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Education on Tickborne Diseases and Prevention Strategies

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Problem Identification and Need

Tick encounters and Tick-borne diseases are increasing in prevalence in Vermont

- Research suggests that around 300,000 people are diagnosed with Lyme disease each year.
- Tick encounters have been well above the historic average this year with some weeks being above the historic maximum in Vermont.
- In 2016 Vermont was one of 14 states that contributed to 95% of confirmed Lyme disease cases.
- Vermont has the highest average incidence of Lyme disease per 100,000 persons in the United States.

The Blacklegged tick is responsible for more than 99% of all tickborne diseases reported in Vermont.

- 52.9% carry Borrelia burgdorferi, 7% carry Anaplasma phagocytophilum, and 0.8% carry Babesia microti.

Changing landscape of tickborne diseases:

- In 2008 Lyme disease contributed 97% of tickborne disease with anaplasmosis, babesiosis and erlichiosis contributing 1% each in the state of VT.
- In 2016 Lyme disease contributed 77% of tickborne disease while anaplasmosis contributed 21% and Babesiosis 2% in the state of VT.
Problem Identification and Need

Patient awareness of tickborne diseases is lacking:

- In the New England and Mid-Atlantic regions, areas that have a high incidence of Lyme disease, Anaplasmosis and Babesiosis, 13.9% of those surveyed reported that no tickborne diseases occur in their area and 20.8% said they had not heard of any of these diseases.

- Regardless of region few respondents reported that the following diseases occur where they live: Anaplasmosis (0.9%), Babesiosis (1.1%).

- 21.0% of total respondents reported that a household member found a tick on his or her body during the previous year; of these, only 10.1% reported that a health care provider was consulted as a result of finding a tick on a household member.

- The majority of respondents (51.2%) reported that they did not routinely take any personal prevention steps against tick bites during warmer weather seasons.

From provider perspective (what can they do for chronic disease):

- The Centers for Disease Control and Prevention estimates 10 to 20 percent of those treated for Lyme disease with the recommended two-to-four week course of antibiotics continue to have symptoms.

- There is no approved therapy for these patients and the magnitude of the problem in the U.S. population has never been systematically studied.
Public Health Cost and Unique Cost Considerations

Healthcare costs:

- Lyme disease costs the U.S. health care system between $712 million and $1.3 billion a year.
- Lyme disease is associated with $2,968 higher total health care costs over a 12-month period, as compared to a control group.
- Lyme disease is associated with 87% higher evaluation and management visits and 71% higher emergency department visits over a 12-month period, relative to a control group.
- Among those who were diagnosed with Lyme disease, having one or more symptoms of post treatment Lyme disease syndrome was associated with $3,798 more in health care costs as compared to those with no post-treatment symptoms.

There is a fear of going outside due to the prevalence of tickborne diseases:

- Researchers found that the perceived risks of contracting Lyme disease, on average, cause a person in the Northeast to forego eight 73-minute outdoor trips per year, which results to about nine hours of outdoor time per year.
- “People are giving up trips, and it’s not just hiking and camping in the woods,” said Kevin Berry, a former postdoctoral scholar at F&ES and the lead author of the study ‘The Allocation of Time and Risk of Lyme’. "It's trips to the park, soccer games, or walks and bike rides in places where there are stands of trees and tall grasses... a wide variety of activities pretty much anywhere in this part of the Northeast that's outdoors.”
- Eli Fenichel, an assistant professor at the Yale School of Forestry & Environmental Studies (F&ES) and senior author of the study ‘The Allocation of Time and Risk of Lyme’ mentioned that Lyme disease has been very expensive, but “the cost is not what people spend on doctors, or medicine, or even bug spray. These are costs that everybody incurs because we’re all choosing second-choice activities to avoid getting Lyme disease.”
- The study found that people in the northeastern United States will make 1 billion fewer trips to the outdoors like hiking in the woods or trips to parks resulting in approximately $2.8 billion to $5 billion in lost revenue every year.
Community Perspective

Jennifer Overton (Washington county resident)

• Students are learning extensively about ticks and tickborne diseases in high school biology class. This has helped make community members more aware and knowledgeable about this topic.

• If a vaccine was available to prevent tickborne diseases it would definitely be supported.

• There have been moments where tall grass has been avoided due to the fear of ticks.

• Have thought about different methods to help combat ticks in the surrounding area including the possibility of getting a guinea hen.

CVMC Community Health Team

• Would like to see improvement in treatment strategies especially for patients that do not have symptoms resolved after the typical course of antibiotics.

• Would like to see improvement in the quality of testing for tickborne diseases as the sensitivity and specificity for some of the tests are not that high.

• Would like to more information about the successes that naturopaths have had with patients with symptoms persisting after original course of treatment.
Intervention and Methodology

Create an educational handout for both patients and providers:

- For patients: focuses on tick bite prevention strategies, proper tick removal and major signs and symptoms of tickborne illness. This is intended to be offered to all patients entering the office as there are many useful prevention techniques as well as more specifically to be handed out to patients with concern for tickborne disease.

- For providers: focuses on identification of ticks, signs and symptoms, pertinent lab tests and results, diagnostic testing and treatment. Also contains a quick reference guide that contains the most pertinent information healthcare providers will need to efficiently and correctly make the proper diagnosis and apply appropriate treatment.

**Tickborne Disease Educational Handout**

**Tick Prevention Techniques**

- Use a repellent that contains at least 20 percent DEET, permethrin, or IES15S in order to have several hours of protection.
- Wear clothing that contains permethrin. You can treat your clothing and gear, such as boots, pants, socks and nets, with products that contain 0.5% permethrin.

**Finding and Removing Ticks from Your Body**

- Bathe or shower as soon as possible after coming indoors (preferably within 2 hours) in order to wash off and more easily find ticks that may be on you.
- Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body where you return from tick-infested areas. Barnes should accent their children in checking for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and especially in their hair.
- Ticks can hide in your clothing, and gear, then sneak to a person later, so carefully examine pets, coats, and dry packs.
- You can safely dry clothes in a dryer on high heat for 20 minutes to kill ticks on dry clothing.

**Safely Removing a Tick**

1. Use fine-tipped tweezers to grasp the tick as close to the surface of the skin as possible.
2. Pull straight up-wards with steady, even pressure. Don’t twist or jerk the tick as this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the mouth-parts using the tweezers. If you are unable to remove the mouth easily with the tweezers, leave it alone and let the skin heal.
3. After removing the tick, thoroughly clean the bite area and any handles with either rubbing alcohol, an iodine scrub, or soap and water.
4. Dispose of the live tick by either submerging it in alcohol, placing it in a sealed bag/container, wrapping it tightly in tape, or flushing it down the toilet. Do not crush a tick with your fingers.

**What ticks look like**

- Relative sizes of blacklegged ticks at different life stages
- As a general rule, adult ticks are approximately the size of a sesame seed and nymphal ticks are approximately the size of a poppy seed.

**Blacklegged Tick (Ixodes scapularis)**

- Adult
- Female
- Male
- Nymph
- Larva

In VT 33.5% of all tick borne diseases are spread via the blacklegged tick. The diseases it can spread are Lyme disease, anaplasmosis, babesiosis, Powassan virus disease, anderson disease.
An educational handout was created for both patients and healthcare providers. There was also a quick reference guide created in a table format that contains the pertinent information about the major tickborne diseases in Vermont.

Educational materials were provided to the Berlin Family Medicine Practice to be distributed to both patients and healthcare providers.
Evaluation of Effectiveness and Limitations

Evaluation of Effectiveness

- Need to deliver more handouts to patients and providers before effectiveness of the handout can be determined. Survey is likely the best method of monitoring its effectiveness.
- Can survey patients that received a handout to see if they were more likely to use the prevention strategies mentioned in the handout.
- Can survey patients to see if they were better able to identify the signs and symptoms of a tickborne illness in order to receive earlier treatment prior to progression of the disease.
- Can survey providers to see if they were able to more quickly identify, diagnose and appropriately treat tickborne disease using the quick reference guide.

Limitations:

- Only reaching a small portion of the state via CVMC as not everyone regularly sees a healthcare provider.
- Not everyone will read the educational material even if they receive it.
- Not everyone will act on the information they acquire to protect themselves.
- There likely is not enough time for a provider to fully discuss with a patient all of the information in the handout given the time constraints of a typical visit. This would likely be the most effective way for change to happen.
- There is an evolving landscape of tickborne illnesses that may potentiate new risks to patients that are currently unfound.
- As long as there are ticks or another vector to harbor these diseases that can subsequently inject it into a human, there will always be a risk for infection.
Recommendations for Future Interventions/Projects

• Working with other hospitals and community centers to ensure that they have educational materials available to members of the community on tickborne diseases and prevention strategies.

• Creating a new position as part of the community health team to discuss tickborne diseases with patients or educate current community health team members to incorporate this into their role. This could include discussing the handout with patients.

• Educating our youth by having a presentation on tickborne diseases at each of the schools around Vermont.

• Educating the community by holding presentations at large public event centers.

• Look into more effective ways to treat patients who are still suffering from the disease after the initial course of treatment.

• Look more into the possibility for and effectiveness of prophylactic antibiotics for people that are at a higher risk for exposure.

• Continue research into improving diagnostic testing for tickborne diseases.

• Continue research for tickborne disease vaccines.

• Researching the ecology and population genetics of ticks to find an environmentally friendly way to reduce the tick population.
References

- Grace, C. Tick Borne Illnesses in Vermont: Science and Controversies. 43rd Vermont Family Medicine Review Course, 8 June 2017. (Images also obtained from this page)

Images: