

## Prevention of disease in shelters and multi-animal environments

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**Multi-animal environments are ideal habitats for infectious diseases. Large numbers of animals living in close proximity give rise to large amounts of potentially infectious body fluids and waste products, which are perfect substrates for infectious agents to multiply and be exchanged.**

Although this article will focus on shelter environments, many of the principles described are applicable to kennels, catteries, breeders and similar circumstances.

It is now widely accepted it is part of the role of a farm vet to be involved with proactive herd health planning and management of on-farm biosecurity, rather than reactive response to problems. However, in shelters, which are effectively the companion animal version of this sector, veterinary involvement in this strategic area is limited. For example, a survey in the US showed only six per cent of shelters have a vet leading their infectious disease protocols (Steneroden et al, 2011).

### Panel 1. Disease management strategy steps.

1. Visit the shelter and understand the aims and priorities of the organisation – this will enable you to tailor an approach that fits with your client's ethics and resources.
2. Disease prevention is a great opportunity to be proactive about health and welfare. Managing intake, reducing stress and using a vaccine protocol, which is tailored to the shelter environment, are all important features.
3. Have a plan for likely outbreaks, recognise them early and learn from each one.
4. When an animal is rehomed its status changes from herd member to individual. Anticipating and managing the challenges this may bring can increase the chances of successful adoption.

Clearly, there is room for more veterinary input into disease prevention and management strategies for cats, dogs and other species, and this article will outline some of the first steps to take (**Panel 1**).

## Visit the shelter

The first and most important process is to visit the shelter regularly and understand how it works. Each organisation will have its own remit – sometimes this is very explicit and protocol driven, especially in larger, national organisations. Others are much less formal and interpretation of practices may even be contested between different members of the organisation.

It is important to try and understand your organisation's aims and priorities as these will be key to the decisions it makes around animal care and preventive strategies.

When visiting the shelter, it is essential to get to know the whole site, not just the vet room. It is helpful to observe staff at work, where possible, and see how any guidelines are actually implicated.

For example, one shelter had recurrent outbreaks of *Cryptosporidium* infection in the puppy block, which, despite well-trained staff and comprehensive biosecurity protocols, persevered for months. One day, the author's colleague observed staff cleaning and realised rather than thoroughly cleaning the floors with detergent, the staff were cleaning and soaking with bleach as a single step. Most disinfectants cannot adequately penetrate organic debris, and this was allowing contamination to recur.



**Figure 1.** It is important to ensure organic debris is thoroughly cleaned away with detergent before disinfection – observe the cleaning process to pick up potential flaws in hygiene. Here, dirty litter trays are being soaked in disinfectant without being properly cleaned, forming a potential source of infection.

Once the staff began cleaning with detergent before disinfecting, the problem resolved (**Figure 1**).

## Prevention of disease

Disease prevention begins before the animal arrives at the shelter. The vast majority of animals entering shelters are either strays or relinquished directly by their owner (Stavisky et al, 2012).

Where possible, intake can be planned to reduce susceptibility of animals to disease. For example, especially vulnerable animals, such as litters of kittens and puppies, can be placed in foster homes where their risk of exposure to infectious disease can be better controlled (**Figure 2**). This can also provide better opportunities for young animals to be socialised to a home environment and homing can take place directly from the foster home or the shelter.

Use of vaccines is an extremely important component of disease prevention in the shelter. Ideally, animals would be vaccinated before entry – where relinquishment is planned (such as via a waiting list), owners can be encouraged or required to vaccinate their animal beforehand, or the shelter may even consider providing subsidised or free vaccines for animals before relinquishment.

This is not always possible and, therefore, it is strongly recommended animals are vaccinated as soon as possible after entry to the shelter (Association of Shelter Veterinarians, 2010; WSAVA, 2016).

Under most circumstances, live vaccines are preferred over killed, due to faster onset of immunity. Animals known or suspected to be ill should be vaccinated, as, in most circumstances, the risk of infectious disease is significantly higher than the risk of an adverse reaction to vaccination.



**Figure 2.** Managing risk of infection is particularly important for vulnerable neonates.

In conditions of high infectious disease risk, commencing primary vaccination early (from four weeks) with repeated doses until 16 to 18 weeks of age, may be of benefit, as maternally derived antibody levels cannot be predicted (without repeated expensive serology) and may interfere with

vaccination (**Figure 3**).

For animals arriving at the shelter, there should be an established flow that balances risk of disease transmission with the need to expedite throughout. Typically, a quarantine period is recommended where intake animals are confined to quarantine and do not share space or resources with other animals in the shelter.

Recommendations vary, but, empirically, many shelters choose a quarantine of around one week, which covers the typical incubation period for many common diseases, such as parvovirus.

A number of different components to a disease prevention strategy exist in the shelter. Control measures should be linked to the common routes of transmission of the disease in question. For example, intracellular bacteria, such as *Chlamydomphila felis*, and enveloped viruses, such as FeLV, survive poorly in the environment and, therefore, transmission will be limited unless animals are in close contact or obvious deficiencies in hygiene exist.

In contrast, non-enveloped viruses, such as canine parvovirus (CPV), feline panleukopenia virus and feline calicivirus, can survive in the environment for long periods and may be resistant to common disinfectants. These viruses can, therefore, be transmitted by a number of routes, including spread on fomites, such as food bowls, cleaning equipment and people.

Understanding the likely routes of transmission of these common diseases enables design of protocols, including if and when animals can be mixed, decontamination of equipment and hand hygiene.



**Figure 3.** A four-week-old puppy in a shelter begins its primary vaccination course.

The mixture of complicating factors affecting development of disease should also be taken into

account.

Physical and psychological stress is associated with susceptibility to infectious disease, and entry into a shelter is in itself a stressor.

For example, it has been shown both are more likely to show clinical signs of cat flu, and to shed infectious pathogens, immediately after entry to a shelter (Edwards et al, 2008). Whether this is as a result of new infections, or reactivation of existing, clinically inapparent infections, is unclear.

Such results suggest stress management is an important component of disease prevention, and measures such as providing hiding places and avoidance of large amounts of social mixing for cats, and managing noise and barking for dogs (for example, by providing screens breaking up visual contact between kennels), can play an important role (Coppola et al, 2006; Sparkes et al, 2013; **Figure 4**).

## **Outbreak management**

In an ideal world, outbreaks would not occur. However, realistically, fluctuations in disease prevalence will occur. An outbreak can be simply defined as “the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season” (World Health Organization, 2016).

Therefore, what constitutes an outbreak will be specific for each shelter, disease and season – for example, in some circumstances, a single case of CPV may constitute an outbreak, while some shelters may consider a rate of feline upper respiratory tract infection of 10 per cent to 20 per cent to be normal.

Monitoring disease incidence (the rate of new cases in a given time period) is a helpful investment of time. This allows early identification of potential problems and also enables the success or failure of interventions, such as changes in hygiene or vaccination protocols, to be assessed objectively.

This can be as simple as a book or sheet where staff can record clinical signs whenever they are observed, which is reviewed periodically.

Having contingency plans in advance of an outbreak can be helpful. This can include a definition of what constitutes an outbreak (for example, disease incidence), plans for any diagnostic tests that may be helpful, increases in biosecurity measures (such as limiting movement in the shelter) and if and when to close to incoming animals.

Once the outbreak is under control, it is helpful to have an open discussion of what occurred and how such instances can be prevented in future. A no-blame culture and inviting input from staff of all levels may help to build a fuller picture and may also ensure buy-in from staff to future changes

in biosecurity.

## Transition to rehoming



**Figure 4.** Stress is a factor in the development of disease. A simple screen reduces traffic in front of shelter kennels, which limits barking and excitement.

The point at which an animal is rehomed is also where it will become subject to veterinary care as an individual rather than as part of a herd.

This can be a source of some conflict, when a decision made on a herd level differs from a decision that would have been made for an individual patient. For example, targeting FeLV and FIV testing to at-risk cats is a sensible use of charity funding, but does mean occasionally a cat thought to be at low risk of infection will be found to be positive when tested post-rehoming.

It is essential to be clear on these types of charity policies, and the reasons they exist, when rehoming animals.

Another complexity occurs when a shelter animal has been found to have an infectious disease during its stay. It is essential to provide clear, preferably written, information for the new owner.

Some shelters will provide short-term ongoing veterinary care for animals rehomed with an illness or developing one shortly after rehoming (for example, upper respiratory disease). This can be helpful for inexperienced owners, who may find it daunting to cope with what we would consider minor problems, such as kennel cough.

Data suggests illness shortly after rehoming is associated with an increased risk of re-relinquishment (Wells and Hepper, 1999), and, therefore, maintaining support for a short period may help to prevent animals being returned.



Infections such as *Campylobacter* and *Bordetella* are common and may theoretically pose a zoonotic risk. Advising owners of this risk and providing straightforward advice (such as avoiding letting them lick your face, washing hands after handling and before eating, and being particularly cautious in vulnerable individuals) is good practice.

## Conclusion

Prevention and management of infectious diseases in multi-animal environments is a challenging and multifaceted process. Vet professionals have a unique skill set that can have a significant positive impact in such environments. This may involve adopting changes in practice, such as choices around vaccination and diagnostic testing, when making decisions around the herd rather than the individual.

There is enormous scope for vets to become more involved in herd health planning for companion animals and, thereby, improving the welfare of animals in shelter environments.

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