

## Reducing the Spread of Infectious Disease

Protecting Yourself and Your Clients, Patients, and Pets

Christy Michael, BVMS, MBA

In the veterinary industry, we are exposed to many pathogens, often without even realizing it is happening. We are talking about things like feline rhinotracheitis, herpes virus, canine parvovirus, feline panleukopenia virus, rotavirus, MRSA/I/P, pseudomonas, Bordatella bronchiseptica, canine parainfluenza, E. coli, giardia, ectoparasites, dermatophytosis, tapeworms, hookworms, roundworms, FIV, feline leukemia, bartonella, canine influenza, pasteurella multocida, clostridium difficile, cryptosporidium, salmonella, toxoplasma, canine distemper, rabies, brucella, lyme disease, psittacosis, Q fever, leptospirosis, RMSF, canine distemper, canine adenovirus, mycoplasma to name a few.

Many of these are directly infectious to other animals (in the hospital or in our homes) or even to people (us and our clients) so we have a responsibility to be deliberate and consistent in our efforts to reduce the spread of infectious disease. Every clinic should have a written infection control program with formal protocols, training, and maintenance. You might think that your clinic does not have a problem but note that many of these infectious diseases have an incubation period of 48 hours or more so at times there is a disconnect between a visit with your hospital and infection or a patient might not return to your practice.

It is a simple truth that our environments WILL become contaminated by infectious diseases. What can make a difference in protecting us, our clients, our patients and our own pets from these diseases is how we respond to these incidents. Our actions from prior to patient arrival to the hospital through after discharge make all the difference in reduction of the spread of infectious disease. Reducing the spread of infectious disease can be accomplished through four simple techniques: limiting contamination of the environment, appropriate hygiene, personal protective equipment, and environmental cleaning/disinfection.

### Limit Contamination

All staff members, no matter how little medical training they have, should be trained to recognize risk factors that a patient could be suffering from an infectious disease. Weather permitting, client service representatives can request that a pet owner leave their pet in the car when they check in at the front desk to facilitate a more controlled entry into the hospital into an appropriate isolation area. Technicians can identify risk factors at triage and can escort patients to an isolation area to reduce contamination of public areas. Assistants may be the ones that hear the coughing or sneezing or take a hospitalized pet on a walk and discover gastrointestinal symptoms. In addition to identifying patients that may carry infectious diseases, team members can protect patients that may be immunocompromised by allowing them to wait in less public places where they are less likely to pick up infectious disease from asymptomatic carriers or pets whose illness has not yet shown its true colors.

Some common risk factors might include:

- Acute onset of coughing in young to middle aged dogs
- Ocular and/or nasal discharge in dogs or cats
- Gastrointestinal symptoms in young or unvaccinated dogs or cats
- Non-healing or exudative wounds

Some examples of patients that are at risk of picking up infectious disease include:

- Chronic illness in dogs or cats
- Debilitated or immobile dogs or cats
- Dogs or cats undergoing chemotherapy
- Dogs or cats under treatment for immune mediated disease
- Unvaccinated dogs or cats
- Any patient with an IV catheter, urinary catheter, surgical incision, or freshly placed esophagostomy tube

While this may seem to be a small thing to consider, limiting contamination of the environment and limiting exposure of at-risk patients to environmental contamination can drastically reduce the pathogen load of your environment. We work in hospitals – we will have contaminants in our environment and we will have them often but the spread of infectious disease requires exposure to an adequate load of a pathogen to overcome the host's immune system. By limiting pathogen load in the environment and being particularly protective of those pets at particular risk we will significantly cut the rate of infections.

If we are immediately placing animals at risk of suffering from infectious disease into isolation, why are we so worried about isolating our at-risk pets? Keep in mind that there will be pets suffering from infectious disease during an incubation phase, patients that are asymptomatic disease carriers, animals colonized by infectious agents that are not making that animal ill, and animals that are in the recovery phase from an infectious disease that continue shed pathogens. Pathogens from any of those animals can be transmitted directly from the environment, on clothing, medical devices, and on your hands.

### **Appropriate Hygiene**

Evidence shows us that a few simple hygiene practices can significantly reduce the transmission of infectious disease. In a video surveillance study conducted in 51 clinics over 3 weeks, Anderson et al (BMC Vet Res 2014), hand hygiene was assessed in multiple different types of situations ranging from casual patient contact to dirty procedures and on average, in all situations less than 40% of individuals utilized appropriate hand hygiene. While the individuals under surveillance knew that infection control was the topic of the observation, they were not aware that hand hygiene in particular was the topic of interest.

The goal of hand hygiene is to reduce the number of microorganisms on the hands, both the flora of our skin and pathogens that we may have picked up along the way. Every time that we interact with a surface, we potentially pick up flora from that surface. Washing our hands serves to reduce the pathogen load on our hands the same way that we reduce the environmental pathogen load in our general environment by limiting the activity of pets with potential infectious diseases to an isolation area. While it is important to wash our hands in situations where we suspect we have come in contact with pathogens, it is equally important to do so even when there is no such suspicion.

The CDC provides recommendations for appropriate hand hygiene across all walks of life from medical professionals to the average person. In a weekly Morbidity & Mortality Report March 4, 2011 the CDC outlined an assessment of change in central line infections related to altering hygiene practices in ICUs in the United States. This paper identified a 58% reduction in catheter related infections from 2001 to 2009 and identified improved hand hygiene practices as the primary reason for this reduction.

Recommendations for hand washing include: before, during and after preparing food; before eating food; before and after caring for someone who is sick; before and after treating a cut or wound; after using the toilet; after changing diapers or cleaning up a child who has used the toilet; after blowing your nose, coughing, or sneezing; after touching an

animal, animal food, or animal waste; after handling pet food or pet treats; and after touching garbage. It is also noteworthy that washing hands is the gold standard with use of hand sanitizers considered a less effective means to reduce hand contamination. Hand sanitizers should only be used if there is no visible biologic contamination, there is no soap and water available to wash hands, or after washing hands with soap and water. In addition, the use of gloves does not replace the value of washing your hands.

CDC recommendation for hand washing procedure takes into consideration water and paper conservation and are as follows:

- Wet your hands with clean, running cold or warm water
- Turn off the tap and apply soap
- Lather your hands front, back, between the fingers and under your nails
- Scrub your hands for at least 20 seconds (they recommend singing the Happy Birthday song from beginning to end twice for a personal timer)
- Rinse your hands under clean, running cold or warm water
- Dry your hands using a clean towel or air dry them

Depending on your resource, other hand washing recommendations may include turning the tap on and off with a paper towel and drying your hands with a clean paper towel. The CDC sites no difference in hand contamination if the hands are used to turn the tap on or off but does not discuss the use of paper towels other than in a conservation sense. In human hospitals, training for appropriate hand hygiene is an important part of every employee's training and hand sanitizers are distributed freely.

## **Personal Protective Equipment**

Personal protective equipment (PPE) is important to reduce the risk of contamination of exposed skin, mucous membranes, and clothing to reduce the transmission of pathogens. Wright et al (JAVMA 2008) identified generally inappropriate or poor use of PPE among both small and large animal veterinarians and noted that practices without a written infection control policy and male gender were significantly associated with worse practices. It is important to remember that these means are there to protect us and those around us and use the tools we have available.

Most people think of gloves, face masks, gowns, and foot covers as our primary PPE in veterinary practice but the base of our PPE goes even deeper than these items that are frequently worn and discarded. The first barrier we have against infectious disease in practice is our scrubs and our lab coats. In order to avoid spreading pathogens outside of your practice and reduce the chances that you bring outside pathogens into your environment, street clothes should be covered when handling patients if worn. Scrubs and lab coats should only be worn in the clinic and should be laundered after each use – not worn again. We work in a place where we frequently have potential exposure to pathogens so we should also have spare scrubs or lab coats at work. In the event of biologic contamination or exposure to a patient that is a high risk of carrying infectious disease, these PPE should be changed out for clean garments.

Gloves should be worn for any patient at risk of carrying infectious disease as well as any patient at increased risk of contracting infectious diseases but bear in mind that they do not protect completely against hand contamination. Hands should still be washed after removing gloves. It is not wrong to wear gloves to examine all patients but wearing the same gloves to examine multiple patients is counterproductive in limiting the spread of infectious disease. Gloves should always be worn when handling bodily fluids, when cleaning surfaces, and when doing laundry.

Gowns, face masks (+/- eye shield), and booties have situational benefits to reduce the spread of pathogens. When working with a patient that is highly suspicious as a carrier of infectious disease, gowns can be utilized to reduce contamination of clothing. Gowns should only be used once then laundered or disposed of to avoid cross contamination or contamination of the environment by a hanging contaminated disposable or cloth gown. Face masks are important to use for protection of the eyes, nose, and mouth and should be utilized when it is possible that aerosolized pathogens will be encountered. Dental procedures, nebulization, and wound lavage are common procedures where we may wear face masks to protect us and surgical procedures are common procedures where we wear face masks to protect our patients from our pathogens. Face masks with eye shield should also be worn to protect from zoonotic pathogens such as leptospirosis that can be spread with urine contact to mucous membranes. Booties or foot covers can be used to reduce contamination of the shoes but it should be noted that unless they are waterproof, they will not be fully protective, particularly if there are liquids of bodily fluids on the floor.

### **Environmental Cleaning/Disinfection**

As mentioned earlier, we know that our environment will be contaminated regularly simply by the nature of our patient population. We can work hard to limit that contamination and to limit its spread from us to other patients but we will need to routinely clean and disinfect our environment. While we often think of cleaning and disinfecting as the same thing, they are very different and have different aims. Cleaning involves the removal of biologic material using a detergent while disinfection involves the application of chemical agents that will kill any pathogens that were not removed in the cleaning process. In all situations, we should be cleaning surfaces before disinfecting them as significant volumes of biologic material will limit the contact of the disinfectant with the surface being cleaned. Weese et al (Vet Rec 2012) found that in a referral facility, only approximately 43% of surfaces were cleaned of a fluorescent dye contaminant in a 24-hour period. It is important to know your disinfectant and know the concentration and contact time needed to address different pathogens.

Just as your hands should be washed with any patient contact, hospital equipment should be cleaned and disinfected with patient contact. This includes items that are seldom cleaned such as stethoscopes, sphygmomanometer, blood pressure cuffs, and clipper blades and those that are sometimes cleaned but not necessarily after every patient such as tables and thermometers (especially if disposable probe covers are used). Surgical equipment and endotracheal tubes must be cleaned and appropriately sterilized between uses but anesthetic equipment should also be cleaned and disinfected. Multidose medication vials should be disinfected before drawing medications from the vial.

Weese et al (Vet Rec 2012) noted in the study mentioned above that only 26% of surfaces were adequately cleaned in animal housing wards. It is important to promptly remove any organic material and disinfect surfaces after each use in animal housing facilities. Bedding should be fully changed out at least once every 24 hours. Mop buckets should be changed out regularly. Patients with bandages should be monitored carefully for urine or fecal contamination or strike through with prompt bandage changes in these conditions. Gloves should be worn when handling any patient with broken skin or an indwelling device (such as urinary catheter). IV catheter sites should be retaped and disinfected if soiled. Surgical sites and any breaks in the skin should be protected or kept clean. Where possible, patients that are grossly dirty should be bathed before surgery. Avoid clipping skin for surgery until just before the time of surgery.

Raw food diets should not be fed in a hospital environment. The diets themselves are at risk to contain enteric pathogens such as salmonella, clostridium, and campylobacter and there is evidence that patients fed raw meat diets may shed higher levels of some of these pathogens. Gloves should be worn when handling patients fed raw diets at home and hand hygiene is particularly important after their handling.

All hospitals should have an area where patients with known or suspected infectious disease can be truly isolated. Ideally hospitals would also have a separate entrance for entry and exit of these patients and their owners. In the design of any new hospital, there should be planning to manage these patients and in established facilities teams should work together to come up with creative solutions to managing infectious patients. Any isolation area or room with a potentially infectious patient should have a foot bath to disinfect the bottom of the shoes, even if shoe covers are used.

Finally, employees must consider the accessories and adornments they wear in patient areas. Ideally, cell phones would be kept away from patient care areas unless they can be safely cleaned and disinfected. If it is not possible to keep cell phones out of patient care areas then they should be cleaned frequently. Rings, watches, and ties can be fabulous fashion accessories but are also a liability when it comes to infection control. Unlike the skin, rings and watches should be disinfected like any other surface and ties should be restrained appropriate and removed the same as any other item of clothing if it becomes soiled or is exposed to an infectious patient.

## **Conclusion**

An understanding of contamination and infectious disease is an important tool for every member of the veterinary team. All of us are stewards for our patients and our clients and if we are not aware we can become ill ourselves or spread infectious diseases to our own pets at home. Laying out all of the details of infection control makes it seem complicated but really there is one underlying theme to it all – when something is contaminated, everything it comes in contact with becomes contaminated, remains contaminated and becomes a contaminant for anything it comes in contact with until it is disinfected. Infectious disease can be reduced by being aware and managing situations where it is suspected but cleaning and disinfection are just as important when there is not suspicion of infectious disease. Following basic hygiene, utilizing PPE, and environmental cleaning and disinfection can significantly decrease the spread of infection in those situations where it is not known that a patient is carrying or shedding an infectious organism. You can expect improved results in your practice with written policies and formal employee training.