

# Public Veterinary Medicine: Public Health

## A veterinary perspective on the recently published guidelines for animal-assisted interventions in health-care facilities

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Animal-assisted interventions have become commonplace in human health-care facilities across North America, primarily owing to their positive impact on the health and well-being of patients.<sup>1-5</sup> However, few studies of the likelihood that pathogens will be spread from the animals to the patients participating in these programs have been published, hampering the development of relevant infection control policies designed to mitigate the risk of pathogen spread. As awareness of infections arising from health-care facilities increases, so does concern about the possible role of AAIs in the epidemiology of some nosocomial illnesses.<sup>6,7a</sup> The issue of whether animals may suitably interact with patients in health-care facilities is particularly contentious owing to the increased vulnerability to infection among these individuals, compared with healthy people.

Most individuals with an interest in AAIs acknowledge the need to ensure that participating animals are unlikely to harm the patients with whom they interact. Consequently, they tend to agree that participating animals should be in good health and have received appropriate vaccinations and that they should undergo temperament testing as part of the screening and acceptance process.<sup>8-10</sup> However, many disagree on how these criteria should be defined and on whether, when, and how animals should be screened for infectious pathogens that may be transmitted to patients. There is also no consensus on how interactions between patients and animals should be controlled to prevent the bidirectional spread of pathogens during AAIs. Given the dearth of data concerning the prevalence of potential pathogens among this select subset of animals or the rate of transmission of pathogens during AAIs, this lack of agreement is not surprising. The potential health risks to participating animals and the possibility of health-

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### ABBREVIATIONS

AAI	Animal-assisted intervention
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
VRE	Vancomycin-resistant enterococci

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care facility-associated pathogens being spread into the community via animals participating in these programs have received even less discussion.

To comprehend the issues related to animals interacting with people in health-care facilities, veterinarians need to first understand what is involved. Animal-assisted interventions are defined as “any intervention that intentionally includes or incorporates animals as part of a therapeutic or ameliorative process or milieu.”<sup>11</sup> In health-care facilities, AAIs can range from animal visitation programs, which tend to focus on the emotional and social aspects of interacting with animals, to animal-assisted therapy, which uses interactions with animals as a formal part of the patients’ treatment plan. People delivering AAI programs may be specially trained volunteers or professionals; participating animals may reside in the health-care facility or may be brought in by their handlers.

Animals participating in AAI programs may act as reservoirs or mechanical carriers of infectious agents, spreading pathogens to and between health-care facility patients and staff members. Further, these animals may be more likely to acquire certain types of infections (eg, multidrug-resistant bacterial infections) than are pets in the general population. Several researchers have reported that rates of infection did not change and that zoonotic infections were not detected after AAI programs were implemented.<sup>12-14</sup> Although these findings are encouraging and should not be dismissed, none of these reports provided sufficient information to allow the validity of the surveillance methods that were used to be assessed. Importantly, it is unclear whether the zoonotic potential of pathogens endemic to health-care facilities, such as MRSA and VRE, was considered when monitoring for infections in these studies.

Furthermore, there is a growing body of evidence that patients in health-care facilities could potentially become infected through contact with animals involved

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in AAI programs. In 1 report,<sup>15</sup> a resident cat that was found to be heavily colonized with MRSA was implicated as the reservoir for an outbreak of MRSA infection in a geriatric ward in the United Kingdom. The cat was hypothesized to have acquired the organism from the shed epithelial cells of an infected patient. In other studies,<sup>16,a</sup> MRSA was recovered from the hair, paws, or nares of dogs involved in AAI programs following visits to health-care facilities. Because MRSA could not be isolated from specimens obtained before these visits, the authors concluded that the dogs acquired the organism somewhere along their route. Another study<sup>b</sup> found that dogs enrolled in AAI programs involving visits to human health-care facilities in Ontario and Alberta over a 1-year period were 6 times as likely to acquire MRSA as were dogs involved in other types of AAI programs (eg, dogs visiting group homes or participating in child literacy programs), even after controlling for potential confounders such as diet and exposure to antimicrobials. Whether acquisition of MRSA corresponds to an increased likelihood of infection in human patients or owners is uncertain, but the possibility cannot be dismissed, nor can the possibility of an increased likelihood of infection in veterinary personnel who provide care for these dogs. In addition, dogs that have acquired MRSA through participation in AAI programs may be more likely to become infected with MRSA.

Other potentially zoonotic agents that can be carried by healthy animals and are sufficiently common in companion animals to warrant concern include *Salmonella* spp, *Campylobacter* spp, *Leptospira* spp, *Giardia* spp, dermatophytes, *Toxocara* spp, and hookworms. Constituents of the normal microbiota such as *Pasteurella* spp, an organism that is frequently recovered from animal bite or scratch wounds,<sup>17</sup> may also cause infections in susceptible people without traumatic exposure, possibly as a result of animal licking.<sup>18-20</sup>

Beyond concerns associated with infection, the possibility of injury from or to animals involved in AAI programs needs to be addressed. Although the reported frequency of injuries to patients has been low,<sup>12,21</sup> under-reporting makes it difficult to gauge the true incidence. To the authors' knowledge, studies of injuries involving animals participating in AAI programs do not exist, but one of the authors (SLL) has been notified of incidents in which dogs were harmed by patients or by ingestion of patient medications and has observed situations in which animals were urged to perform tasks that appeared to cause them physical discomfort or stress.

Health-care facilities that participate in AAI programs vary greatly in the protocols they use to minimize opportunities for infection and injury during such activities. Some choose to follow guidelines recommended by the CDC<sup>10</sup>; others create their own guidelines, which may or may not be based on the available scientific evidence. Consequently, the protection provided for patients and animals that participate in AAI programs is highly variable.

To address the need for standard, evidence-based guidelines to minimize the possibility of adverse events during AAI in health-care facilities, experts with an interest in the subject were invited to a meeting in Janu-

ary 2007. The Working Group included 29 individuals from Canada and the United States with expertise in AAI, infection control, public health, and veterinary medicine. After reviewing elements of previous guidelines for AAI<sup>8,9,22-24</sup> and current research findings, the Working Group developed a consensus document<sup>25</sup> that put forth guidelines for AAI in health-care facilities.

In large part, the guidelines for AAI in health-care facilities<sup>25</sup> are directed at health-care facility staff members and the individuals who own and handle participating animals. Realizing that veterinarians may be involved in screening animals prior to participation in AAI programs and in providing ongoing veterinary care to participating animals, we believe that it would be helpful to provide additional information regarding those parts of the guidelines that may have a direct impact on veterinarians. The present report, therefore, was developed to highlight those elements of the guidelines likely to be of interest to veterinarians who provide care to animals participating in AAI programs and to discuss the rationale for the Working Group's recommendations.

Importantly, when drafting the guidelines, members of the Working Group were aware that the evidence available to inform their recommendations was often limited both in quantity and in quality, sometimes consisting of little more than case reports or surveys of limited scope. Rather than ignore available evidence on the basis of these limitations, the authors believed it was best to err on the side of caution and address concerns raised in those reports. Recommendations for animals that reside in health-care facilities were not included in the guidelines and are not discussed in the present report. For information on veterinarians' responsibilities for resident animals involved in AAI programs, readers are referred to guidance documents offered by the AVMA.<sup>10,26</sup>

## **Guidelines Referring to Animal Selection**

The guidelines state that the only animals that should be allowed to enter health-care facilities for the purpose of interacting with patients are the patients' own pets and animals that are part of an official AAI program. Historically, however, the criteria used to identify those animals that would be allowed to enter health-care facilities have varied greatly. Therefore, the Working Group members attempted to develop standards for determining which animals could be allowed to enter health-care facilities, with more stringent standards for animals involved in AAI programs than for patients' pets. When counseling organizations that provide AAI programs, human health-care professionals, or pet owners on determining the suitability of animals for interacting with people in health-care facilities or when certifying animals for enrollment in AAI programs, veterinarians should consider the following recommendations from the guidelines.<sup>25</sup>

### **RESTRICT SUITABLE ANIMAL SPECIES TO DOMESTIC COMPANION ANIMALS THAT ARE HOUSEHOLD PETS**

In the situation of a patient's own pet, no further limitations are suggested, so long as interactions with

the animal while in the health-care setting are restricted to the patient and his or her family. In the situation of animals involved in AAI programs, additional limitations are recommended. In particular, the guidelines suggest that dogs and cats are the most suitable species for AAI programs because the likelihood of injury and infection are better understood and more easily controlled than for other species. Although the risks associated with other companion animals, such as rabbits, guinea pigs, and birds, are less well understood, these species may also be suitable, provided that litter training or some other method is used to prevent patients from being exposed to animal excrement.

The guidelines also identify several species that are unsuitable for participation in AAI programs in health-care facilities because of a lack of formal temperament evaluation protocols and a higher likelihood of patient injury or exposure to pathogens. Examples of such species include reptiles, amphibians,<sup>27-30,c</sup> nonhuman primates,<sup>31,32</sup> hamsters, gerbils, mice, rats,<sup>33,34</sup> hedgehogs, prairie dogs, and other recently domesticated animal species.<sup>35-37</sup> Farm animals, which tend to be housed in environments with high concentrations of microbial pathogens, are also considered inappropriate owing to the high likelihood of carriage of or contamination with zoonotic pathogens.<sup>38-40</sup>

**REQUIRE THAT ALL AAI ANIMALS BE ADULTS, WITH CATS BEING AT LEAST 1 YEAR OF AGE AND DOGS AT LEAST 1 YEAR BUT IDEALLY 2 YEARS OF AGE**

Immature animals are not only more likely to shed zoonotic organisms,<sup>41-45</sup> they are also more inclined to engage in potentially injurious behaviors, such as playful scratching, mouthing, or nipping, until properly socialized.<sup>46</sup> Furthermore, dogs that are prone to dominance aggression or other behavior problems usually show signs by 18 to 24 months of age, the time of social maturity.<sup>46,47</sup>

Some animals may be prone to alterations in mentation or physical condition as they approach their geriatric years. These changes may adversely affect an animal's ability to safely interact with patients, whether by increasing opportunities for patient injury or by increasing the animal's discomfort or stress during AAls. Because not all animals experience these changes, no recommendation regarding a mandatory age of retirement is made in the guidelines. Instead, veterinarians are urged to regularly monitor the physical and mental condition of animals involved in AAI programs. If the veterinarian observes a deterioration that may influence the animal's ability to perform activities related to AAls, such as an orthopedic ailment that might cause discomfort when walking long distances or ascending onto patients' beds, the handler should be advised accordingly and a note to that effect should be included on any associated health certificate.

**DENY THE ENTRY OF ANY ANIMAL DIRECTLY FROM AN ANIMAL SHELTER, POUND, OR SIMILAR FACILITY**

Animals taken directly from an animal shelter or animal control facility are unsuitable for interacting with any potentially immunocompromised people. Hygiene conditions within shelters are highly variable,

and the opportunities for animals to become exposed to infectious pathogens may be greater than in other environments. In addition, the behavioral and medical histories of shelter animals are often unknown. Consequently, shelter animals may be more likely to carry infectious organisms or have behavioral problems.<sup>48-55</sup> Animals from an animal shelter, pound, or similar facility should not be allowed to visit people in a health-care facility until they have been living in a permanent home for at least 6 months.

**REQUIRE THAT EVERY ANIMAL PASS A TEMPERAMENT EVALUATION SPECIFICALLY DESIGNED TO EVALUATE THE BEHAVIOR OF AAI ANIMALS UNDER CONDITIONS THAT THEY MIGHT ENCOUNTER WHEN IN HEALTH-CARE FACILITIES**

Temperament evaluations are not required for patients' pets because they should have limited exposure to other patients. Such evaluations are, however, crucial for minimizing opportunities for patient injury and infection by animals that participate in AAI programs. Although large organizations that provide AAI programs often have their own specially trained evaluators, veterinarians may be asked to perform temperament tests for smaller organizations on occasion. In these instances, the veterinarian must have successfully completed a course or certification process in temperament evaluation and must have experience in assessing animal behavior and training. In addition, the veterinarian must have experience with AAI programs or, at the least, appreciate the types of challenges that animals may encounter in health-care facilities, such as crowding, startling sounds, and rough handling. Veterinarians are discouraged from providing temperament evaluations for animals being considered for AAI programs if they lack such experience.

During temperament evaluation, specific elements that should be assessed include the animal's ability to obey the handler's commands and the animal's reactions to strangers, other animals, loud noises, novel stimuli, angry voices, potentially threatening gestures, being crowded, being patted in a vigorous or clumsy manner, and being held in a restraining hug.<sup>24</sup>

For animals participating in AAI programs on an ongoing basis, periodic temperament reevaluation is recommended, although the optimal frequency with which these reevaluations should be performed remains unresolved owing to a lack of evidence. Although the guidelines recommend reevaluation a minimum of once every 3 years, this may not be sufficient. For this reason, veterinarians who provide care for animals involved in AAI programs have an important role in identifying behaviors that may portend future aggression toward patients, that may have gone unnoticed or unreported by others, and that may not have been evident during past temperament evaluations. For example, if such an animal were to require muzzling during a routine physical examination, the veterinarian should question whether this animal could safely interact with patients. The same may be true for an animal that loses its sight or hearing, that develops a painful condition, or that displays an increased startle response or reduced tolerance to handling during an appointment. The veterinarian should point out any concerns about an animal's behavior to

the handler. If asked to certify an animal's health and suitability for AAI programs, the veterinarian should document any concerns. The guidelines do not require that cats involved in AAI programs be declawed to prevent scratching. Therefore, if a cat scratches veterinary personnel during routine procedures, this should also be documented.

### **Guidelines Related to General Health Screening of Animals**

The success of AAI programs depends on the organizations that sponsor these programs, the animals and their handlers, the staff of the participating health-care facilities (including infection control professionals, physicians, and persons delegated as liaisons to AAI programs), and the veterinarians who provide care for participating animals. Historically, the veterinarians' primary responsibility has been to certify the health of participating animals, with most, but not all, organizations that sponsor AAI programs requiring annual or semiannual physical examinations. However, organizations differ with regard to factors that should be assessed during these examinations and how frequently examinations should be performed.<sup>56</sup> Many, but not all, ask that veterinarians sign documents testifying to the suitability of individual animals for participation in AAI. Therefore, a major goal of the guidelines was to standardize the approach to health screening so that all animals participating in AAI programs would be held to the same requirements, recognizing that requirements for patients' own pets would be more variable.

To this end, the guidelines indicate that a veterinarian should be responsible for monitoring the health and welfare of all animals participating in AAI programs and for ensuring, to the extent possible, that both behaviorally and physically, these animals can safely interact with the human participants in these programs, who may be more susceptible to infection or injury than are individuals outside the health-care environment. Communication with others involved in AAI programs is important, as no other profession is better trained to manage or handle inquiries related to risks of zoonotic disease. The following portions of the guidelines relate to managing zoonotic hazards and welfare in animals that visit health-care facilities, including patients' pets and animals participating in AAI programs.

#### **REQUIRE THAT DOGS AND CATS BE VACCINATED AGAINST RABIES AS DICTATED BY LOCAL LAW**

As unlikely as it may seem, animals incubating the rabies virus have been taken into health-care facilities, with unfavorable consequences to those exposed.<sup>48</sup> If a veterinarian has noticed that a particular animal has reacted adversely to a rabies vaccine in the past and is concerned that vaccination may be hazardous to the animal, an exemption to this requirement may be granted. However, such an exemption is only justified in areas where likelihood of exposure to rabies is considered to be very low. In addition, annual serologic testing for rabies for animals in low-risk regions may be useful to document adequate antibody titers. In areas where the likelihood of exposure to rabies is not negligible, animals that cannot be vaccinated should not participate

in AAI programs. Serologic testing for rabies antibody titers as a substitute for vaccination in dogs and cats whose owners wish to avoid vaccination for other reasons is not recommended.<sup>57</sup> At a minimum, a region should be considered of risk for rabies if mandatory rabies vaccination is required by law.

Other routine vaccinations (eg, distemper, hepatitis, parvovirus, and parainfluenza virus in dogs; and herpes virus, calicivirus, and panleukopenia virus in cats) are not required to prevent the transmission of zoonotic diseases but are recommended to protect animals from common infectious diseases that may render them more susceptible to zoonotic infections. Whether to vaccinate against zoonotic diseases such as leptospirosis, giardiasis, chlamydiosis, and bordetellosis is left to the discretion of the veterinarian, who should consider the likelihood of the animal's exposure to the causative agents and the consequent benefit to the health of the animal. At the moment, not enough is known about the likelihood of transmission of the causative organisms to humans or about the effectiveness of vaccination in preventing transmission to recommend vaccination strictly as a means of protecting human health, and not enough is known about whether the organisms are sufficiently geographically widespread to require routine vaccination against them. It is also considered that, should AAI animals subclinically harbor these organisms, hygiene methods outlined in the guidelines should still be adequate to prevent transmission.

#### **REQUIRE THAT ANIMALS BE CLINICALLY HEALTHY WHEN VISITING HEALTH-CARE FACILITIES**

For the protection of animals and patients, animals participating in AAI programs and patients' pets must not be allowed to enter health-care facilities at times when those animals are more likely to be carrying potentially zoonotic pathogens or are more likely to become infected themselves. This would include animals that are having episodes of vomiting or diarrhea, urinary or fecal incontinence, or sneezing or coughing of unknown or suspected infectious origin; animals that are being treated with antimicrobials other than topically or that are receiving immunosuppressive dosages of any medications; animals with open wounds, ear infections, or acute moist dermatitis; animals with orthopedic or other conditions that, in the opinion of the animal's veterinarian, could result in pain or distress to the animal during handling or when maneuvering within the health-care facility; and animals in estrus. Handlers should wait at least 1 week beyond the resolution of any of these conditions before resuming visits with their animals.

#### **EXCLUDE ANIMALS THAT HAVE BEEN FED ANY RAW OR DEHYDRATED (BUT OTHERWISE RAW) FOODS, CHEWS, OR TREATS OF ANIMAL ORIGIN WITHIN THE PAST 90 DAYS**

Only those animals that have a low likelihood of harboring zoonotic pathogens should be allowed to enter health-care facilities, and strong evidence has linked raw foods, chews, and treats of animal origin to a higher likelihood that animals will be shedding salmonellae and other pathogens, relative to animals that do not consume these foods.<sup>58,59,b</sup> In some cases, animals can

shed salmonellae for several months. Rather than focusing on frequent screening for salmonellae, which can be shed intermittently, the focus for infection control and prevention should be placed on barring animals that have a high likelihood of shedding salmonellae.

### **Guidelines for Scheduled Health Screening of Animals Participating in AAI Programs**

The health evaluation of participating animals is the point at which veterinarians can have a considerable impact on the safety of AAI programs. Although veterinarians cannot and should not be expected to certify that these animals are free from infectious pathogens, they should be diligent in detecting overt signs of potentially zoonotic illnesses (eg, otitis externa and pruritic skin conditions) and in suggesting an appropriate course of action when such illnesses are detected. The guidelines place the onus of educating handlers about zoonotic diseases on the organizations that sponsor AAI programs. However, veterinarians can help ensure that this communication actually occurs, that the information relayed is accurate, and that handlers are reminded about zoonotic hazards when appropriate (eg, when their animals are examined because of diarrhea).

#### **REQUIRE THAT EVERY ANIMAL RECEIVE A HEALTH EVALUATION BY A LICENSED VETERINARIAN AT LEAST ONCE AND OPTIMALLY TWICE PER YEAR**

The more frequently physical examinations are performed, the greater the opportunities for veterinarians to identify problems that may impact the safety of AAI programs for participating animals and patients. During physical examinations of these animals, veterinarians should actively look for evidence of zoonotic ectoparasites, such as fleas, ticks, and mites, and for overt signs of other potentially zoonotic infections. A complete history should be taken, including specifics on diet, lifestyle, and behavior. It is recommended that veterinarians prominently identify in the medical record those animals that are involved in AAI programs, so that appropriate measures can be promptly taken should relevant health or behavioral problems arise.

Animals with physical impairments such as an amputation are often embraced by patients who have similar impairments. Therefore, veterinarians should assess physically disabled animals on a case-by-case basis to determine their suitability for participation in AAI programs. There is no reason to bar an animal simply because it has a physical disability, but if the disability might make the animal more likely to respond adversely to visitation or if the rigors of visitation would be unduly harsh, exclusion from the program is warranted.

#### **ROUTINE SCREENING FOR SPECIFIC, POTENTIALLY ZOOONOTIC MICROORGANISMS IS NOT RECOMMENDED**

The goal is not to ensure that no animal participating in AAIs ever harbors an infectious agent, as this would be impractical if not impossible. All overtly healthy animals are likely shedding 1 or more infectious organisms at various times.<sup>8</sup> Given the uncertainty inherent in all testing procedures and the variability in

shedding, testing could provide an unwarranted sense of confidence. Therefore, the most important objective is to reduce opportunities for transmission of infectious agents through the use of infection control practices, such as routine hand hygiene.

Importantly, some zoonotic pathogens, such as *Malassezia pachydermatis* and *Pasteurella* spp, are part of the normal flora in certain animal species. Therefore, even if animals were free of every other zoonotic agent, they would still constitute a potential reservoir of infection for susceptible individuals. Although animals involved in AAI programs may carry some pathogens such as MRSA that have been associated with health-care facilities, this appears to be uncommon at the present time and carriage appears to be brief when it does happen.<sup>60,b</sup> In addition, there is, as yet, no consensus on the most sensitive site (eg, nares vs perineum vs feces) to sample to detect MRSA in animals. Even if that site were known, animals that are exposed to health-care facilities are at risk of acquiring these pathogens every time they visit the facility. Consequently, even if results were negative at one time, this would not guarantee that the animal was free from MRSA at the time of sample collection, nor would it guarantee that results would still be negative if the animal was retested after its next visit to a health-care facility.

Animals infected with hookworms or roundworms may excrete the eggs in their feces. However, excreted eggs require several days in the environment to reach an infectious stage, and there is no evidence to suggest that the number of infectious, larvated eggs on the hair of clean, groomed animals is sufficient to cause visceral or ocular larva migrans in humans<sup>61</sup> or that any human has ever contracted a zoonotic nematode infection from contact with animals, as opposed to animal feces.

Research has shown that exposure to cats is unrelated to seroconversion to *Toxoplasma gondii* in immunocompromised individuals.<sup>62</sup> Rather, most cases of toxoplasmic encephalitis in human patients infected with HIV are the result of reactivation of latent infections.<sup>63</sup> Unless patients handle cat feces, they should not be at risk of acquiring *T gondii* as a result of participating in AAIs.

Finally, although information on prevalence is limited, *Giardia duodenalis* appears to be common in healthy, adult dogs and cats in some regions of North America.<sup>7,64-66</sup> However, the zoonotic potential of strains recovered from these animals is unclear at present. Some genotypes appear to be host-specific,<sup>67-69</sup> and human infection has been attributed to pets only rarely.<sup>70</sup>

Special screening for MRSA or other potentially zoonotic pathogens such as VRE or epidemic strains of *Clostridium difficile* may be indicated in situations where an animal is known to have physically interacted with a known human carrier, either in a hospital or in the community, or when epidemiologic evidence suggests that the animal might be involved in transmission. In these cases, veterinarians may wish to consult with human infection control and veterinary infectious disease or internal medicine personnel to determine how to proceed. Veterinarians are urged to obtain contact information for AAI program liaisons at health-care facilities visited by their patients and to obtain the clients' con-

sent to communicate with those liaisons as required. If the animal does test positive for any of these pathogens, decolonization treatment is not recommended. Rather, the animal's visitation privileges should be temporarily suspended until results of bacterial culture of at least 2 samples obtained 1 week apart indicate that the animal is free from the organism.

Owing to the likelihood that animals participating in AAI programs will be exposed to multidrug-resistant organisms in the health-care facility, veterinarians are encouraged to pursue culture and susceptibility testing whenever these animals develop opportunistic infections that may be caused by MRSA or other hospital-associated, opportunistic pathogens. If the laboratory does not routinely include methicillin or oxacillin in its antimicrobial susceptibility testing profile, then the veterinarian should include specific instructions to test for resistance to methicillin if *Staphylococcus aureus* is isolated. Infection with multidrug-resistant organisms may cause urinary tract infection, pneumonia, bacteremia, infection of surgical sites and other wounds, and general skin and soft tissue infections. Given the possibility that animals participating in AAI programs may carry MRSA or *C difficile*,<sup>7,60,b</sup> veterinary personnel caring for these animals should take steps to protect themselves and their other patients by practicing hand hygiene and following other routine infection control measures.

#### DEFER TO THE ANIMAL'S VETERINARIAN REGARDING AN APPROPRIATE FLEA, TICK, AND ENTERIC PARASITE CONTROL PROGRAM

The ectoparasite examination is an opportune time for veterinarians to educate owners of animals participating in AAI programs on the zoonotic potential of ectoparasites, to provide guidance on detecting fleas and ticks, and to provide information on clinical signs of mange. Because the likelihood of parasite infection or infestation varies by animal age, reproductive status, behavior (eg, coprophagia, drinking from ponds, and hunting), living conditions, and geographic location, an animal's veterinarian is best suited for tailoring a parasite control program for that particular animal. Many veterinarians will have an opinion about how frequently fleas and ticks are encountered in their region of practice and may know whether certain households have recurring problems with ectoparasites. Even in high-risk regions, animals from single-pet households that are kept strictly indoors may not require ectoparasite control.

Although routine screening of dogs and cats for hookworm, roundworm, and heartworm infection is not advocated as a means of preventing human infection during AAIs, such screening is advocated to protect the health of participating animals. With respect to heartworm infection, veterinarians are best able to counsel owners on the advisability of preventative programs for dogs and cats, taking into account the local risks of infection and seasonal and lifestyle factors. Heartworm disease is zoonotic, but the organism cannot be transmitted directly from animals to people. On the other hand, some other parasites can be transmitted from animals to people through contact (eg, fleas and *Sarcoptes* spp).

Animals participating in AAI programs that are receiving a heartworm preventative that is also efficacious against other parasites should still be screened for parasite infections at a minimum of once a year. For intestinal parasites, a centrifugation (ideal) or zinc sulfate flotation method should be used, not a fecal smear technique. If the heartworm preventative is administered only 6 months a year because of seasonal variations in the likelihood of mosquito exposure, veterinarians should recommend that annual screening for intestinal parasites be performed during the early summer.

For animals in which a heartworm preventative is not indicated because of a low likelihood of heartworm infection, screening for intestinal parasites should be performed a minimum of 2 times a year, with a centrifugation or flotation technique being used. In animals for which screening test results are negative for 2 years in a row, screening frequency can be reduced to once a year if the animal's lifestyle does not change.

Although there is no scientific evidence of the benefits of touch, touching animals likely contributes substantially to the therapeutic properties of AAIs for many patients. Consequently, if animals participating in AAI programs are treated with topical parasiticides, the owners should be instructed to apply the product a minimum of 24 hours and preferably at least 48 hours before the next patient visit. Bathing with a flea shampoo prior to AAIs is not recommended because of the possibility that patients will be sensitive to ingredients in the shampoo. For animals in regions or homes with a high likelihood of flea infestation, veterinarians may wish to prescribe nitenpyram instead, with instructions that it be administered at least 3 hours and not more than 24 hours before the next patient visit. Animals infested with fleas, ticks, or mange mites should be temporarily withdrawn until the infestation has been cleared.

Readers are cautioned that these recommendations are not the same as those put forward by the Companion Animal Parasite Council, which advocates more stringent treatment and testing protocols for dogs and cats in the United States.<sup>70</sup> However, given that contact with feces is the primary mode by which gastrointestinal tract parasites are transmitted and that patients should not be contacting feces, the Working Group believed their guidelines were sufficient and could be applied to animals across North America.

#### **Other Guidelines of Relevance to Veterinarians**

Veterinarians may be asked for advice on how to prevent the transmission of infectious pathogens from or to animals during AAIs. Patients are not the only source of infection for animals visiting health-care facilities, and the hands of health-care workers, as well as the environment itself, are frequently contaminated with infectious pathogens.<sup>71-75</sup>

To minimize the opportunities for transmitting infectious pathogens to and from animals participating in AAI programs, the guidelines put a strong emphasis on hand hygiene,<sup>72</sup> requiring that anyone who wishes to touch participating animals practice hand hygiene be-

fore and afterwards. This emphasis is intended to ensure that even when human participants contact fecal, urinary, or other pathogens, they will be protected, and handlers are charged with the responsibility to make certain that hand hygiene is practiced. To address risks of infection and injury, handlers are restricted to bringing a single animal during each visit and are required to keep control of the animal at all times, either by leash or by transporting it in a carrier (ie, not in the handler's arms).<sup>25</sup> Handlers of patients' pets are required to restrict the animals from interacting with anyone but the patients and their families while on the premises and to decline requests from other patients, staff, or visitors to touch the animal.<sup>25</sup>

Although licking may be perceived as therapeutic by some participants in AAI programs, the guidelines require that licking be prevented for 2 major reasons: the skin of patients and staff can be contaminated with pathogens, providing opportunities for animals to acquire pathogens from people they lick, and susceptible people can become infected with pathogens found in animal saliva. The guidelines also suggest preventing "shaking paws" because even if a dog's paws are clean when it enters the health-care facility, its paws may become contaminated with pathogens as it walks through the health-care environment.<sup>a</sup>

Placing animals on beds is often necessary to facilitate patient-animal interactions. Unfortunately, bedding can be contaminated with pathogens to which animals may become exposed,<sup>76</sup> and animals can soil bed linens with hair and other contaminants, including whatever pathogens they came in with and whatever accrued on their paws or fur during the visit. Therefore, handlers are required to place a barrier such as a clean towel or disposable pad between animals and bed linens when placing animals on beds.<sup>25</sup> Handlers of animals participating in AAI programs are further required to avoid visiting patients in isolation to protect themselves, their animals, and the patients from exposure to infectious pathogens.<sup>25</sup>

Results of some studies<sup>60,77,b</sup> have suggested that animals that participate in AAI programs can acquire pathogens during their visits to health-care facilities and subsequently shed those pathogens in their feces. Thus, exposure to fresh feces from these animals may be a source of infection for people and animals outside the health-care setting. Consequently, veterinarians should stress the importance of quickly and properly disposing of fecal matter to protect public health.

Finally, for both patients' pets and animals participating in AAI programs, the guidelines place the responsibility for ensuring that animals are adequately prepared to visit a health-care facility on the handlers, and veterinarians can help by counseling handlers on how to prepare their animals prior to health-care facility visits. Importantly, although animals are expected to be clean, bathing an animal prior to each visit as a means of infection control and prevention is not recommended, unless the animal is malodorous or visibly soiled.<sup>25</sup> The reasoning for this is that some animals participating in AAI programs visit health-care facilities several times a week. In addition, even if the animal is bathed immediately before the visit, the hair can become contaminated during the visit.<sup>a</sup> Therefore,

emphasis is placed on hand hygiene of all participants instead. In situations where bathing before the visit is indicated or desired, the guidelines suggest using a mild, unscented, hypoallergenic shampoo and allowing the coat to dry before visiting.<sup>25</sup> Handlers should also ensure that their animals' nails are short and blunt to minimize opportunities for scratches and should visually inspect their animals for ectoparasites prior to each visit.<sup>25</sup> Equipment used to control animals during health-care facility visits (eg, carriers, leashes, and collars) should be clean and odor-free, and animals participating in AAI programs should be identified with a special tag or harness so that they are easily recognized as such by staff members of the facility. Leashes should be nonretractable and should be no more than 1.3 to 2 m (4 to 6 feet) long. Choke and prong collars should not be used because they may result in injury should a patient's fingers become caught in them.<sup>25</sup>

## Conclusion

Veterinarians can play an important role in helping to keep animals and people who participate in AAI programs safe. This requires that veterinarians have basic information about these programs; know which of their patients participate; know their own role in reducing opportunities for disease transmission; communicate with members of the health-care team as needed; and understand the health hazards to their patients, particularly those that may have an impact on routine veterinary care. The present report attempts to amplify those parts of the guidelines for AAIs in health-care facilities<sup>25</sup> that specifically refer to veterinarians. Readers should understand that both this report and the guidelines themselves will need to be updated as new evidence is brought to light.

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