Emerging and Infectious Disease Updates and Surveillance

WEST NILE

CDC Articles

Cumulative Incidence of West Nile Virus Infection, Continental United States, 1999–2016

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https://wwwnc.cdc.gov/eid/article/25/2/18-0765_article

Summary:

Using reported case data from ArboNET and previous seroprevalence data stratified by age and sex, we conservatively estimate that ≈7 million persons in the United States have been infected with West Nile virus since its introduction in 1999. Our data support the need for public health interventions and improved surveillance.

West Nile virus (WNV) is a mosquito-transmitted flavivirus with human health implications. Since its emergence in 1999, WNV has become endemic across the continental United States (*1*). Seasonal outbreaks occur annually, and large outbreaks occur throughout the country. Infection is commonly asymptomatic; a general febrile illness occurs in ≈20% of the population, and <1% progress to West Nile neuroinvasive disease (WNND), which might include encephalitis, meningitis, and acute flaccid paralysis.

WNV infection can cause permanent sequelae, including physical, neurologic, and cognitive disabilities as well as renal impairment and ocular damage (*2*). The average annual cost to treat hospitalized WNV patients is ≈US $56 million, and initial and long-term costs can exceed US $700,000 per patient (*3*,*4*). Considering the clinical and economic impact of acute and long-term WNV outcomes, determining total WNV disease burden in the United States is imperative. ArboNET data indicate that ≈40% of WNND cases occurred during 2011–2016, suggesting a need to update the estimated cumulative WNV incidence previously determined by Petersen et al. in 2010 (*5*).

LYME DISEASE

CDC Articles

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Lyme Disease Emergence after Invasion of the Blacklegged Tick, *Ixodes scapularis*, Ontario, Canada, 2010–2016

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https://wwwnc.cdc.gov/eid/article/25/2/18-0771_article

PHLEBOVIRUS in the US (Missouri) TICKBORNE NEW!

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Seroprevalence of Heartland Virus Antibodies in Blood Donors, Northwestern Missouri, USA

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https://wwwnc.cdc.gov/eid/article/25/2/18-1288_article

Summary:

We estimated the seroprevalence of Heartland virus antibodies to be 0.9% (95% CI 0.4%–4.2%) in a convenience sample of blood donors from northwestern Missouri, USA, where human cases and infected ticks have been identified. Although these findings suggest that some past human infections were undetected, the estimated prevalence is low.

In 2012, Heartland virus, a novel virus in the family *Phenuiviridae*, genus *Phlebovirus*, was identified in blood specimens obtained from 2 residents (men) of northwestern Missouri, USA (*1*). Given the clinical manifestations of illness and history of tick bites of the patients, both men were initially believed to have ehrlichiosis but they failed to improve after being given doxycycline.

Before identification of Heartland virus in these 2 patients, to our knowledge, there were no known phleboviruses that caused human disease in the United States (*1*,*2*). Subsequent field work identified *Amblyomma americanum* ticks, which are widely distributed across the eastern and central United States, as the likely vector for the virus (*3*,*4*). Wild animals in Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Maine, Missouri, New Hampshire, North Carolina, Tennessee, Texas, and Vermont have been found to be seropositive for Heartland virus antibodies (*5*). Investigations are underway to identify more disease cases, but little is known about the incidence of Heartland virus infection in humans. The objective of this study was to estimate the seroprevalence of antibodies against Heartland virus in a convenience sample of blood donors who reside in northwestern Missouri where human cases and infected ticks have been identified (*1*,*3*,*6*).

We estimated a prevalence of 0.9% for Heartland virus infection in northwestern Missouri, where the virus is known to have circulated. These results suggest that several infections have gone unidentified because they were asymptomatic or the infected persons did not seek care, were not tested, or were ill before the identification of Heartland virus as a cause of human disease. The finding that most identified infections were in 1 county could be a chance occurrence but also might suggest that the virus is geographically focally distributed.

On the basis of available data for >30 reported cases of Heartland virus disease, healthcare providers should consider testing for patients who have an acute febrile illness and leukopenia or thrombocytopenia not explained by another condition or who were suspected to have another tickborne disease but did not improve after appropriate treatment (e.g., doxycycline) (*6*,*11*). Testing should be limited to patients who resided in or traveled to an area with previous evidence of Heartland virus or had a known tick exposure (*5*,*6*).

Because Heartland virus is transmitted by infected ticks, prevention depends on using insect repellents, wearing long sleeves and pants, avoiding bushy and wooded areas, and performing tick checks after spending time outdoors. The clinical spectrum of Heartland virus disease remains to be described, including determination of whether asymptomatic infections can occur. In addition, research is needed to determine whether there are other modes of transmission for Heartland virus, including bloodborne transmission.

LEISHMANIASIS (Exposure during military service or visitors, from dogs, to Bosnia, Serbia etc)

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Zoonotic Leishmaniasis, Bosnia and Herzegovina

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https://wwwnc.cdc.gov/eid/article/25/2/18-1481_article

Summary:

Leishmania infantum causes potentially life-threatening disease in humans. To determine the extent of the animal reservoir for this pathogen in Bosnia and Herzegovina, we tested dogs and cats. We found that a large proportion of dogs were exposed to or infected with *L. infantum*, indicating endemicity in dogs and zoonotic risk for humans.

Among neglected tropical diseases, visceral leishmaniasis is one of the most deadly parasitic diseases in modern history. Worldwide, it causes an estimated 300,000 new cases and ≈20,000 deaths each year (*1*). Leishmaniasis has been the hallmark of poverty-related diseases and of tropical infections in humans forced to migrate from and to conflict areas (*1*).

Like other countries in the Balkan area, Bosnia and Herzegovina is considered a hotspot for neglected infections of poverty (*2*). The economic, political, and social transformations of this country reflect the armed conflicts of the recent past; 16.9% of the population lives under the national poverty level (*3*). In Bosnia and Herzegovina, leishmaniasis is considered hypoendemic, possibly because of lack of awareness among medical personnel (*4*). Although the first autochthonous cases of leishmaniasis in Bosnia and Herzegovina (in 4 children) occurred in 1949 and 1954 (*5*), during the past 10 years, only 7 patients in the capital city of Sarajevo have been hospitalized for this disease (*4*).

In 2013, 8.2% of the soldiers of the Austrian Armed Forces deployed in peacekeeping missions in Bosnia and Herzegovina were exposed to *Leishmania* spp. (*6*). Despite small increases in reports of *Leishmania infantum* infection in human patients from Bosnia and Herzegovina, little information is available about dogs as reservoirs, the main recognized reservoir of zoonotic infection and the target of integrated control strategies. To determine the role of animals in the spread of leishmaniasis, we assessed their exposure to and infection with *L. infantum*. The study protocol was approved by the Ethical Committee of the Department of Veterinary Medicine of the University of Bari (Prot. UniBa 11/18).

CAMPYLOBACTER

Multidrug-Resistant Campylobacter jejuni Outbreak Linked to Puppy Exposure — United States, 2016–2018

Pet store puppies; 118 people affected in Ohio

ODA Article

https://www.cdc.gov/mmwr/volumes/67/wr/mm6737a3.htm?s_cid=mm6737a3_w

Summary

What is already known about this topic?

Dogs, especially puppies, are a known source of sporadic *Campylobacter* infections in humans, but are uncommonly reported to cause outbreaks.

What is added by this report?

Investigation of a multistate, multidrug-resistant outbreak of *Campylobacter jejuni* infections implicated puppies from breeders and distributors sold through pet stores as the outbreak source. Outbreak strains were resistant to all antibiotics commonly used to treat *Campylobacter* infections.

What are the implications for public health practice?

Consumers, employees, and clinicians should be aware of the risk for disease transmission from puppies, including the possibility of exposure to multidrug-resistant pathogens. Greater adherence to implementation of antibiotic stewardship practices in the commercial dog industry might be needed.

Campylobacter causes an estimated 1.3 million diarrheal illnesses in the United States annually (*1*). In August 2017, the Florida Department of Health notified CDC of six *Campylobacter jejuni* infections linked to company A, a national pet store chain based in Ohio. CDC examined whole-genome sequencing (WGS) data and identified six isolates from company A puppies in Florida that were highly related to an isolate from a company A customer in Ohio. This information prompted a multistate investigation by local and state health and agriculture departments and CDC to identify the outbreak source and prevent additional illness. Health officials from six states visited pet stores to collect puppy fecal samples, antibiotic records, and traceback information. Nationally, 118 persons, including 29 pet store employees, in 18 states were identified with illness onset during January 5, 2016–February 4, 2018. In total, six pet store companies were linked to the outbreak. Outbreak isolates were resistant by antibiotic susceptibility testing to all antibiotics commonly used to treat *Campylobacter* infections, including macrolides and quinolones. Store record reviews revealed that among 149 investigated puppies, 142 (95%) received one or more courses of antibiotics, raising concern that antibiotic use might have led to development of resistance. Public health authorities issued infection prevention recommendations to affected pet stores and recommendations for testing puppies to veterinarians. This outbreak demonstrates that puppies can be a source of multidrug-resistant *Campylobacter* infections in humans, warranting a closer look at antimicrobial use in the commercial dog industry.

RABBIT HEMHORRAGIC DISEASE

ODA : First report of Rabbit Hemorrhagic Disease Type 2 In US found in Ohio

November 07, 2018 | Animal Disease Diagnostic Laboratory

https://agri.ohio.gov/wps/portal/gov/oda/programs/animal-disease-diagnostic-lab/news-and-events/rabbit-hemorrhagic-disease-type-2-found-in-ohio

Summary:

The first report of Rabbit Hemorrhagic Disease (RHD) type 2 in the United States was detected in one of five pet rabbits in Medina County, Ohio this fall. The first announcement of RHD2 was made on September 21, 2018, by Dr. John Clifford, Official Delegate, Chief Trade Advisor, Animal and Plant Health Inspection Service, United States Department of Agriculture to the World Organization of Animal Health (OIE). Formalin-fixed tissue examined by a private pathology laboratory had microscopic changes of severe widespread hepatic necrosis that were consistent with RHD infection. The office of the State Veterinarian was notified of the pathology report, and an investigation identified frozen liver tissue retained by the submitting veterinarian. This tissue was forwarded to the Foreign Animal Disease Diagnostic Laboratory (FADDL) at Plum Island (New York) and was found on 9/20/2018 to be positive for nucleic acid of RHD2 virus and not for that of RHD type 1 virus.

As a follow up, ODA field staff and the ADDL worked closely with Division of Wildlife staff to harvest and test several cottontail rabbits from the area. None of the harvested rabbits had gross or microscopic lesions of RHD infection, however tissues from those rabbits were submitted to FADDL for testing. None of the six wild cottontails were found to have RHD2 nucleic acid or antigen in liver tissue, The last surviving pet rabbit at the index case premise was also negative for evidence of RHD infection. It is unknown how this virus gained entry to the barn where the affected pet rabbits were kept. Investigations of more than a dozen other rabbits from around Ohio that died acutely have not detected any additional cases of this highly infectious and contagious calicivirus. The virus may be transmitted orally by secretions and excretions including oral, nasal and pharyngeal secretions, urine and feces; transmission by insects is considered significant in the transmission among wild rabbits. The incubation period may be as short as 1-3 days, with death usually occurring within 12-36 hours after onset of a fever.

Rabbit owners are encouraged to use the highest levels of biosecurity possible to avoid entry of this virus (and other pathogens) into their rabbitries. No vaccine against RHD is currently available in the USA. Veterinarians are encouraged to contact the ODA (614-728-6220) to report outbreaks of acute deaths in rabbits with high mortality rates while additional information is learned about the status of RHD virus in Ohio.

Dr. Jeff Hayes, MS, DVM, ADDL Pathology Section Head

CANINE INFLUENZA

ODA Article: Canine influenza
February 13, 2018 | Animal Disease Diagnostic Laboratory

This is now considered a **dog**-specific, or **canine**, H3N8 virus. … **Canine influenza** H3N2 viruses originated in birds, spread to dogs, and **can** now spread between dogs. Transmission of H3N2 **canine influenza** viruses to cats from infected dogs has been reported also.

From OSU: While we have no confirmed cases of canine influenza virus (CIV) at the Ohio State University Veterinary Medical Center, the following provides an overview of symptoms to watch for, what to do if your dog is showing signs, and preventive measures.

Symptoms of Canine Influenza Virus (CIV)
There are two strains of the virus, H3N8 and H3N2. Symptoms resemble those of "kennel cough."
Watch for coughing, nasal and eye discharge, sneezing and fever (104-105^{o}F).
Other more serious symptoms include lethargy, or not drinking or eating.
CIV is also highly contagious. Some infected dogs show no signs of illness but are still contagious to other dogs.

The following information is provided by the American Veterinary Medical Association.

Summary

Causative agent

Canine influenza (CI), or dog flu, is a highly contagious viral infection affecting dogs and also cats. Influenza viruses belong to the family Orthomyxoviridae. Canine influenza is a Type A influenza virus and is further identified based on the composition of two specific proteins in the lipid outer layer of the capsid: hemagglutinin (HA) and neuraminidase (NA). At present, two strains of canine influenza virus have been identified in the United States: H3N8 and H3N2.

Influenza viruses are able to quickly change and give rise to new strains that can infect different species. Both strains of canine influenza identified in the U.S. can be traced to influenza strains known to infect species other than dogs. At some point, these viruses acquired the ability to infect dogs and be transmitted from dog to dog.

Canine H3N8 influenza was first identified in Florida in 2004 in racing greyhounds. It is thought this strain developed from

an equine H3N8 influenza strain that jumped from horses to dogs. Since being detected in 2004, canine H3N8 influenza has been identified in dogs in most U.S. states and the District of Columbia.

Canine H3N2 influenza was first identified in the United States in March 2015 following an outbreak of respiratory illness in dogs in the Chicago area. Prior to this, reports of canine H3N2 influenza virus were restricted to South Korea, China and Thailand. It was initially identified in dogs in Asia in 2006-2007 and likely arose through the direct transfer of an avian influenza virus – possibly from among viruses circulating in live bird markets – to dogs.

Following the initial diagnosis in Chicago, additional cases of canine H3N2 influenza were reported in a number of states. In early 2016, a group of shelter cats in Indiana were diagnosed with H3N2 canine influenza. It is believed the virus was transmitted to them from infected dogs.

In May 2017, canine H3N2 influenza was diagnosed in dogs in Florida, Georgia, North Carolina, South Carolina, Texas, Kentucky, Tennessee, Missouri, Louisiana, and Illinois. This was the same strain of H3N2 involved in the 2015 outbreak in Chicago.

There is no evidence that either strain of canine influenza (H3N8 or H3N2) can infect humans.

No current evidence that wild canids have been infected, though transmission in urban populations is certainly a risk!:

J Wildl Dis. 2018 Aug 10. doi: 10.7589/2018-03-078. [Epub ahead of print]

Serosurvey for Influenza Virus Subtypes H3N8 and H3N2 Antibodies in Free-Ranging Canids in Pennsylvania, USA.

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Author information

Abstract

Canine influenza virus (CIV) subtypes H3N8 and H3N2 are endemic among domestic dog (XXXX XXXXX) populations in the northeastern US. Infection of free-ranging carnivores with influenza virus has been sporadically reported. Generalist mesocarnivores that exploit anthropogenic, peri-urban habitats share a wide interface with domestic dogs that allows for the transmission of infectious disease. To investigate the potential exposure of free-ranging canids to CIV in Pennsylvania, US, serum samples were obtained from freshly killed coyotes (Canis latrans, n=67), grey foxes (Urocyon cinereoargenteus, n=8), and red foxes (Vulpes vulpes, n=5) from 24 counties. Animals were harvested during the January-February 2017 hunting season. We failed to detect antibodies to CIV subtypes H3N2 and H3N8 by using hemagglutination inhibition assays validated for domestic dogs. Results suggest CIV was not endemic in free-ranging canid populations in Pennsylvania or that prevalence was too low to be detected by our limited sample size.

KEYWORDS:

Canine influenza virus; Canis latrans; Urocyon cinereoargenteus; Vulpes vulpes; coyote; fox; hemagglutination inhibition

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AVIAN INFLUENZA

ODA:

HPAI continues to be a concern throughout the US. We are providing the following guidelines on submitting samples to the Ohio ADDL for Avian Influenza testing.

Please fill out the F-ADDL-ADM-251 form for suspect cases or if there is an outbreak, the HPAI Submission Form, F-ADDL-ADM-1097 completely. The following information is required:

- Owner/Premise name
- Premise ID and/or animal location (county level data - very important)
- Collection date
- Production type (backyard, commercial, etc.)
- Species
- Sample type