3 Addressing the Risk of Presenteeism in Health Care Workers

Staffing shortages in health care settings, especially in LTCFs, often lead to presenteeism—working while ill due to fear of burdening colleagues or losing income. In this case, the CNA worked multiple shifts while symptomatic, increasing exposure risks. To mitigate this issue, IPC professionals should

advocate policies encouraging staff to report symptoms early and take leave when necessary. Clear communication about sick leave policies and ensuring adequate staffing levels can reduce presenteeism and minimize the risk of infectious disease transmission.

#### 4 Timely Identification and Response to Exposures

A 16-day delay between symptom onset and diagnosis highlights the need for improved early detection and reporting mechanisms in LTCFs. IPC teams should implement proactive screening measures, including symptom monitoring and routine skin assessments, particularly during known outbreaks. Staff should be trained to recognize early signs of MPXV and other infectious diseases to facilitate prompt intervention and limit potential spread.

Before the diagnosis, the CNA began experiencing fever and general discomfort 16 days ago (day 1). By day 5, skin lesions had developed on the face and genitals; on day 9, additional lesions appeared on the hands and arms. In total, 16 lesions were noted on the left hand, whereas fewer lesions were observed on the right. On day 9 of the illness, the CNA was sent home from a day shift due to fever, having previously worked 3 symptomatic shifts on days 5 and 7 and a night shift covering days 9 and 10.

“The CNA was considered infectious from 4 days before symptom onset until lesions completely healed,” the authors wrote. “Detailed questioning of the CNA and LTCF leadership was undertaken to identify residents who received care from the CNA. Residents with possible skin-to-skin contact with the CNA were considered at risk, and those with possible contact to areas of compromised skin integrity were considered high risk.”

#### 5 The Role of PEP in Mitigating Infection Risks

Following exposure and receiving a letter explaining the situation, 50% of the residents at risk opted to receive the Jynneos vaccine as postexposure prophylaxis (PEP).

Vaccination is most effective when given within 4 days of exposure, but the first dose was administered 10 days after the last day of possible exposure and 15 days after the first day of possible exposure. All residents who received the first dose also received a second dose 1 month later.

The lack of secondary infections suggests that either the transmission risk was inherently low due to standard precautions or that PEP played a mitigating role. IPC professionals should ensure rapid access to PEP in future exposure incidents and promote its timely administration to maximize effectiveness.

#### 6 Surveillance and Monitoring in Outbreak Response

The LTCF implemented a structured monitoring plan, conducting daily temperature and skin checks for 21 days post exposure. No secondary infections were identified, reinforcing the importance of active surveillance in containing potential outbreaks. IPC teams should develop and maintain comprehensive outbreak response plans, incorporating timely monitoring, clear resident communication, and standardized infection prevention protocols to detect and manage potential cases efficiently.

#### Final Thoughts

This case underscores the importance of strict compliance with standard precautions, rapid identification of infectious cases, and effective outbreak response strategies in long-term care settings. Although MPXV transmission from health care providers to patients remains rare, IPC professionals must remain vigilant, ensuring that staff are well trained, adequately protected, and supported in their infection prevention efforts. By reinforcing infection control measures and advocating for proactive interventions, health care facilities can continue to safeguard both staff and residents from emerging infectious threats. ■

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[INFECTIONCONTROLTODAY.COM](http://INFECTIONCONTROLTODAY.COM)

### Environmental Hygiene

## Evaluating Automated Dispensing Systems for Disinfectants in Hospitals

BY TORI WHITACRE MARTONICZ

**E**nvironmental services (EVS) and infection prevention personnel consider efficacy, safety, and cost when selecting cleaning and disinfection products. Many hospitals use dilutable disinfectants dispensed from automated wall-mounted systems. Although these systems can reduce costs and ensure stability, monitoring is essential to verify correct dilution.

Findings from past studies have found variations in disinfectant concentrations, leading to potential surface contamination. Adjustments such as water pressure regulators and flow control modifications improved accuracy. Hospitals should conduct routine testing to ensure proper dilution levels, as inconsistent concentrations may compromise infection prevention efforts. Evaluating automated dispensing systems can help maintain effective hospital disinfection practices.

A recent study, “Dilution Dysfunction: Evaluation of Automated Disinfectant Dispenser Systems in 10 Hospitals Demonstrates a Need for Improved Monitoring to Ensure That Correct Disinfectant Concentrations

Are Delivered,” explored what is happening in 10 hospitals. *Infection Control Today (ICT)* spoke with lead author Curtis J. Donskey, MD, to learn more.

**ICT: What was the primary motivation or research question that led you to conduct this study, and why do you believe it is essential?**

**Curtis J. Donskey, MD:** We have a long-standing interest in environmental cleaning and disinfection. We recently completed a 30-hospital study where we collected cultures after environmental services personnel had completed their cleaning, and we got a substantial amount of contamination in the environment even after the cleaning was completed. Those results stimulated us to reconsider why we see suboptimal cleaning and disinfection results, which many other [findings from] studies have demonstrated. We usually blame the EVS personnel; we believe they probably didn't wipe surfaces down adequately. But there are other potential explanations too.

Disinfectants can be used incorrectly. If you apply the disinfectant but don't give it enough contact time, it may not work. Sometimes, people may think you'd be using the wrong product. You're supposed to use a sporicidal disinfectant, but someone gets confused and uses a nonsporicidal product. There are some examples of issues where the disinfectants were not working as they were supposed to. We had a study many years ago where a defective product was coming from the manufacturer and losing its activity, so that product was ultimately taken off the market. It is always possible that products need to be fixed or could be more stable.

The final thing in terms of disinfectants is that many of the disinfectants we use are diluted. They come as a concentrate, and they're diluted. Something could be wrong with our dilution mechanisms. We considered all these things, but for this project, we specifically asked our products to be diluted appropriately. Many disinfectants used in the hospital are dispensed from an automated dispensing system that is supposed to ensure things are accurately measured. We specifically looked at the disinfected dispensing systems in hospitals.

John Boyce, MD, and his group published a study in 2016 in which they said there was a lot of variation in the disinfectant concentrations of these dispensers, and they noted that water pressure and water pressure varied. You could have some

variation in the concentration. Some manufacturers then made some adjustments, such as adding a regulator so water pressure wouldn't have an impact. That's the dispenser.

Regarding the methods, we wanted to assess the disinfectant concentrations that were being dispensed. But from these dispensing systems, we started at 1 hospital, and we continued. Overall, we did 10 hospitals. They were from 4 different health care systems in 5 states. Four of those were VA [US Department of Veterans Affairs] hospitals, and 6 were non-VA hospitals.

The methods were very simple. We went to that facility and collected disinfectant as it was being dispensed from the dispensers. We went to at least 10 different dispensers in multiple wards in each facility and collected the fresh disinfectant from the dispenser. At the same time, we went out to the wards and the carts where the EVS personnel were working and collected some from their buckets of disinfectant. We tested the level of disinfectant and the pH, which you can use to assess the pH and the appropriateness of the disinfectant. These are both done with very simple, inexpensive test strips. While we were doing this, we also asked, as we were rounding with the EVS

folks, if [they] were doing anything to monitor whether these dispensers were working correctly.

**ICT: Was it that each of these hospitals had the same dispenser from the same company?**

**CJD:** Overall, we tested 3 different types of dispensers. One of the most common dispensers was quaternary ammonium products. Four of the hospitals use that type of dispenser. Five used a second type of dispenser, and then we had one that used a third, so 3 different types of dispensers. There are at least 4 companies that make these types of dispensers.

**ICT: What were your key findings, and how do they affect and contribute to our current body of knowledge?**

**CJD:** The findings were that none of the 10 facilities had any routine monitoring program for these dispensers. Several of the facilities informed us that they believed the manufacturer thought the product was functioning properly, that the dispensers were operating correctly, and that the manufacturer, when they came in to check, was ensuring that these were indeed working correctly, so they didn't have routine monitoring in place. Nine of the 10 hospitals had



**Disinfectants can be used incorrectly. If you apply the disinfectant but don't give it enough contact time, it may not work. Sometimes, people may be using the wrong product. You're supposed to use a sporicidal disinfectant, but someone gets confused and uses a nonsporicidal product.”**

at least 1 dispenser that was not appropriately dispensing, had too low of a concentration, and 8 of the 10 hospitals had at least 1 dispenser that we tested that was dispensing solution that had no detectable disinfectant in it, essentially dispensing water.

The overall summary is in the visual abstract. Overall, 29 of 107, or 27% of dispensers, had a lower-than-expected concentration. Of those 29, 15—or 14% of all total dispensers—were dispensing water.

Also, one of the types of products that we tested was peracetic acid and disinfectants. In the 5 hospitals we tested, about half of the dispensers were dispensing products with a concentration that was substantially higher than expected. There is some potential risk with that type of disinfectant regarding its elevated concentration, and there was a previously unpublished study.

Still, the National Institute for Occupational Safety and Health has the same online information. They found that some dispensers dispensed higher concentrations of that product than expected. Our primary focus was not on whether the concentration was too high but on whether it was too low. But that's an additional issue to consider.

### **ICT:** Did you return this information to them, and what did they say?

**CJD:** All the facilities were given feedback on their results. Some of the 4 facilities were VA hospitals. In addition to alerting the local facility, we alerted the national EVS program for the VA, and they put out a bulletin to all VA hospitals that this is something you should take upon yourself to monitor for your facility. We were one of the facilities. We developed a standard operating procedure where we asked the EVS personnel to check the strips [and] to check the disinfectant concentration every time they put a new bottle of concentrate into the device. Infection control would also do some additional spot testing. We put in a formal process to provide ongoing monitoring.

We'll give that feedback regularly through our infection prevention committee. I left some of the findings out. Let me give you a couple [of] more surprising things. In addition to the product directly from the dispensers, we also, as I mentioned, went around to environmental services carts to check the product. The overall findings were the same as you would expect if you were in those wards. And 34% of samples from the carts were too low; 18% had no detectable disinfectant. And of note, 4 of the 80 disinfectant samples we tested on the EVS carts were the wrong product.

Instead of using a disinfectant, they were using a nondisinfected detergent product that was typically used as a floor cleaner, and that is a separate issue that we also sought to address. In some ways, our impression was that it was potentially a design issue with the dispensers because if you look at the dispensers, there are 4 different concentrates in the dispenser system, and in our facility, we were finding that they

were often not in the same place. Someone worked on the fifth floor, and they knew the disinfectant was on the upper left, and they went down to the fourth floor, and it was on the lower right; they could get confused about what they were getting out of the machine. In addition to testing levels, standardizing placement is important to avoid that type of situation.

The obvious question is, why are dispensers releasing no detectable disinfectant? What is going on?

The most common reason we identified was that the concentrate container was not appropriately connected to the system. Someone had put it in, but if you don't lodge it in precisely right, a straw goes down into the container and pulls the disinfectant up to mix with water. If you don't get it lodged in there correctly, you're not pulling up any disinfectant. That was the most common issue. We also identified 3 of these concentrates.

The second most common reason was that the top of the disinfectant concentrate had been damaged. In talking to people, it turned out that some of the EVS personnel thought that if they twisted this a certain way, it might dispense more product when [in fact] that damaged it and it didn't dispense any product.

For one of the dispensers, you see a low-product indicator on the dispensing system, and that indicator was not functioning correctly. The actual system was not working correctly. But most of the issues here were people's problems. They were not getting things lodged in there correctly or were confused about what to do with those concentrates. These are the things that led us to our solution. Since many issues arise when adding a new container of concentrate to the machine, our solution is to use one of these test strips every time you add the concentrate, ensuring you have the correct disinfectant concentration.

### **ICT:** What are the key takeaways?

**CJD:** The key takeaway is that hospitals are currently assuming that these dispensers are working and not doing adequate monitoring. The key issue here is that it's essential to have some system in place to monitor whether these dispensers are working correctly. In addition to that, as you said, there are ways to design the systems better so they're a bit more fail-safe. That would be ideal. And as you alluded to, facilities also need to work with the manufacturer to tell them and let them know that we have these issues so they can collaborate with infection prevention and environmental services to fix the problem.

The primary manufacturer we've dealt with has been on top of it. They're eager to ensure that this is taken care of so that people continue to use their products. ■

REFERENCES AVAILABLE AT  
[INFECTIONCONTROLTODAY.COM](http://INFECTIONCONTROLTODAY.COM)



# GUARDIANS OF ANIMAL HEALTH

## Veterinary Infection Preventionists on Challenges, Innovation, and Collaboration

BY TORI WHITACRE MARTONICZ

**Leslie Kollmann, BS, AAS, CVT, CIC**, is a certified veterinary technician and board-certified in infection prevention and control. Kollmann works in Veterinary Infection Prevention at the Minnesota Department of Health. She has 20 years of experience as a vet tech and 15 years in infection prevention. She is also a member of the ICT Editorial Advisory Board.

**Denise Waiting, LVT**, is a licensed veterinary technician at Washington State Veterinary Teaching Hospital, with 30 years in the field and 4 years in infection control and biosecurity.

**Leslie Landis, BS, LVT**, is a licensed veterinary technician at Michigan State University College of Veterinary Medicine supervising small animal surgery and central sterilization for 25 years and serving as the infection control nurse since 2008.

In this engaging discussion, veterinary infection preventionists (IPs) **Leslie Kollmann, BS, AAS, CVT, CIC**; **Denise Waiting, LVT**; and **Leslie Landis, BS, LVT**, share their career paths, daily responsibilities, and the pressing challenges of infection control in veterinary settings. They emphasize the need for more education, resources, and collaboration within the veterinary field, particularly in managing zoonotic diseases, ensuring good hand hygiene, and improving infection prevention protocols across various animal care environments.

### **ICT: Who are veterinary IPs, and what do they do? What does an average day look like?**

**Leslie Landis, BS, LVT:** I work primarily in the clinical setting, mostly in small animal, although I do a little large animal as well. My major role here is to be a resource to answer questions on the hospital policy or how they should handle a certain case. I respond when a potential contamination issue occurs. I can help identify where a protocol might need to be modified to improve best practices or to ensure better buy-in. As we all know, if it's too hard, they will probably not do it. I'm the link between our epidemiologist and the actual hospital working staff, as someone who's actively on the floor and knows how our hospital operates day to day.

**Leslie Kollmann, BS, AAS, CVT, CIC:** I worked on the clinical floor for a long time as a veterinary IP with small and large animals. You're that go-to person for all things IPC [infection prevention and control]. If we have dog or cat bodily fluids everywhere, how do you clean that up? How do you mitigate that? Education is a huge part of the job as well, so making sure that your staff and or volunteers you're working with are all educated on their risks and what to do if you have an exposure, mitigating some of those issues on my day-to-day stuff with being a vet IP, like subject matter expert here at the health department on the public health side of things, it's taking and educating a lot of animal care facilities across the state on some of their risks, and then helping them get programs in place to protect their staff, because there aren't many education and trainings out there.

**ICT:** It sounds like a regular IP, except you deal with dogs, cats, cows, and horses.

**LK:** Absolutely. We often look at our human health care IP partners to see where they are. What have they done? What mistakes have they made that we don't necessarily want to make on our side? But we are also dealing with so many different animal species, and we are dealing with a different population of people in our field who care about the animals, and that's why they're here. And so, then not thinking so much about themselves. How do we get them to understand that we must protect them to protect the animals? And it's a different mindset, and then we are like the human IP field. We are slightly behind, so we are trying to catch up.

**ICT:** What are the current challenges in veterinary infection control? What are your most pressing challenges, especially with zoonotic diseases?

**LL:** One of the most significant challenges is the lack of resources for our fields. There isn't, to my knowledge, a program or special area that we can train in, and specifically in veterinary infection control, we have to take human best practices and human resources and modify them to fit our veterinary capabilities as best as we can and do as best as we can. But there's some guessing work in there, and try to see how it goes, which isn't the best when dealing with a zoonotic disease. It slows us down.

**Denise Waiting, LVT:** One of the struggles also is working with not faculty, but students. We try to keep our students safe, and yes, that's a priority. Then, the technicians and the faculty, we need to keep the students safe, but they have to keep themselves safe....

So, we have wildlife, our exotics, and the Wildlife Department. It's not what comes in; it's what's out there. And we are right on the Washington-Idaho border. If it comes from Idaho, we'll call Idaho. It becomes big when you're right on the border and getting it out to the local clinics, not only our facility. And how do we do that? Some local clinics have looked at me like, "I don't understand what you're talking about." If we had more education, we could also get it out to them.

**LK:** There are many challenges and concerns regarding zoonotic diseases, especially now. Most emerging serious infections involve animals, or they start in animals. And so how do we get the information out there to protect our people immediately without knowing, like Denise is saying, what's coming in through the doors, because there's always something new. Whether you know it's H5N1 today or something new tomorrow, we'll always be concerned about needing to know the basics to protect our staff, but how do we do that correctly, and how do we educate and train without having many of the resources that our human partners do? Like Leslie said, we have to think outside the box a lot. We have to be creative. We need to start collaborating within the field to get some of this stuff together.

**ICT:** Let's recap. We've covered infection prevention in veterinary settings, focusing on small animals like pets and large animals like pigs or goats. In the office, you control the environment using disinfectants, like an IP for humans. But what do you do in the field during a farm call to have a sterile environment? How do you prevent infection when ultrasounding a mare to check for a foal? What advice do you give to doctors and students in those situations?

**LK:** Many wildlife rehabbers I work with conduct wildlife rehabilitation from their garages, sheds, or backyards. In those situations, being in the field or using mobile practices without a fixed location or a stationary spot that isn't a somewhat sterile clinic can be very challenging. That's when the basics of infection prevention become crucial, and having someone trained to think beyond basic clinic procedures is crucial.

There are basics that we look for, like hand hygiene. Where can they wash their hands? What type of PPE is available if we don't have hand hygiene available? So, how do they wash their hands if they're in the middle of the field, working on a horse? If you're trained in some of the basics, there are obstacles that you can figure out, get materials to help, and then do the training beforehand. But it is super challenging. We're dealing with dirt out there, a lot of organic stuff that gets in the way of doing infection prevention correctly, and keeping your supplies sterile, keeping your supplies out of the mud some days when it's raining out in the field. There are many challenges in that arena.

**DW:** Then you bring those samples into your clinic or your



laboratories, which is a lot of what we do. We're testing all the different things related to COVID-19 through the clinic. This teaches them to handle things correctly before they even get to us.

**ICT: What golden words do you have so that they understand your position? What are the difficulties?**

**LL:** The animal-human relationship. Public health is essential. You can't stress enough how important that is. And even though it's that important, our resources are so minimal, we don't have the answers, we don't have the people, we don't have the finances, and we're struggling a lot, even though it affects everybody. We need to increase our resources to stress the importance of increasing communication. It's essential. This new veterinary chapter in APIC [Association for Professionals in Infection Control and Epidemiology] will be huge. And we can't say thank you enough to Leslie, to be a big part of getting that started. I love seeing the increase in the collaboration of the larger veterinary community. I'm starting to hear more and more about it, and it's exciting because it is so important.

**DW:** I agree with what Leslie is saying. I also show dogs, so I watch things happen and know why these dogs get sick at the shows. It's not educating in the vet clinics. It's getting it out there, but we must start with [general IPC]. We need to educate ourselves and have the people go out and educate others. When this started, one of my bosses said, "You should start looking into this." And I thought, oh, man, one more thing. This has become exciting for me because not only am I learning, but I answer the questions a lot easier if we had the resources to say, "Ok, here is the [short] version. But here's some more information. Go to this site. This will help you a ton."

**LK:** Leslie [Landis] is spot on with that One Health component aspect message for everyone. It's important to educate the public that if you're coughing and sneezing, there are ways to protect your pet. Even if you don't know what it is, being aware that disease transmission can occur between animals and people is crucial. People should wash their hands. It's huge: Wash your hands. Cover your cough. If you're sick, don't go out. If your dog is sick, don't bring them to the dog park, shows, or

your friend's house. Be very cognizant of where you're taking your animals. Be cognizant if you're immunocompromised; you can pick up stuff from your animals.

Education is also important to the whole veterinary community. I, too, advocate for this position. Advocating for somebody to train in this infection prevention and control field is huge. Give them the dedicated time to learn. We are now collaborating with this networking team and APIC to get some of this material out and consistent across all fields. Get guidance out there for different animal care facilities, whether it be shelters, sanctuary zoos, wildlife rehabs, clinics, hospitals, or mobile clinics. Whatever it is, those are all we must cover. But advocating first and foremost for the space to have people in your facility learn and then empower them to do something about it in your facility. So, administration is huge in many of these facilities, and it is necessary to be able to do that correctly. And it does cost money. Unfortunately, IPC is not cheap, but there are cost-effective ways to do it. If you know those basic building blocks, it can be done in many of these facilities. Advocating education, training, and being current on what's happening out there are also important.

**ICT: Do you have any final thoughts?**

**LK:** Thank you for getting this out there. The biggest thing we can do right now is to talk to each other and show that we exist, that this field exists. APIC has taken us under their wing at this point to help us and give us a space to collaborate and talk. Hopefully, the council we are forming with APIC will be coming out very soon, but in the meantime, we've been talking for over a year with this IPC networking team, and it has a global reach right now. Everybody needs IPC within their facilities or what they're doing, and zoonotic diseases are across borders. We need to talk to each other. ■

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for clarity and length.  
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# Silent Threat

## The Overlooked Infection Crisis in Dialysis Patients

BY SHAZIA IRUM MOHAMMED, MSC, MBA, RN, CIC, CPHQ

The immunocompromised host is a person with impairments in the body's normal defense mechanisms against infection.<sup>1</sup> Patients who are immunocompromised are susceptible to bacterial, fungal, viral, and parasitic infections that healthy immune systems usually overcome. They are also more susceptible to complications from common infections.<sup>2</sup>

Unfortunately, many patients requiring dialysis are at a higher risk for acquiring infection due to critical illness and multiple comorbidities such as diabetes, heart disease, and immunosuppression. Along with comorbidities, these patients will also require some form of invasive access into their vascular system or peritoneal cavity.<sup>3</sup> Any failure along the spectrum of dialysis treatment, from staff education and hand hygiene to machine and station disinfection, will increase a patient's risk for infection or adverse reaction.

Patients with end-stage kidney disease (ESKD) treated with hemodialysis (HD) are at substantially increased risk of life-threatening infections. Most bloodstream infections are related to vascular access, of which 70% are associated with using a central venous catheter (CVC).<sup>1</sup> Infections result in significant morbidity and are second only to cardiovascular diseases as a cause of mortality in patients with ESKD. In addition, lapses in infection control

practices, such as hand hygiene and environmental cleaning, have been associated with bloodstream infections and hepatitis C virus (HCV) outbreaks.

The role of infection preventionists in mitigating the risk of infections in patients undergoing dialysis is highly challenging due to multiple factors such as the immunocompromised state of patients, underlying medical conditions, frequent hospitalizations, exposure to vascular access for cannulation, central line access, contamination of dialysis water, risk of transmission of blood-borne viruses (BBVs), recurrent bloodstream infections, antimicrobial resistant colonization of methicillin-resistant *Staphylococcus aureus* (MRSA), multidrug-resistant organisms, and many more.<sup>4</sup> Infection risk assessment is the keystone of prevention for patients who are immunocompromised and are undergoing dialysis, leading to implementing preventive actions in their treatment plans.<sup>5</sup> The following preventive strategies are highly effective and recommended as a comprehensive approach to combat infections in this vulnerable population.<sup>6</sup>

### 1 Consistent Implementation of Standard Precautions

Effective hand hygiene, glove use, and environmental surface disinfection can prevent contact transmission. An adequate number of easily accessible handwashing sinks should be available (one for every 2 to 4 chairs/beds).<sup>6</sup> An

alcohol hand rub device (wall-mounted dispenser or desktop pump bottle) should at least be available for every patient's chair/bed. During HD, exposure to blood and potentially contaminated items is routinely anticipated and gloves are required when caring for a patient or touching the patient's equipment. Wearing fluid-resistant gowns, face shields, protective eyewear, and surgical masks is highly recommended to protect staff during initiation and termination of the dialysis sessions, insertion of a dialysis catheter, manipulation of patient's access at any time, and cleaning of the dialysis station.<sup>6</sup>

### 2 Transmission-Based Precautions

Prompt implementation of transmission-based precautions for patients at increased risk for transmission of pathogenic bacteria, including antimicrobial-resistant strains (eg, those infected or colonized with MRSA or vancomycin-resistant Enterococci), and additional precautions (ie, contact precautions) must be followed during the dialysis session. To prevent the transmission of respiratory infections among patients undergoing HD, including COVID-19, appropriate droplet/airborne precautions are necessary.<sup>6</sup> Patients should be screened through a triage clinic before entering dialysis units and isolated based on their infectious status.<sup>6</sup>

### 3 Aseptic Technique

Restrict the use of standard supplies, medications, instruments, and medication trays, and avoid using a standard medication cart. Single-use medication vials should be used whenever available.<sup>6</sup> When a multi-dose vial is used, dedicate it to a single patient whenever possible. If the multi-dose medication is brought to the patient

treatment area, it should be discarded and not returned or used for another patient. The vial should be discarded if sterility is compromised or questionable.<sup>6</sup>

#### 4 Cleaning and Disinfection of Surfaces and Equipment

After each patient treatment session, all surfaces at the dialysis station should be cleaned and disinfected with hospital-approved, US Environmental Protection Agency-registered intermediate-level disinfectant. Special attention and focus should be paid to the control panels on the dialysis machine and other surfaces that are frequently touched and potentially contaminated with the patient's blood. Proper contact time (per manufacturer) of disinfectant is crucial to ensure maximum efficacy of the product.<sup>6</sup>

#### 5 Immunization and Screening

Annual immunization against influenza is recommended for patients with ESKD who are at increased risk of complications from influenza. Routine immunization against hepatitis B virus (HBV) is recommended for all patients with ESKD (ideally before starting HD) and all staff members.<sup>4</sup> Hepatitis B surface antigen (HBsAg) and hepatitis B surface antibody (HBsAb) titers should be obtained before starting dialysis, and HBsAg titers should be checked monthly if HBsAb titers are not at the desired level (nonresponders). Additionally, vaccinations for pneumococcal pneumonia, shingles, and SARS-CoV-2 are highly recommended for all patients undergoing dialysis.<sup>4</sup>

#### 6 Prevention of BBVs

The transmission of HBV and HCV in HD units has been documented. Compliance with hand hygiene practices and glove use continues to be the most effective way to prevent the transmission of BBVs in dialysis units. Dedicated separate rooms for treatment of patients infected with HBV are mandatory. Designated machines, equipment, instruments, medications, and supplies should be used exclusively for patients infected

with HBV (ie, they will not be used by patients susceptible to HBV-susceptible patients). There is no consensus to segregate patients with HCV and those with HIV; transmission between patients within the dialysis environment can be prevented by strict compliance with the infection control precautions (ie, standard precautions) recommended for all patients undergoing HD.<sup>5</sup>

#### 7 Prevention of Vascular Access and Bloodstream Infections

Arteriovenous fistula (AVF)/arteriovenous graft access should be encouraged to reduce central line-associated bloodstream infections. Sterile preparation of the skin over the fistula site (creation of sterile field, use of sterile barriers and sterile gloves) is not more effective in preventing infection than clean technique (clean barriers and clean gloves with strict attention to aseptic technique).<sup>6</sup> All patients should be encouraged to wash their access site with soap and water daily before the HD session. If a catheter must be used for access for longer than 3 weeks, a tunneled, cuffed CVC should be used (if possible, it should not be placed on the same side as a maturing AVF access point).<sup>6</sup> The preferred insertion site is the right internal jugular vein. Catheters should be inserted using maximal sterile barrier precautions. Emphasis should be placed on the principles of asepsis when accessing or caring for central venous access. Chlorhexidine is highly recommended as an antiseptic for cleaning and disinfecting the vascular access of patients undergoing dialysis.<sup>5</sup>

#### 8 Dialysis Events Surveillance

Measuring and tracking infection rates and using this information are essential to infection prevention in patients undergoing dialysis. This surveillance occurs in outpatient HD centers where patients are monitored and reported for 3 defined events: use of intravenous antimicrobials, positive blood culture results, and pus, redness, or increased swelling at the vascular access site.<sup>7</sup> Reviewing dialysis event data and

running analysis reports should be done regularly to prevent bloodstream and vascular access infections and be used for quality improvement initiatives.<sup>7</sup>

#### Conclusion

The incidence of serious infections among patients receiving maintenance HD remains unacceptably high. Acquisition of infections in HD facilities is often due to suboptimal infection control practices, and 100% use of recommended infection control guidelines is essential to prevent infections in this vulnerable population.<sup>4</sup> Prevention efforts may require that HD organizations devote more significant resources to ensure the implementation of infection control practices. To lead these efforts successfully, medical directors and other nephrologists must understand and champion the CDC infection control practice guidelines. When nephrologists lead by example and collaborate closely with nursing management and staff, we may achieve our target of zero preventable infections and reduce infection-related morbidity and mortality.<sup>4</sup> ■

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# Increased Use of Ambulatory Surgery Centers Demands SSI Prevention

BY SHANNON SIMMONS, DHSC, MPH, AL-CIP, CIC, CHES, CPH, MLS (ASCP)

The use of ambulatory health care facilities for minor surgical procedures is projected to grow by at least 25% at ambulatory surgery centers (ASCs) and 18% at hospital outpatient departments and physician offices over the next 10 years.<sup>1</sup> ASCs have the most substantial projected increase due to patient savings. The average price of standard procedures performed in a hospital in 2019 was \$7716, which is nearly 144% higher than the average price of the exact procedures performed in ASCs.<sup>2</sup> This savings is only valid if a surgical site infection (SSI) does not occur.

The CDC defines SSI as “infection related to an operative procedure that occurs at or near the surgical incision within 30 or 90 days of the procedure, depending on the type of procedure performed.”<sup>3</sup> SSIs are a significant concern associated with every surgical procedure regardless of their complexity, as they may enact a considerable economic burden and increase morbidity and mortality rates. Outpatient SSIs can result in prolonged hospital stays that can last 7 to 10 days, resulting in \$20,000 to \$27,600 in costs per admission.<sup>4</sup> The astronomical figures associated with an SSI provide a significant indication for prevention efforts. When considering approaches to SSI prevention, it is essential to address the variety of perioperative opportunities available to improve patient safety during outpatient procedures while

acknowledging the multidisciplinary collaboration needed to implement multiple effective strategies simultaneously.

Every patient who enters a health care facility for a surgical procedure is at risk of developing an SSI. SSIs are among the most avoidable health care–associated infections but only with focused attention to all aspects of a surgical procedure. Delineating the 3 subsections of perioperative processes (pre-, intra-, and postoperative) emphasizes the importance of evidence-based guidelines in SSI prevention while incorporating the unique cross section of disciplines involved in executing surgical procedures even within ASCs.

## Preoperative Strategies Patient optimization

Several accepted risk factors for SSIs are based on the patient. These patient-related risk factors, whether modifiable or non-modifiable, provide a solid foundation for addressing preoperative strategies to mitigate the burden of SSIs. Patient-related factors that influence the risk for SSIs include nonmodifiable variables, such as age or sex. There is evidence that supports the fact that older patients may have comorbidities that can increase their risk for SSIs due to reduced immune function.<sup>5</sup>

Also, specific factors related to sex, determined by a patient’s biological characteristics, might influence surgery type and frequency, resulting in an increased SSI risk. The modifiable lifestyle behaviors of patients, including substance use (ie, alcohol, tobacco, and illicit drug use),

diet, and exercise, can actively contribute to the development of SSIs.<sup>6</sup> Smoking, alcohol misuse, and obesity are known to have a grave impact on immune function, consequently also affecting the wounds associated with surgical procedures. The oxygen supply to tissues, which is necessary for healing, is impaired by smoking.<sup>7</sup> The results of alcoholism are malnutrition and a weakened immune response, whereas obesity can also complicate the wound-healing process and increase the susceptibility of a patient to infections of the tissues.<sup>8</sup> Identifying these risk factors in patients allows for appropriate care management throughout the procedure.

## Antimicrobial prophylaxis

Preoperative antibiotics are justified when the risk of infection is high or if there is a high risk of adverse outcomes specific to the procedure being performed, as seen with cardiac procedures and/or implantation of a foreign device. The rationale behind antimicrobial prophylaxis hinges on its ability to prevent SSIs by reducing the microorganism burden that can occur at the surgical site during the operative procedure. Patients who receive prophylactic antibiotics within 1 to 2 hours before the initial incision of their procedure are at a decreased risk of developing an SSI compared with patients who receive antibiotics sooner or later than this time window.<sup>9</sup> When antimicrobial prophylaxis is employed appropriately, there is an increased likelihood of preventing SSIs, morbidity, and mortality; reducing the duration and cost of health care; causing minimal adverse drug effects; and having minimal adverse effects on the microbial flora of the patient or the health care environment.<sup>10</sup>

## Skin preparation

Contamination by instruments or room air is less likely to cause an SSI than the patient’s normal skin flora. Before a surgical procedure, skin preparation is vital in reducing normal skin flora bioburden.<sup>11</sup> Because of its histologic structure, human skin cannot be sterilized even by intense disinfection; therefore, surgical

skin preparation aims to reduce bacterial colonization.<sup>12</sup> The reduction of bacterial colonization depends primarily on concentration and exposure to the antiseptic agent, given that skin cannot be sterilized. This evidence suggests that surgical skin preparation should be optimized to minimize the intrusion of normal skin flora during procedures, but other strategies must also be considered.

### Intraoperative Strategies

Intraoperative interventions for reducing SSIs are primarily focused on skin decontamination for patients and health care workers, using barriers to prevent the movement of microorganisms into incisions and optimizing the patient's bodily functions to improve recovery.<sup>13</sup>

#### Skin antisepsis

The patients' skin is disinfected in the procedure room using antiseptic solutions such as povidone-iodine or chlorhexidine at varying concentrations. The aim of these skin antiseptic agents for patients is to reduce the risk of SSIs by reducing the number of microorganisms on the skin.<sup>13</sup> The CDC recommends that surgical personnel perform surgical hand/forearm antisepsis according to the product manufacturer's recommendations and remove debris from underneath fingernails using a nail cleaner under running water. Surgical hand antisepsis using an antimicrobial soap or an alcohol-based hand rub with persistent activity is also recommended. Health care workers have multiple opportunities to practice hand hygiene during perioperative patient care.

#### Surgical drapes

In addition to preparing a patient's skin for surgery, sterile drapes are used as a barrier to protect the patient from their skin flora and contamination from the surgical team members and environment.<sup>14</sup> Before a surgical incision, sterile drapes can be placed onto the patient's decontaminated skin. The Association of Surgical Technologists (AST) has developed the AST Standards of Practice for Surgical Drapes to support health

care facilities in reinforcing best practices related to surgical drapes.<sup>14</sup>

#### Surgical attire

Various coverings worn during a procedure are designed to act as a barrier between the environment and the patient's wound to maintain a sterile procedural field, such as masks that aim to contain any droplets being expelled by the surgical staff.<sup>13</sup> Shoe coverings aim to limit the transfer of external material in and out of the procedure room. Gowns cover the designated attire of the surgical staff and can be removed when contaminated and replaced. Surgical staff wear disposable gloves during surgery to prevent the transfer of microorganisms from the staff member's skin to the patient's skin or surgical incision.

#### Patient homeostasis

During the surgical procedure, the patient's bodily functions must be optimized to promote recovery and reduce the risk of SSI.<sup>13</sup> Under general anesthesia, the risk of perioperative hypothermia increases because the body finds it more difficult to regulate temperature in these conditions. Instituting appropriate warming methods to maintain body temperature and prevent the development of perioperative hypothermia, which can prevent postoperative outcomes, to include an SSI. Also, during surgical procedures requiring general anesthesia, the patient is intubated and supplied with oxygen to maintain adequate oxygen perfusion to all tissues; however, if oxygenation is not at optimal levels during surgery, there is an increased risk of an SSI.<sup>15</sup> Strict glycemic control using medications to maintain glucose levels during surgery can reduce the risk of surgical complications, including infection.<sup>16</sup>

#### Postoperative Strategies Wound care

Surgical wound and incision management in the postoperative period is imperative to prevent complications, including SSI and wound dehiscence (wound source). Appropriate cleansing,

skin care, and moisture management should be an essential part of surgical patients' postoperative care plans. Regular dressing changes and monitoring for signs of infection are pivotal during this period in preventing SSIs.<sup>17</sup>

#### Early mobilization

Encouraging mobilization during the postoperative period supports blood circulation and reduces the risk of infection.<sup>18</sup> When patients are mobile, blood can circulate and deliver oxygen and nutrients to the wound site, supporting healing and reducing the chance of infection. Early mobilization can also have broader benefits for patients, including reduced risk of complications such as pneumonia and blood clots and faster recovery times.<sup>19</sup>

#### Multidisciplinary collaboration

In ASCs, the heterogeneity in procedures, roles of the patient care team, and patient populations makes it difficult to define the most appropriate structure or model for optimal team-based health care. Because many factors increase patients' risk of SSI along the surgical pathway, engaging all the health care workers within the ASC is crucial. Implementing multidisciplinary strategies in SSI prevention must be consistently applied, responsive to the individual patient's needs, and supported by the health care organization.<sup>20</sup>

#### Conclusion

Successful implementation of these perioperative strategies could be attributed to increasing awareness of the individual measures but, most importantly, to the patient care team's adherence to these measures.<sup>20</sup> Preventing SSI is a complex endeavor requiring a multidisciplinary approach. A cultural shift acknowledging appropriate perioperative strategies that capitalize on the expertise of various groups, including the patient, can make SSI prevention measures effective and achievable. ■

REFERENCES AVAILABLE AT  
[INFECTIONCONTROLTODAY.COM](http://INFECTIONCONTROLTODAY.COM)

# Optimizing Training for Environmental Services Staff

## A Critical Component of Patient Safety and Infection Control

BY TOMMY DAVIS, PHD, ACHE, APIC, BLS

**E**ffective environmental services (EVS) are critical in maintaining a safe and healthy health care environment.

Properly trained housekeeping staff are essential in preventing health care–associated infections (HAIs), ensuring compliance with regulations, and promoting patient and staff safety. Moreover, EVS leaders must possess supervisory skills and advanced knowledge of cleaning protocols to ensure high hygiene standards. This article delves into the importance of training housekeeping staff and leaders in health care facilities, highlighting key reasons and evidence-based practices to support this imperative.

### Preventing HAIs

HAIs are a significant challenge in health care settings, affecting approximately 1 in 31 hospital patients on any given day in the US.<sup>1</sup> Contaminated surfaces, equipment, and high-touch areas contribute to transmitting pathogens such as methicillin-resistant *Staphylococcus aureus* and *Clostridioides difficile*. Proper training equips housekeeping staff with the skills to clean and disinfect effectively, reducing microbial loads on surfaces and minimizing infection risks.

Key aspects of training should include the following:

- **Understanding pathogen transmission:** Housekeeping staff should learn how pathogens spread and which surfaces are most likely to harbor infectious agents. This includes understanding the role of high-touch

areas, such as doorknobs, light switches, and handrails, in transmitting bacteria and viruses. Recognizing these hot spots helps prioritize cleaning efforts and reduce the risk of infections spreading within the facility.

- **Proper use of cleaning agents:** Training should emphasize the appropriate selection, dilution, and application of disinfectants, ensuring compliance with manufacturers' guidelines. Misusing cleaning agents, such as overdiluting or mixing incompatible products, can reduce their effectiveness and cause harm. Staff should be trained to identify the correct cleaning agent for each surface and follow best practices for safe and effective use.
- **Personal protective equipment:** Staff must understand how to use personal protective equipment (PPE) to protect themselves and prevent cross-contamination properly. This includes selecting the appropriate PPE, such as gloves, masks, and gowns, for the task at hand and knowing how to don, doff, and dispose of it safely. Proper PPE usage minimizes exposure to harmful pathogens and ensures a safer environment for staff and facility occupants.

Evidence suggests that enhanced cleaning protocols and staff education significantly reduce the incidence of HAIs. For example, findings from a study by Kundrapu et al from 2012 demonstrated that cleaning techniques can reduce *C difficile* contamination in health care environments by more than 85%.<sup>2</sup>

### Enhancing Patient and Staff Safety

Inadequate cleaning and disinfection

can lead to unsafe environments, putting patients, staff, and visitors at risk. Training ensures that EVS staff are well-versed in the following:

- **Cleaning procedures for specific areas:** Critical zones such as operating rooms, intensive care units, and isolation rooms require specialized cleaning protocols.
- **Waste management:** Proper medical waste disposal prevents exposure to biohazards and sharp objects, reducing injury and infection risks.
- **Slip and fall prevention:** Training on safe mopping techniques and floor signage reduces the likelihood of accidents.

Effective training prevents accidents and infections and fosters a culture of accountability and professionalism. Well-trained housekeeping staff can promptly identify and address potential hazards, contributing to a safer health care environment.

### Regulatory Compliance and Accreditation

Health care facilities must comply with stringent regulations set by organizations such as the CDC, the Occupational Safety and Health Administration (OSHA), and The Joint Commission. Noncompliance can result in penalties, legal liabilities, and loss of accreditation.

Key areas of compliance include the following:

- **Standard precautions:** Implement evidence-based protocols for hand hygiene and use PPE.
- **Documentation:** Ensure the meticulous maintenance of comprehensive records about sanitation schedules, procedural protocols, and incident documentation essential for compliance and quality assurance in health care settings.
- **Audit preparation:** Implement comprehensive training programs for personnel to effectively prepare for and respond to evaluations conducted by regulatory agencies.

### Role of EVS Leaders

EVS leaders play a pivotal role in ensuring the effectiveness of EVS teams. Properly trained leaders provide

effective oversight, motivation, and guidance to their teams, fostering a culture of excellence. Research by Hashim Zaman and Karim Lakhani from Harvard Business School in Boston, Massachusetts, found that managers sometimes sabotage talented employees to protect their own job security. Troubling results from a survey in this exploration revealed that 71% of executives had observed instances of top-down sabotage during their careers. Notably, 5% of the same respondents acknowledged engaging in actions that undermined their direct reports at some point in their professional tenure.<sup>3</sup>

It is wise to determine what information to share when providing valuable insights to subordinates or selecting new leaders for the team. To paraphrase the biblical saying, avoid giving what is sacred to those who will not appreciate it or sharing treasures with those who may disregard or misuse them, potentially causing harm in return (Matthew 7:6). This exhortation, however, should not be misconstrued as an implication that subordinates or others are inherently unworthy of receiving critical information for professional growth. Instead, it underscores the principle that empowering individuals who lack the requisite values or competence may hinder the achievement of desired outcomes, irrespective of the quality of the information imparted. This also applies to appointing the wrong leaders to positions of authority, which can stifle growth and harm the organization's vitality.

It is imperative to advocate for leadership that prioritizes transparency, fosters professional development, and embraces the recruitment of skilled talent. Key competencies for EVS leaders include the following:

- **Supervisory skills:** Effective leaders must know how to delegate tasks, resolve conflicts, and evaluate performance. Leadership training enhances their ability to motivate staff and ensure accountability. The lack of leadership skills is detrimental

to the team and undermines the quality of patient care, inhibiting team members' continuous learning and development.

- **Knowledge of cleaning methods:** A comprehensive understanding of cleaning chemistries and industry standards is essential for effectively engaging with subordinates and sales representatives.
- **Continuous education:** To maintain high standards, it is essential to stay updated on emerging pathogens, cleaning technologies, and regulatory changes. Certifications from esteemed agencies that assess and enhance competencies are instrumental in equipping leaders and their teams to perform their responsibilities reliably.

For instance, findings from a study by Carling et al from 2008 highlighted that supervisory programs focusing on cleaning efficacy significantly improved surface disinfection, reducing HAIs.<sup>4</sup>

### The Economic Impact of Proper Training

Investing in housekeeping training yields substantial economic benefits for health care facilities. HAIs result in significant costs, averaging \$25,000 to \$40,000 per infection in direct medical expenses.<sup>5</sup> Effective training reduces these costs by preventing infections and minimizing hospital readmissions. Moreover, trained staff improve operational efficiency, reducing turnover rates and the need for corrective actions.

Following are specialized trainings in cleaning and disinfection protocols as well as infection prevention and control practices available from several organizations:

#### 1 Certified Health Care Environmental Services Professional (CHESP)

- Offered by the American Hospital Association
- Focuses on infection control, cleaning protocols, waste management, and patient safety

#### 2 Certificate of Mastery in Infection Prevention (CMIP)

- Offered by the Association for the Health Care Environment
- Covers health care-specific cleaning practices, disinfection, epidemiology,

microbiology, and regulatory issues

#### 3 OSHA training

- Offers courses in workplace safety, blood-borne pathogens, and hazard communication

#### 4 Cleaning Industry Management Standard (CIMS)

- Offered by the International Sanitary Supply Association
- Focuses on management standards for cleaning applicable to health care facilities

#### 5 Infection prevention and control training

- Offered by organizations such as the CDC or the World Health Organization
- Focuses on hygiene practices, infection control, and disinfection protocols specific to hospitals

Developing a robust training program involves the following:

- **Initial orientation:** New employees should receive comprehensive training on cleaning protocols, safety procedures, and organizational policies.
- **Ongoing education:** Regular competency assessments keep staff updated on best practices.
- **Tailored modules:** Training should address specific needs, such as handling biohazards or cleaning isolation rooms.
- **Feedback mechanisms:** Encouraging feedback from staff helps identify gaps in training and opportunities for improvement.

### Conclusion

Properly training housekeeping staff and ESV leaders is vital for maintaining a safe, compliant, and efficient health care environment. Training reduces the risk of HAIs, enhances safety, ensures regulatory compliance, and fosters a culture of excellence. Health care organizations must prioritize comprehensive training programs and continuous education to achieve these goals. Investing in the professional development of housekeeping teams protects patients and staff and delivers significant economic and reputational benefits. ■

REFERENCES AVAILABLE AT  
[INFECTIONCONTROLTODAY.COM](http://INFECTIONCONTROLTODAY.COM)



# Innovation and Infection Control Highlights From W&H at Chicago Dental Society Midwinter Meeting

BY TORI WHITACRE MARTONICZ

**W&H's presence at the Chicago Dental Society Midwinter Meeting in Illinois** from February 20 to 22, 2025, highlights cutting-edge dental innovations, including the Lexa Mini rapid sterilizer and Synea Power Edition handpiece, which enhance infection control and dental efficiency. Doris Schneider, MBA, senior marketing manager for North America for W&H North America, spoke with *Infection Control Today (ICT)* and emphasized W&H's commitment to proper sterilization education, ergonomic dental tools, and improving patient experience.

**ICT: Would you mind telling ICT's audience what your booth will demonstrate?**

**Doris Schneider:** I look forward to showing you what we have at our booth, especially some exciting highlights of new products we've just released.

The first product we have, released just a few months ago in November [2024], is the Lexa Mini [rapid sterilizer]. It's a Class B rapid sterilizer. It's a compact sterilizer that can be used either as a supplemental sterilizer or as a stack. You can have multiple sterilizers, but they don't replace the full tabletop. It's a smaller one, but it's

packed with the same innovation as our award-winning Assistina sterilizers. It uses fresh water for every cycle and closed-door drying to ensure bone-dry loads for effective sterilization.

Next is our Synea Power Edition handpiece. This handpiece is unique because it is electric and specifically designed to cut through the toughest materials, such as zirconia crowns.

Most dentists dread cutting through zirconia, so when they experience this handpiece, it's a different level of torque and less manual hand pressure. It gives an effortless feel. We have several interesting video testimonials from the Stanley Insti-

tute [for Comprehensive Dentistry in Cary, North Carolina]. They tested the product out, and they were amazed. One of the dentists, [who] had I don't know how many zirconia crowns she had worked on throughout the day, and her hands were so tired at the end of the day. She had no hand fatigue when she used the new Synea Power Edition handpiece. She did not have sore hands at the end of the day. When you think about that, it helps her keep her career longer because that eventually takes its toll physically. It's quieter, less [harsh] on the ears, especially for the patient, and a better patient experience. You don't have that dreaded high-pitch drill sound. If you've ever been to a dentist, you do not hear that with this handpiece; it's awesome. We encourage people to come to our booth, where we will have zirconia samples. You can use the handpiece, cut through it, and see for yourself that it's an amazing handpiece.

**ICT: Would you discuss your company as a whole?**

**DS:** The company has been around



for over 130 years. However, what's interesting is that we're still relatively new in the US and Canadian markets. A few years ago, we started to ramp up our branding and strengthen our sales team. We work through an office based in Ontario, Canada, and [with] several remote employees throughout the US and Canada. We have a new sales team that's super energetic, very knowledgeable about the products, and very excited to have people at our booth.

**ICT:** Many in ICT's audience have never attended that meeting. However, infection prevention in the dental industry is crucial, just as in any health care sector. That's very true, but it hasn't been fully addressed yet. Could you provide some insights into the conference overall and explain why you think it's important for your company to participate and why you and others need to attend?

**DS:** That's a great question because one of our goals is to better educate and advocate for proper sterilization and hygiene, specifically in dental practices. We recently renewed our super sponsorship, with ADS, which is the Association for Dental Safety, an organization that advocates for infection control, and we have a few [key opinion leaders] as well who have spoken on our behalf and have discussed our sterilizers as examples of [the fact that] there's a lack of education,

We do not advocate open-door drying because the load still comes out wet. One thing I found very interesting was that in listening to these different webinars and speaking with our [key opinion leaders], there is such a lack of education in that specific space. And this meeting has an interesting platform. I noticed several people speaking on infection control in the dental learning area. There are

a lot of new students, and many hygienists will be there. And this is a growing topic that will be more prevalent in many events such as [the] Midwinter [Meeting].

**ICT:** Is there anything specific people should look for at the conference to ensure they get everything they want out of it?

**DS:** Aside from visiting our booth at 1634, we have oral surgery, restorative handpieces, equipment, and new sterilizers, so our team can take you through all our products, depending on your focus and practice or what you're studying. But what I love this year is [that the] Midwinter [Meeting] has a new Dental Innovation Lab on the show floor, and that's going to be a showcase area where all new products will be on display for all exhibitors that are at the booth, and [that is] something attendees can walk through and check out instead of going to the booth of each [company]. I like that. This is one area you can go [to] for all the latest innovations across all manufacturers, and it's a great thing that they're doing. We have both products in that [Dental Innovation] Lab: the Synea Power Edition handpieces and our Lexa Mini rapid sterilizer. I'm excited to have them showcased there as well.

**ICT:** Do you have anything else you'd like to add?

**DS:** No, other than [to] encourage people to come to our booth. Try out our handpiece and test it on zirconia. We have cutting stations. We will also take you through our new sterilizer products, especially since you and I have discussed infection control. We love that our sterilizers offer closed-door drying and fresh water for every cycle, which minimizes any risk of cross-contamination.



From Sterilization Technology to Infection Control Advocate:

## Sherrie Busby's Inspiring Dental Journey

**Sherrie Busby, EDDA, CDSO, CDIPC,** recounts her 40-year journey in dentistry, from starting as a sterilization technician to becoming an infection control leader. Her story emphasizes the importance of continuous learning, adapting to evolving infection control standards, and fostering educational growth in dental settings. As she prepares for retirement from Heartland Dental in Effingham, Illinois, Busby looks forward to a new career phase, balancing infection control education with personal caregiving while continuing to inspire the dental community.

Before her retirement, Busby delivered 2 presentations at the Chicago Dental Society Midwinter Meeting in Illinois, held from February 20 to 22, 2025. One, "Dental Implants: Everything a Dental Assistant Needs to Know...Well, Most Everything!" covers a broader topic,



Scan here  
for all the  
coverage  
from the  
Midwinter  
Meeting



but her second, “A Comprehensive Overview of OSHA & CDC: Infection Control Guidelines,” is about infection prevention and control. She explained this during her interview with *Infection Control Today (ICT)*.

**ICT: Please explain how you got into dentistry and then how you got into infection control?**

**Sherrie Busby, EDDA, CDSO, CDIPC:**

I started in dentistry in 1980. I was a new mother with 2 very young children, and I needed a way to support my kids. So I went down to the technical college in my town and said, “I just need to do something.” They responded, “OK, we have medical assisting, CNA [certified nursing assistant], or dental assisting.” I wasn’t sure, so I said, “Let’s talk about it.”

I began looking at the programs and quickly decided I didn’t want to be a CNA because that didn’t seem appealing. I then started in dentistry, which was

funny because I was a single mom with 2 kids and needed to work. I got a job as a sterilization technician while still in school. It was interesting because my office was very open to teaching me, which meant I did procedures well before I learned them in school.

Keep in mind, back when I started in dentistry, we didn’t even wear gloves. We would take our burs and sanitize them with alcohol. We knew nothing. I remember around 1984, when AIDS began to spread, and at that same time, I was exposed to hepatitis. I didn’t contract hepatitis, but because I had a patient, I was exposed, which meant going through those painful  $\gamma$ -globulin shots. That experience made me think, “This could be better.” I didn’t know about gloves and proper techniques then because they weren’t part of our training. I began to educate myself about infection control. There weren’t many resources back then like we have now, so I mostly learned through talking to people, like sales representatives.

My education was quite limited. I was curious and wanted to know everything about the dental office. Fast-forward many years, [and] I learned about infection control from the people in my office. I picked up their bad habits because I didn’t know any better. We just learned from each other until the late 1990s when the internet became a thing. Once more information became widely available, I started educating myself better. I discovered that the CDC had resources—who knew? That didn’t happen until 2003, so we were still picking up bad habits from each other.

In the mid-1980s, around 1984 or 1985, we began wearing gloves, masks, and other PPE [personal protective equipment]. Fast-forward a bunch of years, and I kept learning more. It’s been 16 years, but I’ve been with Heartland Dental for quite some time. When I joined Heartland Dental as a dental assistant training developer, the first program they assigned me was on

OSHA [Occupational Safety and Health Administration] infection control. My directive was to make OSHA fun.

I thought, “You’re out of your mind. How can I make that fun?” But I aimed to make it more interesting than it had been before. I realized I needed to delve deeper into this process since I was now responsible for educating around 1000 people across 200 offices. That’s when I got my first certification. I [had known] this lady for a long time, so I went through her program, which was the first OSHA infection control certification I could find. I kept learning, becoming more of a geek, and following people on social media. When DANB [Dental Assisting National Board] and OSAP [Organization for Safety, Asepsis and Prevention], now known as ADS [Association for Dental Safety], launched their national certification, I jumped at the opportunity. I did well because I was already immersed in the material.

### **ICT: Could you describe what the Chicago Dental Society Midwinter Meeting is like?**

**SB:** My favorite part would be the networking. There are many networking opportunities available and so many interesting people to meet. I enjoy that aspect. I take classes even when presenting because I want to learn something new. I usually don’t take infection control classes, but sometimes I do to ensure I’m current on the latest information. People have different opinions, and their perspectives can vary quite a bit. That’s why I occasionally decide to take an infection control class.

I love the wide variety of education that’s offered. Just this morning, I was looking through the course catalog, and it includes everything from yoga classes on Friday afternoons to ergonomics. I’m also teaching an implant class for dental assistants on Friday afternoon. The catalog features infection control, implants, composites—pretty much every procedure you can think of—and

business education and leadership skills. Those leadership courses fill up quickly. There is such a wide range of topics available. Plus, you get to win prizes, which is always fun! The event floor probably has around 4000 vendors, and it’s enormous. Here’s my best personal tip: Wear comfortable sneakers because you’ll walk a ton. The McCormick Place is one of the biggest event centers in the country, with 3 stories packed with learning opportunities, activities, and prizes. It’s truly a great event, and don’t forget to bring some extra cash since the food vendors can be pricey.

### **ICT: Why is it important for you to attend the Midwinter Meeting?**

**SB:** For all those things, I want to check out the new supplies. So I walk the floor. While I’m walking the floor, I network with people I know or might need to know, those kinds of connections. I take classes. I network. I enjoy meeting dental assistants. This event is going to be a lot of fun.

I have a good friend named Julie. You can find her on Instagram as @dentalassistantsrock. Julie is my great buddy. We’re hosting a “brew and chew” for dental assistants on Thursday at 7:30 AM. Just come and talk to us; let us meet you. I want to shake your hand and see who you are. We’ll be near Starbucks on the event floor for room 2 on Thursday at 7:30 AM. There is so much going on—it’s a busy, bustling place all the time. I don’t have an exact number, but around 25,000 people will be there. It’s a lively spot, including the events, speakers, and their entourages. It’s just a ton of people who all love teeth. It’s crazy; we know each other because we love teeth. We love teeth!

### **ICT: Can you give me a short overview of your OSHA and CDC presentation?**

**SB:** I will be covering federal guidelines for CDC guidelines because there is no way I could get into the state-level stuff.

But I’m going to cover CDC guidelines, and it’s so funny that we learn from each other, and people don’t know what they don’t know. I will cover those things, and I hope I have some practical tips on how to do it. We know the science, but we don’t know how to make it everyday dentistry, so I’m hoping that I will cover that, and this is going to be the first [time] ever we’re going to have an infection control Jeopardy [game].

### **ICT: Do you have anything else you’d like to add?**

**SB:** I’m excited about retiring from Heartland Dental in April 2025 to care for my mom, who has advanced Alzheimer [disease]. I can’t handle a 9:00 AM to 5:00 PM job and her care; it’s impossible for me. So I’m starting my third career. I originally didn’t plan to go into infection control since there are so many knowledgeable speakers and instructors in that field, and I often feel like they are much smarter than I am. But here I am, suddenly immersed in infection control, and it’s become my passion.

I love helping people and witnessing those light bulb moments when they realize something new—like, “I didn’t even know I needed to do this.” I should have been in serious trouble for what I did over the years without knowing better, but I’ve learned from others. Seeing others have that revelation makes everything worthwhile.

Now, I’m embarking on this journey in infection control, but I have other topics to explore as well. For instance, I have a great class on fillings and direct restorations, and in July, I’ll be teaching Illinois doctors how to train their dental assistants, as they often don’t know how to do that. I thought my journey would focus solely on that and not on infection control, but now I’ll be juggling both. My third career is kicking off in such a crazy way; I expected a slow start to adjust, but it’s anything but that. The only difference is that I’ll still be working full-time, but I won’t be bound by such strict timelines. ■

# Silent Saboteurs: Managing Endotoxins for Sepsis-Free Sterilization

BY MARJORIE WALL, EDDBA, CRCST, CIS, CHL, CSSBB, RHASHAMEKIA LAW, MBA, BA, CSPDT, CSPDM, AND SANDRA HILLIARD, CHL, CRCST, CIS

Imagine a patient undergoing what should be a routine surgery. The instruments used have been carefully sterilized, but lurking on their surfaces are microscopic endotoxins—heat resistant and undetectable by standard sterilization methods—posing a hidden threat to patient safety. The instruments used have been sterilized and the procedure goes smoothly, but days later, the patient develops a severe, unexplained infection. The culprit? Invisible, heat-resistant endotoxins lurking on supposedly sterile medical devices. These silent saboteurs pose a grave threat to patient safety, capable of triggering fevers, multiorgan failure, and even fatal septic shock. Despite rigorous sterilization protocols, endotoxins persist in health care settings, demanding strict regulatory oversight and innovative mitigation strategies. Understanding the nature of endotoxins and their impact on sterilization practices is crucial in ensuring patient safety and preventing deadly infections.

## What Are Endotoxins?

Endotoxin lipopolysaccharides (LPSs) trigger a vast spectrum of biological responses, both harmful and beneficial to the host organism.<sup>1</sup> They are commonly found in the environment, particularly in the gastrointestinal tract, and are the most significant pyrogens in drugs and medical devices.

Endotoxins can be transmitted through medical equipment, intravenous medications, saline solutions, implants, and sterile water.<sup>2</sup>

LPS, present in the outer membrane of gram-negative bacteria, is heat stable and released upon bacterial lysis or death.<sup>3</sup> LPSs are crucial to bacterial organization and stability.<sup>4</sup> Structurally, endotoxins consist of 3 regions: O-specific antigen, core polysaccharide, and lipid A. These components are responsible for toxic effects, including fever, multiorgan failure, sepsis, and septic shock.<sup>5</sup> Although the O antigen is the outermost part and nontoxic, the core polysaccharide varies among bacterial strains.<sup>6</sup> The lipid A portion is highly toxic and anchors the endotoxin to the bacterial membrane.<sup>6</sup> Although endotoxin structure is largely conserved, it can undergo modifications in response to environmental changes.<sup>6</sup>

## History and Research on Endotoxins

In the early 1800s, researchers speculated that microscopic organisms could be transmitted through soil and air. Louis Pasteur later demonstrated the role of microbes in infectious diseases.<sup>7</sup>

- **1809-1822:** Sir John Burdon-Sanderson confirmed von Haller's findings, proving that putrid fluids caused animal fever and disease.<sup>7</sup>
- **1822:** François Magendie linked putrid water conditions to severe illnesses such as typhoid fever and cholera.<sup>7</sup>
- **1856:** Peter L. Panum observed that injections of putrid fluid induced fever.<sup>7</sup> **Later**

**in 1856, Panum** demonstrated that the fever-inducing substances derived from putrid matter were heat-stable and water-soluble.<sup>9</sup>

- **1880:** Julius Wagner-Jauregg experimented with inducing fevers using endotoxins, later earning a Nobel Prize for his research on artificial fever induction.<sup>8</sup>
- **1884:** Hans Christian Gram developed the Gram staining technique.<sup>9</sup>
- **1890s:** Eugenio Centanni successfully isolated endotoxins from bacterial lysates, confirming their heat stability.<sup>9</sup>
- **1892:** Richard Pfeiffer distinguished between heat-labile exotoxins and heat-resistant endotoxins and coined the term *endotoxin*.<sup>7,9</sup>

Although endotoxin injections evoke memories of unethical research practices, gram-negative bacterial endotoxins have been used in medical treatments for more than a century. Initially, they were used to induce fever to treat infections such as arthritis, eye inflammation, and cancer.<sup>8</sup> By the 1940s, researchers sought to understand endotoxin tolerance through controlled administration.<sup>8</sup> Findings from studies revealed that humans are highly sensitive to endotoxin effects.<sup>8</sup> Today, purified LPS is a critical tool in immunology research, helping to develop better treatments for septicemia.<sup>7</sup>

## Impact of Endotoxins on the Body

The US Food and Drug Administration (FDA) identifies multiple sources of

endotoxin contamination, including solvent water, sterilization water, packaging materials, and manufacturing equipment.<sup>10</sup> Contamination can occur at any point in the reprocessing cycle, including cleaning, sterilization, and storage, making consistent monitoring essential.<sup>10</sup> Medical equipment, including surgical instruments, catheters, and implantable devices, can become contaminated when exposed to water sources that contain endotoxins, potentially resulting in patient exposure.<sup>10</sup>

Once endotoxins enter the bloodstream (endotoxemia), they trigger severe inflammatory responses. The immune system recognizes endotoxins as foreign threats, activating a powerful immune reaction that can cause fever, diarrhea, and, in extreme cases, septic shock.<sup>6</sup> Endotoxins contribute to bacterial infections such as typhoid fever, tularemia, and the plague. They also play a significant role in hospital-associated infections caused by gram-negative bacteria, including *Escherichia coli*, *Proteus*, *Pseudomonas aeruginosa*, *Enterobacter*, *Serratia*, and *Klebsiella*.<sup>11</sup>

Despite extensive research, the exact role of circulating endotoxins in septic shock remains debated. LPSs function as alarm molecules in the innate immune system, signaling potential bacterial invasions. Although small amounts of LPS help the immune system fight infections by coordinating antimicrobial responses, large-scale endotoxin release can overwhelm the body, leading to widespread inflammation, tissue damage, organ failure, and, in severe cases, death.<sup>12</sup>

### Endotoxins and Sterile Processing

Endotoxins persist on sterile biomedical devices because sterilization processes deactivate microorganisms rather than eliminate them entirely. Highly heat-resistant endotoxins can survive regular sterilization methods because most standard techniques, such as steam and chemical sterilization, effectively kill bacteria but do not eliminate the heat-stable endotoxin molecules they release.

“Today, purified LPS is a critical tool in immunology research, helping to develop better treatments for septicemia.”

This resilience necessitates specialized decontamination strategies to prevent patient exposure. The only proven method to destroy them is dry heat at 250 °C for 30 minutes or 180 °C for 3 hours, which is not feasible for many polymeric and metallic medical devices.<sup>13</sup> As a result, endotoxins may remain on surgical instruments and implants, posing infection risks to patients.

The FDA has implemented essential regulations about restricting endotoxins in medical devices. These regulations have significant implications for medical device manufacturers, as they depend on the device's intended application and interaction with bodily surfaces, cavities, and fluids.<sup>14</sup> In sterile processing, screw caddies and implant plates undergo multiple rounds of cleaning and sterilization before being used on a patient. Some sizes may not be used for years.

The American National Standards Institute (ANSI)/Association for the Advancement of Medical Instrumentation (AAMI) ST108 standard provides a regulatory framework for water quality in sterile processing, ensuring that endotoxin contamination is minimized.<sup>15</sup> This standard categorizes water into *utility water*, *critical water*, and *steam*, with strict contamination thresholds. Poor water quality can result in device malfunctions, toxic residue on implants, patient infections, and pyrogenic reactions.<sup>15</sup>

To comply with ANSI/AAMI ST108, sterile processing departments must implement robust water purification strategies, including reverse osmosis, deionization, UV disinfection, and ultrafiltration. Monthly endotoxin testing is recommended for all reprocessing

areas, including steam, ultrasonic, mechanical washers, and final rinse water.<sup>15</sup> Additionally, in-line infection control filtration is crucial for removing endotoxins that sterilization alone cannot eliminate. Compliance with ANSI/AAMI ST108 is critical in preventing endotoxin-related infections and ensuring patient safety by addressing water quality at every stage of the reprocessing cycle.

### Conclusion

Endotoxins pose a significant risk to patient safety, particularly in medical device sterilization. Although extensive research has improved our understanding of endotoxin mechanisms, challenges remain in eliminating them from health care environments. Advancements in detection and decontamination methods are crucial in minimizing endotoxin-related infections. By complying with strict regulations such as ANSI/AAMI ST108 and improving sterilization protocols, sterile processing departments can mitigate the risks associated with endotoxin contamination, ultimately enhancing patient outcomes. Future research into advanced filtration technologies, improved endotoxin detection methods, and novel sterilization techniques will be essential in further reducing endotoxin-related risks in health care settings. ■

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# H5N1 Avian Flu Crisis

## A Growing Threat to U.S. Food Supply and Public Health

BY: KEVIN KAVANAGH, MD, MS

**T**he US could be on the precipice of enduring another pandemic. It is not one from Southeast Asia, but one largely grown and in some respects nurtured in North America, as evidenced by the rising number of avian influenza (flu) (H5N1) cases and the muted response of our public health system. As of January 2025, there have been 67 reported human cases of H5N1 in the US and 1 death.<sup>1</sup> However, confirmed cases of human-to-human spread have not yet been reported. Since January 2022, there have been 1490 bird outbreaks affecting over 150 million animals.<sup>2</sup> Over the last year, there have also been 957 confirmed cases in cattle, with 736 cases in California.<sup>3</sup>

Although largely ignored until recently, the H5N1 virus has existed for over a century. This virus was first observed in the 1880s,<sup>4</sup> and the first outbreak in the US occurred in 1924.

The H5N1 clade that infects birds is B3.6.<sup>5</sup> However, the virus is constantly mutating and optimizing its ability to infect various mammalian species. H5N1 has infected harbor and grey seals, American minks, South American sea lions, and cats.<sup>6</sup> By 2023, 48 mammalian species in 26 countries have contracted the virus.<sup>7</sup>

In March 2024, a clade of the virus (B3.13)<sup>8</sup> was first detected in dairy cows on farms in Texas, Kansas, and New Mexico.<sup>9</sup> A single mutation increased

the virus's ability to transmit in cattle.<sup>10</sup> Approximately 10% of the herds were infected, and early in the epidemic, there was little or no associated mortality.<sup>9</sup> During this time, the American Veterinary Medical Association reported the United States Department of Agriculture (USDA), FDA, and CDC "indicated they [had] no concerns about the safety of the commercial milk supply."<sup>9</sup>

By October 2024, a new, more lethal clade appeared in California dairy herds, with cows dying at a much higher rate.<sup>11</sup> Mortality rates were 15% to 20% compared with 2% in other states. In November, the National Academy of Sciences reported<sup>12</sup> that 15% of the infected herds became critically ill with decreased feed intake and milk produc-

**“Currently, avian flu is devastating our food supply and driving up food prices, including eggs and poultry.<sup>25</sup> More than 100 million birds have died or been culled to prevent further spread.<sup>25</sup>”**

tion. The primary route of infection is thought to be mammary inoculation through the process of milking. The cow's milk can become contaminated, and drinking raw milk poses significant public health risks.<sup>13</sup>

Seven percent of dairy workers on farms with H5N1 outbreaks have had positive test results for the virus.<sup>14</sup> The symptoms are usually mild, with conjunctivitis being a common symptom. No deaths have been reported.

Although the condition has been mild in humans, farm cats have developed neurological signs and rapid death after drinking raw milk from infected cows.<sup>15</sup> This represents mammal-to-mammal spread. In January 2025, the FDA reported that more than a dozen cats had died from avian flu after eating raw pet food.<sup>16</sup>

On December 18, 2024, Governor Newsom of California declared a state of emergency prompted by the H5N1 virus' infection of dairy herds and its detection in milk products.<sup>17</sup> Mechanization with robotic milking machines is one strategy to minimize the spread of the virus in dairy herds and reduce farm worker exposure.<sup>18</sup> The cows are trained to approach the machines, where robotic arms and cameras do the rest. Between milkings, the machines use an iodine solution to clean themselves.

Despite the ongoing threat to our food supply, the US has not had an aggressive response to stop the spread of H5N1:

In April 2024, the USDA enacted testing and reporting requirements for lactating dairy cattle traveling across state lines,<sup>19</sup> but other livestock (heifers, dry cows, and bull calves) did not require testing, and there was no testing required within the various states with outbreaks.

- In April 2024, the USDA required reporting for livestock with positive test results for H5N1.
- In December 2024, a national milk testing

strategy was implemented to safeguard the public and help eliminate the virus from dairy cattle.<sup>20</sup>

- On January 16, 2025, the CDC issued an advisory notice recommending that hospitals subtype flu to better detect H5N1.<sup>21</sup>
- On January 21, 2025, public communications from the US health agencies (FDA, CDC, National Institutes of Health) were paused. This included CDC health alerts, website updates, and *Morbidity and Mortality Weekly Report (MMWR)* publications. The following week, 3 *MMWR* publications regarding the H5N1 outbreak would have been published.<sup>22</sup>
- On January 23, 2025, The Bullvine reported that the USDA is fast-tracking vaccine development for dairy cattle.<sup>23</sup>
- Although H5N1 vaccines are highly effective and are used by the Netherlands and France in poultry, the USDA has not authorized vaccine use due to its potential adverse impact on poultry exports.<sup>24</sup>

Currently, avian flu is devastating our food supply and driving up food prices, including eggs and poultry.<sup>25</sup> More than 100 million birds have died or been culled to prevent further spread.<sup>25</sup> When poultry and eggs are in short supply, the public purchases other food items, increasing prices. Politicians initially blamed corporate price gouging instead of acknowledging an uncontrolled avian flu.

Human outbreaks and taking definitive steps to minimize viral spread<sup>26</sup>

Thus far, humans have been largely spared. This is largely because H5N1 uses the  $\alpha$ -2,3 receptor to infect birds and mammals.<sup>27</sup> This receptor is found in almost all animals, including humans. However, in humans, this receptor is primarily located in the lower respiratory tract, with the  $\alpha$ -2,6 receptor being the dominant receptor in the upper respiratory tract.<sup>28</sup> Thus, in its present form, the H5N1 virus does not readily infect humans; when it does, it seldom spreads to other humans.

Unfortunately, the virus is on the verge of adapting to more readily infect humans through 2 possible mechanisms. The first is recombination (antigenic shift) with a seasonal flu virus

that is fully adapted to infect humans. This requires simultaneous infection of the 2 viruses in an animal. The 2 most likely possibilities are a pig with  $\alpha$ -2,3 and  $\alpha$ -2,6 receptors and a human, such as a dairy worker who goes to work with the seasonal flu and then contracts avian flu. The resultant virus would be entirely new, and its infectivity and pathogenicity would be uncertain.

The second method is by mutation (antigenic drift). A decade ago, several different mutations would have had to occur before there was a risk of significant human-to-human spread, but the virus has progressively adapted. Scripps Research has reported that we are only 1 mutation away from H5N1 efficiently spreading in humans.<sup>29</sup>

According to the CDC, the fatal human case in Louisiana and the severe case in a teenager in Canada<sup>30</sup> have shown similar mutations (in variant D1.1) that could enable the spread between humans.<sup>31</sup> Both dangerous strains were quickly identified and contained, preventing spread to the general population.

Unfortunately, according to the USDA,<sup>32</sup> the D1.1 variant has become the predominate genotype in the North American Flyways. D1.1 has been detected in dairy cattle in Nevada. Spilling over to cattle poses not only a threat to animal farm workers but also to the general public.

## Response and Vaccines

A rigorous response to the H5N1 threat is desperately needed. Unfortunately, surveillance for H5N1 is spotty at best and mainly focused on dairy cattle. The lack of a robust surveillance system and data has allowed many in the public and our leadership to ignore this pandemic. At a minimum, expanded testing and enhanced reporting are needed to help secure our food industry.

Vaccines are also paramount in stopping a potential avian flu pandemic. Finland has proactively offered H5N1 vaccinations to animal farm workers. In December 2024, the United Kingdom

stockpiled 5 million vaccine doses, enough for 8.2% of its population.<sup>33</sup> The European Union has ordered 40 million doses,<sup>34</sup> and in June 2024, the US ordered 4.8 million doses,<sup>35</sup> enough for 1.4% of its population.<sup>34</sup>

Most recently, in January 2025, Moderna was awarded \$590 million for an mRNA avian flu vaccine.<sup>36</sup> The exact genetic composition of the potential human variant is unknown. If human adaptation does occur, mRNA technology provides the fastest response.

Hopefully, our population might be building up a degree of immunity. The seasonal flu vaccine may provide some protection against H5N1. Findings from one study have observed that 12.2% to 15% of vaccinated individuals developed protective antibodies to avian flu 1 month after vaccination.<sup>36</sup> In addition, a degree of immunity might also develop in our population from exposure to inactivated viruses in contaminated food.

Thus, although the potential for a devastating H5N1 pandemic in the US is still uncertain, we need to prepare for the worst while hoping for the best. Actions such as the state of Louisiana prohibiting their health department from promoting vaccines are both dangerous and counterproductive, especially in the state that recently had a fatal case of a dangerously mutated H5N1 virus.<sup>37</sup>

Few can comprehend or imagine what it was like to live in fear of infectious diseases before vaccines. However, if we do not develop a uniform, effective response to emerging pathogens, we will experience this horrible reality firsthand. We need public health cooperation, not social confrontation. We must follow the science that has demonstrated the effectiveness and safety of N95 masks, vaccines, and clean indoor air so we do not have to live through another pandemic. A pandemic that devastates not only our food supply but also our health and the foundations of our society. ■

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# Beyond Hand Hygiene: The 5 Critical Moments for Environmental Disinfection in Health Care

BY TORI WHITACRE MARTONICZ

Infection prevention has long focused on hand hygiene, but what about the surfaces patients and health care workers touch throughout the day? Jim Gauthier, MLT, CIC, alongside coauthors Carol Calabrese, BS, RN, CIC, and Peter Teska, MBA, introduced the concept of *Targeted Moments of Environmental Disinfection* (TMED)—a structured approach identifying 5 critical moments for cleaning high-touch surfaces in patient care areas, published in *The Joint Commission Journal on Quality and Patient Safety*.<sup>1</sup>

In this interview with *Infection Control Today* (ICT), Gauthier discusses the importance of real-time disinfection, the hidden dangers of overlooked surfaces, and practical strategies to integrate TMED into daily health care practices, aiming to reduce health care–associated infections and enhance patient safety.

“TMED is a heuristic, risk-based model proposing additional cleaning and disinfecting within the patient zone modeled on a similar concept developed by WHO [World Health Organization] for hand hygiene,” the authors wrote. “TMED identifies and suggests when disinfection should be conducted by [health care workers], either after or before certain procedures or events that may leave organisms on high-touch surfaces, or to remove organisms that may have been deposited during other care procedures.”

**ICT: Please explain what your commentary covered.**

**Jim Gauthier, MLT, CIC:** What [the

commentary] boils down to is that we told health care workers back in the 2000s when to wash or sanitize their hands, and WHO published the 5 Moments for Hand Hygiene [guidance],<sup>2</sup> which boils down to these are 5 critical moments [when] we need you to make sure your hands are clean: before you have contact with the patient, before you do anything very, very clean or aseptic, after contact with blood or body fluids, before you leave the patient’s room, if you’ve touched the patient’s environment.

When I look at cleaning and disinfection, we go into the patient’s room, hopefully once a day, clean high-touch surfaces, and that’s about it. [Environmental services (EVS) goes] in and [cleans] well once a day, and then care occurs for the other 23.5 to 23.75 hours of that day with no other targeted cleaning being done based on the care we did. So that’s where the genesis of this commentary came from.

**ICT: What was your goal for the commentary?**

**JG:** The point of the paper is care happens all day. There is not an EVS [technician] standing behind the door every time somebody comes in the door to perform some form of care for the patient or the resident, if we’re talking long-term care. As I put the paper together with my peers, and as I’ve talked about it to different infection control groups and to [EVS] groups, I always get this feedback of, “What do you think we should clean?” and what’s not in the article, and I should probably do a follow-up to it. But what it

boils down to is if, during care, you’ve touched it or used it, clean. But we [broke it down] into 5 moments.

As a microbiology technologist, I understand the movement of microorganisms. I know what they look like, what they smell like, and where they can hide. When [my coauthors and I] start looking at papers that are trying to figure out an outbreak and where these organisms came from, the 2 dirtiest surfaces in the hospital, when I looked at the papers, were the over-bed table and the bed rails. When I started looking at what you can find on the over-bed table and the bed rails, we thought, “Those are also high-touch surfaces. They get touched a lot, and we probably need to clean those more than just once a day.”

**ICT: What are the 5 moments you are recommending?**

**JG:** What we’re suggesting is disinfecting the over-bed table.

**Moment 1:** Before placing food or drink on the over-bed table, it must be disinfected.

**Moment 2:** Before and after aseptic practices. For instance, if health care workers come in to change a dressing, insert a line, or perform catheter care, they need to disinfect before establishing a clean space and disinfect after.

**Moment 3:** Involves anything related to feces or respiratory secretions within the patient’s bed space. For example, if the patient is expectorating for you, they’re coughing up something. If you



need to assist a patient with their incontinence products and help them into a clean product, you'll need to disinfect something when you're done.

**Moment 4:** After any patient bath within the patient bed space, if you give the patient a basin and a washcloth and say, "Here, clean yourself up. Breakfast is on its way," you're likely going to need to disinfect afterward. If you're using the prewetted wipes that are quite common in health care today, you can warm a small package of wipes, wipe the patient down, or allow [them] to clean themselves; you have 1 wipe for each part of the body. In my experience, they often end up on the over-bed table. So again, after any patient bathing, you need to disinfect something.

**Moment 5:** Does anything used on or used by a patient that touches the floor need to be disinfected? We all have experiences where somebody will come into a room and see the cell phone charger on the floor, pick it up, and hand it back to the patient. That will fall, hit the floor, and return to the patient without being disinfected.

As these moments arose, much of this came from reading the literature and addressing issues, whether through outbreaks or discussing topics such as what we should do with floors. It doesn't matter too much what you do with a floor; if anything touches the floor, which will be used by or on a patient, it is infected when it hits the floor. [Our] paper has 51 references as commentary to support each of these points.

The over-bed table that the patient eats off—none of us eat in our restrooms, I hope, at home or in our bathrooms. Well, people probably do. But patients are somewhat trapped there, so they might use a urinal if they're bedridden and place it on the over-bed table if they don't use the one on the side. All of us can recall what we've seen on over-bed tables if we've been in health care. That's where I found evidence of bacteria,

and I suggested that we disinfect that over-bed table before placing anything on it. The same applies to all the other moments mentioned in the paper. One of the main pieces of feedback we receive is, "Don't give me anything else to do." Especially for registered nurses trying to care for too many patients, don't add more tasks to their load.

We designed a little table [with] the 5 moments across the top and looked at different kinds of patients. A ventilated patient in the intensive care unit is going to require a lot more wiping if someone tries to follow these 5 moments than a medical-surgical patient who is able to ambulate, look after themselves, use the toilet. You may only be using 3 or 4 wipes just because they eat in bed, so it's not as onerous as what we were looking at. We also realized that for this concept to work, the health care provider doing the care can't take the time to look for a wipe because there are disinfectant wipes that you don't want near the patient. They're either caustic or they are poisonous. You don't want to leave them near a patient. So the staff know where they are, but if they're not right at the bedside, you're going to have this issue of staff not completing the 5 moments.

We learned this with hand hygiene, and we developed something called point of care [for] hand hygiene

products, where the point of care is the patient and the care provider and the care all meeting together, and you want the hand sanitizer so that the care provider only has to reach out the hand sanitizers there. They can sanitize their hand per moment 2 before they move on to another moment.

We propose in the paper that you need to have a safe disinfectant wipe that can be kept where the care will occur. You need to look at the safety data sheet around the wipe to find a wipe that works quickly so that surfaces aren't wet around the patient for 3 to 5 minutes. Find a product that doesn't require personal protective equipment to touch it. Staff always use their gloves because of the care that they provide and other things like that. But if you can find a safe-enough product that's [kept at the] head of bed, you may also have the visitors or family helping to keep the environment cleaner around the patient. There will take some education because we run into the problem of people flushing wipes—not only family, but we've got care providers who, if they have a wipe that is grossly soiled with feces, they may go and flush it, and that causes problems down the road. But with a bit of education, I don't see this as a huge problem. ■

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# Reprocessing Complex Instruments

## Are We Keeping Up With Innovation?

BY MARJORIE WALL, EDDBA, CRCST, CIS, CHL, CSSBB

As surgical instruments become increasingly sophisticated, advances in robotic-assisted surgery, endoscopic procedures, and minimally invasive techniques drive the development of more intricate medical devices. These innovations are transforming patient care by improving precision, reducing recovery times, and enhancing surgical outcomes. However, as instruments become more complex, the challenges that sterile processing departments (SPDs) face grow exponentially. We must ask: Are we keeping up with the pace of surgical innovation regarding sterile reprocessing?

One of the challenges in sterile processing today is the intricate design of modern surgical instruments. Many high-tech devices, such as robotic arms, flexible endoscopes, and instruments with lumens and hinged components, have features that make thorough cleaning and sterilization difficult. Residual bioburden, protein buildup, and biofilm formation are persistent risks, particularly in instruments with narrow channels or multiple moving parts that prevent direct access to all surfaces. Traditional cleaning methods may not be sufficient, and many SPD professionals struggle with instruments that require specialized cleaning tools, enzymatic detergents, and extended soaking times. The more intricate the design, the greater the potential for human errors, ultimately risking patient safety.

In addition to mechanical challenges, manufacturer-provided instructions for use (IFUs) often contribute to confusion and inefficiency in the reprocessing workflow. Some IFUs are overly complex, requiring steps that are difficult to implement within the time constraints of a busy SPD. Others may lack sufficient

detail or fail to consider the realities of high-volume reprocessing environments. When instructions are unclear or impractical, technicians may unknowingly deviate from proper protocols, leading to compliance issues and potential contamination risks. The growing number of instrument variations further complicates training, making it difficult for SPD staff to stay current on best practices for every new device introduced to the market.

Another pressing issue is the gap in education and hands-on training for sterile processing professionals. Although many technicians receive formal training on fundamental reprocessing techniques, high-tech instruments often require specialized education that is not always readily available. Vendor-provided training sessions are valuable but inconsistent, and many SPDs lack the time or resources to ensure all staff receive in-depth, ongoing education. As a result, new and inexperienced technicians may struggle with complex instruments, leading to variations in technique and potential errors. Competency validation is another challenge, as managers must ensure that all team members across all shifts are proficient in handling advanced devices. Without a structured approach to training and assessment, facilities risk noncompliance and compromised patient safety.

Addressing these challenges requires a multifaceted approach. First and foremost, investment in education is critical. Hospitals and health care systems must prioritize ongoing training for SPD staff, incorporating hands-on practice with real instruments, competency-based assessments, and collaboration with surgical teams. Partnering with device manufacturers to provide frequent, in-depth training sessions can help bridge knowledge gaps and ensure that reprocessing

staff fully understand the intricacies of each instrument.

Process standardization is another strategic approach. SPDs should develop clear, evidence-based protocols for handling complex instruments, ensuring consistency across all shifts. Implementing automated tracking systems can help monitor compliance with IFU and ensure proper documentation of cleaning and sterilization steps. Leveraging technology, such as robotic-assisted cleaning systems and artificial intelligence-driven quality checks, can enhance efficiency and reduce human error.

Additionally, sterile processing professionals must proactively advocate for more practical and transparent manufacturer guidelines. Pushing for realistic IFUs that align with real-world workflow constraints can help reduce confusion and improve compliance. Working closely with infection prevention teams, operating room staff, and hospital leadership can also foster a culture of collaboration, where reprocessing challenges are acknowledged and addressed collectively rather than in silos.

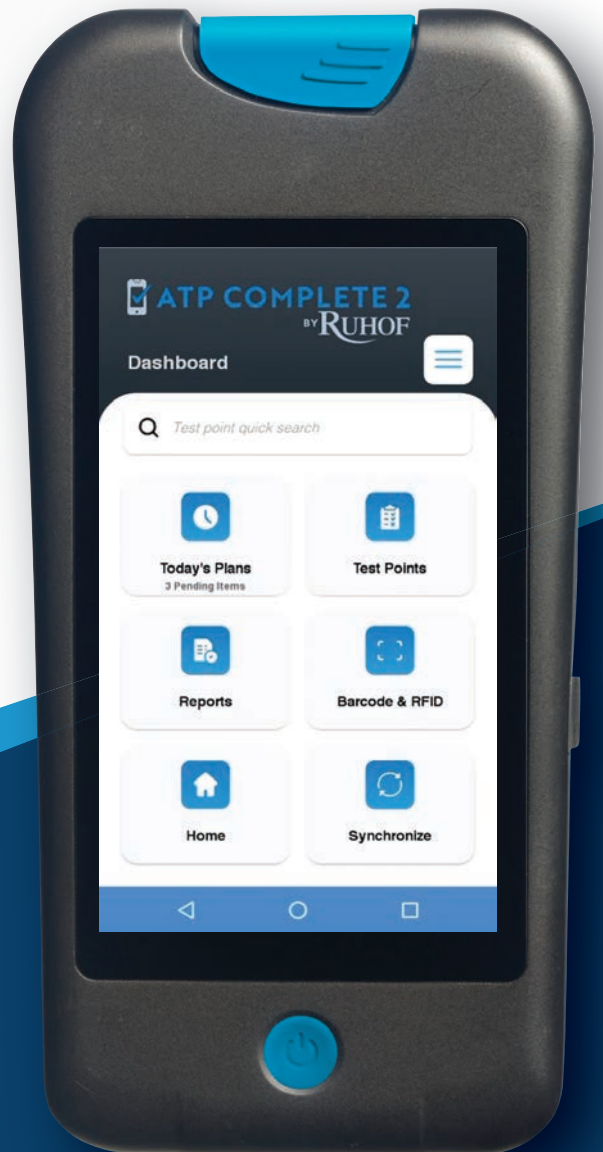
The future of sterile processing depends on our ability to evolve alongside surgical innovation. If we fail to keep pace, we risk compromising patient safety and increasing the likelihood of surgical site infections due to improperly processed instruments. By investing in education, process improvement, and collaboration, SPDs can rise to the challenge and ensure that complex instruments are reprocessed with the highest level of care and precision. The health care industry must recognize that sterile processing is not merely a background function. It is a critical component of patient safety, deserving of the same level of attention and investment as surgical advancements. ■

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