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Short communication

# Surveillance of upper respiratory tract disease in owned cats in Australia, 2009–2012

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ABSTRACT

Reported cases of feline upper respiratory tract disease (URTD) – presumptively diagnosed as feline herpesvirus (FHV) or feline calicivirus (FCV) – throughout Australia (2010–2012) were obtained from Disease WatchDog, a companion animal disease surveillance system. This surveillance system is based on voluntary reporting of cases by veterinarians, using a web-based program. Animal factors, location and vaccination information are also reported. Cases reported were mapped and seasonal patterns were described. A total of 131 FHV cases and 120 FCV cases were reported. Excluding euthanasia, case fatality rates were 1.12% and 1.28%, respectively. The largest proportion of cases was reported in winter. Young cats (≤2 years), intact cats, unvaccinated cats and (for FHV) male cats appeared to be over-represented in the cases reported. The distributions of cases reported in this surveillance system provide information to aid the diagnosis of infectious feline URTD and to develop client educational programs.



## 1. Introduction

Upper respiratory tract disease (URTD) is commonly reported in cats worldwide. Among the range of pathogens, feline herpesvirus-1 (FHV-1) and feline calicivirus (FCV) are reported to be the most important causative agents (Binns et al., 2000; Zicola et al., 2009), and it has been suggested that these two agents are responsible for almost 90% of infections (Hawkins, 2009).

FHV-1 is mainly isolated from domestic cats and there are no other known hosts other than wild felids (Gaskell et al., 2007). Cats remain latently infected after recovery from initial infection and disease. Virus is shed intermittently in oronasal and conjunctival secretions throughout the life of an infected carrier animal, especially when stressed (Gaskell and Povey, 1977). Due to the relatively short-lived persistence of the virus in the environment, environmental contamination is not considered important for disease transmission, except in catteries (Gaskell et al., 2007). Estimates of the prevalence of FHV range from 1% to around 20%, depending on whether the samples were taken from asymptomatic cats or populations in which clinical disease was present (Binns et al., 2000; Sykes et al., 1999; Harbour et al., 1991; Wardley et al., 1974; Hartmann et al., 2010). Risk factors for FHV-1 isolation include younger cats, intact males, those with recent antibiotic therapy, current respiratory tract disease (Binns et al., 2000), recent contact with cats outside the household and non-purebred (Sykes et al., 1999).

Feline calicivirus (FCV) is highly contagious and is ubiquitous worldwide (Gaskell et al., 2004). FCV (an RNA virus) is shed predominantly in oronasal secretions, and some clinically recovered cats become carriers. Unlike FHV, FCV carriers may shed virus continuously for weeks or even years post infection (Binns et al., 2000; Wardley, 1976). Estimates of FCV prevalence range from 26% to 47%, depending on the population sampled, with higher prevalence associated with cats that live in colonies or shelters

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(Binns et al., 2000; Bannasch and Foley, 2005; Radford et al., 2001). Risk factors for FCV isolation include being a kitten, being immunocompromised, living in colonies or shelters, presence of concurrent respiratory tract disease, recent antibiotic therapy and living in larger cat households (Binns et al., 2000; Bannasch and Foley, 2005; Helps et al., 2005; Coyne et al., 2006).

Cases of feline URTD are commonly caused by either FHV or FCV (Gaskell et al., 2007), which can generally be differentiated on the basis of several characteristic features (Maggs, 2005). As a rule of thumb (Maggs, 2009), clinical signs of sneezing and ocular discharge suggest FHV, whereas oral ulceration and ptyalism suggest FCV.

The aim of this study was to describe the distribution of URTD in Australian cats, using data generated by a passive surveillance system.

## 2. Materials and methods

### 2.1. Data collection

All case data were obtained from Disease WatchDog, a companion animal disease surveillance system launched in January 2010 by Virbac Animal Health, Milperra, Australia. The system captures case data throughout Australia by providing an online platform for registered veterinarians and nurses to log disease cases (Ward and Kelman, 2011). Nearly one third of veterinary clinics nationalwide had joined the program by the end of 2010 (Ward and Kelman, 2011), and it was estimated that around 40% clinic participation had been reached by the end of 2011 (Brady et al., 2012; Ling et al., 2012). Veterinary practitioner involvement is encouraged by free access to real-time disease maps which monitor disease occurrences or outbreaks in their practice areas and resources that can be used as an educational tool for promoting disease prevention to clients. Reporting of cases diagnosed by veterinarians in Disease WatchDog is restricted to veterinarians and the staff they supervise. A detailed description of the Disease WatchDog surveillance system is provided by Ward and Kelman (2011), and case studies on canine parvovirus (Brady et al., 2012; Ling et al., 2012) and tick paralysis (Eppleston et al., 2013) have been published.

This study included all feline herpesvirus (FHV) and feline calicivirus (FCV) cases reported in Disease WatchDog between January 2010 and February 2012. A few cases were reported in the system in 2009. These cases were also included in the database to maximize the number of cases available for statistical analysis.

The Disease WatchDog dataset provides information including clinic name, veterinarian name, patient name, case date, case location (state, suburb and postcode), types of disease, animal species, breed, age (year, month and week), sex (male, female and unknown), reproductive status (neutered and intact), number of litter infected, diagnosis method (clinical presentation, PCR and other), outcome (recovered, treatment ongoing, tested positive but not clinically affected, died or euthanized), vaccination status (vaccinated, unvaccinated and unknown), vaccine type and vaccination date. Most practices report their cases on a monthly basis. If a veterinarian reports that the case recovered, it is very unlikely that such a case would later die from URTD (and if it did, it would be arguable whether the cause could be definitively stated as URTD). No additional information is recorded regarding the reason for death or euthanasia. It is assumed that the reported disease is a contributing factor for death or the decision by the owner to elect euthanasia. Veterinarians reporting cases of disease were instructed to characterize each case as either FHV or FCV, following a table of diagnostic criteria (adapted from Maggs, 2009) made available to veterinary staff logging cases.

### 2.2. Data management

FHV and FCV case data were extracted from Disease WatchDog and managed in Microsoft Excel. Each case record was checked for errors (including spelling mistakes and illogical values), incomplete information or duplicate entries. Records with any errors were removed prior to analysis.

Cases were assigned to season (Summer – December to February; Autumn – March to May; Winter – June to August and Spring – September to November) based on reported case date.

Data for age, breed, sex, reproductive status and vaccination status were recategorized. Age was recategorized as less than or equal to 2 years old, 3–4 years old, 5–6 years old and so on, to older than 19 years of age. Breed was reported as domestic shorthair, domestic medium hair, domestic longhair and specific pedigree breeds. Domestic medium hair was included in the domestic longhair category. Each specific pedigree breed was classified into shorthair or longhair according to The Cat Fancier's Association, the world's largest registry for pedigreed cats (The Cat Fancier's Association, 2012). Since the Bengal breed is not accepted by the CFA, it was classified according to The International Cat Association (2012).

### 2.3. Data analysis

The total number of cases was summed for the following variables: season, gender, reproductive status, age, vaccination history, state of residence and breed, and 95% confidence intervals were calculated assuming a binomial distribution.

Case fatality rate was calculated as the number of cases that died and were euthanized (numerator) as a proportion of the total number of cases reported to have survived, died or been euthanasia (denominator). In order to investigate the role that euthanasia might play in the reported disease cases, case fatality rates were also calculated by excluding cases that were euthanized from both the numerator and denominator (the number of cases that died as a proportion of the number of cases survived and died).

Proportional symbol maps were generated showing the location of reported FHV and FCV cases by joining case reports to a postcode of Australia map in ArcGIS v. 9.3 (ESRI Inc., Redlands, CA).

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