Infection Prevention and Control Best Practices

For Small Animal Veterinary Clinics

Dear veterinary staff member,

We are conducting a brief online survey to understand your current infection control practices and your motivation for seeking out these guidelines. Participation in the survey is strictly voluntary. You may exit the survey at any time, and you may skip any questions you wish. All responses are anonymous

This survey should only take approximately 2-3 minutes to complete. We would greatly appreciate your feedback.

Click this link to start the survey:

https://uoguelph.eu.qualtrics.com/jfe/form/SV_6DbIPOk3dZnLbQ9

Dental Procedures

Dental procedures often entail a significant risk of splash exposure to saliva, blood, and bacteria-laden debris (e.g. dental plaque). Procedures such as ultrasonic scaling can result in aerosolization of large numbers of bacteria. There is also potential for personnel to sustain cuts and abrasions from dental equipment or teeth during dental procedures. To reduce the risk of pathogen transmission from the animal's mouth to veterinary personnel during dental exams involving cleaning and other procedures that may aerosolize pathogens, the person performing the procedure and anyone in the immediate vicinity should wear:

- protective outerwear (e.g. designated lab coat, designated scrubs).
- protective eye glasses/goggles, or a full face shield.
- disposable gloves.
- surgical (i.e. nose and mouth) mask.

Dental procedures should be performed in a contained area away from other patients, personnel and high traffic areas. All surfaces in this area, including walls, floors and table, should be easy to clean and disinfect. Procedures such as bandage changes, wound care or placement of invasive devices (e.g. intravenous catheters, urinary catheters) should never be performed in close proximity to a dental procedure due to the risk of contamination by aerosolized bacteria.

Equipment disinfection

Like other surgical instruments, the recommended level of disinfection for dental instruments is based on the their Spaulding classification (see equipment disinfection section in Chapter: Cleaning, Disinfection, Sterilization). Many of the instruments used for these procedures are critical or semi-critical (e.g. periodontal scalers, mouth mirrors). Semi-critical equipment should undergo, at a minimum, high level disinfection between patients. Sterilization is required for critical items (RCDSO 2010 below). Most dental instruments can withstand steam sterilization (i.e. autoclave). For specialized equipment, or instruments with rotating components, follow the manufacturer's guidelines for cleaning and disinfection to prevent damage.

Antimicrobial prophylaxis

Antimicrobial prophylaxis is used to reduce the risk of disease from bacterial translocation during different procedures. While translocation likely occurs in a large percentage of dental procedures, the clinical consequences of this are typically very minor as disease rarely develop. In human dentistry, antimicrobial prophylaxis is reserved for a small subset of patients at particular risk of complications (Table 5 below) (Sarakiala-Kessel 2012 below). These are rare in veterinary medicine, and antimicrobial prophylaxis is likewise rarely indicated. When used, antimicrobial prophylaxis should begin before the procedure and typically not be continued after the procedure.

TABLE 5. Criteria for identification of veterinary patients that may require antimicrobial prophylaxis prior to dental procedures.

Patient Factors	Procedures
Patent ductus arteriosis	Dental cleaning that is expected to cause hemorrhage
Unrepaired cyanotic congenital heart disease	Any oral or periodontal surgery
Subaortic or aortic stenosis	Endodontic surgery
Previous infective endocarditis	
Imbedded pacemaker leads	

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Blood Donation

Transfusion of blood and blood products in veterinary practice is increasingly common. The limited number of centralized blood banks (particularly for cats) and time constraints on obtaining blood products from external sources have led many facilities to develop blood donation programs. These may involve resident animals that are kept on site for the purpose of blood donation (see Chapter: Non-Patient Animals) or use of local client or staff animals that are available as donors on short notice. These programs can be highly beneficial to patient care, yet carry some inherent risks of pathogen transmission.

There are two main infectious disease concerns with blood transfusions. One is transfusion of blood from an animal harbouring an infectious agent in its bloodstream. The second is bacterial or fungal contamination of blood products during collection, processing and storage. While rare, both can have potentially fatal consequences. Close attention to aseptic technique, processing of blood products in dedicated clean areas, use of standard operating procedures for handling blood, avoiding contamination of associated equipment and supplies, and careful screening of donors are critical to reduce these risks.

Donor screening

Donor screening helps to reduce transfusion-associated infections, but the risk can never be entirely eliminated because of limitations in test sensitivity/specificity, and the inability to test for all theoretically relevant microorganisms. Regardless, any facility that collects blood for transfusion must have clear protocols that take into account available recommendations and risks relevant to the geographic region. Some general recommendations include:

- Use standardized forms for enrollment and prior to each donation, including a consent form detailing potential risks to the donor.
- Do not use free-roaming cats as donors due to increased risk of infection with various pathogens (e.g. FIV, FeLV, FCV).
- Gather history and perform a physical exam prior to each donation, including:
  - temperature check
  - syndromic screening (e.g. presence or recent history of fever, depression, weakness, vomiting, diarrhea, coughing, sneezing)
  - health status of in-contact animals (e.g. housemates of donors)
  - inspection for external parasites
  - use of flea, tick and heartworm preventive practices
- Initially screen for relevant pathogens (see below), with periodic retesting at set intervals (e.g. every 6-12 months depending on pathogen, lifestyle and medical history).
  - Consider travel history when determining screening tests for individual animals.
- Keep records on all donors, recipients, type of transfusion, etc. to facilitate tracing should an adverse event occur or contamination of a product be detected.

Universal guidelines for disease screening for donors are impossible to develop because of regional differences in pathogen distribution. Economic factors may also play a role because the cost of screening may be significant. The appropriate frequency of testing is unclear and testing should be repeated whenever there have been potential new exposures. Periodic retesting is likely warranted but the appropriate time interval is unclear. Screening is recommended for pathogens that fulfill at least 3 of the following criteria (Wardrop 2016):

- documented to cause clinical infection by blood transfusion
- can be carried in the blood of clinically healthy animals
- can be detected in blood
- can produce disease that is severe or difficult to treat

For more information regarding recommended screening protocols and examples of intake questionnaires, see the 2016 ACVIM consensus statement on blood donor screening (Wardrop 2016).

Blood collection and processing

Blood must be collected using aseptic technique. Subsequent transfer and processing of blood should be performed in a clean laboratory area away from patients, areas where specimens such as fecal samples are handled and high traffic. Clear protocols must be in place regarding blood handling and processing practices. All blood samples should be clearly identified and logged, including the specific animal donor, person collecting the blood and date of collection.

Pre-transfusion evaluation

All blood products to be transfused should be given a close visual inspection for evidence of discolouration (an insensitive indicator of contamination but one that should result in further investigation of the product (e.g. culture)). The expiration date, donor species, product and blood type should also be verified prior to transfusion. Freezing a small aliquot (1 ml) of each transfused blood product is a good standard practice that allows for retrospective testing in the event of possible transmission-associated infection.

Screening for bacterial contamination of blood products

Routine screening of blood products for bacterial contamination is ideal; however, cost may be a limiting factor and it is unrealistic to expect that each unit of blood will be tested for an array of pathogens. Testing should be performed in any situation where contaminated blood products are suspected based on disease development in recipients, transfusion reactions, abnormal appearance of the blood or other factors. All samples from the same donor collected on the same day should be quarantined if testing is being performed on any one sample because of contamination concerns. If there is any suspicion that an infection attributable to a subclinically infected donor may have occurred, blood from that donor must be quarantined and tested or discarded, and the donor must be re-evaluated prior to any further donations.

Transfusion

Blood or blood products should be administered over a maximum of 4 hours and the administration set discarded after a single use (Day 2012 below).

Post-transfusion surveillance

Adverse transfusion events (e.g. fever, infection, anaphylaxis) should be logged by the clinic infection control practitioner so that the potential for bacterial contamination can be more readily investigated and identified should a cluster of potentially infectious adverse events be encountered.

Passive surveillance of the health status of donors should also be performed by recording illnesses in donors within a short period of time (e.g. 48 hr) after donation. Good communication with owners is required when volunteer client or staff animals are used. If a donor develops clinical signs that could indicate a disease with transfusion-associated infection risk, blood products that remain from that transfusion should be quarantined until the cause of disease has been determined. In situations where blood or blood products have already been administered, testing of the donor may be important for identification of risks to the recipient. (See Chapter: Surveillance for more information regarding surveillance practices and programs.)

References

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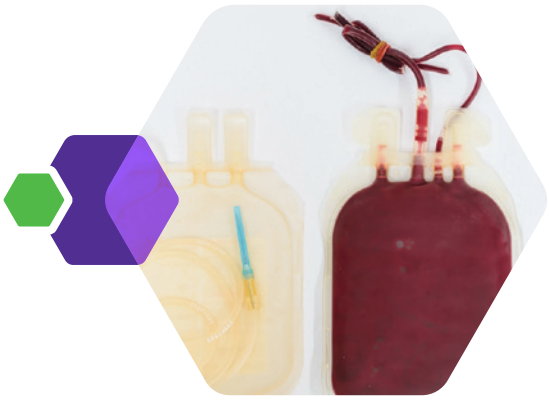

Rehabilitation and Physical Therapy

Rehabilitation is an increasingly popular field of veterinary medicine and raises some unique infection control issues. Rehabilitation is often used in patients that are recovering from an infection (e.g. surgical site infection), carrying multidrug-resistant pathogens (e.g. due to prolonged antimicrobial use and hospital exposure) and susceptible to infection from immobility due to neurological or orthopedic problems (e.g. paralysis or paresis leading to pressure sores, or urinary dysfunction increasing the risk of urinary tract infection). Cancer patients undergoing rehabilitation may be further immunosuppressed due to chemotherapy or radiation therapy. Therefore, this population should be considered at increased risk of both being infectious and susceptible to infection.

Virtually no research is available pertaining to infectious disease risks or infection control practices associated specifically with rehabilitation in veterinary medicine, but basic infection prevention and control principles still apply. These include hand hygiene, cleaning and disinfection of the environment and equipment surfaces, proper patient handling to reduce pathogen transmission between patients and hospital personnel, and management of infectious syndromes. Details for each of these practices can be found in the corresponding chapters of these guidelines.

Patient assessment

Patient evaluation and development of a rehabilitation plan is a standard practice, and should include consideration of infectious disease issues, such as patient susceptibility to infection and their likelihood of shedding an infectious agent (e.g. ongoing/previous infection, presence of open wounds, antimicrobial therapy). The rehabilitation plan should be modified as necessary if the patient's status changes (e.g. planned activities with water vs no-water)

If a patient is potentially infectious, and rehabilitation cannot be postponed, additional measures should be taken such as treating the animal at the end of the day to limit the risk of exposure to other patients and to allow for more thorough cleaning and disinfection after the session, use of enhanced barriers (e.g. gloves, additional protective outerwear), and extra attention to hand hygiene.

Hydrotherapy

Hydrotherapy (the use of a pool or tank with or without an underwater treadmill) is a common rehabilitation tool. While formal research studies are lacking, anecdotal evidence suggests that the risk of hydrotherapy-associated infection is limited. However, there are theoretical concerns, particularly transmission of multidrug-resistant pathogens such as *Pseudomonas spp*, methicillin-resistant *Staphylococcus pseudintermedius* (MRSP) and enteropathogens.

While hydrotherapy is likely low-risk overall, certain precautions should still be used to reduce risks to patients and the facility as a whole. On each treatment occasion, the patient's risk status should be reassessed and changes made as necessary (see patient assessment section above). Prior to entering a pool or treadmill, the patient should be examined to ensure there are no new open wounds or skin lesions. Patients whose haircoats are visibly dirty should be brushed, rinsed or washed prior to use of hydrotherapy equipment, depending on the amount and nature of contamination.

A hydrotherapy log should be kept of the patient, personnel, date and time of each use of the pool/tank in the event that any contact tracing is required.

Microbiological testing of hydrotherapy water

Routine testing of municipal water at the source or the pool/tank water is not indicated. Water testing in these cases is typically only used as part of an epidemiologic investigation in response to an outbreak where hydrotherapy water is considered a possible source. Facilities using wells or other non-municipal sources (e.g. cisterns) that are not otherwise regularly tested like municipal water sources should ensure that microbiological testing is performed as per local recommendations.

Pool maintenance

For complete maintenance requirements, refer to manufacturer guidelines. General recommendations include:

- Keep the pool area and filters clean, removing hair and debris daily or more often as required.
- Monitor and maintain water quality, disinfectant level and water chemistry balance, to avoid persistent contamination as pool water is reused, and to prevent skin and eye irritation for patients and staff in contact with the water.
  - Check water chemistry levels at least daily to make corrections as indicated. Record all measurements to facilitate compliance and identify problems with quality or monitoring.
  - Establish written protocols that detail water testing, routine water treatment and the response to any abnormalities.

While chlorine is the most commonly used pool disinfectant, bromine (another halogen) is also widely available. Bromine can be an effective water disinfectant at 3-6 ppm, although there is less information regarding effective times and concentrations for management of fecal contamination. Bromine activity is less dependent on pH than chlorine, but standard water quality monitoring practices still need to be followed.

Various other water treatment systems are available, including ozone and ultraviolet light; however, they are probably unnecessary in a well-managed facility. They may provide additional benefits in facilities with high traffic or inadequate source water quality, but they should not be used in place of good management.

Establish written protocols that detail water testing, routine water treatment and the response to any abnormalities (e.g. defecation in the water) for hydrotherapy pools.

Fecal contamination of pools

If a patient defecates in the water:

- Remove the animal immediately and return it to its cage/kennel.
- Promptly wash hands.
- If staff were in the water with the animal, showering is recommended.
- Remove as much of the fecal material from the pool as possible using a net or bucket, taking care to prevent contamination of personnel or the environment in the process. This should be done as quickly and gently as possible to avoid breaking up pieces of solid waste and further dispersing the contamination.
- Do not use the pool vacuum to remove gross contamination unless water can be directly discarded using a “waste” setting (or equivalent) that bypasses the pool filter.
- Initiate a water treatment plan once gross contamination has been removed.
- If gross contamination cannot be adequately removed, drain all the water, clean the pool surfaces of any residual debris, refill and treat the water as follows: maintain fresh water at 2 ppm chlorine, pH of 7.5 or less and temperature of 25°C (77°F) or higher for 25 minutes prior to next use.
- Change or clean and disinfect the filter after treatment.
- The pool can be used once water parameters have returned to normal.
- Log the incident, including patient identifier and the cleaning and disinfection measures that were used.
- Bathe the patient, especially before immersion in the clean pool or contact with other patients.

A more aggressive approach using higher chlorine levels and longer contact times is justified if a dog passes diarrhea in the pool, which is more difficult to remove and more likely to contain environmentally tolerant enteropathogens.

Underwater treadmill maintenance

Underwater treadmills should be drained between uses, therefore water quality is less of a concern than treadmill cleaning, surface disinfection and maintenance. Holding tanks and reservoirs are commonly used to store the water from underwater treadmills. To reduce the risk of pathogen accumulation or proliferation, the water should be treated and managed as for a pool.

After draining, the treadmill should be inspected for and cleared of any gross contamination. Regular use of an appropriate disinfectant on tolerant surfaces is prudent; however, the appropriate frequency of disinfection is unknown. Cleaning, disinfection and complete drying of the interior surfaces and any exterior surfaces in contact with an animal or human should be performed if the patient is known or suspected to be shedding an infectious pathogen.

If fecal contamination occurs, management is the same as for fecal contamination of pools.

Personnel in pools

Handlers accompanying animals into pools should be healthy with no skin lesions. Water clothing worn in the pool should not be taken home but should be laundered in the clinic or by a commercial laundry service (see Chapter: Laundry and Waste Management).

Dry rehabilitation therapy

Items such as mats, stairs, fitness balls, balance boards, small jumps (cavalettis), carts and dry treadmills may be used during dry land rehabilitation therapy. These items should be amenable to cleaning and disinfection (e.g. impermeable) and should be inspected regularly to identify surface defects that might facilitate pathogen survival. The required level of cleaning and disinfection should be determined for each item based on the Spaulding classification (see equipment disinfection section in Chapter: Cleaning, Disinfection, Sterilization), and recorded in the clinic infection control manual for easy reference. Fabric items such as reusable elastic bandages, slings and braces should be laundered in the clinic and hot-air dried (see Chapter: Laundry and Waste Management).

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