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DIVISION OF ENVIRONMENTAL EPIDEMIOLOGY

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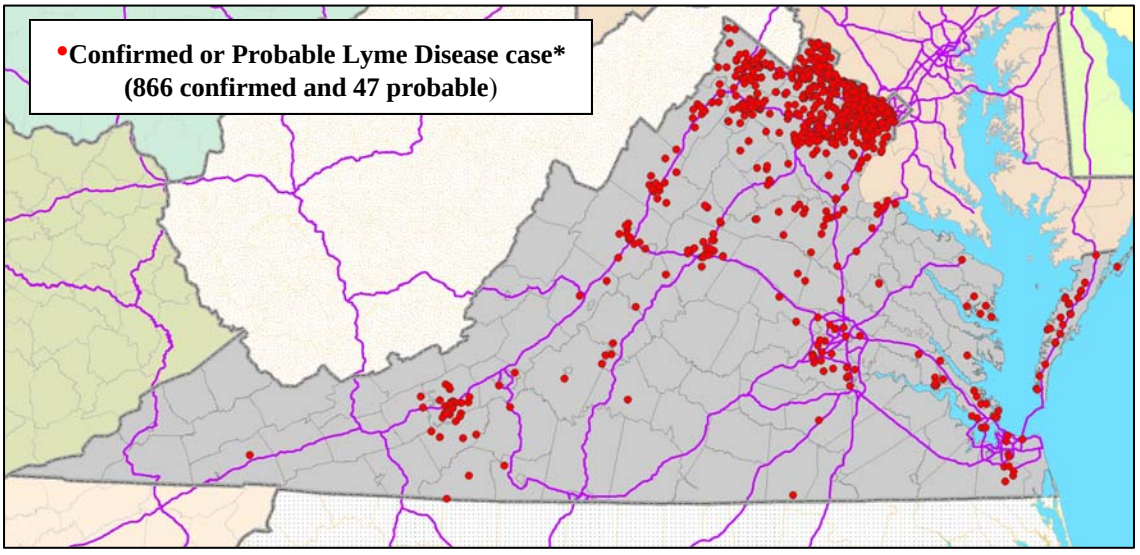
Incidence of Lyme Disease in Virginia and the Diagnostic Evidence Needed for Disease Reporting

by David Gaines Ph.D and Jennifer Halpaus

Human Lyme disease activity in Virginia has increased substantially over the past few years, going from 357 recorded cases in 2006, to 959 cases in 2007. Currently, Virginia's case count for 2008 stands at 933 cases.

Lyme disease activity has been recorded on the Eastern Shore of Virginia since the early 1990s, but the majority of recent Lyme disease activity is being seen in the counties of northern Virginia. Lyme disease activity has also appeared around the more heavily developed cities and towns of the Shenandoah Valley, along the eastern and western side of the Blue Ridge Mountains as far southwest as Martinsville and Christiansburg, along the I-95 corridor to the Richmond City Area, and down the I-64 corridor to the Hampton Roads region (see Figure 1, below). Many Lyme disease patients reside in places where new suburban developments have carved into what was once forest or farmland, possibly facilitating increased local deer and tick populations and human exposures to ticks.

Figure 1: Geographic distribution of the 933 human Lyme disease cases counted* in Virginia in 2008.



*Dots on map are approximate locations for the Lyme disease patient's address, or town of residence.

The number of Lyme disease cases counted each year in Virginia may be an underestimate of the total cases seen by health care providers in the state. Reporting may be affected by many factors including: (1) healthcare provider awareness of the requirement

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to report cases and need to include details on symptoms, onset date and laboratory results; (2) local health department resources available to follow up on and obtain needed details to confirm reported cases and (3) the diagnostic criteria that must be met before a reported Lyme disease case can be counted.

All states that count and report Lyme disease cases currently use the 2008 Surveillance Case Definition for Lyme Disease (prior to 2008, they used the 1996 Case Definition). Surveillance case definitions are established by the Council of State and Territorial Epidemiologists (CSTE) and the Centers for Disease Control and Prevention (CDC) to provide criteria for consistent reporting across all states. These criteria are meant to be used for disease surveillance and are not necessarily the same as those used for clinical diagnosis by a physician.

State reportable disease statistics count both confirmed and probable cases of Lyme disease. Confirmed cases are those that have clinically compatible symptoms (such as an erythema migrans [EM] rash) in conjunction with a known exposure to tick habitat in a Lyme endemic county, or clinically compatible symptoms with laboratory evidence of infection (clinically compatible symptoms are listed in the case definition). Probable cases are any physician diagnosed cases of Lyme disease that has laboratory evidence of infection.

It has been long recognized that the ELISA (EIA) serology for Lyme disease can yield false positives in some patients, so the 1996 case definition only accepted positive results from western immunoblot (WB) serology. More recently it was recognized that WB serology IgM results for Lyme disease also yield false positive test results, so the 2008 Lyme disease case definition states that certain Lyme disease cases must have positive results from a two-tiered serology. In a two-tiered test, the serum sample must have positive or equivocal results by Lyme EIA, as well as WB positive IgM results to eliminate the probability of a false positive. For example:

1. For a patient to meet the serological evidence for early stages of Lyme disease, the patient must be:
   a. An EIA positive or equivocal for Lyme disease, and
   b. A WB positive IgM with the serum sample having been drawn ≤30 days after onset of symptoms. (a serum sample drawn more than 30 days after onset of symptoms must be WB positive for IgG to qualify as laboratory evidence of infection).

2. For a patient to meet the serological evidence for later stages of Lyme disease, he/she need only be WB positive for IgG, (positive EIA results and/or WB positive IgM results are not needed, for the diagnostic criteria to be met).

The case definition requirements for counting Lyme disease cases may not be known to, or understood by some of the health care providers who would report Lyme disease cases to local health departments. Additionally, whether a case is counted may also depend on the completeness of the information included in the report, or the local health department's resources available to contact a provider to obtain complete patient data. Therefore, improved knowledge of the current Lyme disease case definition among health care providers may facilitate the counting of more reported Lyme disease cases in state statistics.

For more information about the clinical or laboratory diagnostic criteria required by the 2008 Lyme Disease Surveillance Case Definition, go to: http://www.cdc.gov/ncphi/disss/nndss/print/lyme_disease_2008.htm

The Risk of Chicks

By Cate McManus VMD, MPH, DACVPM

What is hot pink and might be shedding *Salmonella*?

If your answer is a dyed chick, you are correct. You may be able to purchase a live chick dyed green, blue, or hot pink, but you cannot purchase one that is guaranteed to be *Salmonella* free. *Salmonella* is normal flora in these animals; therefore, it is not unusual for chicks to shed *Salmonella*, especially when they are stressed by handling and transport.

According to the Centers for Disease Control and Prevention, "each spring some children become infected with *Salmonella* after receiving a baby chick or duckling for Easter"[1]. Young children are more likely to become ill after handling a chick, because they have developing immune systems and the habit of placing their unwashed hands into their mouths. While anyone should practice good hand hygiene after handling a chick, this is especially important for children and people who are immunocompromised.

Salmonella is typically considered a foodborne disease; however direct contact with animals (e.g., reptiles or birds) can also be a source of infection. People who are sick with salmonellosis typically present with diarrhea, fever, cramps and vomiting[2]. *Salmonella* must be isolated from a specimen to be considered a confirmed case[3]. Salmonellosis in humans and various species of animals is reportable in Virginia.

Uncomplicated cases may require rehydration and electrolyte replacement. Infants up to two months of age, immunocompromised persons and patients with persistent high fevers or manifesting extraintestinal infections should receive appropriate antibiotic therapy[4].

Symptomatic persons should not handle food or perform patient care. If a case is sporadic, a food handler or care provider may return to work after the diarrheal illness has subsided if his hygiene has been evaluated as being adequate. In some situations, like an outbreak, a food handler or care provider may need to culture negative before they are allowed to return to work. To culture negative, two stool samples that have been collected 24 hours apart must test negative[4].

When working with a patient with salmonellosis, be sure to follow universal and enteric precautions. **Caregivers should**:

-Wash their hands after touching blood, body fluids, secretions, excretions and contaminated items, immediately after removing gloves, and between patients.

-Wear gloves when they expect to have contact with blood, body fluids, secretions and contaminated items.

-Handle soiled linens in a manner that minimizes contact with them. When changing soiled bed linen, loosen the edges and roll the sheets toward the center of the bed. Do not shake or flap the sheets. The linens should be bagged or put into carts immediately. They should not be sorted or pre-rinsed in patient-care areas. The temperature of the wash water and the contact time may depend upon the chemicals being used.

At this time, the federal government has no restrictions associated with the sale of chicks. In Virginia, it is legal to sell chicks; however there are some restrictions. The Code of Virginia states that "no person shall sell, raffle, give away, or offer for sale as pets or novelties, or offer or give as a prize, premium, or advertising device any living chicks, duck-

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lings, or other fowl under two months old in quantities of less than six"(3.2-6510).

If chicks are purchased, children less than 5 years of age SHOULD NOT handle them. Anyone who does contact the chicks or their droppings should thoroughly wash his hands with soap and water. People should avoid eating or drinking around the chicks, and the chicks' food and water dishes should be washed outdoors.

1. www.cdc.gov/HEALTHYPETS/diseases/salmonellosis.htm
2. www.vdh.state.va.us/Epidemiology/factsheets/Salmonellosis.htm
3. www.cdc.gov/ncphi/disss/nndss/casedef/salmonellosis_current.htm
4. Heymann, DL. Control of Communicable Diseases Manual. 19th Ed. Washington, DC: American Public Health Association, 2008.

This fish has a foot fetish!

By Cate McManus, VMD, MPH, DACVPM

In 2008, "fish pedicures" became available in the Commonwealth. These "pedicures" are performed using a couple of dozen small fish, *Garra rufa*, which are used to "nibble" the dead skin off of your feet to smooth the skin and remove calluses[1].

To date, no studies have been performed to determine if these fish are able to transfer human diseases. While no adverse events have been reported as a result of receiving a "fish pedicure", this does not mean it is necessarily a benign procedure. It is important to remember that both contact with fish and pedicures can result in illness.

Freshwater fish and their aquatic environments can harbor zoonotic agents such as *Mycobacterium* spp., *Aerosomas* spp., *Streptococcus iniae,* and several genera of bacteria in the Enterobacteriaceae family[2]. Infected fish may appear ill and die, or they may look healthy and act as unaffected carriers. People that are exposed to these pathogens may develop skin lesions and/or gastroenteritis. The typical route of exposure is direct contact. These pathogens will enter open wounds and abraded skin. Immunocompromised people seem to be more susceptible to these pathogens, and are predisposed to systemic infections.

Improperly disinfected pedicure instruments have the potential to transmit bloodborne pathogens, while improperly cleaned footbaths may be a source for various *Mycobacterial* infections. Lower limb mycobacterial infections that resulted from exposures to contaminated footbaths have documented in multiple journal articles[3,4,5]. As a result, it is recommended that clinicians ask about a patient's pedicure history when they are presented with nonhealing lower limb furunculosis and abscesses.

1. http://www.yvonnesalon.com/

2. Lowry, T. and Smith, S.A. Aquatic zoonoses associated with food, bait, ornamental, and tropical fish. *J of the Am Vet Med Asso* 2007; 231(6):876-880.

3. Winthrop, K.L. et al. An outbreak of mycobacterial furnunculosis associated with foothbaths at a nail salon. *N Engl J Med* 2002; 346(18):1366-1371.

4. Sniezek, P.J. et al. Rapidly growing mycobacterial infections after pedicure. *Arch Dermatol* 2003; 139(5): 629-634.

5. Redbord, K.P. et al. Atypical mycobacterium furunculosis occurring after pedicures. *J Am Acad Dermatol* 2006; 54(3):520-524.

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