



Community & Hospital Letter

Volume 26, Issue 10 May 2006

Cats and H5N1 Influenza, Is There a Risk?

“*What’s new pussycat!...*” may remind some readers of Tom Jones’ hit song. However, it does illustrate a highly debated epidemiologic issue related to the avian influenza H5N1 epizootic occurring in Asia, Europe, and Africa – namely do cats pose a risk of infection to humans with this strain of influenza.

The World Health Organization (WHO), the World Organization for Animal Health (OIE), and the United Nation’s Food and Agriculture Organization (FAO) all agree that although cats are susceptible to H5N1 virus and that transmission between cats can occur, the epidemiological evidence to date suggests that cats play no discernable role in the transmission of H5N1 influenza virus in the natural setting.

There is no argument that domestic cats in Asia and Europe have contracted H5N1 infections as the result of feeding on infected birds. Therefore, at a minimum, the death of these cats represents collateral damage in avian influenza’s deadly spread. What is debatable is whether the epidemiological data used by WHO, OIE, and FAO are sufficient to support the positions taken by those organizations.

The prevailing thought had been that domestic and wild felines were resistant to disease from influenza A viruses. And, since the H5N1 strain is a type A virus cats should

be resistant to that agent as well. This position was shaken in 2004 when 14 out of 15 household cats in Thailand started vomiting and coughing up blood before dying. The presence of the H5N1 virus in these cats and others in Thailand was confirmed (*Science* 306:241, 2004; *Emerg Infect Dis* 12:681-683, 2006). Experimental studies demonstrated the susceptibility of cats to the virus, the severity of their symptoms, and transmission to other cats (*Am J Pathol* 168:176-183, 2006; *Science* doi:10.1126/science.1125548, 2006). Subsequently, H5N1 infected cats (confirmed or suspected) have been reported from China, Indonesia, Iraq, Germany and Austria. (*Nature* 440:135, 2006 and 440:741-742, 2006; *Eurosurveillance Weekly* 11(4), 2006). In addition, tigers and leopards in Asian zoos have died from H5N1 infection following consumption of infected bird carcasses (*Emerg Infect Dis* 11:699-701, 2005).

Not all naturally infected domestic cats die from H5N1 infection. In Thailand, a serologic survey of 629 village dogs and 111 cats living in proximity to H5N1 outbreaks in poultry found 25% of the dogs and 7% of the cats had antibodies to H5N1, indicating that they were infected with the virus or had been infected in the past (*Nature* 439:773, 2006). These results may suggest differential levels of exposure to the virus or may reflect differential mortality in the two species when infected with the H5N1

Principles of Epidemiology

The Kansas City Health Department is pleased to announce the next session of its popular training course, *Principles of Epidemiology*. This four-day course will held June 26-29, 2006 at the Health Department. The course is free-of-charge to participants. Anyone in the community who feels that this training may be helpful to them may attend, however, class size is restricted to 15 persons on a first come, first serve basis. To register, send an e-mail to gerald_hoff@kcmo.org.

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virus, with fewer cats surviving infection.

Infected cats shed the H5N1 influenza virus in their feces and respiratory secretions and this excretion can start before the development of symptoms. It is not known whether infected cats that do not develop clinical illness can shed the virus. The amount of virus excreted by infected cats is less than that excreted by infected poultry, but apparently is sufficient for horizontal transmission of the virus between cats. Whether these levels are sufficient to infect poultry, humans, or other species is unknown.

Based on what is known and not known about H5N1 influenza virus infection in cats, researchers in the Netherlands proposed that official guidelines for controlling the spread of H5N1 virus include recommendations for cats. The FAO has addressed both cats and dogs in its recommendations, however many other guidelines do not. Recommendations, such as those of the FAO are needed and they may be helpful in preventing the widespread abandonment of pet cats such as occurred in France following

the discovery of H5N1 in that country.

If the risk of transmission of H5N1 influenza virus from cats to humans remains unknown, what is the potential for transmission amongst cats? Again, the answer is unknown. However, in the US, pet cats outnumber pet dogs. There are approximately 60 million pet cats and >25% of households have a cat. Roughly 60% of pet cats are strictly indoor pussycats, while about 40% are allowed to spend part or all of the time outside. In addition to the pet cat population there are free-roaming cats, the number of which is estimated to be between 70-100 million. It is estimated that about 20% of "owned" cats leave home and join the free-roaming cat population. And, surveys have shown that 17-39% of pet cats are recruited from free-roaming cat populations. Thus, the pet-free-roaming cat populations have ample opportunity to mix and exchange pathogens that may represent threats to feline or human health.

When the H5N1 virus becomes epidemic among wild

FAO Recommended Actions

- Report any evidence of significant bird mortality (both wild and domestic) to the local authorities
- Be especially vigilant for any dead or sick cats and report such findings to the local authorities
- Make sure contact between cats and wild birds or poultry (or their feces) is avoided and/or keep cats inside
- Keep stray cats outside the house and avoid contact with them
- If cats show breathing problems or nasal discharge, a veterinarian should be consulted
- Do not touch or handle any sick-looking or dead cat (or other animal) and report to the local authorities
- Wash hand with water and soap frequently and especially after handling animals and cleaning their litter boxes or coming in contact with feces or saliva
- Dogs can be taken outside the premise if kept restrained
- Do not feed any water birds
- Disinfect (eg, with bleach 2-3%) cages or other hardware with which sick animals have been transported or been in contact with
- Wash animal blankets with soap or any other commercial detergent
- Those living on farms should also be aware of the risk that semi-domestic (feral domesticated and farm cats) could shed the virus into poultry feed or housing, leading to exposure of poultry

birds in the US, the virus may be a great incentive for pet owners to make their pets strictly indoor cats (*J Am Vet Med Assoc* 228:1163-1180, 2006). It may also discourage neighborhoods from maintaining quasi-pet cat colonies. These colonies of free-roaming cats develop because 7-22% of households in a neighborhood will feed them without taking individual responsibility for these cats.

Quasi-pet cat populations have engendered considerable debate in many communities and opinions are deeply held by proponents and opponents of cat colonies. On Saturday, April 22, 2006, there was a front page story in the *Kansas City Star* about cat colonies, with emphasis on the community of Riverside. While it is not possible to delineate here all the positions of both sides, the following summarizes key issues.

Proponents believe that free-roaming cat colonies can be appropriately managed through trap-neuter-release programs. It is felt that if properly managed, reproduction within the colony will decrease, and eventually the population will achieve a reasonable balance. Research, however, suggests that this is not the case (*J Am Vet Med Assoc* 227:1775-1781, 2005). Yet, there are some well op-

erated programs that do achieve the objectives (*J Am Vet Med Assoc* 225:1369-1375, 2004).

Opponents point out the significant mortality impact caused by free-roaming cats on wildlife populations (*J Am Vet Med Assoc* 225:1377-1383, 2004). In addition, there are public health risks posed by free-roaming cats, eg bites, rabies, parasite infections, etc. The opponents favor trap and euthanize programs, if suitable placement of the cats is not possible, in order to reduce and/or eradicate the colonies. And, there is the animal welfare argument that indoor cats outlive their free-ranging brethren by a factor of 4-8 times.

Whether one is in favor of or opposed to cat colonies and trap-neuter-release programs, it must be recognized that free-roaming cats kill hundreds of millions of birds, mammals, reptiles, amphibians, and fish each year (*Wildlife Control Technol* Jul/Aug 1995:44). And, when H5N1 virus begins infecting wild bird species in the lower 48 states, some percentage of free-roaming cats will become infected. And, while these cats may never represent a threat to human health they will represent a threat to other cats and possibly other species of animals.

Potpourri

THE AP-LPSOS SURVEY (www.ap-ipsosresults.com) released Friday, April 21, 2006, found widespread belief that birds in the US will become infected with H5N1 influenza virus in the next year, as the government predicted. One-third of respondents worried that someone in their family would get infected with the H5N1. Half of the respondents thought the bird flu would kill them if they contracted the virus. Among the most concerned: women, older people, minorities, poorer people, and the less educated. The survey found respondents wanting a resolute response if Americans do become infected. There were strong majorities in favor of all options presented to contain any outbreak among humans: quarantining those who have been exposed to the H5N1 virus, closing the borders to visitors from countries that have experienced the flu, closing schools, offering experimental vaccines or drugs, and encouraging people to work from home.

CAN A PERSON contract H5N1 virus from eating infected poultry? The official position is no. Yet, like the cat and H5N1 issue discussed above, there is lack of evidence to say that the risk is zero (*Nature* 440:850-851, 2006). Direct evidence of oral infection in humans is lacking, but so too is proof against it. H5N1 virus is present in the meat and eggs of infected birds and oral infection in mammals has been reported for several species, including cats. Also, there is not enough epidemiological evidence to identify the source of infection in all human cases to date, and therefore poor food preparation and cooking of food cannot be excluded as a cause.

And, while there is no evidence to date that H5N1 virus can infect the human gastrointestinal tract, diarrhea and the presence of virus in diarrhea and rectal swabs has been documented for a number of human cases. Yet, the presence of the virus does not necessarily permit the assumption of virus replication in the intestinal tract. How-

ever, a number of the patients with diarrhea lacked respiratory infections.

It is assumed that proper food preparation and cooking would render any risk of H5N1 infection negligible, yet food borne infections remain a significant public health issue (*MMWR* 55:392-39395, 2006). Therefore, the risk of H5N1 virus transmission to humans via infected meat or eggs cannot be totally dismissed.

PIGEONS SHOULD NOT pose a threat to humans or animals when the H5N1 influenza reaches the continental US, according to the US Geological Survey's National Wildlife Health Center (www.nwhc.usgs.gov). Although susceptible to infection with the virus, pigeons must be exposed to very high doses of the virus and then not all birds become infected. Carriage of the virus is brief in pigeons. Experimentally infected pigeons carried the virus about 10 days, but were infectious for only about 2 days. The amount of virus excreted by an infected pigeon is below that necessary to infect a chicken.

There have been no pigeon die-offs in parts of the world experiencing H5N1 outbreaks, although in February a pigeon seller in Iraq died from H5N1 infection and three relatives were hospitalized with similar symptoms. The source of their infections is unknown.

THE AGE-ADJUSTED DEATH RATE in the US declined 3.8% between 2003 and 2004 (832.7 and 801.0 per 100,000 population, respectively) (www.cdc.gov/nchs). Actual deaths declined by almost 50,000 between the two years, the biggest one year drop in several decades. The adjusted death rate declined significantly for males, females, and race/ethnic groups. Whites had the smallest declines while Hispanics had the highest which was approximately 1.9 times higher than that of whites. And, Alzheimer's disease move to 7th place among the leading causes of death, ahead of pneumonia/influenza.

In Kansas City, there was little change in the age adjusted death rates between 2003 and 2004 (901 and 900, respectively). There were 81 fewer actual deaths in 2004

than in 2003, representing a ~2% drop. Since 2000, however, the age-adjusted death rate and the actual number of deaths in Kansas City both declined 7%. Similar to the national data, in 2004, Alzheimer's disease moved to the 7th leading cause of death among Kansas Citians and was the 6th leading cause of death among whites. Prior to 2002, Alzheimer's disease deaths did not make the top 10 leading causes of death in the community.

An analysis of trends in leading causes of death in the US between 1970-2002 was reported last year (*J Am Med Assoc* 294:1255-1259, 2005). Over that time frame, age adjusted death rates for stroke declined 63%, heart disease 52%, and accidents 41%. Death rates for all cancers increased between 1970 and 1990 and then decreased through 2002, for a net decline of 2.7%. In contrast, death rates doubled for chronic obstructive pulmonary disease (COPD) over the entire time interval. The death rate for diabetes increased by 45% starting in 1987.

In Kansas City, in 2004, all cancers were the #2 cause of death, stroke was #3, chronic lower respiratory disease #5, and diabetes #8. While heart disease was the #1 leading cause of death overall, it was the #2 leading cause for persons <85 y old, with all cancers being #1.

BETWEEN 2000-2004, only 2 Kansas City residents died as a result of drowning. Yet, as the swimming pool season approaches, the risk from drowning increases. A study looking at drowning in the US among persons 5-24 y old found that 75% of victims were male, 47% black, 33% white, and 12% Hispanic (*Am J Public Health* 96:728-733, 2006). Blacks were more likely to drown in public pools, whites in residential pools, and Hispanics in neighborhood pools, such as apartment complex pools.

THE KANSAS DEPARTMENT of Agriculture expects the first swarms of so-called "killer bees" to cross into the state from Oklahoma sometime this year (www.ksda.gov). These Africanized honeybees are easily provoked to attack.

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Healthy People, Healthy Communities