

Lyme Disease: Symptoms, Diagnosis, & Treatment

Shelby Brown & Megan Kerr

Tracy Curtis, Lyme Disease Research Lab

INTRODUCTION

- Lyme Disease is caused by *Borrelia burgdorferi*
- Transmitted to human through the bite of an infected tick
 - need to be attached 36-48 hours before they can transmit Lyme Disease bacteria
- First recognized in the United States in 1975 after unusual outbreak of arthritis near Lyme, Connecticut
- 30,000 cases of Lyme Disease are reported each year

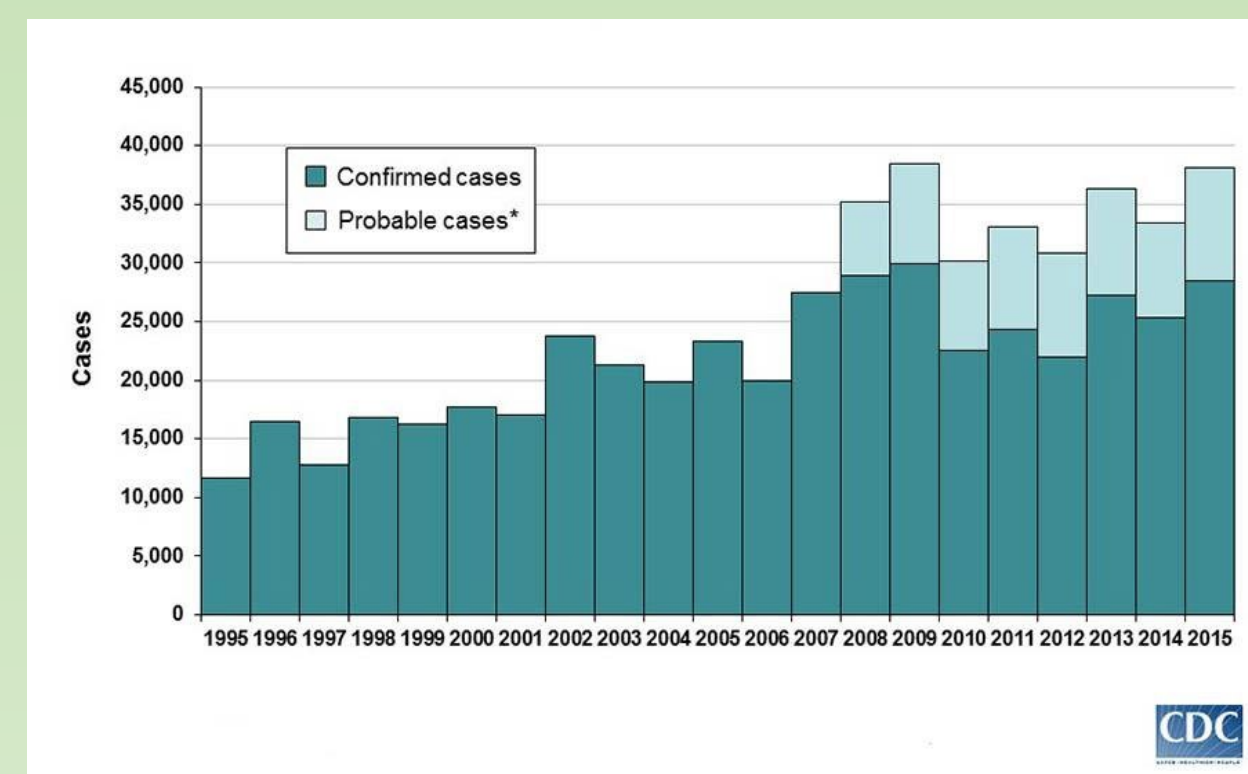


Figure 1 shows the reported confirmed and probable cases of Lyme Disease between 1995-2015 (https://www.cdc.gov/lyme/images/confirmedprobablegraph1995_2015.jpg)

SYMPTOMS

Early Symptoms (3-30 days after tick bite):

- Fever/Chills
- Muscle aches
- Fatigue
- Nausea
- Joint pain
- Rash - not necessarily Bull's eye
 - Erythema migrans (Bull's eye rash) occurs in 70-80% of cases

Late Symptoms (days to months after tick bite):

- Severe headache & neck stiffness
- Arthritis with severe joint pain (e.g. knees)
- Facial palsy - loss of muscle function
- Lyme Carditis: heart palpitations/irregular heart beat
- Dizziness
- Shortness of breath
- Shooting pain, numbness, or tingling in hands/feet
- Problems with short-term memory

★The absence of the Bull's eye rash does not mean the person is not affected with Lyme Disease if they are experiencing the above symptoms

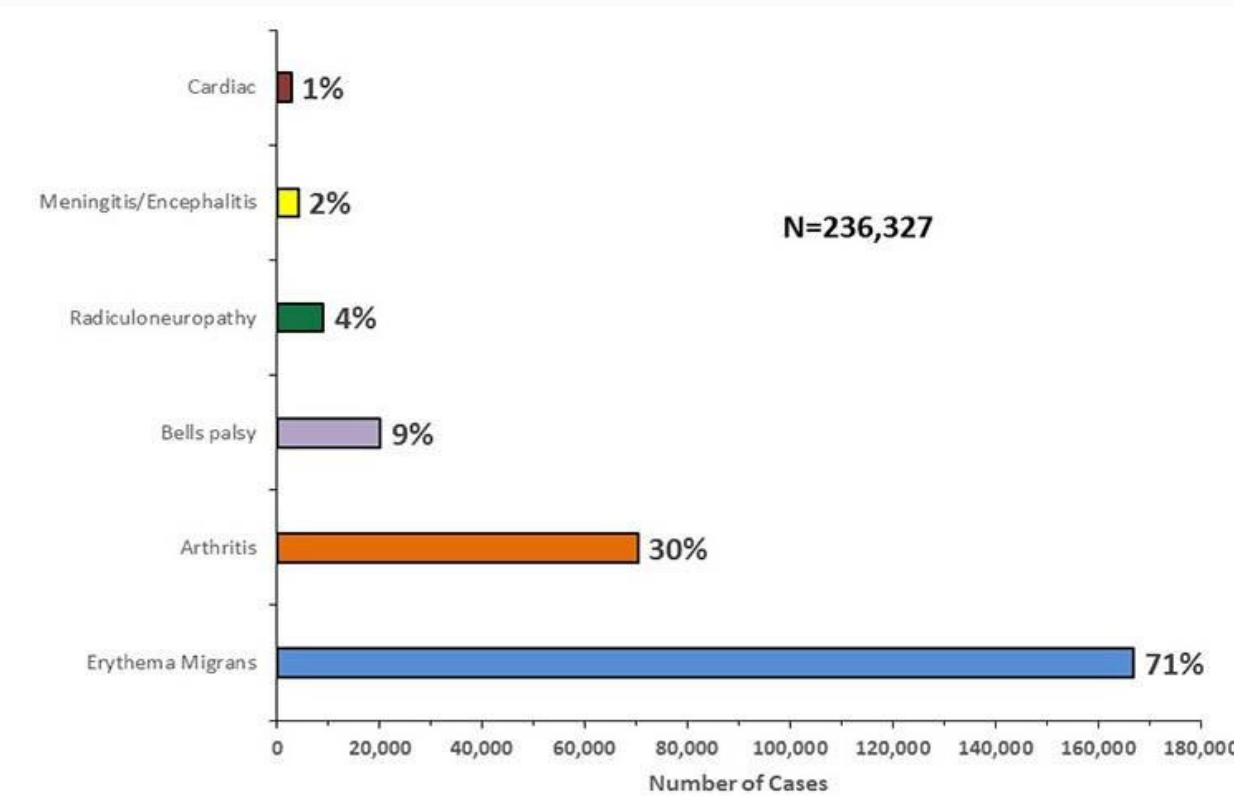


Figure 2 shows the Lyme Disease manifestation by symptom between 2001-2015 (https://www.cdc.gov/lyme/images/symptoms_2001-2015.jpg)

DIAGNOSIS

Based on:

- Signs and symptoms
- History of possible exposure to ticks
- Two-tier blood test
 - measures antibodies in blood
 - can take 4-6 weeks after infection for the body to produce measurable levels of antibodies in the blood

Two Tier Blood Test

- enzyme immunoassay (EIA) or Immunofluorescence assay (IFA)
 - if negative:
 - alternate diagnosis
 - convalescent serum if symptoms consistent with Lyme Disease are present for < 30 days
 - if positive:
 - IgM and IgG Western Blot if symptoms < 30 days
 - IgG Western Blot ONLY if symptoms > 30 days

- ❖False negatives can occur if:
 - the patient was recently infected and has a Bull's eye rash
 - not high enough antibody levels
 - immune system is suppressed
 - strain may not be measured in the test
- ❖20-30% of patients with Lyme Disease have false negative antibody tests



Figure 3 shows the classic "Bull's eye" rash that is present with a tick bite (https://www.cdc.gov/lyme/signs_symptoms/rashes.html)

- When a tick is found on the body it is advised to keep the insect in order to expedite the diagnosis process once Lyme disease is suspected.
- Once Lyme disease is suspected a Primary care physician or Pediatrician depending on the possibly infected individuals age should be contacted.
- Other specialist who can treat and manage specific symptoms and diagnoses are as follows.
 - Infectious disease doctor: They will treat the infection
 - Rheumatologist: Treats rheumatic diseases, joint inflammation
 - Neurologist: To treat and evaluate neurological symptoms

TREATMENT

- When diagnosed with Lyme disease if a patient receives treatment immediately then they will usually completely recover in short period of time.
- The three most common drugs used to treat the infection are
 - Doxycycline a tetracycline antibiotic oral tablet
 - Amoxicillin: a type of penicillin antibiotic oral tablet
 - Cefuroxime Axetil: a cephalosporin antibiotic oral tablet
- If the condition is not chronic then the treatment will take only a few weeks. **If prescribed an antibiotic the medication must be taken as instructions to its completion.**

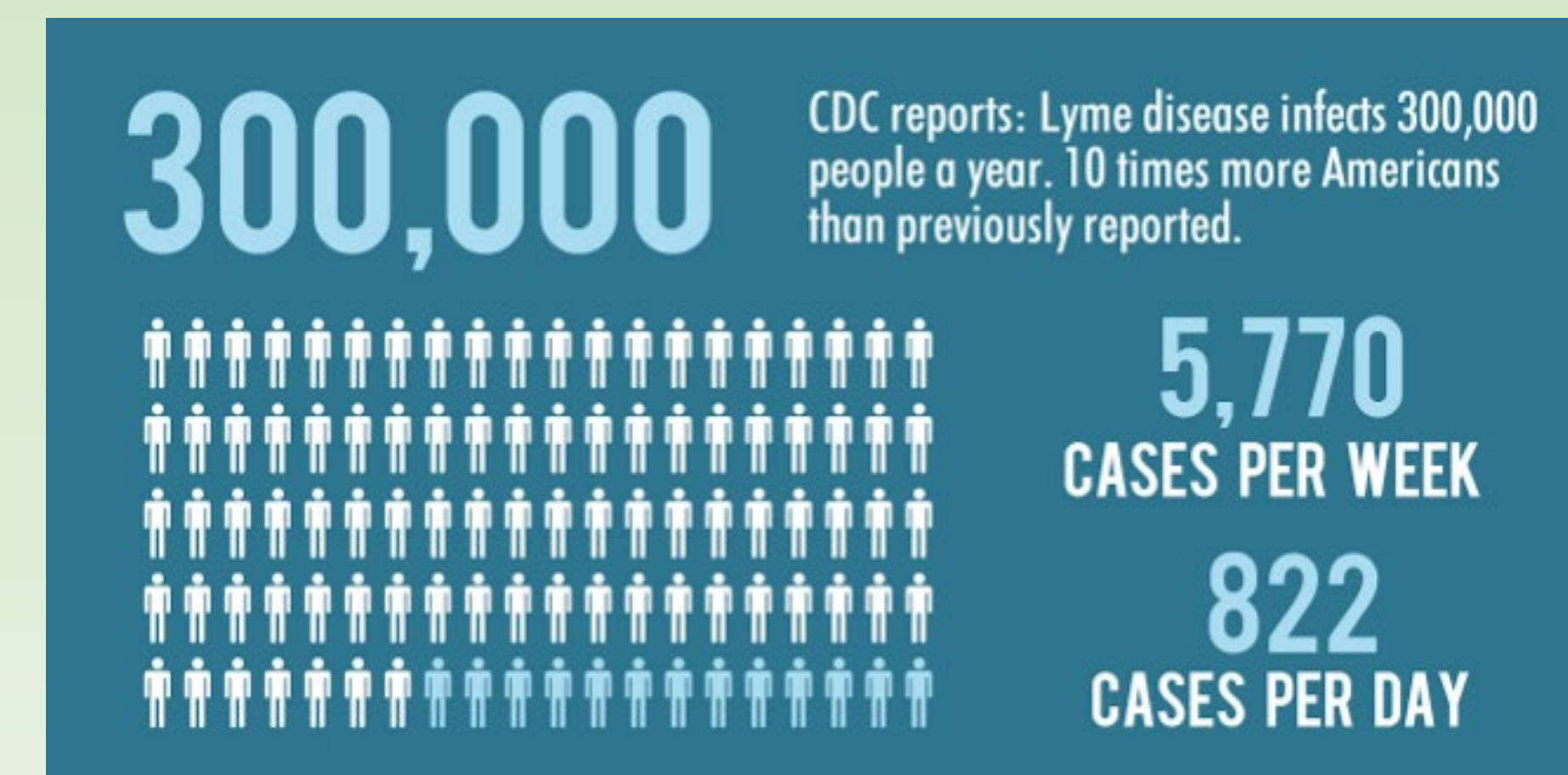


Figure 4 shows CDC statistics on Lyme disease prevalence.

- If symptoms are still present for more than 6 months then the infected person may be suffering from Post-treatment Lyme Disease Syndrome. Treatment for PTLDS include:
 - Painkillers such as Hydromorphone, Hydrocodone, and Valium
 - Anti-inflammation such as Indomethacin
 - Steroids such as Prednisone
 - Surgery such as 27 catheter ablation
 - Medication such as Iv nano silver, and Glutathione
 - Replacement therapy, hormone and lipid.
- Treatment may vary on a case to case basis.
- Prolonged exposure to antibiotics may become harmful to a person and increase the possibility of antibiotic resistant behavior in the bacteria.

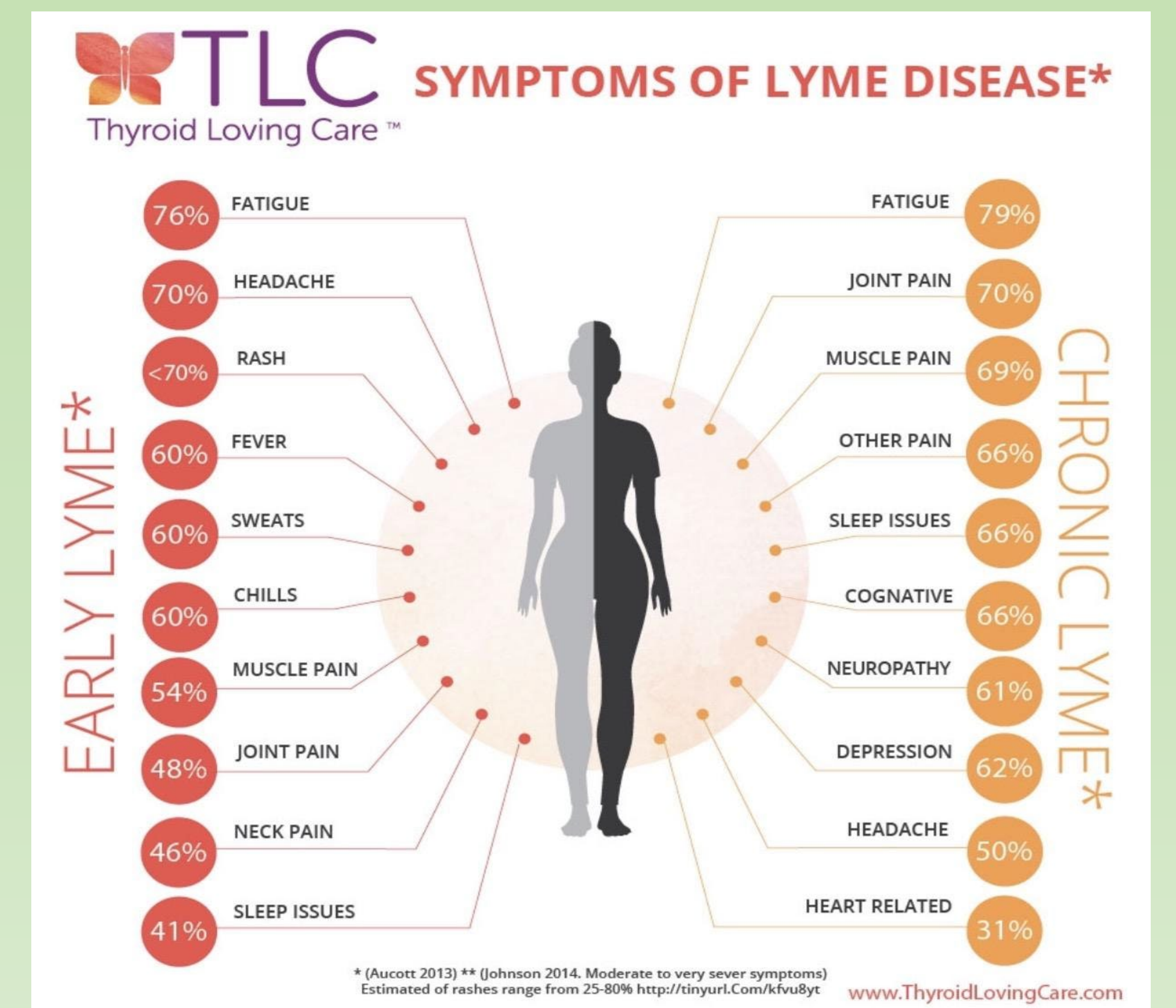


Figure 4 shows early versus late (chronic) Lyme disease symptoms.

CONCLUSION

Lyme disease is not a new found condition but new research is being done to better understand the infection. New and improved diagnostic techniques are being used to treat a patient more effectively. There are many treatments for Lyme disease, however before the Lyme is chronic antibiotics is the best course of action.

Lyme disease can be curable if found and treated soon enough. Chronic Lyme is rare but can become manageable with the right course of treatment. Lyme can show a verity of symptoms and sometimes be mistaken as another ailment. Lyme can be tested and treated by general physicians as well as specialists.

REFERENCES

Center for Disease Control (www.cdc.gov)
<https://www.lymedisease.org/>

ick! A Tick! Connections Between Lyme Disease and Hashimoto's You Need to Know. (2016, March 15). Retrieved March 31, 2017, from <http://yourbestthyroidlife.com/ick-a-tick-connections-between-lyme-disease-and-hashimotos-you-need-to-know/>