

Self-Assessment Checklists to Prepare for and Respond to Carbapenem-Resistant Organisms for Companion Animal Veterinary Facilities

This document is intended to help companion animal veterinary facilities evaluate their preparedness for carbapenem-resistant organisms (CROs) and guide response efforts if a CRO-positive animal is identified.

Checklist 1 focuses on proactive preparedness, helping facilities assess existing infection prevention and control (IPC) infrastructure, protocols, training programs, isolation practices, surveillance systems, and overall CRO readiness. ***It is recommended that veterinary facilities complete Checklist 1 before a CRO case or outbreak is identified and re-check it at least annually.***

Checklist 2 is intended for use when responding to a suspected or confirmed CRO-positive animal and outlines key considerations for communication, patient isolation and management, enhanced infection control measures, case finding, and long-term management. ***Facilities should use Checklist 2 whenever a CRO-positive patient is identified or suspected.***

These checklists are intended to serve as practical guidance tools and may be adapted based on facility size, patient population, workflow, and available resources.

Abbreviations:

AAHA = American Animal Hospital Association

ABHS = Alcohol-based hand sanitizer

AST = Antibiotic Susceptibility Tests

CDC = Centers for Disease Control and Prevention

CFSPH = Center for Food Security & Public Health, Iowa State University

CRO = Carbapenem-resistant organism*

AAHA ICPB Guidelines = American Animal Hospital Association Infection Control, Prevention, and Biosecurity Guidelines

MDRO = Multidrug resistant organism

NASPHV = National Association of State Public Health Veterinarians

PPE = Personal protective equipment

SOPs= Standard Operating Procedures

*Other common acronyms used refer to specific groups of CROs include CPE = Carbapenemase producing Enterobacterales; CRE = Carbapenem-resistant Enterobacterales; CRPA = Carbapenem-resistant *Pseudomonas aeruginosa*; CRAB = Carbapenem-resistant *Acinetobacter baumannii*, Enterobacterales (*Escherichia* spp. [*E. coli*/*E. hermannii*], *Enterobacter* spp., *Klebsiella* spp., *Citrobacter* spp., *Leclercia adecarboxylata*, *Morganella* spp., *Raoultella* spp.)

Checklist #1: Self-Assessment checklist for CRO infection prevention and control in veterinary facilities.

✓		Resources and additional information
I. General Infection Prevention		
The facility:		
<input type="checkbox"/>	<p>Has identified a designated personnel member or veterinary infection preventionist (VIP) to lead infection prevention and control efforts for the facility.</p> <p><i>Name of personnel member/VIP:</i> _____</p> <p><i>Job title:</i> _____</p>	<p>A designated personnel person to develop, maintain, and implement infection prevention and control procedures, and ensure a rapid response in the event of CRO detection is recommended. See 2018 AAHA ICPB Guidelines, AAHA ICPB Implementation Overview, and AAHA's A Champion for Your Practice: Your Infection Control Practitioner.</p>
<input type="checkbox"/>	<p>Has developed a written IPC manual or standard operating procedure (SOP) that is regularly reviewed and updated, that addresses general IPC as well as carbapenem-resistant organisms (CRO).</p> <p><i>Refer to suggested components are described below in the checklist</i></p> <p><i>Location of IPC plan:</i> _____</p> <p><i>Date of last review:</i> _____</p>	<p>SOPs should be readily available for new and existing personnel to review and should be reviewed and updated regularly. See 2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines for examples and best practices.</p>
<input type="checkbox"/>	<p>Maintains a readily available supply of PPE (gloves, gowns, eye protection, masks, and shoe covers) that can be used for protection against CRO.</p> <p><i>Location and types of PPE:</i></p> <p>_____</p>	<p>Personal protective equipment should be routinely restocked and accessible to personnel. See 2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines.</p>

<input type="checkbox"/>	<p>Provides information and training to personnel about workplace hazards and occupational safety, including hazards related to transmission of antimicrobial resistant organisms.</p> <p><i>Location of workplace hazard protocol(s):</i> _____</p> <p><i>How often is training conducted:</i> _____</p> <p><i>Date of last all personnel training:</i> _____</p>	<p>Employers have a responsibility to ensure all medical and non-medical personnel are trained in hazards at work and how to mitigate them. All personnel should be trained to protect themselves and others from workplace hazards, including basic infection prevention and control practices, PPE usage, and chemical and drug health risks. Employers should consider mandatory training for all personnel upon hire, with a requirement for personnel to annually review trainings. See NIOSH Veterinary Safety & Health.</p>
<input type="checkbox"/>	<p>Has a dedicated isolation area for housing animals with known or suspected transmissible diseases and an associated protocol for use. (Refer to II. <i>Isolation Space and Procedures</i> section below)</p> <p><i>Location of isolation protocol:</i> _____</p>	<p>Isolation spaces are ideally distant and in separate rooms from other kennels or cage spaces. In the absence of isolation rooms, spaces that are segregated from other patient care areas may be sufficient for CRO containment when strict adherence to other infection prevention practices are in place (hand hygiene, environmental cleaning and disinfection, dedicated patient care equipment, etc.). See 2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines.</p>
<p>The facility maintains/enforces written protocols for:</p>		
<input type="checkbox"/>	<p>Facility and equipment cleaning and disinfection, including each of the following elements:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Require routine cleaning and disinfection of environmental surfaces throughout the facility including keyboards, light switches, cage latches, IV pumps, door handles, shared equipment and other high touch surfaces. <input type="checkbox"/> Require personnel to wear appropriate PPE while cleaning and disinfecting. <input type="checkbox"/> Assigning personnel to periodically inventory cleaning and disinfection products and check concentrated and mixed product expiration dates. <input type="checkbox"/> Appropriate detergent and disinfectant selection for various patient and personnel contact surfaces. <input type="checkbox"/> Instructions for cleaning and disinfection product mixing, dilution, labeling concentrated and mixed products with expiration dates and other essential information, and chemical disposal. Include instructions to clean and disinfect re-usable secondary containers (spray bottles) before being refilled. <input type="checkbox"/> How to clean and disinfect and use the appropriate products including appropriate contact time and PPE use. <input type="checkbox"/> Training of personnel on appropriate cleaning and disinfection protocols. <p><i>Location of cleaning and disinfection protocols:</i> _____</p>	<p>Several resources exist to guide development of cleaning and disinfection protocols, including CDC's Guideline for Disinfection and Sterilization in Healthcare Facilities (2008), Virox Animal Health and AAHA Keep It Clean, AAHA's Sample environmental cleaning and disinfection protocol, Center for Food Safety and Public Health. Antimicrobial Spectrum of Disinfectant Classes.</p>

<input type="checkbox"/>	<p>Maintaining Instructions for Use (IFU) for reprocessing reusable equipment (e.g., clipper blades, endoscopes, laryngoscopes, x-ray machines) and sterilization equipment (e.g. autoclave)</p> <p><i>Location of IFU's:</i> _____</p>	<p>Reprocessing is the term used for a series of steps that makes contaminated reusable medical devices safe and effective for their intended use. The Spaulding Classification System categorizes medical equipment into three categories based on risk: critical, semi-critical, and non-critical. This classification system continues to be the primary principle that guides disinfection and sterilization processes.</p> <p>In human healthcare settings, endoscopes are linked to more healthcare-associated outbreaks than any other device, underscoring the importance of meticulous reprocessing. In veterinary medicine, equipment suspected or linked to hospital-associated infections include endoscopes, clipper blades, monitoring equipment, and re-used endotracheal tubes (1). Strict adherence to manufacturer Instructions For use (IFU) (cleaning, sterilization, and reprocessing) of reusable equipment is strongly recommended. Medical equipment intended for single use should not be reused (e.g., endotracheal tubes, surgical staples). For more information, see CDC's Guideline for Disinfection and Sterilization in Healthcare Facilities (2008).</p>
<input type="checkbox"/>	<p>Management of biological and non-biological waste.</p> <p><i>Location of biological and non-biological waste protocols:</i> _____</p> <p><i>Company name and contact information for biohazardous waste/sharps removal:</i></p> <p>_____</p>	<p>Waste management protocols should describe what constitutes biomedical waste, and how to dispose of different kinds of biological waste in accordance with local or regional regulations. Items saturated with potentially infectious blood (e.g., blood-soaked gauze) or bodily fluids, potentially infectious feces or tissues, and deceased animals are all considered biomedical waste. Non-infectious urine, feces, or blood from healthy companion animals are not usually considered biomedical waste but may be dependent on local regulations and should still be handled with standard precautions (gloves). All sharps must be discarded into approved sharps disposal containers. See 2018 AAHA ICPB Guidelines and OSHA: Response to Interpretation Request for Application of the Bloodborne Pathogens Standard to Veterinary Clinics. Review state EPA rules regarding Medical Waste for further instructions.</p>
<input type="checkbox"/>	<p>Management of laundry (e.g., bedding, clothing, surgical drapes and gowns) to prevent pathogen transmission during handling and reduce microbial numbers on laundered linens which include</p> <ul style="list-style-type: none"> <input type="checkbox"/> How to appropriately wash and dry different types of laundry, including materials contaminated with pathogens <input type="checkbox"/> Appropriate PPE and handling of clean vs dirty laundry <input type="checkbox"/> Appropriate storage of clean vs dirty laundry 	<p>Gross biological material should be removed from textiles prior to putting in the washing machine. Washing with bleach, detergent, and hot water (160°F held for 20 minutes) and drying at high heat (dependent on fabric material) is recommended for effective killing of microbes. See 2018 AAHA ICPB Guidelines and CDC Guidelines for Environmental Infection Control in Health-Care Facilities: Laundry and Bedding.</p>

<input type="checkbox"/>	<p>Use of PPE, including:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Proper PPE selection and usage (to prevent transmission of pathogens during animal handling and other procedures) <input type="checkbox"/> Proper donning and doffing of PPE <input type="checkbox"/> Proper disposal or reuse of non-disposable PPE 	<p>See 2018 AAHA ICPB Guidelines</p>
<input type="checkbox"/>	<p>How and when to perform hand hygiene (HH) (see section below <i>The Facility ensures hand hygiene by</i>, for more details on HH)</p>	<p><i>See references provided in HH section below</i></p>
<input type="checkbox"/>	<p>Employee health management (e.g. how personnel handle bites or exposures to zoonotic pathogens)</p> <p><i>Clinic/hospital to send personnel if exposures occur:</i> _____</p> <p><i>Location of employee health management information:</i> _____</p>	<p>See 2015 NASPHV Veterinary Standard Precautions</p>
<input type="checkbox"/>	<p>Regularly evaluating or auditing personnel adherence to protocols, including:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Who is responsible for conducting the audit and how frequently. <input type="checkbox"/> How audits are conducted and how results and feedback are reported. <input type="checkbox"/> A follow-up or remediation plan. 	
<p>The facility ensures hand hygiene by:</p>		

<input type="checkbox"/>	Requiring all personnel to receive training upon hire and at least annually about when and how to perform hand hygiene. This training should include the requirement that personnel demonstrate proper handwashing techniques.	Hand hygiene should be performed anytime hands are visibly soiled, after patient contact and before contact with the next patient, before aseptic procedures, after putting on gloves, after contact with body fluids or contaminated surfaces, after removing gloves or other PPE, after contact with the patient space (e.g., cage doors, water bowls, fluid pumps), after using the restroom, coughing, sneezing, and before eating (2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines).
<input type="checkbox"/>	Having signage posted in multiple age- and language- appropriate formats around the facility to reinforce the importance of hand hygiene to visitors and personnel.	
<input type="checkbox"/>	Providing all patient contact areas with supplies necessary for hand hygiene (e.g., non-refillable soap, water, paper towels, and pump/auto-dispensing ABHS).	<p>Training in hand hygiene should require personnel to demonstrate proper handwashing technique. Trainings are available under CDC's Training and Education Resources; use the drop-down box to select relevant options (e.g., Hand Hygiene, Competency Based Training, etc.).</p> <p>ABHS are preferred over washing with soap and water for routine sanitation when hands are not visibly soiled because of their ease of use and improved compliance (see CDC's Hand Hygiene Guidance)(2). ABHS dispensers should allow for convenient application (2018 AAHA ICPB Guidelines and CDC's Hand Hygiene Guidance).</p> <p>Facilities should maintain a HH program for all personnel, including routine evaluation and timely, non-punitive feedback mechanisms.</p>

II. Isolation Space and Procedures

The isolation spaces for suspected or confirmed CRO-positive animals:

<input type="checkbox"/>	Have kennels or cages with hard, non-porous surfaces and are maintained in good repair, with surfaces that are smooth and free of cracks or damage.	<p>Isolation rooms or spaces are recommended to have:</p> <ul style="list-style-type: none"> -restricted access -nonporous flooring and walls -equipment, PPE, and hand hygiene stations for use only in the isolation room, -be free from clutter, -supplied by single-use items, when possible (e.g., feeding bowls, cleaning supplies). Supplies should be kept in limited quantities and restocked as needed -supplied by dedicated equipment when possible (e.g., stethoscopes, fluid pumps, doppler ultrasounds) -a clearly labeled designated clean to dirty donning and doffing transition area at the entrance/exit to the isolation space. Visual marking on the floor using tape or paint is useful to designate the different transition areas. -a table or bin located in the clean area for personal items to be left prior to donning. Items such as cell phones, stethoscopes, pens, paper, etc., should not enter the isolation area.
<input type="checkbox"/>	Are clearly identified at the entrance to the area with visible signage designating the isolation area and precautions that need to be taken (PPE, designated equipment/materials).	
<input type="checkbox"/>	Are supplied with PPE (gloves, gowns/coveralls, shoe covers, masks, eye protection, and hand hygiene stations).	
<input type="checkbox"/>	Are supplied with designated or single-use equipment when possible, and designated waste disposal bins.	
<input type="checkbox"/>	Are free from clutter and all supplies are stored in limited quantities behind closed cabinets/drawers.	
<input type="checkbox"/>	Have a designated transition area for donning and doffing PPE, including a space in the clean area to leave personal items that should not be brought into the area (cell phones, etc.)	
<input type="checkbox"/>	Have cage cards that alert personnel to the potential risk of zoonotic disease transmission.	

<input type="checkbox"/>	<p>Have a dedicated place for dogs to urinate and defecate separately from other animals.</p>	<p>See 2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines.</p> <p>Hard non-porous surfaces are ideal for relief areas for dogs in isolation because they can be cleaned and disinfected. Artificial turf is not recommended to be used as an alternate inside relief area.</p> <p>If the patient needs to use an outside relief area, the patient should be either carried or carted to a dedicated isolation relief area that is separate from all other patients. Personnel should wear PPE and work in teams to prevent contamination of the environment.</p> <p>Any incidents involving urine or fecal contamination outside of the patient housing or dedicated relief area must be immediately cleaned and disinfected.</p>
<p>The facility maintains written protocols and/or checklists related to patient isolation for:</p>		
<input type="checkbox"/>	<p>Daily and terminal cleaning and disinfection of isolation spaces.</p>	<p>Daily cleaning and disinfection: the process carried out while a patient is still hospitalized.</p>
<input type="checkbox"/>	<p>Cleaning and disinfection of equipment after each use and terminal cleaning upon discharge (e.g., stethoscopes, fluid pumps, doppler ultrasound and cuffs, mobile ultrasound machines).</p>	<p>Terminal cleaning and disinfection: the process carried out after a patient under isolation has been discharged, end of the day cleaning in areas such as operating rooms, or end of procedure cleaning in areas in which a patient known to be infected with a contagious disease has been handled (7)</p>
<input type="checkbox"/>	<p>Proper removal of items from the isolation area including biological and non-biological waste, laboratory samples, and shared equipment.</p>	<p>See Environmental Cleaning and Disinfection- Vet Clin North Am Small Anim Practice and 2018 AAHA ICPB Guidelines and Ontario Animal Health Network Infection Prevention and Control Best Practices for Small Animal Veterinary Clinics</p>
<input type="checkbox"/>	<p>Animal handling includes how to remove and transport a patient from isolation for necessary procedures or to use an outside relief area (as permitted for the pathogen of concern).</p>	
<input type="checkbox"/>	<p>Personnel receive competency-based training prior to entry to an isolation area and annually. Training should include appropriate donning and doffing of PPE, cleaning and disinfecting, patient handling, and hand hygiene.</p> <p><i>Training is documented and recorded here:</i> _____</p>	<p>Personnel who work in isolation spaces should receive specialized training upon hire and at least annually about infection prevention and control when caring for patients that could be infectious. See 2018 AAHA ICPB Guidelines and CDC's Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings. Trainings are available under CDC's Training and Education Resources; use the drop-down box to select relevant options (e.g., Competency Based Training, Personal Protective Equipment, etc.).</p>

III. Risk Triage, Flagging, and Surveillance		
The facility monitors for potential introduction of CROs by:		
<input type="checkbox"/>	Routinely asking screening questions for new patients when appointments are made or at intake to assess risk for introducing CROs to the facility.	Consider developing a set of questions for intake documentation to help your personnel assess the risk that a pet could introduce antimicrobial-drug resistant organisms to your clinic. Examples might include: "In the last 6 months, has your pet received multiple different antibiotic medications?" See AAHA's Identifying High-Risk Patients: Questions to Ask When Making Appointments . Although risk factor data for companion animal CRO infection or colonization is sparse, human risk factors for infection or colonization include a history of extended or repeated hospitalizations, antibiotic use and antibiotic treatment failures (3). In animals, international travel or origin may be a risk factor (4).
<input type="checkbox"/>	Training personnel to take appropriate steps when an animal is identified that could be at higher risk of CRO colonization or infection (e.g., notify the attending veterinarian or designated infection prevention personnel person, use alternative waiting spaces or exam rooms, etc.).	
<input type="checkbox"/>	Using a flagging system for medical records that alerts personnel at intake and those involved in patient care to take additional precautions when animals are confirmed or suspected to be carrying a CRO.	For animals suspected or confirmed to carry CROs, consider retaining the medical record flag for future visits. See PennVet's CREATE a Plan .
<input type="checkbox"/>	Implementing a system to track movement, housing, and shared equipment of animals through facility.	Tracking animal movement and housing is helpful to guide environmental cleaning and assess transmission risk if hospital-acquired CRO infections are identified. Ideally recorded spaces include cages/kennels, elimination space, movement to ancillary services (e.g., diagnostic imaging rooms, surgical suites). If applicable and available, shared equipment should also be labeled and tracked per patient use. Equipment may include scopes, anesthesia machines, dialysis machines, IV pumps, or other medication delivery systems.
<input type="checkbox"/>	Implementing a basic surveillance program to monitor and tabulate antimicrobial treatment failures, antimicrobial susceptibility profiles, and/or veterinary healthcare-associated infections.	Surveillance centralizes data so that personnel responsible for infection control can access, analyze, and monitor trends. A trained veterinary infection preventionist as part of the clinic/hospital team, can establish a surveillance program to ensure efficient data collection. Surveillance data could include collection and analysis of surgical site infection data, antimicrobial susceptibility results, empiric antimicrobial therapy failures, or recording certain syndromes. See 2018 AAHA ICPB Guidelines .

Box 1: Considerations for veterinary facilities developing CRO preparedness plans.

Does the veterinary diagnostic laboratory used for bacterial culture and antimicrobial susceptibility testing include at least one carbapenem antibiotic (e.g., imipenem, meropenem) on primary antimicrobial susceptibility testing (AST) panels? (refer to [PennVet's CREATE a Plan](#) for more information on how to recognize CRE)

Have all veterinary personnel been provided training about how to monitor the AST results for carbapenem resistance in gram negative bacteria, the importance of monitoring, and who results should be reported to?

Has the veterinary practice identified and documented the legal reporting requirements for carbapenem-resistant organisms to the public health or animal health jurisdiction?

Has a contact person or program (e.g., Healthcare-associated Infections/Antimicrobial Resistance Program, One Health Program or Zoonotic Disease Program) in the jurisdictional public health department been identified that may be consulted in the event of a CRO identification?

Has the facility determined what deems a healthcare CRO outbreak response and has a funding source/budget line been identified that could be used if a response is necessary?

Has the veterinary practice established a hand hygiene auditing program to ensure proper hand hygiene of all personnel? Hand hygiene resources such as alcohol-based hand rub should be made available to encourage hand hygiene. See [CDC's Hand Hygiene Guidance](#).

Has the veterinary practice developed a CRO response plan that includes the following elements?

- Criteria that will lead to notification and consultation with the public health jurisdictional point-of-contact
- Cleaning and disinfection of all facility areas and equipment contacted by CRO-positive animal(s)
- Movement restrictions within the facility for CRO-positive animals
- PPE requirements for personnel who handle CRO-positive animals
- Informational materials for owners of CRO-positive animals that include potential human health implications and risk for CRO transmission

Checklist 2: Considerations for veterinary facilities when responding to identification of CRO-positive animals

✓ **Resources and additional information**

I. Communications

Each of the following parties have been notified:

<input type="checkbox"/>	The designated infection prevention personnel member (VIP) and applicable hospital administrative personnel which may include hospital director, medical director, and/or practice manager	The infection prevention personnel member (VIP) and other administrative personnel are typically responsible for implementing and enforcing infection control measures and coordinating facility CRO responses. See 2018 AAHA ICPB Guidelines , AAHA ICPB Implementation Overview , and AAHA's A Champion for Your Practice: Your Infection Control Practitioner .
<input type="checkbox"/>	All personnel who have interacted with the CRO-positive animal (this may be a hospital wide notification or service specific depending on the facility) and personnel working in kennel/cage areas have been notified of their exposure and zoonotic disease risk.	<p>Personnel have a right to know about potential health hazards at work. See NIOSH Veterinary Safety & Health and OSHA Worker's Rights.</p> <p>Any personnel members that are pregnant, immuno-compromised or at high risk of acquiring a zoonotic infection should consult with their healthcare provider.</p> <p>Personnel who oversee cleaning and disinfection of the kennel/cage areas should be informed to use protocols that are appropriate for CRE.</p>
<input type="checkbox"/>	The patient's primary care, referral veterinarian(s) or any other specialty veterinarian overseeing care.	All veterinary facilities the animal has visited should be made aware of an animal's CRO-positive status so they can monitor CRO transmission, implement enhanced cleaning and disinfection protocols if relevant, and employ infection prevention measures for future visits by the animal. See CDC's FAQs about CRE for Veterinarians
<input type="checkbox"/>	The animal health or public health authority.	Depending on the circumstances and resources, local public health officials will help assess potential human health risks, epidemiologic links, and whether the animal cases are linked to a larger outbreak or transmission chain. Public health authorities might request additional information about the animal including the animal's origin, travel history, health history, veterinary referral history, whether the animal interacts with people at higher risk of infection, and animal-owners' occupations. See State Public Health Veterinarians by State .
<input type="checkbox"/>	The veterinary diagnostic laboratory or reference laboratory.	The public health authority may want to perform further testing of the isolate. Clinicians should request that the laboratory retain the isolate until further direction is received by the public health authority or at the discretion of the facility's leadership to determine whether additional testing is needed.

<input type="checkbox"/>	<p>The animal's owners have been notified about zoonotic disease risk and public health implications, as follows:</p>	<p>The animal owners or household contacts should be provided with information about CROs, risks to their health and how to manage the animal at home to reduce risk for transmission. Facilities might consider informing animal owners that public health authorities may be contacting them if further investigation is required. CRO-positive animal owners and household members should be referred to their healthcare providers to help determine their risk. See CDC's FAQs about CRE for Pet Owners.</p>
<input type="checkbox"/>	<p>Owners of CRO-positive animals have been advised against their pet visiting public spaces (e.g., dog parks, pet daycare facilities, groomers) to prevent transmission to people and animals.</p> <p>Owners of CRO-positive animals have been advised that animal visits should be discontinued to</p> <ul style="list-style-type: none"> • human healthcare settings, or • settings that result in contact with people who have a higher risk of infection (e.g., people who have weakened immune systems, who have recently taken antibiotics, or who need medical devices like ventilators or urinary catheters). 	<p>There is limited data to support a time when CRO-positive animals can be expected to stop carrying the bacteria. Consider recommending exclusion from public spaces for the lifetime of the animal. At least one study of 12 healthy CRO-positive dogs suggests that after 6 months most dogs will revert to testing negative (6) but further study is needed to determine duration.</p>

II. Management of Hospitalized Patients

Each of the following infection control practices are in place for hospitalized CRO-positive animals:

<input type="checkbox"/>	<p>Hospitalized patients with CROs are placed in isolation or a dedicated area segregated from other patients. The following is a prioritized list of housing spaces for patients with CROs (from most ideal to least ideal):</p> <ul style="list-style-type: none"> - Full isolation unit - A ward dedicated to MDRO patients - Integrated into other inpatient areas with visual floor marking (e.g., tape or paint) to designate the "local" isolation area <p>If housing outside of an isolated area is necessary:</p> <ul style="list-style-type: none"> - Consultation with infection control officer/VIP is recommended - Strict adherence to PPE and hand hygiene must be followed regardless of housing location 	<p>Movement out of the animals' housing area and through the hospital should be restricted for CRO-positive animals. CRO-positive animals should only be removed from isolation spaces for procedures that cannot be done in isolation spaces, or to eliminate outside in a designated space. The patient should be either carried or guerneyed to their destination; personnel should wear PPE and work in teams to prevent contamination of the environment during transportation, taking care to decontaminate surfaces (floor, door handles) behind the patient.</p>
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	<ul style="list-style-type: none"> - The space must be clearly labeled to indicate need for contact precautions, strict hand hygiene, and workflow modifications (see bullets below) 	
<input type="checkbox"/>	Entry into the isolation space or dedicated area is restricted to essential personnel required for care of the patient.	Prior to entering the isolation area, personnel should be trained on appropriate donning and doffing of PPE, cleaning and disinfecting of the isolation area, isolation patient handling, and hand hygiene See 2015 NASPHV Veterinary Standard Precautions and 2018 AAHA ICPB Guidelines .
<input type="checkbox"/>	Personnel caring for CRO-positive animals should use Contact Precautions and appropriate PPE including gown/coveralls, gloves and shoe covers (+/- mask, eye protection based on type of anticipated patient interaction/procedure) during patient handling, cleaning of the kennel/cage, and anytime personnel enter the isolation area.	Proper PPE use decreases the risk of transmission to personnel and other patients through direct contact and decreases the potential for spread throughout the facility on hands and fomites. CDC's FAQ's About CRE for Veterinarians , CDC's Transmission-Based Precautions and CDC's Information About CRE for Clinicians .
<input type="checkbox"/>	Personnel who care for the CRO-positive animal strictly adhere to hand hygiene protocols	Refer to Box 1 above
<input type="checkbox"/>	During hospitalization, a designated space for defecation and urination is used for CRO-positive dogs. No other animals use the designated animal relief area until the CRO-positive patient is discharged, and the space is cleaned and disinfected.	<p>CROs typically colonize the gut but are often only identified after an opportunistic infection in another body site. Therefore, feces from animals found to have extra-intestinal infections with CROs should be considered infectious.</p> <p>Remember that the patient should be either carried or carted to their destination; personnel should wear PPE and work in teams to prevent contamination to the environment during transportation, taking care to decontaminate surfaces (floor, door handles) behind the patient. Ensure that disinfectants are used according to the label.</p>
<input type="checkbox"/>	<p>Reusable medical equipment (including stethoscopes, blood pressure cuffs, and monitors) should be designated for the CRO-positive patient where possible for the duration of admittance</p> <p>All equipment should be cleaned and disinfected per the manufacturer's instructions and facility protocols prior to use on another patient.</p>	CROs can easily be transferred through a facility on fomites.
<input type="checkbox"/>	Disposable articles (e.g., food bowls, litter pans, gowns) and single-use devices are used for the CRO-positive patient wherever possible.	Medical supplies and equipment that cannot be re-sterilized or are intended for single use (e.g., endotracheal tubes) should never be re-used after use by a CRO-positive animal.
<input type="checkbox"/>	Enhanced cleaning and disinfection have been implemented for all spaces (e.g., waiting areas, exam rooms, procedure rooms, and kennels/cages) after use by the CRO-positive patient and before use by other patients.	Once a CRO is identified, all spaces and materials that could have been contaminated should be either cleaned and disinfected or discarded. This includes surfaces that could have been contaminated by personnel (doorknobs, clipboards, computers/keyboards, pens, etc.), and any single use items that cannot be repackaged and autoclaved/gas sterilized. Consider thoroughly cleaning and disinfecting the entire facility, depending on how much environmental contamination is possible.

	Ensure adherence to removing organic debris and maintaining appropriate contact times based on disinfectant labels.	
III. Case Finding		
To identify additional CRO cases:		
<input type="checkbox"/>	Review the facility's clinical culture and antimicrobial susceptibility data from the past 6 months to identify any carbapenem-resistant Organisms. (Escherichia sp./E.coli, Enterobacter, Pseudomonas, Klebsiella with meropenem or imipenem resistance)	CRE does not have to be of the same bacterial species (e.g. carbapenem-resistant E. coli from one patient and carbapenem-resistant Enterobacter in another patient within a 6-month timeframe) to prompt a thorough investigation and response. If, on retrospective review, additional cases are identified, contact your jurisdiction's public health department or animal health official for assistance in determining whether transmission is occurring in your facility and for preventing additional cases. Other veterinary facilities where the animal has visited should also consider reviewing clinical cultures from the last 6 months. See CDC's FAQ's About CRE for Veterinarians .
<input type="checkbox"/>	Establish a system to actively monitor the facility's culture and susceptibility data to identify any possible new cases. Facilities should perform enhanced surveillance post identification of a patient with CRO.	Continuing to monitor for cases will help identify whether ongoing transmission is occurring within the hospital. If you think you may have had CRO transmission in your facility, contact your jurisdiction's public health department or animal health official for assistance in preventing additional cases. See CDC's FAQ's About CRE for Veterinarians .
IV. Long-term Management		
Preparation for future veterinary visits include the following:		
<input type="checkbox"/>	The CRO-positive patient's record should remain flagged so that enhanced infection prevention precautions (i.e., facility movement restrictions, PPE use, enhanced cleaning and disinfection) can be employed during future veterinary visits.	
<input type="checkbox"/>	Consider implementing infection prevention precautions (i.e., facility movement restrictions, PPE use, enhanced cleaning and disinfection) for future veterinary visits by other pets in the same household as CRO-positive animals.	Enhanced infection prevention precautions should be implemented for other pets in the household.

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Linked documents:

[CDC's FAQ's About CRE for Veterinarians](#)

[CDC's Information About CRE for Clinicians](#)

[CDC's Transmission-Based Precautions](#)

[CDC's Hand Hygiene Guidance](#)

[CDC's Training and Education Resources](#)

[CDC Guidelines for Environmental Infection Control in Healthcare Facilities: Laundry and Bedding](#)

[CDC's Guideline for Disinfection and Sterilization in Healthcare Facilities \(2008\)](#)

[2015 NASPHV Veterinary Standard Precautions](#)

[2018 AAHA ICPB Guidelines](#)

[AAHA ICPB Implementation Overview](#)

[AAHA's A Champion for Your Practice: Your Infection Control Practitioner](#)

[AAHA's Sample environmental cleaning and disinfection protocol](#)

[Virox Animal Health and AAHA Keep It Clean](#)

[State Public Health Veterinarians by State](#)

[NIOSH Veterinary Safety and Health](#)

[OSHA Worker's Rights](#)

[OSHA: Response to Interpretation Request for Application of the Bloodborne Pathogens Standard to Veterinary Clinics.](#)

[PennVet's CREATE a Plan](#)

[AAHA's Identifying High-Risk Patients: Questions to Ask When Making Appointments](#)

[CDC's Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings](#)

[Spaulding Classification System](#)

[Center for Food Safety and Public Health. Antimicrobial Spectrum of Disinfectant Classes](#)

[Ontario Animal Health Network Infection Prevention and Control Best Practices for Small Animal Veterinary Clinics](#)