



Zoonoses Associated with White-tailed Deer in Maryland

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May 11, 2023

Agenda

- Introductions
- Diseases transmitted by the blacklegged tick
- Other diseases associated with deer in Maryland
- Key takeaways



Introductions

Katherine Feldman, DVM, MPH

- Chief Public Health Scientist
- Office of the Deputy Secretary for Public Health Services
- (former State Public Health Veterinarian)



David Crum, DVM, MPH

- State Public Health Veterinarian
- Center for Zoonotic and Vector-borne Diseases



Center for Zoonotic and Vector-borne Diseases

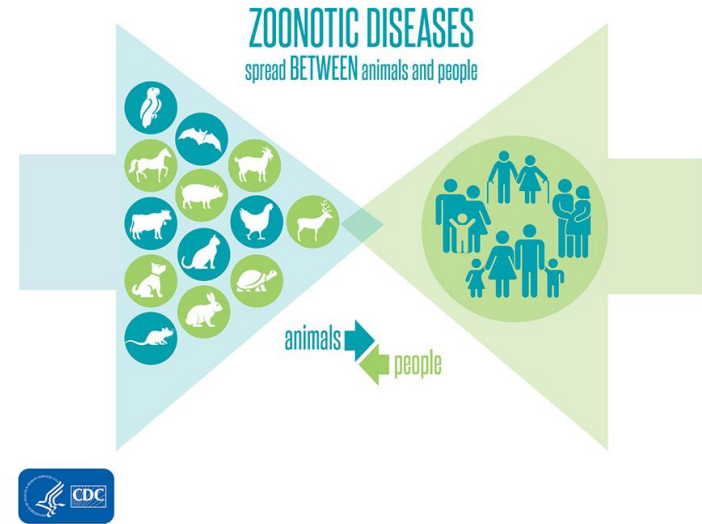
Mission

- To reduce the incidence and associated impact of rabies and other zoonotic and vector-borne diseases in Maryland



What is Zoonotic Disease?

- Infections that spread between people and animals
 - 6 out of every 10 known infectious diseases
 - 3 out of every 4 new or emerging diseases



What is a State Public Health Veterinarian?

- >40 states have a State Public Health Veterinarian at the health department
- Responsible for disease in humans that involves animals in its life cycle
- NOT responsible for animal health
 - State Veterinarian at MD Department of Agriculture
 - State Wildlife Veterinarian at MD Department of Natural Resources

What is One Health?

One Health is the idea that the health of people is connected to the health of animals and our shared environment.

When we protect **one**,
we help protect **all**.



www.cdc.gov/onehealth

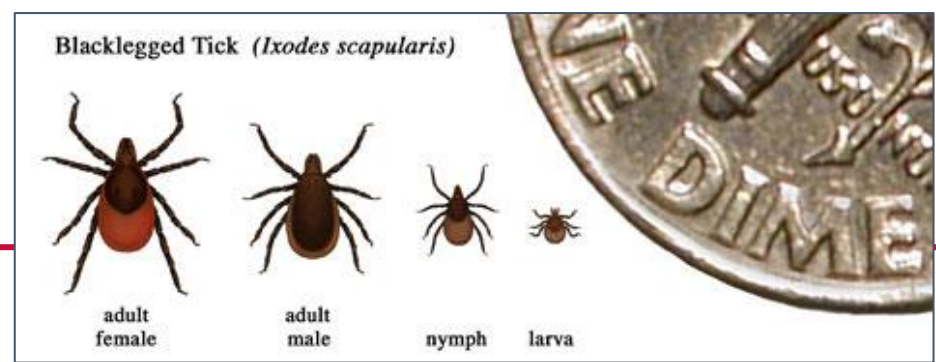


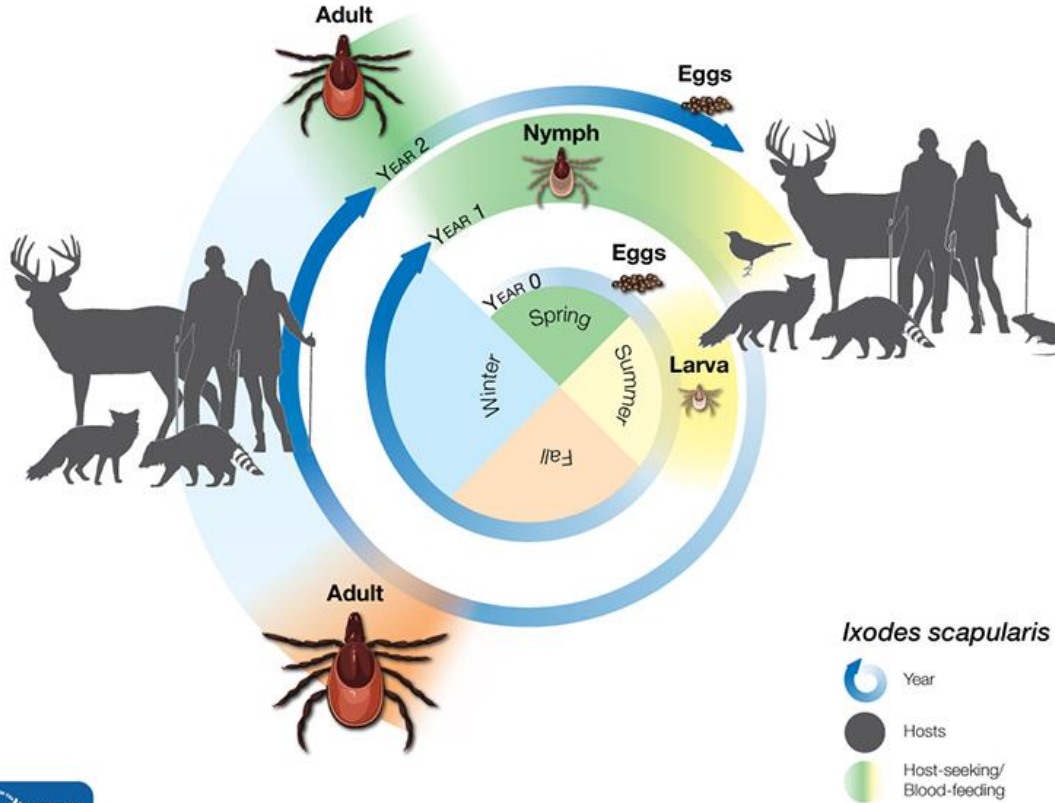
03/19/2014



Blacklegged Tick

- Deer tick, *Ixodes scapularis*
- Widely distributed across the eastern United States.
- Transmits *Borrelia burgdorferi* (Lyme disease), *Anaplasma phagocytophilum* (anaplasmosis), *Babesia microti* (babesiosis)
- Greatest risk of being bitten exists in the spring, summer, and fall
- All life stages bite humans, but nymphs and adult females are most commonly found on people





- Blacklegged ticks have a 2-to-3-year life cycle
- Deer are important sources of blood for ticks and are important to tick survival and movement to new areas



Lyme Disease

- *Borrelia burgdorferi* causes human infection in the United States
- Spread primarily by an infected blacklegged tick (*Ixodes scapularis*)
- Deer are **not** infected with Lyme disease bacteria and **do not infect ticks**



"Classic" erythema migrans rash

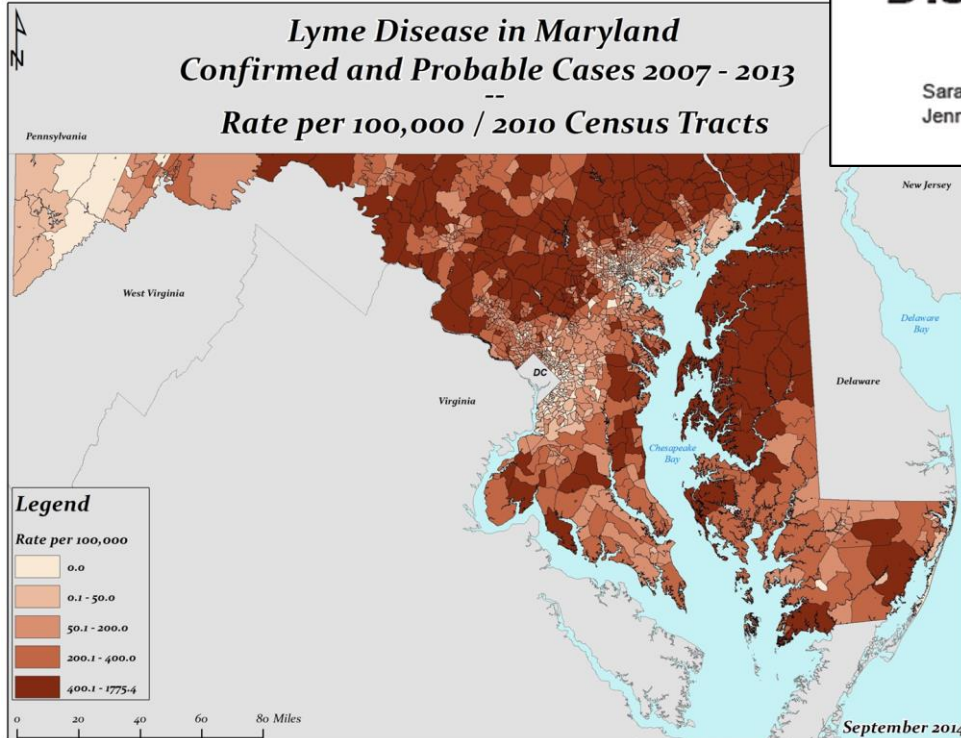


Facial palsy



Swollen knee

Lyme Disease



RESEARCH

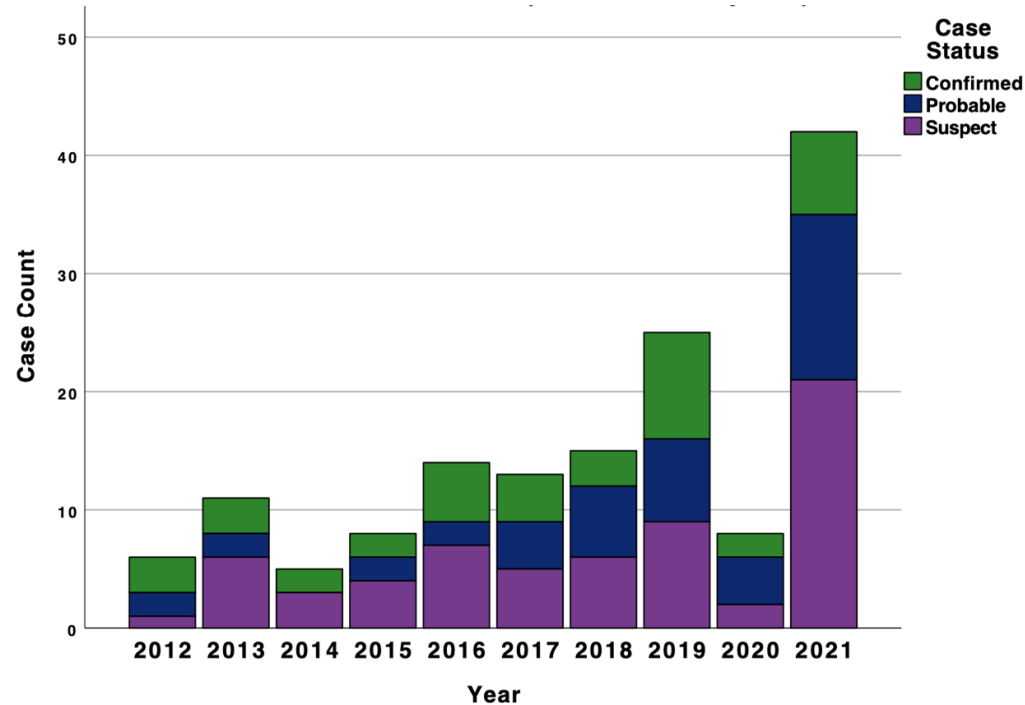
Economic Burden of Reported Lyme Disease in High-Incidence Areas, United States, 2014–2016

Sarah A. Hook, Seonghye Jeon, Sara A. Niesobecki, AmberJean P. Hansen, James I. Meek, Jenna K.H. Bjork, Franny M. Dorr, Heather J. Rutz, Katherine A. Feldman, Jennifer L. White, P. Bryon Backenson, Manjunath B. Shankar, Martin I. Meltzer, Alison F. Hinckley

- ≈476,000 Lyme disease cases/year in US
- Mean patient cost ≈\$1,200 (med \$240)
- Mean societal cost ≈\$2,000 (med \$700)
- Annual, aggregate cost of Lyme disease could be \$345–968 million (2016 US dollars) to US society
- Findings underscore importance of effective prevention and early diagnosis

Anaplasmosis

- Caused by bacterium, *Anaplasma phagocytophilum*
- Case-fatality rate among patients who seek care for the illness is <1%,
- Predictors of a more severe course include:
 - Advanced age
 - Immunosuppression
 - Concurrent medical conditions
 - Delay in diagnosis and treatment



Babesiosis

- Babesiosis is caused by the microscopic parasite, *Babesia microti*, that infects red blood cells
 - Concern about transmission in the blood supply
- Many people who are infected with *Babesia microti* feel fine and do not have any symptoms. Some people develop nonspecific flu-like symptoms, such as fever, chills, sweats, headache, body aches, loss of appetite, nausea, or fatigue

Babesiosis can be a severe, life-threatening disease, particularly in people who

- Do not have a spleen;
- Have a weak immune system for other reasons (such as cancer, lymphoma, or AIDS);
- Have other serious health conditions (such as liver or kidney disease); or
- Are elderly



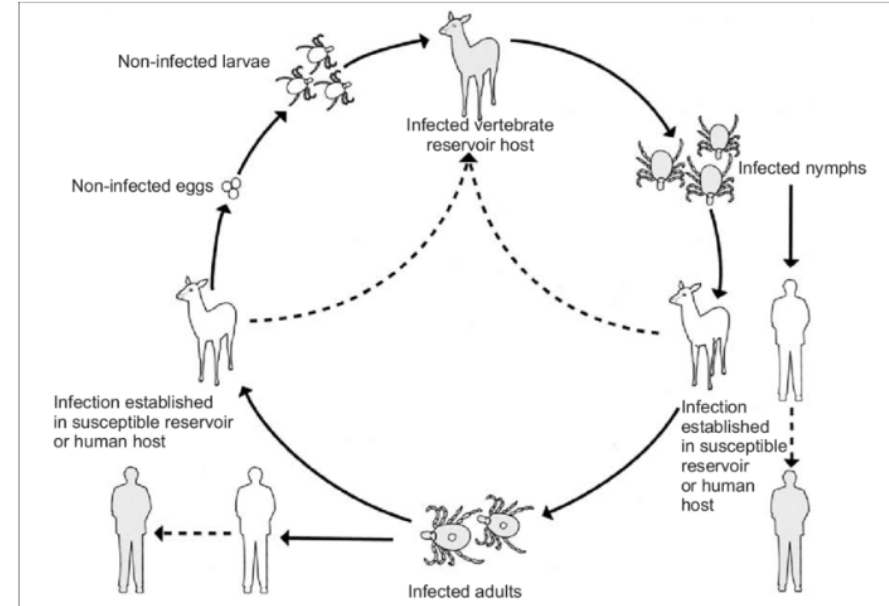
Ehrlichiosis



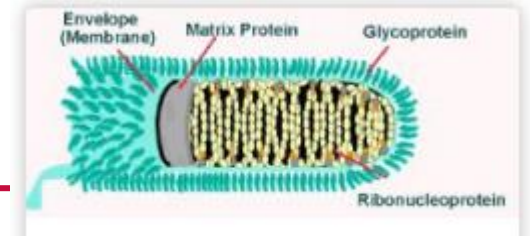
- Transmitted by the bite of an infected lone star tick (*Amblyomma americanum*)
- Nonspecific flu-like symptoms, such as fever, chills, sweats, headache, body aches, loss of appetite, nausea, or fatigue. (Rash in children)
- If antibiotic treatment is delayed, ehrlichiosis can sometimes cause severe illness
 - Damage to the brain or nervous system
 - Respiratory failure
 - Uncontrolled bleeding
 - Organ failure and death

Ehrlichia Transmission Cycle

- Larval lone star ticks become infected after feeding on infected vertebrate reservoir host (e.g. white-tailed deer)
- Infected nymphs and adults may transmit ehrlichiosis to other reservoir hosts or to humans
- Deer are important sources of blood for ticks and are important to tick survival and movement to new areas
- Deer can be infected with *Ehrlichia* and **serve as a reservoir host**



Rabies



- An acute progressive viral encephalitis
- The virus circulates among domestic, feral, and wild mammals
 - All mammals are susceptible, including deer
- Transmitted to humans via infected saliva from bites, scratches or mucous membrane exposure
- 100% fatal after symptoms develop
- 100% preventable if exposures are identified and preventive therapy is administered according to guidelines

Rabies

- Rabies is rare in white-tailed deer
 - 4 rabid deer in Maryland since 2012
- Human exposures to deer are not rare
 - Good samaritans / “Adoption” of fawns
 - Vehicular trauma
- To date
 - No human case of rabies associated with deer
 - But PEP not infrequently administered for exposures



Other Infectious Diseases that Could Potentially Affect Maryland Residents

SARS-CoV-2 Virus

- Currently no evidence that animals, including deer, play a significant role in spreading the virus to humans

Chronic Wasting Disease (CWD)

- To date, there have been no reported cases of CWD infection in people and no strong evidence for the occurrence of CWD in people

Tuberculosis and Brucellosis

- Due to a federal eradication program for *Mycobacterium bovis* (bovine tuberculosis), *Brucella abortus*, and *Brucella suis* in cattle and captive deer, these diseases are uncommon in the United States

Maryland One Health Bulletin

- Joint communication mechanism from the three agencies that can be used for vets and targeted communications
- Intended to provide reports of zoonotic and other animal diseases of concern in Maryland



ZOONOTIC AND OTHER ANIMAL DISEASES OF CONCERN IN MARYLAND

For questions regarding specific disease events, please contact the lead agency noted. This contact information is for use by Maryland veterinarians and health professionals:

MDA - Maryland Department of Agriculture: ahops.mda@maryland.gov, 410-841-5810

MDH - Maryland Department of Health, Center for Zoonotic and Vector-borne Diseases: mdh.czvbd@maryland.gov, 410-767-5649

MD DNR - Maryland Department of Natural Resources, Fish & Wildlife Health Program, 877-463-6497

The Maryland Department of Natural Resources (MD DNR) receives reports of wildlife disease cases via the 24/7 toll-free MD Natural Resources Police Call Center:

1-800-628-9944, the USDA/MD DNR Call Center: 1-877-463-6497, or the MD DNR Wildlife & Heritage Service office in Annapolis 1-410-260-8540.

*****IMPORTANT UPDATE***** Maryland Request for Rabies Vaccination Delay

Starting June 1st, 2023, all requests for rabies vaccination delay must be submitted electronically via the online form available at: <https://www.cognitofirms.com/MDH3/MarylandRequestForRabiesVaccinationDelay>.

After June 1st, 2023, Maryland Rabies Vaccination Delay Request submissions received via fax, mail, or email will no longer be reviewed. If you have any questions regarding this notice, please call the Maryland Department of Health Center for Zoonotic and Vector-borne Diseases at 410 767-5649.

HIGH PATH AVIAN INFLUENZA UPDATES

Human Cases U.S. vs Worldwide

Since 2022, despite the wide geographic spread of highly pathogenic avian influenza (HPAI) A(H5N1) viruses in wild birds and poultry worldwide, with sporadic spillover to mammals, only a small number of sporadic human cases of A(H5N1) have been identified. All reported human cases since 2022 were associated with recent poultry exposures, and no cases of human-to-human transmission have been identified. Currently, HPAI A(H5N1) viruses are believed to pose a low risk to the health of the public in the United States; however, people who have job-related or recreational exposures to infected birds may be at higher risk of infection and should take appropriate precautions outlined in CDC guidance. For more information, visit <https://www.cdc.gov/flu/avianflu/spotlights/2022-2023/h5n1-technical-report.htm>.

Worldwide: While HPAI A(H5N1) viruses are currently circulating widely in wild birds and poultry in many geographic regions, relatively few human cases of A(H5N1) have been reported in recent years. Between January 2022 and February 2023, ten sporadic human cases of A(H5N1) were reported from seven countries. All reported human cases had recent exposure to sick or dead poultry, and no cases of human-to-human HPAI A(H5N1) virus transmission were identified. Five cases (3 children, 2 adults) had severe disease, and 2 died. Seven cases were associated with clade 2.3.4.4b HPAI A(H5N1) viruses, and two cases were associated with clade 2.3.2.1c HPAI A(H5N1) viruses.

To report cases of disease in:	Contact:
Domestic animals	MDA Animal Health Program Office 410-841-5810 http://mda.maryland.gov/animalHealth/Pages/Diseases.aspx
Humans	MDH Center for Zoonotic and Vector-borne Diseases 410-767-5649 https://phpa.health.maryland.gov/OID/OR/CZVBD/pages/Home.aspx
Wildlife	MD DNR/USDA Call Center 877-463-6497 https://dnr.maryland.gov/wildlife/Pages/default.aspx

Key Takeaways

- Considerable amount of Lyme disease and other diseases associated with deer in Maryland, regardless of exact numbers
- High aggregated costs to patients and to society
- Public health plays key role
 - Surveillance for existing and emerging diseases
 - Education for prevention and early recognition of disease
- MDH looks forward to ongoing collaboration with sister agencies to best serve Maryland residents

