Keeping It Clean

Proper disinfecting protocols are the key to decreasing nosocomial infections

by Jen Reeder

Antibiotic resistance and nosocomial (hospital-acquired) infections pose a growing threat to all medical facilities. Just as the rise of methicillin-resistant Staphylococcus aureus (MRSA) is a hot topic in human hospitals, its canine counterpart MRSP (previously called MRSI—see sidebar) increasingly concerns veterinarians.

As resistant bacteria contaminate hospitals and potentially harm patients, the need for effective disinfecting protocols has never been greater.

"We all took an oath, that first 'do no harm' principle—we certainly do not want to be the cause of animals getting sick," said Justine Johnson, DVM, DACVECC, staff critical care specialist and co-owner of Ocean State Veterinary Specialists in East Greenwich, R.I. "But the reason those nosocomials are so concerning is they do tend to have more of a resistance profile than run-of-the-mill bacteria that you get out in the community."

She said one of the most important ways to combat nosocomial organisms is to try to contain a patient and any eliminations from that patient that could contaminate the environment.

"The only way to do that really is to have an effective disinfection program, which means that all of your high-touch, or frequently touched, surfaces get disinfected at least every day, but things like tables should get disinfected between patients," Johnson said.

A critical area to disinfect that people overlook all the time is the latch on a cage.

Start with the basics

One of the basic elements to disinfecting a hospital is cleaning with soap and water or an enzymatic cleaner before applying the disinfectant, as organic material like dirt or feces acts as a physical barrier to the disinfectant and renders it ineffective. This applies to laundry, countertops, floors and other surfaces, as well as hands. Hand hygiene is a cornerstone of good cleaning protocols.

"Alcohol hand rubs are the most effective things, but they don't work in the face of debris," she said. "They work to kill bacteria on the skin, but if there's dirt or grease on the skin or under the nails, bacteria can hide and be protected. So it's very important that hands get washed frequently."

It is important not only that all hospital employees get in the habit of washing

their hands, but also that they use alcohol rubs and make sure the alcohol has dried before touching another person or patient. To boost compliance, alcohol rubs should be as readily available as they now are in human hospitals, Johnson says.

"They have to be all over the place—it can't take too many steps to walk to a sink to wash your hands, and the [alcohol] dispensers should be over the cages, in numerous places, at the entrance to every exam room," Johnson said. "You cannot overdo it. There is minimal [bacterial] resistance to alcohol—that's why we need to realize how important that is."

Joshua Portner, DVM, DACVECC and critical care specialist at AAHA-accredited NorthStar VETS in Robbinsville, N.J., said disinfecting protocols are important for health reasons as well as keeping costs down.

He said that because nosocomial infections are caused by resistant bacteria, antibiotics become more expensive and more difficult to administer—possibly requiring animal sedation—which leads to additional client costs, always a concern in veterinary medicine.

"Then there's always the unrealized cost of the angry client who says, 'My dog got this at the hospital, so this is your fault and you should pay for it.' So there can be a pretty significant expense," Portner said.

Because the most important part of a cleaning protocol is implementation, training staff is a critical component, he said.

"We have over 100 employees, so we have a lot of people that have to be up to speed… the biggest thing is your staff has to agree with its importance. People are much more likely to do it if they understand the 'whys' than just 'this is how it's supposed to be,'" he said.

In addition to hand hygiene, basic surface disinfection is a good place to start when developing cleaning protocols. Alcohol should be used on high-touch areas such as door handles, stethoscopes, telephones, computer keyboards and any buttons that are touched a lot, such as on defibrillators and IV fluid pumps.

"The other one that people overlook all the time is the latches on cages—they clean the rest of the cage, but they forget the latch, which is probably being handled most commonly," Portner said.

He noted that a different protocol will be necessary in the isolation ward, where alcohol isn't best for non-enveloped viruses like parvo; a disinfectant from the peroxygen compound category would be more effective. He said that, in any case, the key to disinfection is contact time (which depends on the disinfectant used, so read manufacturer labels).

MRSI vs. MRSP

MRSA's canine counterpart is alternately referred to as MRSI (for methicillin-resistant Staphylococcus intermedius), MRSP (methicillin-resistant Staphylococcus pseudintermedius) or MRSI/MRSP—and sometimes as MRSP, previously MRSI.

So what is the correct terminology?

While S. intermedius was first identified in 1976, findings published in the *International Journal of Systematic and Evolutionary Microbiology* in 2005 showed three distinct species under the S. intermedius umbrella: S. intermedius, S. pseudintermedius, and S. delphini (first identified in a dolphin).

The pathogen S. pseudintermedius is actually the strain that most commonly affects dogs and has developed a methicillin resistance. So technically, MRSP is the correct acronym, not MRSI.

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One of the most important parts of developing a cleaning protocol is the imperative to read manufacturer labels for disinfectants before using them.

"You can't just wipe it and be done—you need to wipe it and then leave it alone for a bit," Portner advised. "It makes sense: These things are killing pathogens, but they need time in order to be able to do that. Nothing is an instantaneous kill."

Laundry and floors

Laundry protocols should also be considered. When soiled linen is transported to the washing machine, it should be carried in a leak-proof container, like a trash bag, with gloved hands.

Surgical linens, general hospital linens and isolation linens should be washed in separate machines or, at the least, separate loads. Ideally, the hot water cycle will be over 160 degrees Fahrenheit for at least 25 minutes, and Portner recommends adding bleach diluted at 1 to 50.

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"The cheat on that is that for regular household bleach, it's going to be 72 ml of bleach per gallon of water in the machine," Portner said.

Floors are another cornerstone to cleaning protocols, since urine and feces can easily spread disease.

Though quaternary compounds ("quats") are popular because they are inexpensive, Portner stresses that they should be "used with caution" because resistance can easily develop against them and they have variable efficacy against parvo and other non-enveloped viruses—despite manufacturer claims.

"There has been some research that's shown for methicillin resistance and bacteria and certain staph—the MRSAs and MRSI—there is a genetic link that if they develop methicillin resistance they develop a resistance to quaternary compounds," Portner said.

As an alternative to quats for general floor cleaning, he suggests enzymatic cleaners or even Lysol, a phenolic compound.

Larry Shively, co-owner of the cleaning product company ProVetLogic, says mopping itself presents issues if not done properly. He said animal hospital employees often will mop up urine and then stick the mop back in the bucket before using it again.

"As soon as that water appears to be dirty or cloudy—and this is according to the EPA—you've pretty much lost your efficacy," Shively said.

As an alternative, he suggests bucketless mop systems that use microfiber mop heads that can be washed and reused up to 500 times. Another option is to use a traditional mop system, but instead of putting disinfectant in the mop bucket, spray disinfectant directly on the floor,

allow for contact time and then mop the floor with clean water.

"That way, you're not wasting disinfectant, and you're only picking up dirty water and dumping it and getting fresh water," he said. "It's going to save the hospital upward of 50% on their chemical use, and it's going to be more effective."

When in doubt—read the directions

Glenda Dvorak, DVM, MS, MPH, DACVPM and assistant director of the Center for Food Security and Public Health at Iowa State University in Ames, Iowa, said one of the most important parts of developing a cleaning protocol—or "biological risk management protocol"—is the imperative to read manufacturer labels for disinfectants before using them.

"You need to know what concentration to use. If it's over-concentrated, you might cause harm to your technicians—these are chemicals actually registered with the Environmental Protection Agency as pesticides—so there are some hazards," she said. "At a low concentration, maybe it's a sanitizer, where at a higher concentration, it's a disinfectant. At an even higher one, it might be a sterilant."

It's also good to read labels to learn if they are corrosive to the surface on which they will be used. For example, bleach can cause corrosion to stainless steel exam tables if used every day, so it should probably be used only when dealing with very infectious diseases like parvo.

Dvorak recommends posting written protocols with instructions for dilution ratios for each disinfectant to help boost staff compliance, eliminate waste and keep costs down. Safety measures are also important; beyond wearing gloves, goggles and—in the case of powdered disinfectants—masks, rooms should be ventilated, and poison hotlines posted in case of injury.

Everyone is responsible

Paul Morley, DVM, PhD, DACVIM and director of biosecurity at Colorado State University's James L. Voss Veterinary Teaching Hospital in Ft. Collins, Colo., said because there is no silver bullet that applies to every situation or every hospital, it's important to have a holistic approach to developing biosecurity protocols.

"It's also important to remember that there is no insignificant person in terms of participation in infection control in a hospital," Morley said. "It's a weakest-link kind of deal."

He said identifying problems through surveillance is necessary to improving care—his team tests cultures from Swiffers frequently to monitor for disease. Additionally, he said there's a need for more research in veterinary medicine to determine concrete cost-benefits and efficacy benefits for specific prevention measures.

"We really need some multicenter studies to help us understand what we should expect of each other," he said. "There's no standardized yardstick."

Until then, veterinary staff must work to tailor cleaning protocols for their individual animal hospitals.

"There are a lot of different ways to achieve the end goal, which is having a low risk for your patients and a safe working environment for your personnel," Morley said. "You have to figure out what your threats are, control those threats and make sure that works on an ongoing basis." ■

Freelance journalist Jen Reeder often found herself washing her hands and cleaning her dog's crate vigorously while researching this story.

For More Information

Iowa State University's Center for Food Security and Public Health's disinfection resources page: *cfsph.iastate.edu/Disinfection*

Colorado State University's James L. Voss Teaching Hospital's biosecurity and infection control page: *csuvets.colostate.edu/biosecurity*

ProVetLogic website: *provetlogic.com*