UNIVERSITY OF WISCONSIN-LA CROSSE

Graduate Studies

THE FURTHER REFINEMENT OF THE LA CROSSE COUNTY VECTOR CONTROL ELECTRONIC TOOLKIT BASED UPON PARTNER FEEDBACK IN A WESTERN WISCONSIN SERVICE REGION

A Graduate Project in Partial Fulfillment of the Requirements for the Degree of Master of Science in Community Health Education

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THE FURTHER REFINEMENT OF THE LA CROSSE COUNTY VECTOR CONTROL ELECTRONIC TOOLKIT BASED UPON PARTNER FEEDBACK IN A WESTERN WISCONSIN SERVICE REGION

By Adam Berg

We recommend acceptance of this project report in partial fulfillment of the candidate's requirements for the degree of Master of Science in Community Health Education.

The candidate has met all of the project completion requirements.

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ABSTRACT

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This project involved the further refinement of the La Crosse County Vector Control Electronic Toolkit by using needs and capacity assessments with the regional public partners. The author assessed the needs and capacity of the counties served by the LCHD regarding their awareness of vector-borne (mosquito and tick-borne) disease and control, and their receptivity to the services already provided by the LCHD. It was the desire of Dave Geske, Vector Control Manager, to utilize the findings from this assessment to better inform and educate the population he serves regarding vector-borne disease and control. Prior to this project, the LCHD developed a Vector Control Electronic Toolkit, to provide an informational and educational resource to the counties they serve. As a result of this project, the LCHD was able to determine the needs of the counties they serve, along with the capacity to which public health representatives from partner agencies were able to achieve their vector control goals. The evaluation of the toolkit resulted in recommendations for its refinement as an informational and educational resource, as well as immediate additions strengthening its educational value.

ACKNOWLEDGEMENTS

I would not have been able to complete this undertaking without academic and personal support. I am tremendously grateful to Dr. Gary Gilmore for providing me with the opportunity to further my education and pursue my Masters of Science in Community Health Education. It was with his guidance and support that I was able to complete this project, and continue to learn and grow as a health educator. Along with Dr. Gary Gilmore, Dave Geske also provided guidance throughout this project, as well as during my preceptorship experience with the La Crosse County Health Department. An additional thank you goes out to Dave Geske, for his cooperation during this project and for allowing me to share in his breadth of knowledge and experience regarding vector control.

I must also thank the counties of La Crosse, Vernon, Crawford, La Fayette, Monroe, Jackson, Trempealeau, Dunn, Peirce, St. Croix, Houston (MN), Winona (MN), the Ho-Chunk Nation, and the representatives within them, for their participation in this project. Through their cooperation and feedback, the Vector Control Division of the La Crosse County Health Department was able to identify ways to improve their overall vector control efforts, and further develop and revise of the La Crosse County Vector Control Electronic Toolkit.

I would like to thank the Department of Health Education at the University of Wisconsin – La Crosse and the network of teachers, staff, and students that have made my graduate experience so enjoyable. Lastly, I am very fortunate to have always had the support of my friends and family throughout my life, many thanks to my friends and family around the globe.

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INTRODUCTION AND OVERVIEW

Statement of Purpose Based on Established Need

This graduate project was a collaborative effort with the Vector Control Division of the La Crosse County Health Department (LCHD) assessing the needs and capacity of the counties they serve on their awareness of vector-borne (mosquito and tick-borne) disease and control, and their receptivity to the services already provided by the LCHD. The information pertaining to vector-borne illness, particularly tick and mosquito-borne, is readily available and the harmful effects of these diseases are understood by many public health professionals. However, the distribution of this information to at-risk populations and appropriate supporters remains a difficult task. Mosquito-borne (e.g., West Nile, La Crosse viral encephalitis) and tick-borne (e.g., Lyme disease, anaplasmosis, ehrlichiosis) diseases present significant health risks, particularly in our geographic region of the United States.

The mission of the La Crosse County Health Department (LCHD) is to: *improve the quality of life and health of all people in La Crosse County*. In addition to that, the vision of the Vector Control Division of the LCHD reads; *The La Crosse County Vector Control Division is committed to serving and protecting the La Crosse County area from animal disease and nuisance along with providing timely response to community health issues* (LCHD, 2012). The Vector Control Division of the La Crosse

County Health Department serves the Wisconsin counties of La Crosse, Vernon, Crawford, La Fayette, Monroe, Jackson, Trempealeau, Dunn, Peirce, St. Croix, as well as; Houston (MN), Winona (MN), and the Ho-Chunk Nation. Vector control is funded through these counties as well, with each of them acquiring this money in their own way. Efficient communication with these counties, the municipalities within them, and public health entities (e.g., Public Health Officers, Board of Health, County Board Chairpersons, and Chairman of Board of Health) is critical to incentivizing and reminding them of the positive and impactful work done by, and in collaboration, with the La Crosse County Vector Control Division. With this organization in mind, it is only proper to provide La Crosse County, as well as the counties the LCHD serves, with the appropriate resources to best keep themselves and their neighbors healthy and disease free to the degree possible.

Birth of the Vector Control Toolkit

The idea for a toolkit evolved during the author's preceptorship experience with the La Crosse County Health Department. The request for concise scientific documents pertaining to mosquito and tick-borne disease came at the request of Dave Geske, Vector Control Manager with the LCHD. Mr. Geske holds a breadth of knowledge regarding vector control and vector-borne disease, acquired throughout his 36-year career as a vector ecologist. Although there is no questioning his scientific knowledge, Mr. Geske felt more could be done in the educational aspect of vector control. For that reason, he enlisted the services of two health education students from the University of Wisconsin – La Crosse. These students were a Community Health Education graduate student, the author, and Tessa Whitemarsh, a Community Health Education undergraduate student.

This "toolkit" began as a series of well-developed documents intended to aid health professionals, with the primary focus being their use as an informational and educational tool. The original location of these documents was anticipated to be the La Crosse County Health Department's web page. However, as more and more documents were developed a discussion took place determining that this abundance of information may appear a bit overwhelming on the county home page, and instead should be consolidated and categorized in some way. It was a dialogue session with Mr. Geske, towards the end of the author's preceptorship experience that the thought of a "toolkit" emerged. This toolkit could be used as a practical resource not only for health professionals, but also for health departments, communities, and other organizations. Moving forward, the author continued developing documents based on themes requested by Mr. Geske, or determined useful through discussions with Mr. Geske. Just prior to the summer of 2013, these assorted documents were combined, resulting in the very first *La Crosse County Vector Control Electronic Toolkit*.

Dave Geske then submitted the toolkit for a review of its subject matter. Following its approval of content by the LCHD it was distributed electronically to all of the counties served by the LCHD, the State of Wisconsin Division of Public Health, and organizations such as the North Central Mosquito Control Association (NCMCA) and the National Association of County & City Health Officials (NACCHO) for further use and dispersal at their discretion.

Need for Conducting this Project

The initial idea for this project came at the request of Dave Geske. His desire to increase interaction with the counties served by the LCHD, through collaboration, and to

address the needs and capacity of each individual county sparked the original idea for this organizational assessment. A need is defined as "the difference between the present situation and a more desirable one." Meanwhile, capacity refers to "both individual and collective resources that can be brought to bear for health enhancement" (Gilmore, 2012, p. 8). By identifying the needs of these individual counties, and their capacity to work with the LCHD, and evaluating a resource like the toolkit, a much more successful network of communication could be developed.

The primary public health goal of vector control is to interfere with the vector/host relationship and to disrupt the vector/host cycle. Described by Geske as, disturbing the interaction between the vector (tick or mosquito) and a human host (or pet); by monitoring vector populations, eliminating breeding habitat, and providing people with the proper information in order to protect themselves and limit exposure to these vectors (D. Geske, personal communication, April 16, 2013). .

The LCHD Vector Control program began in 1979 to control for the mosquito vector for La Crosse viral encephalitis (LVE), Aedes triseriatus. Following the inception of the program, and others like it throughout the state of Wisconsin, cases of LVE statewide decreased from 10-36 cases per year (annual average of 27 cases) from 1978 – 1982, to 2-19 cases per year (annual average 10.5 cases) from 1983 – 1995 (Geske & Parry, 1995). Following a grant-funded project, from 1994-1995, La Crosse County Vector Control was provided with additional resources to determine the increase in cases of LVE in 1993. This provided an opportunity for additional community outreach and interaction. In the final report of this project, Dave Geske and Dr. James Parry identified that:

> Education of the public still remains one of the greatest allies in overcoming the risk of La Crosse viral encephalitis. Habitat reduction and proper management of old tires are important measures the public can take to help avoid having their children suffer the effects of La Crosse viral encephalitis. During 1994, 46 public educational programs were provided; during 1995, 29 programs. (Geske & Parry, 1995, p.11)

Since 1995, the area served by the LCHD has averaged fewer than 5 cases of LVE annually, including one case in 2011 and zero cases in 2012. Even so, Dave Geske maintains this philosophy, and states that communication and interaction with the public are still a vital part of the vector control process. However, the efforts of the LCHD are currently limited primarily to surveillance habitat elimination and habitat management; and less on community outreach, due primarily to time and fiscal restraints (D. Geske, personal communication, April 16, 2013).

This project is also vital to strengthen communication among the individual counties and potentially professional organizations, such as North Central Mosquito Control Association (NCMCA) and the National Association of County & City Health Officials (NACCHO). Geske identifies effective communication, particularly related to collaboration, as a difficulty between the LCHD and the counties it serves, especially in the areas of education and their individual needs and understanding pertaining to vector control. Collaboration is a formal relationship that is defined as, "exchanging information for mutual benefit, altering activities, and sharing resources to achieve a common purpose" (Gilmore, 2012, p. 42). With the continuous improvement of vector control efforts not being the responsibility of one specific entity (i.e., LCHD), but instead

being a collaborative effort between the LCHD and the counties it serves, these entities can work together to enhance each other's capacity and achieve a higher quality of vector control services.

Review of Relevant Literature

Introduction

During this project, the most common vector-borne diseases that were encountered in the service area of the LCHD included the mosquito-borne viruses of West Nile and La Crosse viral encephalitis, and tick-borne illnesses of Lyme disease, anaplasmosis, and ehrlichiosis; the most prominent being the two mosquito-borne illnesses and Lyme disease. The documented cases of all of these illnesses tend to fluctuate over the course of time due primarily to environmental factors that influence vector activity, such as below or above average seasonal rainfall or extended or shortened wet/dry seasons, as well as the prevention efforts of organizations like the LCHD.

Impact

Both mosquito and tick-borne disease can have devastating impacts on those infected, as well as their families and loved ones. In 2009, Lyme disease alone accounted for 29,959 confirmed cases and 8,509 probable cases United States (CDC, 2013). Lyme disease can result in severe joint pain, headaches, and other nervous system and memory problems; these symptoms may subside with treatment, but about 10-20% of patients with Lyme disease have symptoms that last months to years after treatment. If left untreated, approximately 60% may have irregular stints of arthritis with severe joint pain and swelling (CDC, 2013). The body's large joints, particularly the knees, are most often affected.

As for mosquito-borne disease, they tend to affect at-risk individuals more severely. Individuals affected most negatively by mosquito-borne diseases such as West Nile virus or La Crosse viral encephalitis are elderly individuals and children, mostly due to their compromised or developing immune systems. Although 1-3% of LVE cases are fatal, 15% of patients have long-term nervous system problems (CDC, 2009). Patients are hospitalized to insure that appropriate testing and supportive treatment prevail. The impact of these diseases may seem minimal to some when reviewing morbidity and mortality rates; however, the effects are seen far beyond physical symptoms. The costs accrued by both the family and medical provider for a single case of one of these vector borne diseases can be insurmountable. The direct medical costs absorbed by the infected individual, or family, just scratch the surface of the financial impact of a single case of LVE; there are indirect costs that accumulate, as well (e.g., lost work days, travel expenses, lost school days, non-medical equipment, impaired years of life, disability affected years of life). The results of a study, on the economic and social analysis of La Crosse viral encephalitis in North Carolina, identified that the cost of a single case of LVE with lifelong neurologic aftereffects ranged from $48,775 to $3,090,798. Resulting in 13 Disability Adjusted Life Years (DALYs) accumulated for the 25 patients and over 100 life years of the study. DALYs are a non-monetary estimate of productive life years lost due to an illness or health event. In addition, about 55 of the 100 life years of the study were impaired to some degree as a result of the illness (Utz, Apperson, MacCormak, Salyers, Dietz & McPherson, 2003). According to Dave Geske, the lifetime financial impact of one single case of the mosquito-borne illness, La Crosse encephalitis, could fund the Vector Control Division of the LCHD for upwards of a decade. This

financial impact does not take into consideration the long-term health impacts on the infected individual, the indirect financial burden on the family, or the emotional stressors that accompany such a devastating illness (D. Geske, personal communication, April 16, 2013).

Prevention and Control

The purpose of this project was to assess the needs and capacity of the counties served by the Vector Control Division of the LCHD on their awareness of vector-borne (mosquito and tick-borne) disease and control, and their receptivity to the services already provided by the LCHD. The Health Belief Model (HBM) guided this purpose, and was used throughout the project. The HBM originated in the 1950's and was originally developed to examine why people used or did not use health services, and served as a vital guide for the direction of this project (Cottrell & McKenzie, 2011). This model has six constructs, which serve as building blocks; they include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Sharma & Romas, 2008, p.76-77).

In relation to Lyme disease, an example of perceived susceptibility could be how likely someone feels they are to acquire Lyme disease. How severe the individual views Lyme disease would be an example of perceived severity. A simple and easy self tick-check to prevent Lyme disease could be a perceived benefit. A perceived barrier might be the preventive measure of wearing long pants while outdoors, or tucking ones pants into their socks, which may be viewed by some as unattractive. Another barrier could simply be the distaste for the scent of an insect spray containing DEET. A cue to action could be educational material circulated by a local health department on properly

checking oneself for ticks. When an individual believes that they can accurately perform a self tick-check, it could be said that they have a high self-efficacy, or confidence in their ability to pursue a behavior, in regard to protecting themselves from Lyme disease (Sharma & Romas, 2008, p. 77). All constructs of the HBM were significant to the completion of this project.

Despite having averaged less than five cases of La Crosse viral encephalitis annually since 1995, one in 2011, and none in 2012; another mosquito-borne illness has come to the attention of the LCHD. In 2012, La Crosse County recorded only its second ever, human case of West Nile virus (the first being in 2006). Although not native to the area, the mosquito vector for West Nile virus (Ochlerotatus japonicus) has become well established in the LCHD service area, and breeds in containers and small amounts of water just as the vector for La Crosse viral encephalitis (Aedes triseriatus) (Bloom, 2012). In an article from the La Crosse Tribune, published October 5, 2012, discussing the increasing population of this particular mosquito vector, Dave Geske declared, "It might indicate a growing threat from an invasive mosquito, capable of carrying the West Nile virus, that harbors a taste for humans as well as birds." The article also contained testimony from the spouse of the infected individual stating, "they are expected to make a full recovery, though they will remain hospitalized for months and probably won't feel back to normal for a year, they have begun to move their extremities after being virtually paralyzed from the neck down by the virus" (Bloom, 2012).

Although the LCHD Vector Control program began as a means of combating La Crosse viral encephalitis, and mosquito-borne illness in general, tick-borne illnesses are equally a threat. The incidence rate of tick-borne illness, particularly Lyme disease, has

continued to show an increase throughout recent years. In La Crosse County alone, reported cases of Lyme over a five year period were: 31 in 2007, 97 in 2008, 150 in 2009, 181 in 2010, and 117 in 2011 (LCHD, 2012). This is particularly important because Lyme disease not only affects humans, but it can dramatically impact the health of pets as well, not to mention that pets can serve as a host for bringing infected ticks into close contact with humans (e.g., homes, automobiles). Though a much different vector than mosquitoes, prevention and control of tick-bone illness is much the same as that of mosquito-borne illness, both of which focused on disrupting the vector/host cycle (D. Geske, personal communication, April 16, 2013).

Sustainability of Collaborative Vector Control Efforts

The Vector Control Division of the La Crosse County Health Department has proven its value and its effectiveness dating back to its inception in 1979 as the La Crosse County Encephalitis Control Program, then a six-county program. Since its inception, the number of cases of La Crosse encephalitis has fallen from 37 diagnosed cases in 1978, to an average of less than five cases per year since 1995, not to mention that this program began as a 6-county program, and since 2001 has more than doubled in size and grown to currently serve 12 counties and the Ho-Chunk Nation. The increased efforts by the LCHD Vector Control Division to expand their service area also has yielded an increased need for efficient and quality communication with all of these counties. While the successful efforts of this unit have helped in reducing the number of cases of La Crosse viral encephalitis, the incidence of Lyme disease has risen since 2007 (from 31 cases in 2007, to 117 in 2011), along with the emergence of a potential increase in the risk of West Nile virus in the area. With the number of vector-borne illnesses that need

to be addressed, as well as the increase in the service area of the LCHD (from 6 to 12 counties since 2001), a much greater need for efficient communication and collaboration between the LCHD and the counties they serve has emerged.

SECTION II

METHODS

Introduction

This graduate project focused primarily on assessing the current awareness of the counties served by the LCHD pertaining to vector-borne (mosquito and tick-borne) disease and control efforts of the LCHD, and the counties they serve, as well as their receptivity to the services provided by the LCHD. This was done using a needs and capacity assessment developed by the author. The needs and capacity assessment was a two-part assessment containing a survey and a key informant interview portion. The author delimited the scope of this project because of the diverse populations and communities served by the LCHD; this also offered the potential for greater implication and implementation of the findings.

Following the completion of the needs and capacity assessment, the author and Mr. Geske took time to individually interpret the findings, reviewing the frequency of responses for survey related questions, and common responses and statements, both written (e.g., survey) and verbal (e.g., key informant interview). This was done for the survey portion of the assessment, as well as the key informant interviews (Figure 2.1). They then sat down together for a collaborative review process, in which the two discussed, in-depth, their interpretation of each portion of the assessment. By using the similarities found in each of their interpretations, the two were able to develop their

preliminary findings. One week was then given for the author and Mr. Geske to once again, individually, analyze their collaborative review of the findings. The two again partnered in a dialogue session where the comprehensive ("grouped") findings were determined. By establishing these comprehensive findings the two were then able to form conclusions based upon these findings.

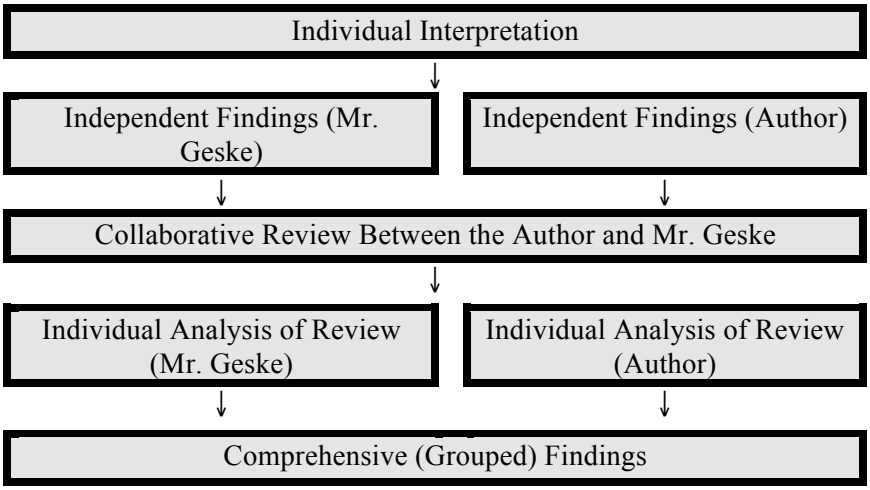

Figure 2.1 Flowchart for Determining Grouped Findings, Western Wisconsin, 2013.

Throughout this project the author met and communicated frequently with Dave Geske regarding matters including; communicating with representatives from each individual county, scheduling key informant interviews, developing the needs & capacity assessment, and establishing findings. However the cornerstone of this project was the meeting sessions among the author, Dave Geske, and Dr. Gary Gilmore (Graduate Program Director and project advisor for this particular project). This trio worked together with great synergy to maintain the continuation of this project, often battling scheduling conflicts and very limited time. These meeting sessions stabilized the development of this project and stimulated excellent discussion, as well as maintained the direction of the project. Dr. Gilmore guided each meetings sessions with a very orderly

approach, resulting in revisions to the project, new ideas and thoughts, and the appropriate next steps leading into future meetings as well as the continued development of this project.

Need vs. Capacity

Throughout the course of this project, the importance of maintaining the distinction between 'need' and 'capacity' was crucial in determining its success. 'Need' is defined as, "the difference between the present situation and a more desirable one", whereas 'capacity' refers to "both individual and collective resources that can be brought to bear for health enhancement" (Gilmore, 2012, p. 8-9). Dr. Gary Gilmore characterizes a needs assessment as "a planned process that identifies the reported needs of an individual or a group" (2012, p.8), and the assessment portion of this project allowed each county to identify their individual needs as they pertain to their current vector control efforts. A capacity assessment is "a measure of actual and potential individual, group, and community resources that can be inherent to and/or brought to bear for health maintenance and enhancement" (2012, p. 10). In short, by measuring the capacity to which each county is able to act upon their particular vector control needs, with the assistance of the LCHD, and the resources available within each, the author was better able to determine the ability of each county to meet their particular needs.

By recognizing the needs and capacity of each county, the LCHD could better distinguish the desired outcome each individual county sought from the services provided by La Crosse County, as well as better utilize existing resources to achieve desired outcomes. Determining these resources allowed the LCHD to understand the degree that each particular county could best utilize the La Crosse County Vector Control Toolkit.

This initial assessment also aided in the ability to receive continuous feedback from these counties to the originator of the toolkit (Mr. Geske), to support its continuous refinement.

Development of the Needs & Capacity Assessment

A needs and capacity assessment was developed for this project containing a survey portion and key informant interviews with representatives from select counties. The survey portion of this assessment (Appendix B) was distributed electronically following the complete distribution of the Vector Control Toolkit, with the key informant interviews (Appendix C) to subsequently follow.

The needs and capacity assessments of these counties recognized their specific areas of need and interest, and helped identify proper steps the LCHD can take on a county-by-county basis in order to meet their needs. Serving as a stimulus to remind and incentivize these counties of the efforts of the Vector Control Division of the LCHD and the positive impact of vector control. In addition, it reminded counties that their cooperative work and collaboration with the LCHD is a continuous partnership, and is more than a contractual agreement between counties.

The author evaluated the results of the survey, as well as participated in, and documented, each individual key informant interview. This assessment contributed to two additional parts of this project; the refinement and continued development of the Vector Control Electronic Toolkit, and the capacity amplification and enhancement of each county, and public health entities within them, regarding vector-borne illness and disease prevention and education. This evaluation was an impact assessment of the Vector Control Electronic Toolkit and the current services provided by the LCHD. A process evaluation was also conducted focusing on the efficiency of communication and

collaborative efforts between the LCHD and each respective county. The findings from these assessments were then used to draw specific conclusions pertaining to the vector control needs of these counties, the capacity of each county and their relationship with the LCHD, and to determine proper next steps for the refinement and continuation toolkit. Other useful recommendations were then derived from the conclusions.

Rationale for Choosing Health Belief Model

The needs and capacity assessment was developed, using the guidance of the Health Belief Model (HBM), to determine the vector-borne awareness of the counties served by the LCHD, as well as their receptivity to the services already provided by the LCHD. The HBM was developed to help explain health related behaviors and is a framework used to motivate individuals to make positive healthful measures by using desire to evade harmful health consequences. It can help develop messages that are likely to influence individuals to make a particular behavioral change and healthier decisions. For example, when an individual believes that he/she is susceptible and recognizes the severity of vector-borne disease, there is a higher likelihood that a preventative behavior will be adopted (Daltroy, Phillips, Lew, Wright, Shadick & Liang, 2007).

The author called upon the Health Belief Model (HBM) to guide the needs and capacity assessment. The underlying concept of the original HBM is that health behavior is determined by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Hayden & Paterson, n.d.). Thus, in theory, by providing services to raise awareness and inform individuals on the harmful effects of vector-borne disease, and by providing them with educational resources and guidance to

best protect them, individuals will act in ways to better protect themselves from vector-borne disease.

The HBM is based on the understanding that a person will take a health related action if that person (Cottrell & McKenzie, 2011):

1. Feels that a negative health condition can be avoided (e.g., La Crosse viral encephalitis).
2. Has a positive expectation that by taking a recommended action, they will avoid a negative health condition (e.g., emptying and removing water collecting items from around their home).
3. Believes that they can successfully take a recommended health action (e.g., they can comfortably and confidently take preventive and protective vector control measures).

The main constructs of the HBM include: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy; each of which aid in the process of predicting behavior change (Table 2.1).

Table 2.1 Constructs of the Health Belief Model

Construct	Definition
Perceived Susceptibility	Subjective belief that a person may acquire a disease or enter a harmful state as a result of a particular behavior
Perceived Severity	Belief in the extent of harm that can result from the acquired disease or harmful state as a result of a particular behavior
Perceived Benefits	Belief in the advantages of the methods suggested for reducing the risk or seriousness of the disease or harmful state resulting from a particular behavior
Perceived Barriers	Belief concerning actual and imagined costs of following the new behavior
Cues to Action	Precipitating force that makes a person feel the need to take action
Self-Efficacy	Confidence in one's ability to pursue a behavior

Note. Adapted from *Theoretical Foundations of Health Education and Health Promotion* (p.77-78), by M. Sharma & J. Romas, 2008, Sudbury, MA: Jones and Bartlett Publishers.

By positively influencing the perceived susceptibility and perceived severity (recognized together as 'perceived threat') of individuals pertaining to vector-borne disease, their likelihood to perform a healthy behavior is greatly increased. Individuals generally do not attempt to do something new unless they believe they can do it (self-efficacy). If an individual believes a new behavior is useful (perceived benefit), but does not think they are capable of doing it (perceived behavior), chances are they will not attempt it. By creating a perceived threat, providing strategies to help individuals start on their way to changing behavior (cues to action), and by creating a belief that they have the ability to change their behavior (self-efficacy), the likelihood of behavior change is greatly increased.

The needs and capacity assessment was designed to identify how the LCHD can best collaborate with its partner agencies to most successfully impact the likelihood of healthy behaviors, regarding vector-borne disease control and prevention (Table 2.2).

Table 2.2 Constructs of the Health Belief Model as Influenced by the Needs and Capacity Assessment, Western Wisconsin, 2013

Construct	Influence of Needs and Capacity Assessment
Perceived Susceptibility	Reintroduced the threat of vector-borne disease through the purpose of the project, and the needs and capacity assessment. As well as through the purpose of the toolkit, which was to be reviewed prior to completing the survey or participating in a key informant interview.
Perceived Severity	
Perceived Benefits	Disclosed specific barriers to each counties vector control efforts through responses collected during the needs and capacity assessment. Also, identified benefits of the toolkit toward each counties vector control efforts.
Perceived Barriers	
Cues to Action	Provided cues to action by way of the conclusions and recommendations established through the findings from the needs and capacity assessment.
Self-Efficacy	Developed conclusions and recommendations to strengthen the LCHD Vector Control Program, and improve the toolkit, by recognizing each counties barriers and assessing their receptivity to the current work done by the LCHD, through the needs and capacity assessment.

It reintroduced the perceived threat (perceived susceptibility and perceived severity) of vector-borne disease, provided cues to action for improved vector control efforts, and recognized perceived benefits and perceived barriers to improve the self-efficacy of each county regarding their vector control efforts.

Rationale for Key Informant Interviews

The key informant interview portion, of the needs and capacity assessment, was designed to unveil ways to strengthen communication between the counties served by the LCHD, as well as other public health entities. Mr. Geske brought this desire for improved communication to the table, as he is always looking to better improve the lines of communication and education on vector-borne illness between the LCHD and the number of communities they serve.

The author realized that key informant interviews usually precede a survey, however in the case of this particular project the interviews were done following the completion of the survey portion of the assessment. This was done as a result of multiple scheduling difficulties and conflicts within the counties served by the LCHD, as well as the overlap of the timing of this project falling during the annual budgeting period within other health departments. Dr. Gary Gilmore references the common sequential approach to a project similar to this, as well as details the key informant interview process; "key informant interviews can provide a unique perspective, as they are able to directly express their insight on the needs of the communities they live and work in. Frequently, the information and insights provided by these key informants can help to frame key areas of need, which then can be followed up through more definitive needs assessment strategies" (e.g., survey, group interviews) (Gilmore, 2012, p.37). In this case, the same

can also be said for the information obtained relating to the capacity of these individual counties. Through these structured interviews, the direct dialogue and testimony from each key informant offered a deeper look into the available resources of each county, and how they could be brought to the surface to focus on their individual vector control needs and efforts.

Development of Key Informant Interviews

A series of questions made up the key informant interviews and were developed by Mr. Geske and the author (Appendix C). Questions were individually developed, targeting specific areas in which Mr. Geske sought further insight from these key informants. These areas focused on the continuous improvement of the LCHD Vector Control Program and gaining further insight into the existing resources and educational methods of each county, outside of the services already provided by the LCHD.

These questions were also designed to stimulate discussion among the participant, the author, and Mr. Geske pertaining to each individual question. Participants were often asked by Mr. Geske to expand on their responses; this was done primarily as a means of collecting a more detailed response. The key informant interview questions included:

1. What are your county's individuals goals pertaining to vector control and disease prevention?
2. Did you have time to review and consider the information contained in the toolkit?
3. What value do you see in a resource like the toolkit and in the efforts of an organization like the LCHD?
    a. Who do you believe will benefit most from this toolkit?

4. To what degree do you feel your county, and the communities with the county, recognize the impact of vector-borne disease?
    a. To what degree do they recognize the benefits of control efforts?
5. What resources for vector control is your county lacking?
    a. What is keeping you from achieving your vector control goals?
6. Do we make a good enough case (within the toolkit) for you to go to your county board to ask for action on issues such as vector control?
    a. Or to stimulate heightened awareness of State and Government Officials so that informed decision-making can occur?
7. What additional services could the LCHD provide to your county in order to cooperatively achieve these vector control goals?

Implementation of Key Informant Interviews

The four representatives, selected as key informants, were chosen directly by Dave Geske, as he has worked closely with most of these counties since the inception of the LCHD Vector Control Program. His familiarity with these individuals and these counties comes from years of partnership and collaboration. He identified that these individuals, and their respective counties, were a good mix of resources, and that they each shared similarities with other counties that the LCHD serves.

The interview sessions were structured around a series of predetermined questions (Appendix C), and slated to last around forty to forty-five minutes. All interview sessions were scheduled ahead of time through communication with the interview participant, the author, and Mr. Geske. Prior to beginning the interview session each participant was asked to review and sign a consent form, just as in the survey portion

(Appendix B). Also, all interview participants had completed, and submitted, the survey portion of this assessment.

Once again, it is traditionally recommended that the interview segment would precede the survey portion of an assessment such as this, in order to be followed up by more definitive assessment strategies (e.g., survey, group interviews) (Gilmore, 2012, p.37). However, due to scheduling difficulty, as a result of annual budgeting and other job-related obligations (for the key informants, as well as the author), the interviews were conducted following the collection of the surveys. This adjustment to the normality of this process was necessary in regards to timeliness and convenience to both the participants and the continuation of this project.

Rationale for Survey

The survey portion of this needs and capacity assessment was developed to help determine the current capacity of each county, or municipalities within them, regarding their existing resources for vector control, as well as their perceived need for disease prevention. Surveys provide opportunities to obtain thoughtful replies, and respondents can complete the survey when they have time and perspective to give their best answers, rather than responding on the spot to an interviewer's question. According to Dr. Gary Gilmore, "surveys also help eliminate the influence and bias that interviewers bring to telephone or face-to-face surveys" (Gilmore, 2012, p.61).

Development of the Survey

Four sections comprised the survey portion of the assessment, to include: content of the toolkit, use of the toolkit, what is missing from the toolkit, and capacity enhancement. The author and Mr. Geske identified these four areas as the most impactful

towards the vector control efforts of the LCHD, and the areas where they would like to obtain specific feedback through the survey. They then expanded on them, through specific questions within each section; these four sections provided the framework for the survey (Appendix B).

The author and Dave Geske worked together to develop the questions contained in the survey. Through discussion, the two were able to generate questions as they pertained to each of the four sections. The questions, or a series of questions focused on obtaining specific information about each individual section, with the underlining goal of improving the vector control efforts of the LCHD.

The survey was made up of questions using a Likert scale in order to gauge the respondent's degree of agreement, as opposed to asking nominal questions (e.g., yes/no). Multiple-choice questions were used, but were not limited to simply one response (e.g., selecting just one option), and provided the opportunity for the respondent to submit additional information they believed necessary. A short answer questions were also used, allowing a response more tailored towards each specific organization.

Implementation of the Survey

This survey was distributed electronically, via email, following the complete distribution of the toolkit to all eleven counties served by the LCHD. A consent form that detailed the purpose and procedure of this project, along with the participant's rights and confidentiality, accompanied the survey (Appendix B). Participants were asked to review, sign, and return the consent form along with their completed survey. Respondents then completed the survey at their convenience and returned their responses to the author, either by traditional mail or through e-mail. The author requested the

return of the survey within fourteen days, thereby attempting to provide sufficient time for responses.

SECTION III

FINDINGS

Findings Related to the Survey

The survey component of this needs and capacity assessment was completed and returned to the author by a representative from all eleven counties served by the LCHD. These representatives were the individuals that work most closely with vector control, either a Health Officer or an Environmental Health Specialist. The survey was implemented highlighting four areas of interest. These areas included: content of the toolkit, use of the toolkit, what's missing from the toolkit, and capacity enhancement. The author and Mr. Geske individually reviewed the surveys using the process depicted in the "Flowchart for Determining Grouped Findings" (Figure 2.1). The two identified the frequency of responses and searched for common responses and statements. Then, through a collaborative review session, the two were able to identify similarities within their individual findings, resulting in preliminary findings. After taking some time to analyze their collaborative review, one week, the author and Mr. Geske partnered in a final session where they were able to determine the comprehensive ("grouped") findings, resulting from the responses collected.

Content of the Toolkit

All content related questions yielded positive responses (Table 3.1). The responses show that nearly all of the individuals surveyed indentify the toolkit is a useful

resource that can be used to reach out and educate communities, and to stimulate interest in vector-borne disease prevention. All responses denote that the toolkit clearly details vector-borne disease as well as accurately details the severity of vector-borne disease. The toolkit was also viewed as an extremely useful resource toward the development of educational programming and materials.

Table 3.1 Responses Related to Content of the Toolkit, Western Wisconsin, 2013

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
This toolkit clearly details vector-borne disease and the proper protective measures.	**(11)**	-	-	-	-
This toolkit accurately details the severity of vector-borne disease.	**(11)**	-	-	-	-
This toolkit will be a useful instrument in your organizations public health efforts.	**(7)**	**(3)**	**(1)**	-	-
This toolkit will increase knowledge/stimulate interest in vector-borne disease prevention in your county.	**(7)**	**(1)**	**(3)**	-	-
There is value in distributing information (like the toolkit) to reach out and educate members of your community about vector-borne disease.	**(8)**	**(3)**	-	-	-
The contents of this toolkit would be a useful resource towards the development of educational programming/material.	**(9)**	**(2)**	-	-	-

Use of the Toolkit

Analysis showed that all respondents viewed the toolkit being utilized primarily for educational materials (Figure 3.1). Over half also believed the toolkit would be useful for educational programming and trainings. Potentially meaning that a resource like this toolkit could allow these counties (or organizations within them) to develop specified programs, aside from literature, intended to educate and mobilize communities on steps

they can take at an individual level to prevent vector-born disease and illness (e.g., habitat elimination). Additional uses included:

1. Press releases
2. Treatment plans for infected individuals
3. Providing a format for developing educational tools, and trainings for staff members and community groups
4. For use in conducting follow up interviews for reported disease, as an additional informational/educational resource
5. Use of fact sheets to send for follow-up with patients/clients diagnosed and reported through WEDSS; and use of fact sheets and checklists to distribute with letters following mosquito control surveillance

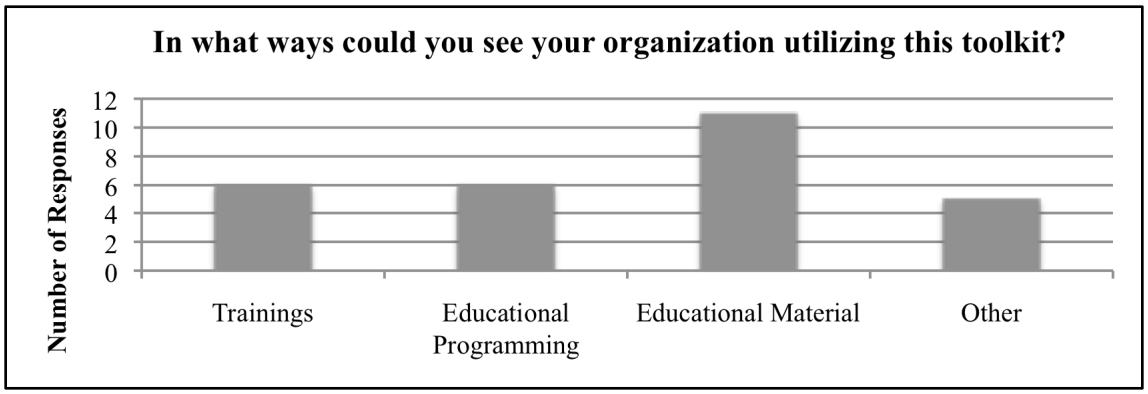

Figure 3.1 Responses Related to Use of the Toolkit, Western Wisconsin, 2013.

What is Missing from the Toolkit?

The responses regarding content or items that could potentially be missing from the toolkit was limited, however a few suggestions were yielded from this section. Information on the endemic nature of Lyme disease in WI was requested particularly including material addressing treatment issues surrounding Lyme disease and Lyme disease testing. PowerPoint templates were also suggested for educational purpose. The final suggestion was that of additional places/partners that these counties could provide

with the information contained within the toolkit, as well as suggested places to circulate this information.

Capacity Enhancement

All counties submitted a response of 'Very High' or 'High' when rating their respective counties recognition of the threat/impact of vector-borne disease, as well as their interest/willingness to implement and use the Toolkit (Table 3.2). However, the average response when asked to rate their respective counties success in achieving its goals pertaining to vector-borne disease and control fell between 'High' and 'Moderate.'

Table 3.2 Responses Related to Capacity Enhancement, Western Wisconsin, 2013

	Very High	High	Moderate	Low	Very Low
Rate your county's recognition of the impact/threat of vector-borne disease.	**(5)**	**(6)**	-	-	-
Rate your county's interest/willingness to implement and use this toolkit.	**(4)**	**(5)**	**(2)**	-	-
Rate your county's success in achieving your goals pertaining to vector-borne disease and control.	-	**(6)**	**(4)**	**(1)**	-

The barriers keeping them from achieving their goals were identified consistently as; personnel, time, and funding (Figure 3.2). Acknowledging that any extra support, outside of that already provided by LCHD, is a rarity due to these insufficient resources.

Figure 3.2 Responses Identifying Barriers of Partner Counties, Western Wisconsin, 2013.

All of the counties served by the LCHD were also asked to rank the priority of vector control within their department and the responses varied slightly (Table 3.3). The two questions related to vector control as a priority seasonally (during summer, and in preparation for summer) yielded responses directed more toward the top of their departments priority list.

Table 3.3 Vector Control as a Priority within Partner Counties, Western Wisconsin, 2013

	Top 1/3 of Priorities	Middle 1/3 of Priorities	Lower 1/3 of Priorities
Seasonally (In preparation for the summer)	**(7)**	**(4)**	**-**
Seasonally (During the summer)	**(7)**	**(4)**	**-**
Annually (Throughout the entire year)	**(2)**	**(6)**	**(3)**

However, when asked about the priority of vector control throughout the year the responses from these counties shifted more towards the lower portion of the spectrum regarding priority of vector control for their respective departments.

When asked what else LCHD could do to assist or complement their counties vector control efforts, responses were:

1. Continue the great work that is already provided, and continue with the existing timeliness of response.
2. Continue to be available (Dave Geske) for speaking engagements with different organizations.
3. Perhaps look into a collaborative partnership with solid waste removal services for items such as tires.

Key Informant Interview/Findings

The review of the key informant interview process produced significant findings as well. These interviews were structured to assess the Vector Control Electronic Toolkit, to uncover the degree to which the residents of these individual counties are willing to collaborate with the LCHD, and to also identify each pre-selected counties

recognition of the services currently provide by the LCHD (Appendix C). Each of the four individuals selected for this process offer a unique perspective on vector control. Obtained through their past and present experience working with the LCHD and the particular populations they serve as a representative for each of their respective counties. As with the review of the survey portion, the author and Mr. Geske used the same process to establish their findings (Figure 2.1). Trend analysis of this qualitative data was used to identify common responses during this process, and although the interview process offered a seemingly consistent series of responses, it also surrendered some unique responses that will serve as an aid in the continuation of work between the LCHD and these counties.

Common goals pertaining to vector control and disease prevention were identified through these interviews. Continuing to maintain and create a safe environment, and educate the population on the risk, severity, and incidence of vector-borne disease were consistently the goals of these counties, in addition to continuing the already established collaborative relationship with the LCHD.

Value of the Toolkit

In regards to the toolkit, all of the individuals interviewed identified it as a valuable resource towards their public health efforts; stating that it was easy to read and navigate, and indicating that a resource such as the toolkit will potentially save their respective counties resources such as time, money, and personnel. Gloria Wall, Crawford County Health Officer, stated, "by having access to a resource like the toolkit, health educators and public health professionals can ensure quality service to the populations they serve due to quick access to quality health related information" (G. Wall, personal

communication, November 18, 2013). Also, all individuals interviewed collectively described the toolkit as having the greatest value to the "general public" as a whole, because of the quantity of information contained within this resource and the ease of circulation of this information within many different population groups and organizations within their communities.

Community Recognition of Vector Control

As intended, these interviews also provided responses pertaining to the degree to which each county recognizes the impact of vector-borne disease, as well the degree to which they recognize the benefits of vector control. As a whole, responses indicated that the communities within all of these counties recognize that vector-borne disease is an issue, but they don't tend to show a large amount of concern unless a significant situation happens to develop (e.g., death, hospitalization). These communities also recognize the efforts of the LCHD through their annual work (e.g., canvassing for tires, treatment of breeding habitat), and the people of these counties are thankful for these particular services. Sharon Nelson, Monroe County Health Officer, stated that the work done annually by the LCHD is "so worth the service, for the minimal cost," when looking at the cost of treating one case of LVE compared to compensating the LCHD for their current vector control services and efforts (S. Nelson, personal communication, November 20, 2013). However, aside form the work currently being done by the LCHD there is not much done by these individual counties and communities within them, due to a regular trend in limited resources. These resources remained very consistent among the counties interviewed as well. All four key informants identified funding, time, and lack of personnel (staff) as the major resources their counties were lacking. These

shortcomings in manpower and work-hours contribute to the inability of these counties to raise awareness and develop educational materials/programming for vector-borne disease.

Push for Further Action

When asked if a resource like the toolkit would be influential in individuals taking steps forward on issues regarding vector control, such as approaching their county board, all key informants indicated that it indeed would. They identified that the toolkit and its contents offer a concise way to approach their county board directly, as well as serve as an aid in the development of additional materials. Gloria Wall, Crawford County, believes that the toolkit can also allow county boards and other individuals within the community to educate one another, and mobilize others by stimulating interest in vector control within communities (G. Wall, personal communication, November 18, 2013).

Continuing a Collaborative Partnership

Overall, these key informants indicated they were very satisfied by relationship with the LCHD, recognizing that Dave Geske has always been willing to work and communicate with them punctually if ever a situation were to arise. All of them expressed their desire and excitement to continue their collaborative relationship with the LCHD, and Mr. Geske. Although funding and other lacking resources are a consistent trend throughout all counties, the work of the LCHD does not go unnoticed and all of the individuals interviewed expressed their gratitude toward the LCHD and Dave Geske. Sharon Nelson, Monroe County, concluded her interview session by thanking Dave, and the LCHD as a whole, for thirty-six great years of collaboration and partnership. She also stated that she looked forward to continued collaboration with La Crosse County, as

well as all other counties served by the LCHD, regarding vector control issues and services (S. Nelson, personal communication, November 20, 2013).

Reviewing Evaluation Criteria

The focus of this project was the existing knowledge and awareness of the counties served by the LCHD regarding vector-borne disease and disease control. The responses received through the survey portion of this assessment, as well as the key informant interview sessions, were evaluated by using the purpose of the needs and capacity assessment as guidance. The author and Mr. Geske sought to evaluate the Vector Control Toolkit, and gauge the needs and capacity of the counties served by the LCHD regarding their existing vector control resources. Along with determining the degree to which the counties served by the LCHD were willing to collaborate with La Crosse County, and identifying the degree to which those counties recognize the services currently being provided by the LCHD.

Difficulties

Throughout the process of this needs and capacity assessment, there were a few situations that arose and presented challenges (Table 3.4).

Table 3.4 Difficulties Encountered Throughout a Needs and Capacity Assessment of an Eleven County Service Area, Western Wisconsin, 2013

	Difficulties Encountered
1.	Changes/reordering of staff within other counties.
2.	Electronic communication with representatives from other counties.
3.	Introducing needs and capacity assessment electronically.
4.	Technological issues with opening and resending items via email.
5.	Prior work related commitments and obligations of targeted respondents (e.g., finalizing annual budget)

Changes of staff and reordering of staff within a couple of the counties included in this assessment offered significant difficulty while attempting to communicate with

representatives from these counties and retrieve submission of a completed survey. Electronic communication proved to be a challenge at times, as well, particularly when introducing and identifying the purpose of this assessment and the survey. Difficulty opening and resending the attachments of the initial introductory email provided an understanding that a significant amount of the targeted respondents did not effectively receive the proper information pertaining to the assessment and survey portion in particular. By conveying the importance of this assessment through Dave Geske, and by having him reach out to all targeted respondents, the author was then able to collect the surveys in a more timely manner.

Also posing a problem to the collection of surveys and the scheduling of key informant interviews were the issues of many respondents who were facing the demands of prior obligations and work-related commitments, including the finalization annual budgets. The author received many emails and apologies from respondents identifying their priorities to complete budget related obligations before they would be able to successfully complete, and submit, their survey or schedule a meeting time for a key informant interview.

Other Findings

Through the needs and capacity assessment and the collaborative process used to determine the comprehensive findings from the assessment, the author and Dave Geske developed some additional findings. These findings developed indirectly, as a result of the extensive dialogue with Dave Geske throughout this project. The two viewed these findings as relevant toward the continued improvement of the services provided by the

LCHD, despite not being directly aligned with focus of the assessment. The other findings include:

1. This assessment stimulated interest, particularly with key informants, in enhancing communication with their local boards of health. They found themselves more comfortable with vector-borne disease and believed that a resource like the toolkit would aid them in approaching their county board, or local board of health with more confidence.
2. The counties served by the LCHD relied heavily on the LCHD for vector control services. Most counties really lack personnel with a large amount of experience or knowledge pertaining to vector control. They may have individuals with interest and some knowledge of vector control, however none have a staff member with expertise in vector control (e.g., Dave Geske, Vector Ecologist).
3. All of the counties recognized the toolkit as a great educational resource and a means for heightening awareness and knowledge within their communities. Also, more rural counties identified a particular willingness within small communities and community organizations to circulate educational information, like that of the toolkit.

Summary of Findings

The review of the needs and capacity assessment by the author and Mr. Geske yielded valuable results (Table 3.5). A representative from all eleven counties, served by the LCHD, successfully completed and submitted the survey. The representative from all eleven counties identified the toolkit as a useful resource, acknowledging ease of navigability and value as an educational resource as strong points. Also, all eleven

counties viewed the toolkit as a valuable resource as an educational tool, particularly for creating and distributing educational materials.

All eleven counties recognized the threat of vector-borne disease and expressed interest in utilizing the toolkit within their county. Vector control was also identified as a seasonal priority, with all eleven counties ranking it in the top 1/3 (7 of 11) or middle 1/3 (4 of 11) of their counties priorities both during summer and in preparation for summer. However, as an annual priority vector control fell as a priority within their county, top 1/3 (2 of 11), middle 1/3 (6 of 11), lower 1/3 (3 of 11).

Overall, the individual county health departments served by the LCHD recognize vector control as an issue, and even a priority within the communities that make up these counties. The major barrier keeping these counties from achieving their vector control goals however, are their limited resources (e.g., time, money, personnel). Responses yielded a very positive attitude toward the collaborative partnership with the LCHD, as well as the relationship these counties have with Mr. Geske. Representatives from these counties expressed a willingness to collaborate with the LCHD, and provide feedback useful to the continued development of educational resources such as the toolkit.

Findings Related to the Toolkit

As a portion of this project sought to assess the current services provided by the LCHD, the importance of evaluating the LCHD Vector Control Electronic Toolkit, and its continuation as an evolving document, became quite apparent. Proposals for additional elements resulted from direct questions asked during the assessment. These responses evolved into recommendations for continued refinement of the toolkit (Table 3.5).

Table 3.5 Summary of Findings and Toolkit Revisions/Recommendations, Western Wisconsin, 2013

Survey	Key Informant Interviews	Revisions/ Recommendations for the Vector Control Electronic Toolkit
Content of the Toolkit • 10 out of 11 individuals surveyed identified the toolkit as a useful resource. • All 11 respondents stated toolkit clearly details vector-borne disease. • All 11 respondents viewed the toolkit as an extremely useful resource for developing educational programming and material.	Value of the Toolkit • All 4 individuals interviewed o Identified toolkit as a valuable resource toward their public health efforts. o Stated the toolkit is easy to read and navigate, resource like toolkit will save their county on resources (e.g., time, personnel, money). o Believed it had great value to the general public as a whole because it can be applied universally within their counties.	Content of the Toolkit • Include an educational component • Suggested partners health departments can team with • Educational PowerPoint templates • Annual updating of statistics and disease trends
Use of the Toolkit • All 11 respondents saw toolkit being used primarily for educational materials. • 6 of 11 believed toolkit would be useful for educational programming and trainings.	Community Recognition of Vector Control • All 4 individuals interviewed: o Acknowledge that communities within their respective counties recognize that vector-borne disease is an issue, but do not show concern unless a significant situation arises. o State that communities also recognize that annual work done by the LCHD. o Identify that individual counties do not (cannot) do a lot aside from the services provided by the LCHD because of limited resources. o Recognized that their respective counties are lacking time, money and personnel	Use of the Toolkit • With the addition of an educational component o Use as a resource for developing educational material, among individuals with little or no health education experience

Table 3.5 Summary of Findings and Toolkit Revisions/Recommendations, Western Wisconsin, 2013, Continued.

What is missing from the toolkit? • Information regarding the endemic nature of Lyme disease in WI was requested. • Information regarding Lyme disease testing • PowerPoint templates were also suggested for educational purposes. • Providing information pertaining to additional places/partners to provide with vector related information.	Push for Further Action • All 4 interviewees indicated: o That a resource like the toolkit would be influential in taking steps forward on issues regarding vector control. o Value in the toolkit and its contents as a concise way to approach their county board directly, and as an aid in developing materials to do so.	What is missing from the toolkit? • Additional documents continuing both educational information, and information on the endemic nature of Lyme disease • A section addressing the treatment issues surrounding Lyme disease and testing for Lyme disease. • Literature tailored more specifically towards school-aged children. • PowerPoint templates, or links to PowerPoint templates, for educational use. • Annual updating of disease information and statistics.
Capacity Enhancement • All 11 counties recognized the threat/impact of vector-borne disease. • All 11 counties expressed interest/willingness to implement and use the Toolkit. • The average response of counties when rating their success regarding achieving vector-borne disease and control was between 'High' (6 of 11) and 'Moderate' (4 of 11). • Barriers identified in keeping counties from achieving their vector control goals were personnel, time, and funding. • All 11 counties identified vector control as a priority, ranking in the top 1/3 or middle 1/3 of their counties priorities during the summer and in preparation for summer. • Annually vector control fell on the priority list of these counties o Top 1/3 (2 of 11) o Middle 1/3 (6 of 11) o Lower 1/3 (3 of 11)	Continuing a Collaborative Partnership • All 4 individuals interviewed: o Identified that their relationship with the LCHD has been great. o Acknowledged that Dave Geske has always been willing to work with them whenever a situation may arise. o Expressed excitement and desire to continue to collaborate.	Capacity Enhancement • The addition of documents detailing community action and ways local health departments can effectively circulate information contained within the toolkit. • Suggested places/partners health departments can team with to strengthen vector control efforts. • A guidance system for the development of a community health education program. Including easily accessible recourses outside of the LCHD.

Aside from the survey and key informant interview portions of the needs and capacity assessment, dialogue continued between the author, Dave Geske, and Dr. Gary Gilmore, and from these communications developed additional findings (Table 3.5). Dr. Gary Gilmore brought these findings to the surface by referencing the fact that the LCHD Vector Control Electronic Toolkit was created to be an informational and educational resource. The toolkit was intended to serve as a resource for the counties served by the LCHD, but its use should not be limited to health educators or those with health education experience. However, at its current stage the resource provided an abundance of quality information, but was lacking an educational component. To maximize the use and potential of the toolkit, an additional educational component of some sort would need to be added. A component such as this would allow the potential for the toolkit to mobilize people, outside of just health educators, to distribute vector related information and to educate others.

SECTION IV

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This graduate project was a collaborative effort with the Vector Control Division of the La Crosse County Health Department to assess the needs and capacity of the counties they serve on their existing awareness of vector-borne disease and control, and their receptivity to the services currently provided by the LCHD. The author, under the supervision of Dave Geske and Dr. Gary Gilmore, developed a two-phase needs and capacity assessment. This assessment contained a survey portion, as well as a four key informant interviews. This assessment identified the specific areas of need and interest of these counties, and helped identify proper steps the LCHD can take on a county-by-county basis in order to meet their needs. Also, it served as a reminder to these counties that their cooperative work and collaboration with the LCHD is a continuous partnership, and is more than a contractual agreement between counties.

In addition to assessing the counties served by the LCHD, segments of this assessment were designed to evaluate the La Crosse County Vector Control Toolkit. The toolkit was evaluated on its content, use, ability to enhance capacity regarding vector control, and for any missing or additional material, as suggested by those that were assessed.

Following the completion of all key informant interviews and the collection of all completed surveys, the author and Mr. Geske were able to begin the process of determining the grouped findings from the needs and capacity assessment. From these findings, they then were able to develop conclusions, which emanated directly from the findings. Recommendations for the refinement and continuation of the Vector Control Toolkit also came as a result of these grouped findings, through the responses gathered during the needs and capacity assessment. Immediate revisions and additions to the toolkit also took place as a result of continued discussions between the author, Dave Geske, and Dr. Gary Gilmore.

Conclusions

The conclusions, initially drafted by the author and Mr. Geske, were established directly from the findings of the needs and capacity assessment. However, following their development the two came to a unique realization. The conclusions very closely resembled three of the ten essential public health services. Those being: inform, educate, and empower people about health issues; mobilize community partnerships and action to identify and solve health problems; and develop policies and plans that support individual and community health efforts (CDC, 2014).

Conclusion I

Aside from the current work done annually by the LCHD, they must continue to educate the population they serve on vector-borne disease and illness. This includes providing them with resources such as the toolkit, rich with accurate and reliable scientific information. The needs and capacity assessment disclosed that all participants identified the toolkit as a helpful resource toward their counties vector control efforts; it

also was viewed as an extremely useful resource for developing educational materials. Shortcomings in staff, time, and funding were all barriers that were identified through the needs and capacity assessment. In addition, key informant interviews reveled that these individuals believed that the toolkit itself was vey easy to read and navigate, and that resources such as the toolkit would allow their counties to conserve these already lacking resources.

These barriers become punctuated when looking at where vector control ranks as an annual priority within these individual counties, with 9 out of the 11 counties served by the LCHD responding that vector control ranks in the middle, to lower 1/3 of annual priorities for their county.

With vector control ranking so low as an annual priority within these counties, the ability to circulate high quality information to educate and protect the people of these counties comes at a premium. Having resources like the vector control toolkit, containing an abundance of vector related material, is extremely helpful when lacking time and personnel within a department. By the LCHD continuing to create and provide quality resources, these counties will maintain access to valuable information and as a result, they will be able to more efficiently develop educational materials and programming, and better educate and protect their individual counties and communities on issues regarding vector-borne disease and illness.

Conclusion II

All of the counties served by the LCHD recognize the threat of vector-borne disease. Key informant interviewees believed that while there is an understanding that vector-borne disease is an issue, individuals often show very little concern unless

significant situations arise (e.g., illness, hospitalization, death) as a result of vector-borne disease.

Although all eleven counties served by the LCHD are geographically similar, what comprises these counties is very unique (e.g., total population, sizes of cities, vector control activity). The key informant interview process identified that the counties, and communities within them, in the service area of the LCHD tend to show little concern regarding the impact of vector-borne disease, and do not fully understand the health and financial impact associated with vector-borne disease. Individual counties and communities need to consider the preventative steps that can be taken, at the individual and community level, to protect one another from such illness. They must also recognize the portions of their population with greatest level of vector exposure, like those who inhabit rural areas and spend more time outdoors, and target these groups more diligently.

Understanding that resources (e.g., time, funding, personnel) are lacking in most of these counties, their collaboration and communication with the LCHD and the counties around them is vital. By consolidating these resources between counties, individual counties could work together as a stronger unit to deliver their message about vector control as a means of protecting a greater population.

Conclusion III

A contributing factor to the lack of resources (e.g., time, money, personnel) of the counties served by the LCHD is the priority of vector control within their respective county. Annually, vector control was not identified as a very high priority within these counties resulting in the limited resources, this translates from the local and county level to the state level as well. One way to promote vector control as a priority is to reach out

to all levels of government, and those who influence policy. This could include elected government officials (e.g., governors, city council members, school board members), corporate figures (e.g., CEOs, board of director members), and nonprofit figures (e.g., teachers, faith-based leaders) (CDC, 2014).

By increasing the effort to educate and inform policy makers of these counties (e.g., county boards, elected government) awareness could be raised regarding vector-borne illness and disease prevention. Other influential individuals are those who represent a variety organizations and businesses within the community, such as physicians, nurses, coaches, teachers, and law enforcement. Communicating with these groups, and educating them on the harmful effects of vector-borne illness can greatly increase the likelihood of positive action, to include their voicing support.

All individuals represented in the key informant interview portion of this project stated that a resource like the toolkit greatly increased their confidence in approaching policy makers within their individual counties. They also stated that the toolkit not only served as an educational tool for the general public and as a resource for public health professionals, but as an excellent way to approach those who influence decision and policy making within their counties.

Recommendation I

Each county should promote the vector control toolkit to all of its communities. Since it is an existing resource, doing so could potentially save on resources that may already be limited. The LCHD should continue to maintain active communication with the counties it serves and inquire often about any additional resources that may be useful for their individual vector control efforts. This communication might disclose interests or

requests shared by multiple counties. It also will allow for the continued development and strengthening of current resources available through the LCHD.

Mr. Geske could accept the duty of continuing to develop these resources personally, or he could enlist the skills of student help and oversee the development of these additional resources, and review these resources for content before their distribution. Student help could consist of seasonal help such as a summer vector control monitor, or perhaps a graduate or undergraduate student seeking a preceptorship experience.

Recommendation II

Collaboration does not have to be limited to interaction within county health departments. The LCHD should encourage the counties they serve to initiate communication with other community organizations, such as solid waste removal, to organize preventive efforts (e.g., recycling, tire removal, tire pick-up); as well as provide community organizations (e.g., boy scouts, girl scouts, 4H, park and recreation departments) with guidance on fostering and promoting preventive vector control measures. Once again, understanding the limited resources of these counties, making the effort to aid in the elimination of habitat that harbors breeding sites for potentially harmful vectors could contribute greatly to the reduced exposure of populations to harmful vectors. Individually most of these counties do not have the means to organize such efforts, but collectively the LCDH and these counties can work together to strengthen their vector control efforts and help eliminate vector-borne disease and vector activity within their communities.

Recommendation III

By the LCHD serving as a resource and continuing to provide these counties with good scientific information, and positive steps for action, they could stimulate these counties to begin working to enact change regarding vector control. The LCHD should encourage the counties it serves to consider developing a plan between health educators and other public health professionals to approach their county board of health regarding issues such as the ability for health officers or sanitarians having the right to more strictly enforce restrictions regarding unsightly properties, tire removal, and vector habitat elimination.

Recommendations for Continued Refinement of the Toolkit

Recommendations for the refinement and continuation of the LCHD Vector Control Toolkit emanated from the results of the needs and capacity assessment. From its inception, this toolkit was intended to be an evolving resource, meaning that the document is never complete and is always open to additional information, as well as being kept up to date with current disease trends and changes within the region and across the country. Continuing to improve the toolkit through the addition of new documents, and with up-to-date material, is vital to its success and effectiveness as an informational and educational resource.

These recommendations include:

1. The development and addition of documents containing information on the endemic nature of Lyme disease.
2. Developing an additional section addressing the treatment issues surrounding Lyme disease and testing for Lyme disease.

3. The addition of literature tailored more specifically towards school-aged children.
4. The addition of PowerPoint templates, or links to PowerPoint templates, for educational use.
5. Annually updating disease information and statistics.

Summary of Recommendations for the Toolkit

The recommendations are intended to acknowledge the appropriate next steps, as disclosed by the needs and capacity assessment, in the continued development of the toolkit. These recommendations resulted from the descriptive analysis of the data collected during both segments of the needs and capacity assessment, the survey and key informant interviews. The four specific areas of the survey directed the refinement of the toolkit, as well as detailed discussion between the author and Mr. Geske. Responses from the key informant interviews were also reviewed, however these sessions served as more of a guideline for amending the LCHD Vector Control program as a whole, not specifically the toolkit. The final recommendations were determined necessary by the volume of response collected through the needs and capacity assessment, and through communication between the author and Mr. Geske pertaining to what refinements were most practical, as well as most achievable given the capacity of the LCHD. Once again, these recommendations are intended to contribute to the continued improvement and evolution of the toolkit.

Immediate Additions and Revisions to the Toolkit

Through the continued communication among the author, Dave Geske, and Dr. Gilmore, the need arose for the inclusion of an educational component in the LCHD Vector Control Electronic Toolkit. The entire purpose of the toolkit was to serve as an

informational and educational resource, and aid in the vector control efforts of the LCHD. The needs and capacity assessment disclosed that the toolkit contained great value for creating educational materials and programs, but not everyone had the training regarding how to develop an educational program. During the time of this project, however, the toolkit appeared mostly an informational resource, with its use as an educational tool potentially relating to those with health education experience. To maximize the potential use of the toolkit, an additional educational component was added to benefit municipal professionals, outside of health educators, who would be using this resource.

This component provides a guidance system for individuals with little to no health education experience. It serves as a model for the development of a community health education program, in addition to providing references to helpful and easily-accessible resources for developing a health education program. This component offers those with little to no health education experience a better means of applying the array of information contained within the toolkit

Additionally, added to the toolkit was a component focused on community action and ways local health departments could more effectively disseminate the information contained within the toolkit. This included partners that health departments, and other municipal professions, could collaborate with to strengthen vector control efforts.

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KEY INFORMANT INTERVIEWS

Jill Johnson (Environmental Services Director, Winona County). Interview conducted: November 19, 2013.

Troy Moris (Registered Sanitarian (R.S.), Environmental Health Coordinator, Grant, Iowa, Lafayette, Richland, and Vernon Counties). Interview conducted: November 21, 2013.

Sharron Nelson (Health Officer, Monroe County). Interview conducted: November 20, 2013.

Gloria Wall (Health Officer, Crawford County). Interview conducted: November 18, 2013.

APPENDIX A

INFORMED CONSENT AND CONFIDENTIALITY AGREEMENT

Protocol Title: The Further Refinement of the La Crosse County Vector Control Electronic Toolkit Based Upon Partner Feedback in a Western Wisconsin Service Region.

Principal Investigator: Adam Berg
315 South 3rd Street, Apt. 435
La Crosse, WI 54601

Purpose and Procedure

- The purpose for this research project is to increase the collaborative disease control and prevention efforts of the La Crosse County Health Department, and the counties it serves, though vector control.
- This specific research project is a needs and capacity assessment of the counties served by the La Crosse County Vector Control Division.
- This assessment will contribute to the refinement of the vector control toolkit, as well as recognizing and improving communication with each individual county and partnering agencies.
- This assessment consists of a survey, which all of the counties will be asked to complete and return to the researcher. As well as, selected key informant interviews.
- This survey should take about 15 minutes to complete and each participants submission will remain completely confidential
- Detailed and specific responses are greatly appreciated.

Rights & Confidentiality

My participation is voluntary. I can withdraw or refuse to answer any question without consequences at any time. I can withdraw from the study at any time for any reason without penalty.

The results of this study may be published in scientific literature or presented at professional meetings using grouped data only. All information will be kept confidential and data will not be linked with personally identifiable information.

Questions regarding study procedures may be directed to:

Adam Berg	Dr. Gary D. Gilmore	Dave Geske,
Graduate Student	Graduate Project Advisor	Vector Control Manager
UW-La Crosse	UW-La Crosse	La Crosse County
(715) 797-4881	(608) 785-8163	(608)785-9727
berg.adam@uwlax.edu	ggilmore@uwlax.edu	dgeske@lacrossecounty.org

Participant_____ Date_____

Researcher_____ Date_____

APPENDIX B

VECTOR CONTROL SURVEY

OF THE WESTERN WISCONSIN SERVICE REGION

Vector Control Survey

of the Western Wisconsin Service Region

The Vector Control Division of the La Crosse County Health Department would greatly appreciate if you could take a few minutes to complete the following assessment, as it will be used as a means of continued improvement of the services provided by La Crosse County, as well as, the continued development and improvement of the Vector Control Electronic Toolkit. The primary goal of this assessment is to improve disease prevention through vector control.

Content of the Toolkit

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
This toolkit clearly details vector-borne disease and the proper protective measures.	5	4	3	2	1
This toolkit accurately details the severity of vector-borne disease.	5	4	3	2	1
This toolkit will be a useful instrument in your organizations public health efforts.	5	4	3	2	1
This toolkit will increase knowledge/stimulate interest in vector-borne disease prevention in your county.	5	4	3	2	1
There is value in distributing information (like the toolkit) to reach out and educate members of your community about vector-borne disease.	5	4	3	2	1
The contents of this toolkit would be a useful resource towards the development of educational programming/material.	5	4	3	2	1

Use of the Toolkit

In what ways could you see your organization utilizing this toolkit? Please be specific.

b. Trainings

c. Educational Programming

d. Educational Materials

e. Other: _____

What is missing from the Toolkit?

From your organizational standpoint what else do you believe should be included in this toolkit? Please be specific.

a. Trainings

b. Educational Programming

c. Educational Materials

d. Other: _____

Capacity Enhancement (Please be specific)

	Very High	High	Moderate	Low	Very Low
Rate your county's recognition of the impact/threat of vector-borne disease.	5	4	3	2	1
Rate your county's interest/willingness to implement and use this toolkit.	5	4	3	2	1
Rate your county's success in achieving your goals pertaining to vector-borne disease and control.	5	4	3	2	1

What barriers are keeping you from achieving your vector control goals as a county (e.g., personnel, time, funding)?

a. Personnel

b. Time

f. Funding

g. Other: _____

Outside of the toolkit, what else could the La Crosse County Health Department do to assist or complement your organization's vector control efforts?

How would you rate the priority of vector control in your department?
(Please check one box for each)

	Top 1/3 of Priorities	**Middle 1/3 of Priorities**	**Lower 1/3 of Priorities**
Seasonally (In preparation for the summer)			
Seasonally (During the summer)			
Annually (Throughout the entire year)			

APPENDIX C

KEY INFORMANT INTERVIEW QUESTIONS

Key Informant Interview Questions

1. What are your county's individual goals pertaining to vector control and disease prevention?

2. Did you have time to review and consider the information contained in the toolkit?

3. What value do you see in a resource like the toolkit and in the efforts of an organization like the La Crosse County Health Department (LCHD)?

    a. Who do you believe will benefit most from this toolkit?

4. To what degree do you feel your county, and the communities within the county, recognize the impact of vector-borne disease?

    a. To what degree do they recognize the benefits of control efforts?

5. What resources for vector control is your county lacking?

    a. What is keeping you from achieving your vector control goals?

6. Do we make a good enough case (within the toolkit) for you to go to your county board to ask for action on issues such as vector control?

    a. Or to stimulate heightened awareness of Local and State Officials so that informed decision-making can occur?

7. What additional services could the LCHD provide to your county in order to cooperatively achieve these vector control goals?

APPENDIX D

LA CROSSE COUNTY VECTOR CONTROL ELECTRONIC TOOLKIT

La Crosse County Vector Control Electronic Toolkit

An Educational Toolkit on Mosquito and Tick-Borne Disease

Provided by: The Vector Control Division of the La Crosse County Health Department

Health Department
County of La Crosse, Wisconsin
300 4th Street North • 2nd Floor
La Crosse, Wisconsin 54601-3228
(608) 785-9872 • FAX: (608) 785-9846
http://www.co.la-crosse.wi.us/Health/

Public Health
Prevent. Promote. Protect.

INTRODUCTION

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

This La Crosse County Vector Control Electronic Toolkit was developed as an informational and educational resource, intended to enhance the vector-borne disease control and prevention efforts of the La Crosse County Health Department (LCHD) and the counties they serve. The Vector Control Division of the LCHD works in collaboration with La Crosse, Monroe, Vernon, Crawford, Trempealeau, Pierce, Dunn, St. Croix, La Fayette, Jackson, Houston (MN), and Winona (MN) Counties, as well as the Ho-Chunk Nation.

This toolkit aims to provide up-to-date information to local health departments, nongovernmental organizations, and local authorities containing educational material and standards for preventing and controlling vector-borne diseases. This resource also provides scientific information outlining the burden of vector-borne disease, transmission, symptoms, and treatments, along with specific guidelines on the prevention and control of these diseases.

The La Crosse County Vector Control Electronic Toolkit was created so educational information could be shared with multiple audiences and in various settings within a community. Potential audiences could include:

- Hikers and or campers
- Local government
- Employers
- Boy and Girl Scouts
- Park and recreation departments
- Hunters
- Schools (elementary, middle and high school)
- Hospitals and health clinics
- General public

Also contained within this toolkit is a planning model, and additional resources, intended to assist with the independent development of a community health educational program. This toolkit is intended to be used as a resource for strengthening vector control efforts, be sure to utilize and distribute its contents, as you feel necessary, as it has been developed for such a purpose.

The control of tick and mosquito-borne diseases represents a major challenge to those in the La Crosse area and neighboring countries. It is with hope, that this resource will facilitate the coordination of vector-borne disease control activities between all agencies working in this region.

For additional information or questions, communicate directly with the Vector Control Division of the La Crosse County Health Department.

Table of Contents

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Ticks of Wisconsin

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

American dog tick

(*Dermacentor variabilis*)

Disease: RMSF

Blacklegged tick

(*Ixodes scapularis*)

Diseases: Lyme, Anaplasmosis, and Babesiosis

Lone star tick

(*Amblyomma americanum*)

Diseases: Ehrlichiosis, Tularemia, and STARI

Brown dog tick

(*Rhipicephalus sanguineus*)

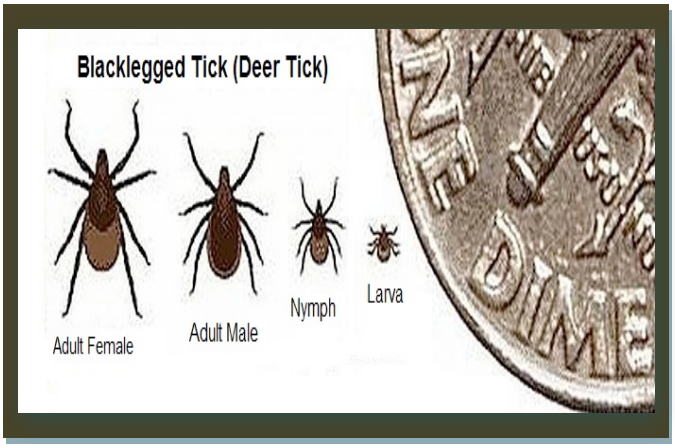
Diseases: RMSF

Lyme Disease

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Lyme disease?

Lyme disease is an infection caused by the bacterium, *Borrelia burgdorferi* and is transmitted through the bite of a black legged tick (deer tick).



What are the Symptoms?

Early Lyme -- 3-30 days post-tick bite

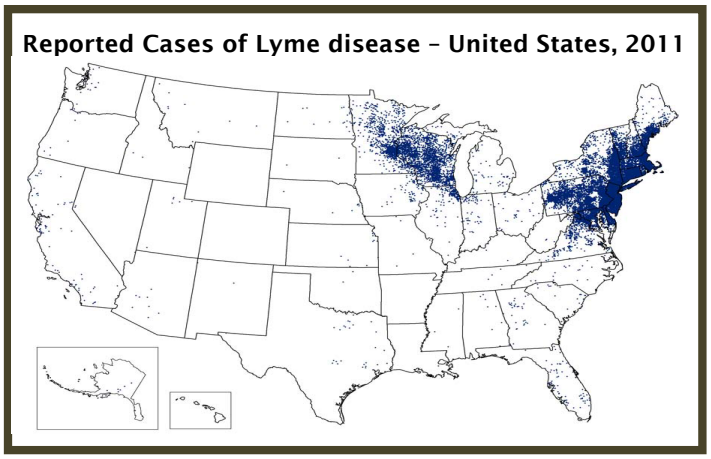
- "Flu-like symptoms"
- Bulls-eye rash (Erythema Migrans)
- Stiff neck
- Headache
- Fever
- Chills
- Swollen lymph nodes
- Fatigue
- Muscle aches
- Joint pain

Late Lyme -- months-years post-tick bite

- Arthritis
- Facial paralysis
- Meningitis
- Hearing loss
- Severe fatigue
- Numbness in arms/hands or legs/feet
- Short term memory loss

When early symptoms go undetected or ignored it is possible to develop late-stage symptoms. Refer to the resource section of this article for further information on the signs and symptoms of Lyme disease.

Lyme disease is the most commonly reported vector-borne illness in the United States. In Wisconsin, the highest number of cases is seen in the western region, but in recent years, cases have increased in the central region and eastern region. It is the highest reported tick-borne disease in Wisconsin, with more than 25,000 cases reported between 1980 and 2011.



How is it transmitted?

Lyme disease is transmitted when an infected tick attaches to the human body, usually at the armpit, groin, or scalp, and is attached for 36-48 hours or more. The majority of infections are caused from immature ticks, called nymphs. Nymphs are very small (less than 2mm), and feed during the spring and summer months. The larger, adult ticks can also transmit Lyme disease, typically during the cooler months of fall.

How Prevalent is Lyme disease?

In 2011, 96% of Lyme disease cases were reported from 13 states: Connecticut, Delaware, Maine, Maryland, Massachusetts, **Minnesota**, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, Virginia, and **Wisconsin**.

What are the treatments?

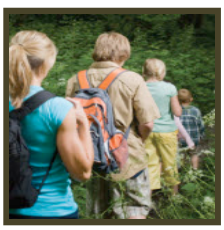
Antibiotics

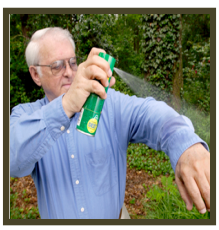
Oral antibiotics are the standard early treatment for Lyme disease. Individuals older than 8 years old typically receive doxycycline. Younger children, and breastfeeding or pregnant women usually receive amoxicillin, or cefuroxime. A 14 – 21 day antibiotic treatment is standard. In some situations intravenous antibiotics are recommended.

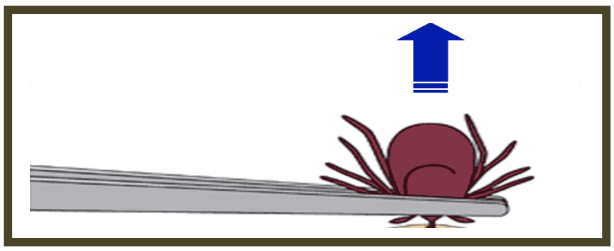
How do I prevent Lyme disease?

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

- Avoid areas where there is a high concentration of ticks- wooded and brushy areas with high grass.
- Stay on cleared, well-traveled trails.
- Use insect repellents containing at least 20% DEET.
- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.







How do I remove a tick?

- Using tweezers, grasp the tick's mouthparts as close to the skin as possible.
- Gently pull the tick straight out, using a firm steady motion.
- Wash your hands and the bite site with soap and water. Apply an antiseptic to the bite site.
- If you experience flu-like symptoms within 2-3 weeks after being bitten by a tick, or after having been in an area where ticks are present, see your doctor or health care provider.

Myths about Lyme

MYTH #1- The best way to remove a tick is with a lit match, fingernail polish, or petroleum jelly.

Fact: None of these methods cause the tick to "back out," and all of them may actually result in the tick depositing more disease carrying saliva into the wound, increasing the risk of infection.

MYTH #2- Ticks live in trees, so as long as I don't live near or visit a wooded area, I don't have to worry about them.

Fact: Ticks live on the ground, regardless of where you are. Ticks often crawl up from grass blades onto humans, migrate upwards, which is why they're often found on the scalp.

For further information

Please refer to the following sources for more information on Lyme disease.

- **Wisconsin Department of Health Services**
  http://www.dhs.wisconsin.gov/communicnble/Tickborne/Lyme/Index.htm
- **Centers for Disease Control and Prevention**
  http://www.cdc.gov/lyme/
- **International Lyme and Associated Disease Society**
  http://www.ilads.org/lyme_disease/about_lyme.html

ANAPLASMOSIS

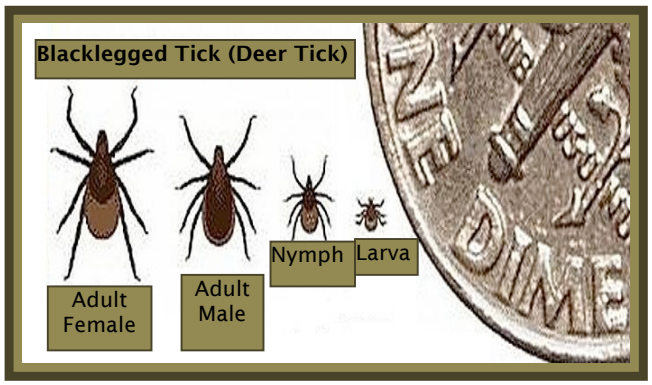
La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Anaplasmosis?

Anaplasmosis is an infection caused by the bacteria, *Anaplasma phagocytophilum*. The bacterium infects certain types of white blood cells called granulocytes.

How is it transmitted?

In Wisconsin, Anaplasmosis is transmitted to humans through the bite of an infected blacklegged tick (deer tick), the same tick that causes other tick-borne diseases in Wisconsin, including Lyme disease. Ticks become infected with the bacterium when they bite an infected wild rodent. If that tick later bites a human, the tick may transmit the bacterium to the person. Dogs

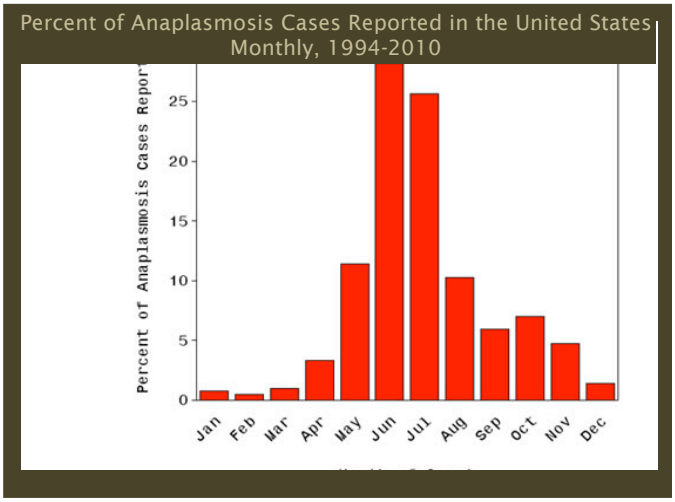


Where do cases of occur?

In the United States, Anaplasmosis is most commonly found in the Northeast, mid-Atlantic and upper Midwest. Six states (New York, Connecticut, New Jersey, Rhode Island, Minnesota, and Wisconsin) account for 90% of all Anaplasmosis cases. In Wisconsin, HGA is the second most reported tick-borne disease and can be found throughout the state.

When am I at risk?

In Wisconsin, reports of Anaplasmosis illnesses are usually seen from spring through autumn when the ticks are active. The highest number of infections is reported between May and July. Illness occurs more frequently in adults than in children.



What are the symptoms?

Symptoms of Anaplasmosis generally include: fever, headache, chills, muscle aches, and fatigue. Less commonly, people may have abdominal pain, nausea, vomiting, diarrhea, cough, and joint aches.

The symptoms of Anaplasmossi usually begin to appear 7 to 14 days after being bitten by an infected tick.

If not treated, Anaplamosis can be serious illnesses, and occasionally can even be fatal. Signs of severe illness may include difficulty breathing, hemorrhage, renal failure, or neurological problems.

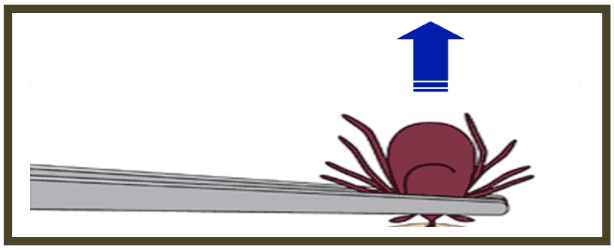
What are the treatments?

Anaplasmosis can be successfully treated with antibiotics. Persons generally begin to feel better within one to two days of starting antibiotic treatment.

How can I prevent Anaplasmosis?

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

- Avoid areas where there is a high concentration of ticks- wooded and brushy areas with high grass.
- Stay on cleared, well-traveled trails.
- Use insect repellents containing at least 20% DEET.
- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.



How do I remove a tick?

- Using tweezers, grasp the tick's mouthparts as close to the skin as possible.
- Gently pull the tick straight out, using a firm steady motion.
- Wash your hands and the bite site with soap and water. Apply an antiseptic to the bite site.
- If you experience flu-like symptoms within 2-3 weeks after being bitten by a tick, or after having been in an area where ticks are present, see your doctor or health care provider.

For Further Information

Please refer to the following sources for more information on Anaplamosis.

- **Wisconsin Department of Health Services**

  http://www.dhs.wisconsin.gov/communicable/TickBorne/AnaplasmosisEhlrichiosis.htm

- **Centers for Disease Control and Prevention**

  http://www.cdc.gov/anaplasmosis/

- **American Lyme Disease Foundation**

  http://www.aldf.com/Anaplasmosis.shtml

- **Minnesota Department of Health Services**

  http://www.health.state.mn.us/divs/idepc/diseases/anaplasmosis/index.html

EHRLICHIOSIS

Vector Control

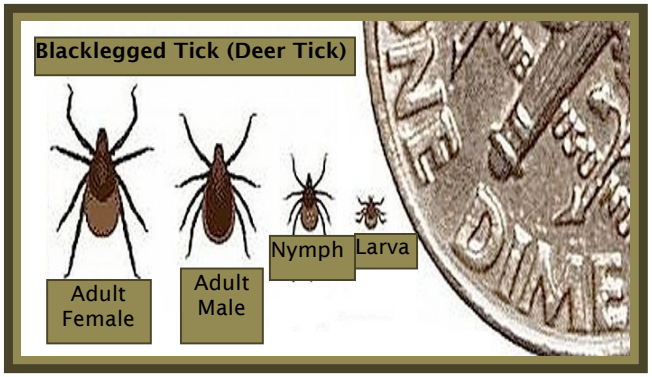
La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Ehrlichiosis?

Ehrlichiosis is a rare, sometimes severe, and occasionally fatal tick-borne disease caused by a bacterium that infects white blood cells causing illness in humans and animals.

How is it transmitted?

Ehrlichiosis is caused by three different bacterium species: *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, and *Ehrlichia muris.* The bacterium can be transmitted by the bite of an infected deer tick and lone star tick. The tick is carried by meadow voles, mice and deer.



Who gets Ehrlichiosis?

Everyone is susceptible to Ehrlichiosis, but individuals who spend time outdoors are at a greater risk of exposure. Historically, Ehrlichiosis is less common in Wisconsin but in the past 4 years, cases of Ehrlichiosis have increased.

What are the symptoms?

Symptoms of Ehrlichiosis usually begin to appear from 1 - 3 weeks after exposure to an infected tick. The initial signs and symptoms of Ehrlichiosis include rapid onset of fever, sweats, chills, headache, fatigue, and muscle aches. Other less common signs and symptoms may include vomiting, nausea, diarrhea, cough, confusion, rash, rigors, and joint pain.

What is the treatment?

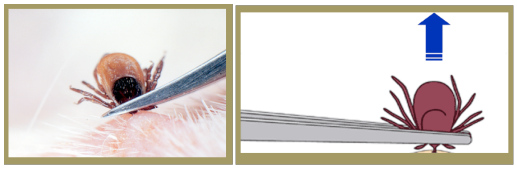
Ehrlichiosis can be successfully treated with antibiotics. Persons with Ehrlichiosis generally begin to feel better within one to two days of starting antibiotic treatment.

How can I prevent Ehrlichiosis?

- Avoid areas where there is a high concentration of ticks- wooded and brushy areas with high grass.
- Stay on cleared, well-traveled trails.
- Use insect repellents containing at least 20% DEET.
- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.

How do I remove a tick?

- Using tweezers, grasp tick near the mouthparts, as close to the skin as possible.
- Pull tick in a steady, upward motion away from skin.
- Disinfect site with soap and water, rubbing alcohol or hydrogen peroxide.



For further information

Please refer to the following sources for more information on Ehrlichiosis.

- **Wisconsin Department of Health Services**

  http://www.dhs.wisconsin.gov/communicable/Tickborne/Ehrlichiosis.htm

- **Centers for Disease Control and Prevention**

  http://www.cdc.gov/parasites/ehrlichiosis/

- **American Lyme Disease Foundation**

  http://www.aldf.com/ehrlichiosis.shtml

BABESIOSIS

Vector Control

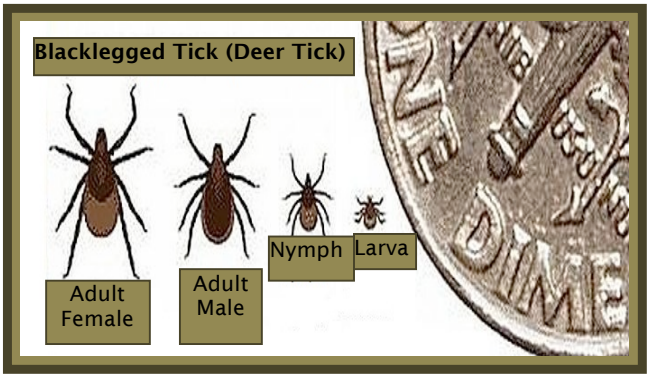
La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Babesiosis?

Babesiosis is a rare, sometimes severe, and occasionally fatal tick-borne disease caused by a parasite that infects red blood cells.

How is it transmitted?

Babesiosis is caused by *Babesia microti*, a parasite transmitted by the bite of an infected deer tick (the same tick species that can carry the Lyme disease bacterium). The tick is carried by meadow voles, mice and deer. Less commonly, transmission can also occur via contaminated blood transfusions if the donor had Babesiosis.



Who gets Babesiosis?

Anyone can get Babesiosis, but it occurs most frequently in the elderly or in persons whose immune system is impaired. Cases of this disease have been reported during spring, summer and fall in northwestern Wisconsin and in coastal areas in the northeastern United States.

What are the symptoms?

Symptoms of Babesiosis usually begin to appear from 1 to 8 weeks after being bitten by an infected tick. Most people who are infected by the parasite will show mild signs of illness or no signs at all. If symptoms occur, they may include fever, chills, headache, achy joints and muscles, fatigue, nausea, vomiting, abdominal pain and dark urine.

What is the treatment?

Standardized treatments for Babesiosis have not been developed. However, antibiotics combined with certain drugs used in the treatment of malaria have been found to be effective in some patients with Babesiosis.

How can I prevent Babesiosis?

- Avoid areas where there is a high concentration of ticks- wooded and brushy areas with high grass.
- Stay on cleared, well-traveled trails.
- Use insect repellents containing at least 20% DEET.
- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.

How do I remove a tick?

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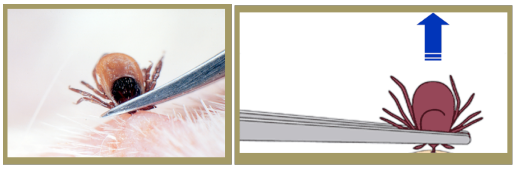
- Disinfect site with soap and water, rubbing alcohol or hydrogen peroxide.



For Further Information:

Please refer to the following sources for more information on Babesiosis.

- **Wisconsin Department of Health Services**
  http://www.dhs.wisconsin.gov/communicable/Tickborne/Babesiosis.htm
- **Centers for Disease Control and Prevention**
  http://www.cdc.gov/parasites/babesiosis/
- **American Lyme Disease Foundation**
  http://www.aldf.com/Babesiosis.shtml

Rocky Mountain Spotted Fever

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Rocky Mountain Spotted Fever?

Rocky Mountain spotted fever (RMSF) is rare in Wisconsin, but isolated cases have been reported from various parts of the state. The illness is caused by bacteria called *Rickettsia rickettsii*, which is transmitted locally by the tick species *Dermacentor variabilis* (American dog tick, also called the wood tick). American dog ticks are found in grassy or wooded areas throughout Wisconsin. They are most active from spring through mid-summer.

Who gets RMSF?

RMSF is rare in Wisconsin. The majority of cases in the U.S. occur in the southeastern states. In spite of its name, RMSF is not common in the mountain states. Children and young adults are most frequently affected.

How is RMSF transmitted?

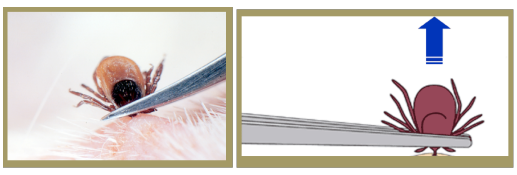
RMSF is spread by the bite of an infected tick (the American dog tick, the lone-star tick or the wood tick). Person to person and direct animal to human transmission of RMSF does not occur.

What are the symptoms of RMSF?

Symptoms usually appear between 3-14 days after the bite of an infected tick. RMSF is characterized by a sudden onset of moderate to high fever (which can last for two or three weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash usually begins on the legs or arms and may spread rapidly to the rest of the body.

How do I remove a tick?

- Using tweezers, grasp tick near the mouthparts, as close to the skin as possible.
- Pull tick in a steady, upward motion away from skin.
- Disinfect site with soap and water, rubbing alcohol or hydrogen peroxide.



What is the treatment for RMSF?

Prompt antibiotic treatment for suspected cases of RMSF is important, because it can be fatal in 15-20% of untreated cases. Delays in diagnosis because of the absence of a rash or no knowledge of a tick bite could be dangerous for the patient.

How can I prevent RMSF?

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

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- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.

For further information

Please refer to the following sources for more information on Rocky Mountain spotted fever.

- **Wisconsin Department of Health Services**
  http://www.dhs.wisconsin.gov/communicable/Tickborne/RockyMountainSpottedFever.htm
- **Centers for Disease Control and Prevention**
  http://www.cdc.gov/rmsf/index.html
- **American Lyme Disease Foundation**
  http://www.aldf.com/RMSF.shtml
  http://www.ilads.org/lyme_disease/about_lyme.html

POWASSAN

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is Powassan virus?

Powassan virus (POWV) infection is a rare tick-borne viral infection occurring in Wisconsin and other northern regions of North America. POWV infection is caused by an arbovirus (similar to the mosquito-borne West Nile virus) but it is transmitted to humans by the bite of an infected tick instead of a mosquito bite. Eleven reported cases of POWV infection have been detected among Wisconsin residents during 2003 to 2011. At least 50 cases have been detected in the United States and Canada since 1958.

Who gets POWV?

Everyone is susceptible to Powassan virus, but people who spend time outdoors in tick-infested environments are at an increased risk of exposure. Powassan virus infection occurs mostly in northeastern and upper Midwestern states. In the upper Midwest, the risk of tick exposure is highest from late spring through autumn.

How is POWV transmitted?

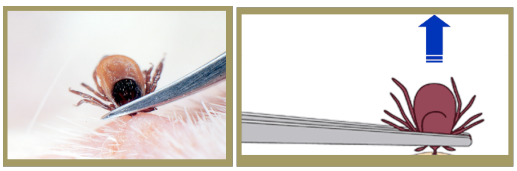
In Wisconsin, the blacklegged (deer) tick is capable of transmitting POWV.

What are the symptoms of POWV?

Symptoms usually begin 7-14 days after the bite of an infected tick. Symptoms of illness usually begin with acute onset of fever and may include: headache, muscle weakness, nausea, vomiting, stick neck, fatigue, confusion, speech difficulties, and memory loss. POWV infects the central nervous system and can cause encephalitis and meningitis. About 10-15% of persons infected with POWV will experience severe illness and survivors may develop long-term neurological problems.

How do I remove a tick?

- Using tweezers, grasp tick near the mouthparts, as close to the skin as possible.
- Pull tick in a steady, upward motion away from skin.
- Disinfect site with soap and water, rubbing alcohol or hydrogen peroxide.



What is the treatment for POWV?

Currently, there are no medications available for the treatment of Powassan virus illness but supportive care can be used to manage and alleviate symptoms.

How can I prevent POWV?

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

- Avoid areas where there is a high concentration of ticks- wooded and brushy areas with high grass.
- Stay on cleared, well-traveled trails.
- Use insect repellents containing at least 20% DEET.
- Wear clothing that has been treated with Permethrin.
- Scan clothes and any exposed skin frequently for ticks while outdoors.
- Wear enclosed shoes and light-colored clothing.
- Take a shower as soon as possible from after coming indoors
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.

For Further Information:

Please refer to the following sources for more information on POWV.

- **Wisconsin Department of Health Services**
  http://www.dhs.wisconsin.gov/communicable/tickborne/Powassan.htm
- **Minnesota Department of Health Services**
  http://www.health.state.mn.us/divs/idepc/diseases/powassan/basics.html

TICK BORNE DISEASES FACT SHEET

Vector Control

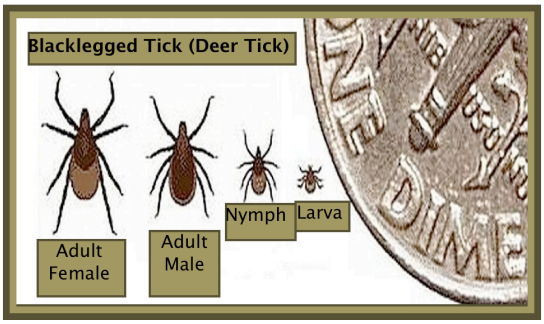
(Lyme disease, Anaplasmosis, Babesiosis, Ehrlichiosis, Powassan, and Rocky Mountain Spotted Fever)

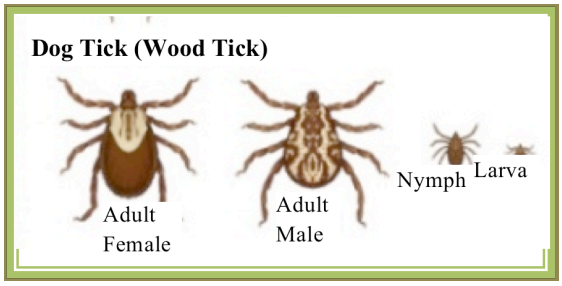
La Crosse County Health Department *400 4th St. N, La Crosse, WI54601* *(608) 785-9872*

What is a tick?

Ticks are blood-feeding parasites. They are found in wooded or grassy areas, especially along the edges of trails, roads, and yards. Once on a host (deer, raccoons, and other wildlife), ticks crawl until they find a suitable spot to feed. Then they burrow their mouthparts into the skin for a blood meal. Ticks can feed anywhere from several minutes to several weeks depending on their life stage, type of host, and type of tick. It is during feeding that infected ticks can transmit disease to their hosts.

The two most common ticks found in Wisconsin include the blacklegged (deer) tick and the dog (wood) tick.





What diseases can ticks spread?

The most common tick-borne diseases in Wisconsin include Lyme disease, Anaplasmosis, and Babesiosis. These diseases are transmitted from the bite of a blacklegged (deer) tick.

Uncommon tick-borne diseases found in Wisconsin include, Ehrlichiosis, Powassan virus infection (a rare tick-borne arbovirus illness) and Rocky Mountain spotted fever.

What are the symptoms of tick-borne diseases?

Early symptoms of many tick borne diseases are similar to the symptoms of the "flu"

Lyme disease:
- Slowly expanding "bull's eye" rash
- Fever
- Headache
- Stiff neck or neck pain
- Fatigue
- Joint pain

Anaplasmosis:
- Headache
- Fever
- Chills
- Muscle Aches
- Fatigue
- Fatigue
- Joint pain

Ehrlichiosis:
- Fever
- Headache
- Muscle Aches
- Diarrhea
- Nausea
- Cough
- Confusion

Powassan Virus:
- Sudden fever
- Headache
- Nausea
- Fatigue
- Confusion
- Speech difficulties

Babesiosis:
- Fever
- Chills
- Joint Pain
- Nausea
- Vomiting
- Abdominal pain

RMSF:
- Sudden fever
- Chills
- Headache
- Muscle pain
- Reddish-to-purple rash

Tick borne diseases can be serious if not properly diagnosed and treated. If you are ill and have had recent exposure to ticks, it is important to tell your doctor. This information could help accurately diagnose what is wrong with you.

How are tick borne diseases treated?

Lyme disease, Anaplasmosis, Rocky Mountain spotted fever, and Ehrlichiosis are all treatable with antibiotics. People and domestic animals treated in the early stages with short courses of antibiotics usually recover quickly and fully.

Standardized treatments for Babesiosis have not been developed. However, antibiotics combined with certain drugs used in the treatment of malaria have been found to be effective in some patients with Babesiosis. There is no current treatment for Powassan virus.

When can I get tick-borne diseases?

In Wisconsin, tick-borne illnesses are usually seen from spring through autumn when the ticks are active but can occur at any time throughout the year. The highest number of infections is reported between May and July.

Steps to prevent tick-borne illness

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

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- Scan clothes and any exposed skin frequently for ticks while outdoors.
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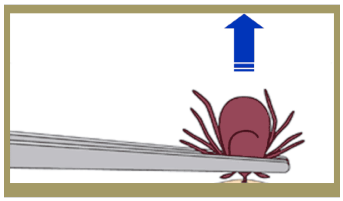


How do I remove a tick?

- Using tweezers, grasp the tick's mouthparts as close to the skin as possible.
- Gently pull the tick straight out, using a firm steady motion.
- Wash your hands and the bite site with soap and water. Apply an antiseptic to the bite site.
- If you experience flu-like symptoms within 2-3 weeks after being bitten by a tick, or after having been in an area where ticks are present, see your doctor or health care provider.

Myths about Lyme

- ***MYTH #1***- The best way to remove a tick is with a lit match, fingernail polish, or petroleum jelly.
- **Fact:** None of these methods cause the tick to "back out," and all of them may actually result in the tick depositing more disease carrying saliva into the wound, increasing the risk of infection.
- ***MYTH #2***- Ticks live in trees, so as long as I don't live near or visit a wooded area, I don't have to worry about them.
- **Fact:** Ticks live on the ground, regardless of where you are. Ticks often crawl up from grass blades onto humans, migrate upwards, which is why they're often found

For Further Information

Please refer to the following sources for more information.

- **Wisconsin Department of Health Services**
  http://www.dhs.wisconsin.gov/communicable/TickBorne/index.htm
- **Centers for Disease Control and Prevention** http://www.cdc.gov/ticks/index.html
- **American Lyme Disease Foundation**
  http://www.aldf.com/majorTick.shtml

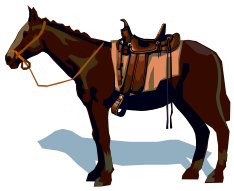
Lyme Disease in Pets

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Q. Can dogs and cats get Lyme disease?

A. The companion animals that we live closest contact with (dogs, cats and horses) can all get Lyme disease and the other tick- borne diseases (Anaplasmosis, Babesiosis, and Ehrlichiosis).



Q. What are the symptoms of Lyme disease in pets?

A. Dogs infected with Lyme disease my display symptoms which include: fever, loss of appetite, depression, lethargy, swelling and pain in one or more joints. More serious complications include kidney disease, heart disease and nervous system disorders. Most cats and horses do not show symptoms of Lyme disease but the signs of illness in cats are similar to those in dogs.

Q. Is there a test my veterinarian can do to diagnose Lyme disease in my pet?

A. For dogs, your veterinarian has a quick blood test that gives accurate results in 8 minutes. A confirming test, called the Western Blot test, is available through veterinary diagnostic laboratories. For cat and horses, blood tests are sent to a diagnostic laboratory for confirmation.

Q. What is the treatment for Lyme disease in my pet?

A. A course of antibiotics is usually effective in treating Lyme disease. The earlier treatment is started, the more successful the outcome. Long-standing disease may respond slowly and require longer periods of treatment.

Q. If my pets are restricted to my yard, can they still get Lyme disease?

A. Yes. Ticks are frequently found in suburban yards, brought in by deer or mice. Ticks can also be found in yards that border wooded areas and where the lawn is not kept short, if there is bushy vegetation, leaf litter and/or tall grasses.

Q. If my dog or cat brings deer ticks into my home; do those ticks present a threat to the rest of my family?

A. You are not at risk of getting Lyme disease directly from your pet. But if a tick is brushed off your pet before it is firmly attached, and a member of your family has direct contact with the tick, it may then attach itself to a human host. (For example, a tick is brushed off a dog or cat on the family couch. A family member sits on the couch and the tick crawls onto that person's arm and searches for a warm moist spot to attach itself.) Ticks do not fly or jump from one host to another.

Q. Should I examine my pets for ticks each time they come in from outside?

A. Yes! Remove ticks before they have a chance to attach and transmit bacteria to your pet. If ticks are removed within 24-36 hours of attachments, the risk of disease transmission is minimal.

Q. Is there a way to reduce the chances of my pet being bitten by potentially harmful ticks?

A. Yes. Use products such as Frontline that kill ticks within 24-48 hours of application. Mow your lawns frequently and don't let pets get into the underbrush. Perform tick checks on your pets every time they come inside during the tick season. Beware of tick repellents that may have chemicals too toxic for your pet or family members. Always read and follow label directions!

Q. Where should I go for more information on Lyme disease in my pets?

A. Talk to your veterinarian or contact your local health department for further information.

Think Tick…Take Action!

Vector Control

- How to prevent tick bites when hiking and camping -

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Prevention begins with you!
Take steps to reduce your chances of being bitten by any tick.

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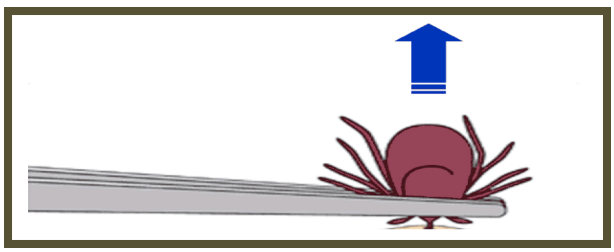
- Perform a final, full-body tick-check at the end of the day (also check children and pets).
- Put clothes in the dryer on high hear for 60 minutes to kill any remaining ticks.

How do I remove a tick?

- Using tweezers, grasp the tick's mouthparts as close to the skin as possible.
- Gently pull the tick straight out, using a firm steady motion. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
- Wash your hands and the bite site with soap and water. Apply an antiseptic to the bite site.
- If you experience flu-like symptoms within 2-3 weeks after being bitten by a tick, or after having been in an area where ticks are present, see your doctor or health care provider.

Note: *Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin. This is not effective.*



When to See Your Doctor

See a doctor if you develop any of the following symptoms within 30 days of being bitten by a tick or after having been in an area where ticks are present. If you have these symptoms and spend a lot of time outdoors where Lyme disease is common, it is important to get treatment right away.

Early Lyme -- 3-30 days post-tick bite

- "Flu-like symptoms"
- Bulls-eye rash (Erythema Migrans)
- Stiff neck
- Headache
- Fever
- Chills
- Swollen lymph nodes
- Fatigue
- Muscle aches
- Joint pain

Late Lyme -- months-years post-tick bite

- Arthritis
- Facial paralysis
- Meningitis
- Hearing loss
- Severe fatigue
- Numbness in arms/hands or legs/feet
- Short term memory loss

When early symptoms go undetected or ignored it is possible to develop late-stage symptoms. Refer to the resource section of this article for further information on the signs and symptoms of Lyme disease.

What are the treatments?

Oral antibiotics are the standard early treatment for Lyme disease. Individuals older than 8 years old typically receive doxycycline. Younger children, and breastfeeding or pregnant women usually receive amoxicillin, or cefuroxime. A 14 – 21 day antibiotic treatment is standard. In some situations intravenous antibiotics are recommended.

Myths about Lyme

MYTH #1- The best way to remove a tick is with a lit match, fingernail polish, or petroleum jelly.
Fact: None of these methods cause the tick to "back out," and all of them may actually result in the tick depositing more disease carrying saliva into the wound, increasing the risk of infection.

MYTH #2- Ticks live in trees, so as long as I don't live near or visit a wooded area, I don't have to worry about them.
Fact: Ticks live on the ground, regardless of where you are. Ticks often crawl up from grass blades onto humans, migrate upwards, which is why they're often found on the scalp.

For further information
Wisconsin Department of Health Services

http://www.dhs.wisconsin.gov/communicable/Tickborne/Lyme/Index.htm

Centers for Disease Control and Prevention

http://www.cdc.gov/lyme

International Lyme and Associated Disease Society

http://www.ilads.org/lyme_disease/about_lyme.html

CREATING A TICK-FREE ZONE AROUND YOUR HOME

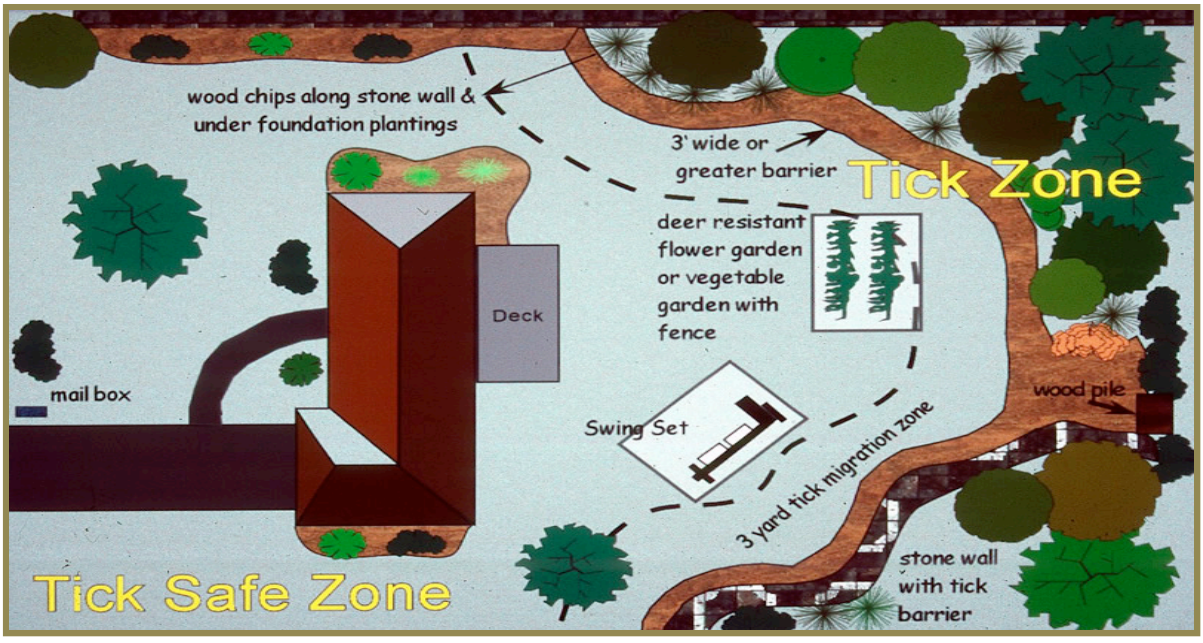
La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

While deer ticks are most abundant in wooded areas, they are also commonly found in our lawns and shrubs. There are a number of measures Wisconsin residents can take to reduce the possibility of being bitten by a tick on their property.

Ticks and their primary hosts - mice, chipmunks and other small mammals - need moisture, a place away from direct sunlight and a place to hide. The cleaner you keep the area around the house, the less likely your chances of being bitten by a tick.

Although it may not be possible to create a totally tick-free zone, taking the following precautions will greatly reduce the tick population in your yard.

- Keep grass mowed.
- Remove leaf litter, brush and weeds at the edge of the lawn.
- Restrict the use of groundcover, such as pachysandra in areas frequented by family and roaming pets.
- Remove brush and leaves around stonewalls and wood piles.
- Discourage rodent activity. Clean up and seal stonewalls and small openings around the home.
- Move firewood piles and bird feeders away from the house.
- Manage pet activity; keep dogs and cats out of the woods to reduce ticks brought into the home.
- Use plantings that do not attract deer or exclude deer through various types of fencing.
- Move children's swing sets and sand boxes away from the woodland edge and place them on a wood chip or mulch type foundation.
- Trim tree branches and shrubs around the lawn edge to let in more sunlight.
- Widen woodland trails.
- Consider a pesticide application as a targeted barrier treatment. ***Do not*** use any pesticide near streams or any body of water as it may kill aquatic life or pollute the water itself. **Always read and follow pesticide label directions and precautions.**



It's Lyme Time!

Be Tick Aware!

1 Walk in the middle of trails; avoid sitting on logs and leaning on trees.

2 Wear a hat,tuck in hair, if possible.

3 Wear a long-sleeved shirt fitted at the wrist.

4 Wear shoes, no bare feet or sandals.

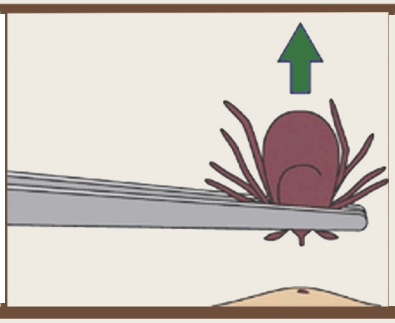
5 Wear long pants tucked into high socks or duct tape around pants.

6 Consider Deet for skin and permethrin for clothes.

7 Wear white or light-colored clothing to make it easier to see ticks.

8 Do tick checks immediately and 3 days after outdoor activity.

9 If you find a tick, ask an adult to remove it carefully and save it.



Remove tick with tweezers. Gently pull the tick straight out, using a firm steady motion

La Crosse County Health Department

400 4th Street North

La Crosse, WI 54601

(608) 785-9872

Health Department
County of La Crosse, Wisconsin
300 4th Street North • 2nd Floor
La Crosse, Wisconsin 54601-3228
(608) 785-9872 • FAX: (608) 785-9846
http://www.co.la-crosse.wi.us/Health/

Public Health
Prevent. Promote. Protect.

NEWS RELEASE

For Immediate Release: insert date

For More Information Contact: insert contact name, insert phone number

La Crosse County Health Department Urges the Public to be "tick aware" This Season

Lyme disease is the fastest growing infectious disease in North America. The United States reports over 30,000 cases annually, and estimates the disease can be underreported several fold. In Wisconsin, Lyme disease is the highest reported tick-borne disease, with more than 23,000 cases reported between 1980 and 2010. Disease carrying ticks are becoming more and more prevalent and are on the move.

The species of ticks that transmit Lyme disease to humans, the black-legged tick or commonly known as the deer tick are only about the size of a poppy seed when they are in the nymphal stage, and only about 3 mm in length in the adult phase. These ticks are capable of transmitting several different diseases to humans including Lyme disease, Anaplasmosis, and Babesiosis. These ticks are transported randomly by our friendly migratory birds, deer, mice, and other rodents that can also harbor Lyme disease and other diseases in their blood. Remember, no tick is a good tick.

Lyme disease can cause long-term health issues if not identified and treated early. It can affect the brain, eyesight, hearing, heart, nervous system, muscles, joints, digestive tract, and lymph nodes. Because Lyme disease is a multi-system disorder many systems of the body can be affected at once, therefore, it can often be misdiagnosed.

Ticks can be found in your lawn, on your pets, in tall grass or brush, on logs or woodpiles. If outside do not brush up against brush or tall grass, walk in the center area of trails, and wear a repellent containing DEET. Pets can carry ticks into your home. Talk to your veterinarian about protecting your pets.

Use fine tipped tweezers to remove an attached tick, being careful not to touch the body of the tick (get as close to the skin as possible then pull backwards). Apply antiseptic to the area immediately. Save the tick if possible and call us, or your local health department.

Prevention is the best medicine. Be tick aware, **NO TICK IS A GOOD TICK!**

For more information on prevention please visit: www.co.la-crosse.wi.us/health/

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PSA's

- **Prevent Lyme Disease/Spring and Summer PSA (:30)**
    - Spring and summer are prime time for ticks that can spread Lyme disease and other infections. The Centers for Disease Control and Prevention would like to remind you to wear bug repellent when outdoors, shower as soon as possible after coming indoors, and check your whole body for ticks--every day. If you've been bitten by a tick and develop fever, rash, or fatigue, seek medical care.
- **Recognize the Early Signs of Lyme Disease PSA (:30)**
    - A bull's-eye rash can be the first sign of Lyme disease, but not everyone will develop the rash. If you've been in areas where Lyme disease is common and develop fever, fatigue, facial paralysis, or joint and muscle pain, seek medical care. Reduce your chances of getting Lyme disease by wearing insect repellent, showering soon after coming indoors, and checking for ticks daily.
    - To learn more, visit www.cdc.gov/lyme.
    - A message from CDC.
- **Talking to Patients about Preventing Tick Bites**
    - *This program is presented by the Centers for Disease Control and Prevention.*
    - You know that ticks can spread serious diseases like Lyme disease, Rocky Mountain spotted fever, or babesiosis, but when was the last time you talked to a patient about tick bite prevention?
    - Welcome to CDC Audio Rounds. I'm Dr. Robert Gaynes with the Centers for Disease Control and Prevention.
    - Your patients, who spend time outdoors, especially in brushy areas or tall grass, are at risk for getting tick bites. Hikers, campers, outdoor workers, gardeners, golfers, and children are at particular risk. Ticks can be active any time the ground temperature is 50 degrees Fahrenheit or higher. In some

regions, ticks can be active year-round. Here's how your patients can prevent tick bites:

- First, tell them to wear repellent that contains at least 20 percent DEET. Parents should apply repellent to children, avoiding the hands, eyes, and mouth. People who spend a lot of time outdoors should consider wearing permethrin-treated clothing, including boots, pants, and socks. Permethrin-treated items can be purchased online or at sporting goods stores and can remain protective through repeated washings.

- Second, tell your patients to check themselves and their children for ticks every day. Places that ticks frequently hide are in the ears, on the back of the neck, and in the groin area.

- Third, advise them to remove clothing where ticks might be hiding, and take a shower to wash off any unseen ticks. Research has shown that showering within two hours of coming indoors can protect against Lyme disease.

- Finally, tell your patients who spend time in tick habitats or find an attached tick to watch for fever and rash, and to see you if they have any symptoms or concerns.

- To order or download Lyme disease informational materials for your patients, go to the Lyme disease prevention toolkit at www.cdc.gov/Lyme.

- *For the most accurate health information, visit www.cdc.gov or call 1-800-CDC-INFO.*

West Nile Virus

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is the West Nile Virus?

West Nile virus (WNV) is a potentially serious illness, which is spread to people by the bite of a mosquito infected with the virus. Viruses that are spread by mosquitoes are called arboviruses.

Experts believe WNV is established as a seasonal epidemic in North America, infections generally occur during warm weather months when mosquitoes are active.

What Are The Symptoms of WNV?

About 80% of people infected with WNV do not show any symptoms or become ill.

Most of the remaining 20% of infected people may experience a mild illness that can present:

- Fever
- Eye pain
- Joint Pain
- Nausea
- Headache
- Muscle aches
- Swollen Lymph Nodes
- Vomiting

**Note: People typically develop symptoms between 3 and 14 days after they are bitten by an infected mosquito.

Less than 1% of people infected with WNV will become severely ill. Symptoms of severe illness include:

- Inflammation of the brain (encephalitis)
- Extreme muscle weakness
- High Fever
- Neck Stiffness
- Disorientation
- Tremors
- Vision Loss
- Headache
- Paralysis
- Coma
- Convulsions
- Numbness

In rare cases the infection may be fatal, particularly in the elderly and people with other medical conditions.

People over 50 at higher risk. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick, special care should be taken to avoid mosquito bites.

How is WNV Treated?
There is no specific treatment for WNV. A physician may provide treatment to relieve the symptoms of the illness. In severe cases hospitalization may be required.

How Does West Nile Virus Spread?

Infected Mosquitoes

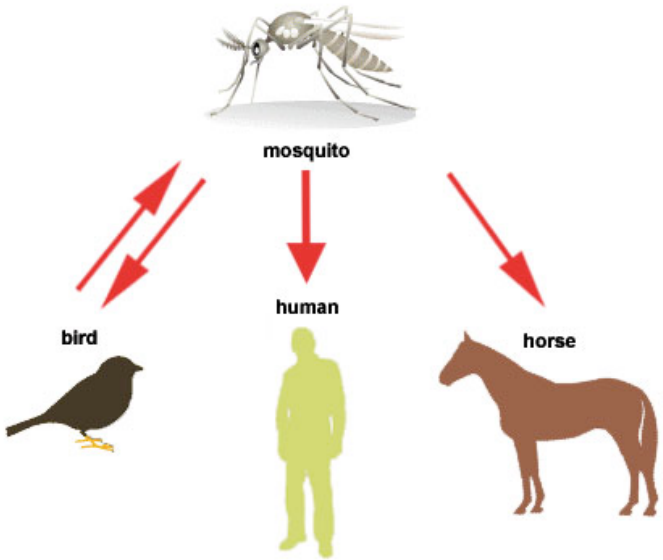
Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

Transfusions, Transplants, and Mother-to-Child

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

Not through touching

WNV is not spread through casual contact such as touching or kissing a person with the virus.



Mosquitos are the vector, birds are the reservoir host of WNV. Humans/mammals are incidental hosts.

How Can I Protect Myself?

Personal Measures:

- Limit time spent outdoors at dawn and dusk during mosquito season (June to Sept.), or other times mosquitoes are active
- Wear shoes, socks, long sleeve shirts and long pants when outdoors
- Apply insect repellents containing an EPA-registered ingredient (such as DEET) to exposed skin when outdoors
- Spray clothing with insect repellents since mosquitoes may bite through thin clothing
- Make sure your window and door screens are in good repair to prevent mosquito entry to your home

Environmental Measures:

- Dispose of tin cans, plastic containers, ceramic pots and other water-holding containers
- Remove all discarded tires
- Drill holes in the bottoms of recycling containers that are kept outdoors
- Make sure roof gutters drain properly and clean clogged gutters
- Change water in birdbaths regularly.
- Turn over wheelbarrows, children's pools, and boats when not in use
- Clean and chlorinate swimming pools, outdoor saunas and hot tubs
- Drain water from pool covers
- Use landscaping to eliminate standing water that collects on your property.

For Additional Information

Wisconsin Department of Health Services

http://www.dhs.wisconsin.gov/communicable/ArboviralDiseases/WestNileVirus/Index.htm

Centers for Disease Control and Prevention

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm

American Mosquito Association

http://www.mosquito.org/

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La Crosse Virus

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is LVE?

La Crosse viral encephalitis (LVE) is an illness that is transmitted to people through the bite of an infected mosquito.

Most cases of encephalitis, meaning inflammation of the brain, can produce fever, headache, drowsiness, vomiting, and other mild flu-like symptoms. The illness may progress to disorientation, seizures, and even coma. Most of these severe cases occur primarily in children.

Approximately 1-3% of these encephalitis cases are fatal, and another 15% of patients have long-term nervous system problems. There is no treatment for the illness other than supportive care until the illness is over.

****Note**: If your child develops symptoms of fever, severe headache, vomiting, drowsiness or convulsions, seek immediate medical attention.

LVE is carried and spread by the *Aedes triseriatus* mosquito. This mosquito breeds in any object that holds water over a prolonged period of time.

It feeds during the day, unlike many of our pest mosquitoes that feed mostly at dusk and dawn. The highest risk of LVE is typically from mid-July through early September.

For additional information please visit:

CDC: http://www.cdc.gov/LAC/index.html

Or

WI Department of Health Services

How can I protect myself?

1.) The best way to prevent LVE is to remove water-holding containers from your property.
   - Empty cans, buckets, bottles, & other containers that can collect water
   - It is easier to do this in the spring before growing vegetation can hide the containers.

2.) Fill in tree holes temporarily with sand or other coarse soil.

3.) Store old tires where water can't collect inside of them.
   - Do not use tires to hold down tarps or other covers.

4.) Bird baths should have their water changed every week to prevent mosquito breeding, and gutters should be checked to make sure they are not plugged

5.) If children play in or near wooded areas during the day, they should:
   - Wear long-sleeved shirts and long pants (light-colored clothing works best)
   - Use repellents containing DEET (less than 30% DEET is sufficient for adults, and less than 10% DEET is adequate for children) according to label directions

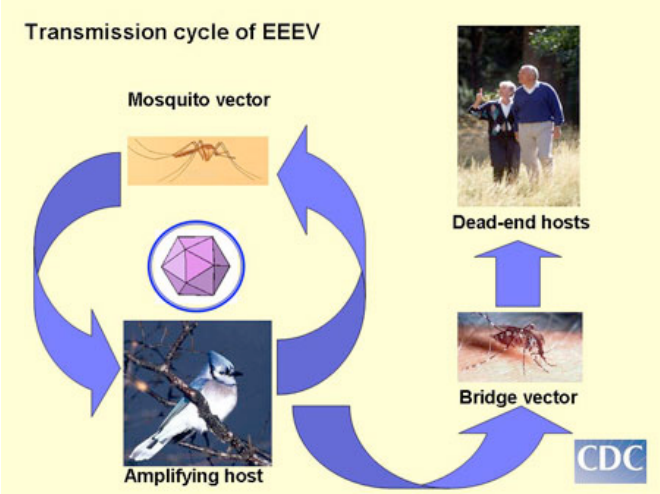
EASTERN EQUINE ENCEPHALITIS

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is an EEE virus infection?

The Eastern equine encephalitis (EEE) virus is transmitted to humans by the bite of an infected mosquito. Viruses that are spread to people by mosquitoes are called arboviruses. EEE virus infections generally occur during warm weather months when mosquitoes are active.

EEE is a rare illness in humans, and only a few cases (about 5) are reported in the United States each year. The disease also affects horses, and is found primarily in the Atlantic and Gulf Coast states



Symptoms & Treatment

Most people infected with EEE virus do not become ill. When symptoms do occur they can range from mild fever and headache to coma. Other symptoms include high fever, fatigue, muscle aches, neck stiffness, tremors, or confusion. Severe cases, although rare, include inflammation of the brain (encephalitis) which can lead to coma, convulsions, and death.

**Symptoms usually occur 5 to 15 days after a bite from a mosquito infected with the EEE virus. The virus is spread by the bite of a mosquito infected with the EEE virus. Mosquitoes get infected with EEE virus by feeding on infected birds. The virus is not spread between horses or from horses to people or between people.

Treatment

There is no specific treatment for EEE virus infection. A physician may prescribe medications to relieve the symptoms of the illness. In severe cases hospitalization may be required.

How Can I prevent an EEE infection?

There is no vaccine or preventive drug for EEE. Prevent mosquito bites by:

- Apply insect repellents containing an EPA-registered ingredient (such as DEET) to exposed skin when outdoors
- Spray clothing with insect repellents since mosquitoes may bite through thin clothing
- Wear shoes, socks, long sleeve shirts and long pants when outdoors
- Have secure screens on windows and doors to keep mosquitoes out
- Limit time spent outdoors at dusk and dawn

You can also take measures in your own yard to eliminate standing water where mosquitoes breed.

- Sources include: old tires, barrels, buckets, ceramic pots, clogged rain gutters, wading pools, pool covers, or birdbaths
- Drill holes in tire swings and recycling containers stored outdoors so water drains out
- Keep children's wading pools empty and on their sides when they aren't being used
- Keep rain gutters clean and change water in bird baths weekly

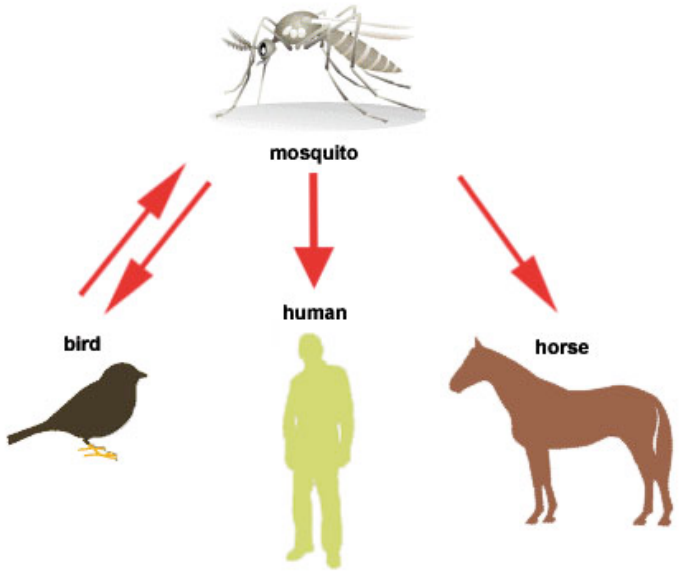
Western Equine Encephalitis

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is a WEE virus infection?

Western equine encephalitis (WEE) is a viral illness transmitted to people and horses through the bite of an infected mosquito.

WEE is normally maintained between *Culex tarsalis* mosquitoes and birds. People and horses are usually bitten during the late summer months (mid-July through early September) in wet years when this mosquito is produced in abundance.



Preventing a WEE infection?

Reduce your risk of WEE significantly by:

- Avoiding outdoor activities at dusk and dawn, the primary feeding period of mosquitoes
- Wear shoes, socks, long sleeve shirts and long pants when engaging in outdoor activities around dusk or dawn
- Use mosquito repellents containing DEET (less than 30% DEET is sufficient for adults, and no more than 10% for children) according to label instructions
- A WEE vaccine is available for horses. Please contact your veterinarian for vaccine recommendations.

You can also take measures in your own yard to eliminate standing water where mosquitoes breed.

- Sources include: old tires, barrels, buckets, ceramic pots, clogged rain gutters, wading pools, pool covers, or birdbaths
- Drill holes in tire swings and recycling containers stored outdoors so water drains out
- Keep rain gutters clean and change water in bird baths weekly

Symptoms & Treatment

Most people infected with WEE will have either no symptoms or a very mild illness.

There is no treatment for WEE other than supportive care until the acute phase of the illness is over.

A small percentage of people, especially infants and the elderly may develop encephalitis (inflammation of the brain).

Approximately 5-15% of these cases are fatal, and about 50% of surviving infants will suffer permanent brain damage.

Most of the severe human cases begin with a sudden onset of:

- Fever
- Headache
- Stiff Neck
- Vomiting
- Lethargy

Within two to four days, the illness may progress into disorientation, irritability, seizures, and coma.

In Horses

Approximately 20-50% of symptomatic horses are put down or die from WEE infections.

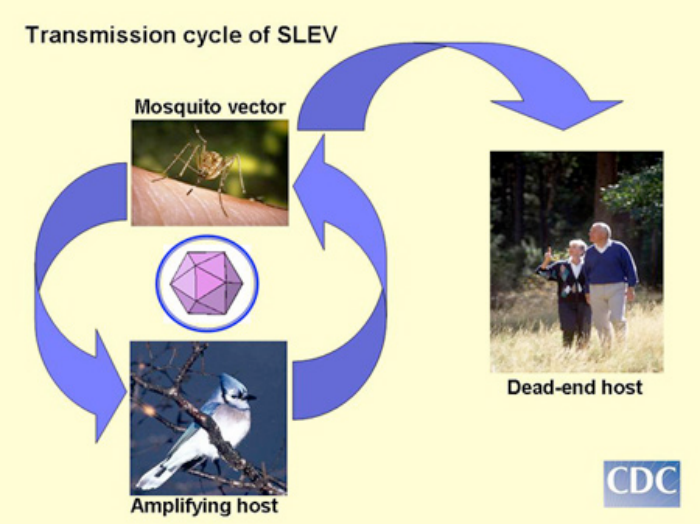
ST. LOUIS ENCEPHALITIS

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

What is St. Louis Encephalitis?

St. Louis encephalitis (SLE) virus is a rare disease transmitted by the bite of an infected mosquito; it cannot be transmitted directly from person to person. The SLE virus is one of a group of mosquito-transmitted viruses that can cause inflammation of the brain (encephalitis).

Periodic outbreaks primarily occur along the Gulf Coast and in the Mississippi Valley. In most areas of the US, SLE cases occur primarily in the late summer or early fall. In southern states, cases can occur year round.



How Can I prevent an EEE infection?

There is no vaccine or preventive drug for SLE. Prevent mosquito bites by:

- Apply insect repellents containing an EPA-registered ingredient (such as DEET) to exposed skin when outdoors
- Spray clothing with insect repellents since mosquitoes may bite through thin clothing
- Wear shoes, socks, long sleeve shirts and long pants when outdoors
- Have secure screens on windows and doors to keep mosquitoes out
- Limit time spent outdoors at dusk and dawn

You can also take measures in your own yard to eliminate standing water where mosquitoes breed.

- Sources include: old tires, barrels, buckets, ceramic pots, clogged rain gutters, wading pools, pool covers, or birdbaths
- Drill holes in tire swings and recycling containers stored outdoors so water drains out
- Keep children's wading pools empty and on their sides when they aren't being used
- Keep rain gutters clean and change water in bird baths weekly

Symptoms & Treatment

Most people infected with SLE have no symptoms or only mild non-specific flu-like illness. However, in some individuals, especially the elderly, SLE can cause serious illness that affects the central nervous system. Symptoms often include:

- Fever
- Headache
- Stiff Neck
- Disorientation
- Altered level of consciousness
- Coma, Convulsions & Paralysis may occur.

Onset

It takes 5 to 15 days after a bite from an infected mosquito to develop symptoms of the SLE virus.

Treatment

There is no specific treatment for SLE. Severe illnesses are treated by supportive therapy; including hospitalization, respiratory support, IV fluids, and prevention of other infections. Antibiotics are not effective against the virus.

Outdoor Protection

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

How can I protect myself?

COVER UP

Wear long sleeve shirts, long pants, and socks when outdoors. Since mosquitoes may bite through clothes, spraying clothes with a repellant will provide extra protection.

USE REPELLANT

Apply insect repellant when you go outdoors. The U.S. Environmental Protection Agency (EPA) has registered several active ingredients for use in repellants that can be applied to skin and/or clothing, including:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)
- Oil of lemon eucalyptus (p-menthan 3,8-diol)
- Permethrin (DO NOT APPLY DIRECTLY TO SKIN; only for use on clothes, camping gear, etc.)

ALWAYS FOLLOW LABEL INSTRUCTIONS

Repellants have different age restrictions, shelf lives, and application limitations. Do not put repellant on children's hands because it may get into their mouth. Do not spray repellant containing DEET on the skin underneath clothing.

AVOID MOSQUITOES

The mosquitoes that carry West Nile virus bite between dusk and dawn so if possible limit your time outdoors during these hours.

MOSQUITO-PROOF YOUR HOME

Keep mosquitoes outside by fixing or installing window and door screens.

Around The House

CLEAN OUT MOSQUITO BREEDING SITES

A small amount of standing water can be enough for a mosquito to lay her eggs. Look around for possible mosquito breeding places.

DRAIN OR REMOVE STANDING WATER

Be sure to empty water from buckets, cans, pool covers, flowerpots, wheelbarrows, boats, trash cans, and other items that may hold water.

MAINTAIN WATER BOWLS AND BIRDBATHS

Clean pet water bowls weekly. Change water in water bowls and birdbaths regularly.

UNCLOG RAIN GUTTERS

Ensure that your rain gutters remain unclogged and drain properly.

DISCARD OR STORE USED TIRES

Throw away or cover up stored tires that aren't being used.

For additional information visit:

CDC: http://www.cdc.gov/LAC/index.html

LCHD: http://www.co.la-crosse.wi.us/Health/

Protect Yourself from Mosquitoes with the 4 D's!

1. **Dusk/Dawn** – Stay indoors at dusk and dawn. This is the time of day that mosquitoes are most active.
2. **DEET** – Use insect repellents that contain DEET when going outside, especially at times closer to dawn or dusk when mosquitoes are most active. Always follow label instructions.
3. **Dress** – In loose light colored long-sleeved shirts and long pants when going outside.
4. **Drain** – Remove all areas of standing water. Examples are tires, buckets, water dishes, birdbaths, flower pots, wheelbarrows, and wading pools. Remove all piles of dead leaf material from under trees and shrubs, and be sure to keep rain gutters clean. Mosquitoes will breed in this debris since it is normally damp under the debris.

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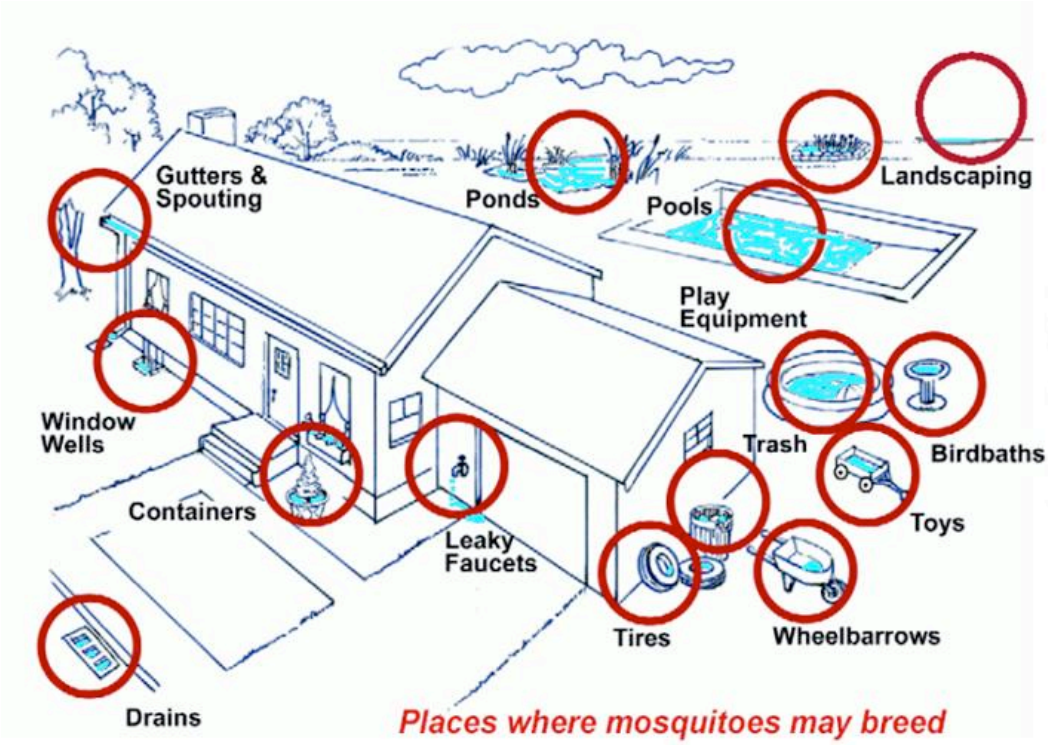
HOME CARE

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*



How to minimize mosquito habitat around your home

- Dispose of tin cans, plastic containers, ceramic pots or similar water-holding containers that have collected on your property.
- Pay special attention to discarded tires. Stagnant water in tires are where most mosquitoes breed.
- Drill holes in the bottom of recycling containers left outdoors.
- Have clogged roof gutters cleaned regularly (spring & fall), particularly if the leaves from surrounding trees have a tendency to plug up the drains.
- Turn over plastic wading pools when not in use. Stagnant water in a wading pool becomes a place for mosquitoes to breed.
- Turn over wheelbarrows and don't let water stagnate in birdbaths. Both provide breeding habitats for domestic mosquitoes.
- Aerate ornamental pools or stock them with fish. Water gardens can become major mosquito producers if they are allowed to stagnate. Clean and chlorinate swimming pools not in use. A swimming pool left untended by a family on vacation for a month can produce enough mosquitoes to result in neighborhood-wide complaints. Mosquitoes may even breed in the water that collects on pool covers.
- Use landscaping to eliminate standing water that collects on your property. Mosquitoes may breed in any puddle that lasts for more than four days.

HOME CHECKLIST

Vector Control

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Water reservoirs other than ponds and wetlands where mosquitoes may breed	Check if present:	Date problem was remedied:
Birdbaths		
Boats that have not been drained or covered		
Cans, jars, other open containers		
Clogged house roof gutter		
Culverts with stagnant water		
Ditches that hold stagnant water		
Drain outlets from air-conditioners		
Dripping outdoor faucets		
Flower pots		
Leaf-filled drains		
Livestock water tanks		
Manure treatment lagoons		
Ornamental ponds		
Over-irrigated lawns and fields		
Saucers under potted plants		
Sewage treatment ponds		
Standing water in tire ruts and horse or livestock lots		
Storm water drain systems		
Street gutters, catch basins at road concerns		
Stumps and tree holes		
Swimming pool covers		
Tires (abandoned)		
Unsealed barrels		
Wading pools or kiddie pools		
Water cans, buckets, troughs, pet bowls		
Wheel barrows or tilt-up carts		

ELIMINATING MOSQUITO BREEDING SITES

- Dispose of old tires, tin cans, plastic buckets, ceramic pots, or other artificial water containers.
- Keep rain gutters unclogged and flat roofs clean and dry.
- Eliminate water collecting in pool or boat covers.
- Drill holes in the bottom of recycling containers left outdoors to prevent them from collecting rainwater.
- Turn over plastic wading pools and wheelbarrows when not in use.
- Drain stagnant pools, puddles, ditches, or swampy areas around the home and property. Fill low areas to prevent pooling.
- Remove old tree stumps that may hold water.
- Change or freshen water in flowerpots and planters two or three times per week.
- Change or freshen animal water bowls and dishes regularly.
- Check mulch around shrubs and bushes for signs of mosquito activity. Change mulch to prevent wet and moldy conditions where mosquitoes can live.

REDUCING MOSQUITO ANNOYANCE

- Stay indoors at dawn, dusk and in the early evening if possible.
- Wear light colors that refract heat and are generally less attractive to mosquitoes.
- Wear long sleeved shirts and pants when you are outdoors during peak mosquito activity periods.
- Apply insect repellant sparingly to exposed skin, 10% DEET repellent will typically last 90 minutes, 30% product will last 5-6 hours. Avoid applying high concentrations (more than 50% DEET) to the skin.
- American Academy of Pediatrics states that it is safe to use up to 30% DEET-based repellants on anyone over the age of two months.
- Keep weeds cut back and mow the lawn regularly to reduce mosquito-friendly habitats.
- Avoid the use of “bug zappers” as they have been shown to be mostly ineffective, and they harm beneficial insect populations.
- Use candles, torches and coils containing citronella oil outdoors and in windless conditions, allowing the odor to remain in the immediate vicinity.

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For More Information Visit:

http://www.co.la-crosse.wi.us/Health/

Vector Control

La Crosse County Health Department

Mosquito Control and Mosquito-Borne Diseases

300 4th Street North
La Crosse, Wisconsin 54601
Office: (608)-785-9872
Fax: (608)-785-9846

MOSQUITO LIFE CYCLE

There are over 3,000 species of mosquitoes worldwide, with 150 known to exist in North America. In their immature stages, the mosquitoes require water to survive. Ideal breeding areas for mosquitoes include old tires, clogged rain gutters, bird baths, wading pools and stagnant water.

Mosquitoes go through 4 stages in their life cycle: egg, larva, pupa and adult. The eggs are laid in or near water and hatch into larvae within a few days. The larvae feed on microscopic plant life, molt several times as they grow and become pupae that turn into adult mosquitoes. The entire process can take place in as little as seven days in mid-summer. The life span of adult mosquitoes varies from two weeks to several months, and depending on the species, will feed in the early morning, early evening or even during daytime hours.

Mosquitoes require a blood meal to develop fertile eggs. Males, because they do not lay eggs, do not bite. Throughout a season, females can lay several batches of eggs, requiring a blood meal for each batch. Each batch can contain as many as 200 eggs. Other than for reproduction, mosquitoes normally feed on nectar from plants or flowers.

MOSQUITO-BORNE DISEASE

Mosquitoes cause more human suffering than any other organism with over one million people dying from mosquito-borne diseases every year. Mosquito vectored diseases include malaria, yellow fever, dengue, and encephalitis to humans and animals. Yellow fever, dengue and malaria were once prevalent in the United States, but now are rare.

In the summer of 1999, West Nile Virus was first reported in the United States. As of September 1, 2010 there have been 29,858 West Nile Virus infections and 1,166 deaths reported in the US. While the number of people affected by West Nile Virus changes each season, it appears that West Nile Virus will remain a threat to the US in the future.

SYMPTOMS OF MOSQUITO-BORNE VIRUSES

- Most people infected with mosquito-borne viruses show no symptoms.
- Some people infected with a mosquito-borne virus have a mild fever, headache and muscle aches that will last up to a week
- A small number of infected people will develop severe illness requiring hospitalization. These people may have body aches, fever, confusion, weakness, stiff neck, tremors, convulsions and may die.
- People over 50 years old who become infected with West Nile Virus or St. Louis encephalitis are more likely to develop severe illness and may die from the disease.
- Children under the age of 16 who contract La Crosse encephalitis or Eastern Equine encephalitis are more likely than adults to develop severe illness.
- People with existing health problems who become infected with a mosquito-borne disease are at increased risk for severe illness.

Health Department
County of La Crosse, Wisconsin
300 4th Street North • 2nd Floor
La Crosse, Wisconsin 54601-3228
(608) 785-9872 • FAX: (608) 785-9846
http://www.co.la-crosse.wi.us/Health/

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Wisconsin Schools

The La Crosse County Health Department urges all people to avoid mosquito bites whenever possible. The risk of a healthy person acquiring a mosquito-borne virus (West Nile virus, La Crosse Virus) from a bite is "very low," however all people should take the appropriate measures to protect themselves.

Everyone should know. . .

- Mosquito-borne virus' can be transmitted *primarily* through the bite of an infected mosquito; although, there have been isolated cases occurring in blood transfusions and organ donation recipients, from mother to baby during pregnancy and through breast milk. People cannot become infected through ordinary contact with an infected bird, horse, or human.
- No vaccine exists to protect humans against West Nile virus or La Crosse Encephalitis. Individuals must personally

A Message for Parents & Students:

- Avoid mosquitoes whenever possible.
- Stay indoors or take personal protective measures, especially between dusk and dawn.
- Use mosquito repellent with DEET (up to 30 percent for adults and 10 percent or less for children, two years - 12 years of age as recommended by the American Academy of Pediatrics). Follow the label directions. For more information visit: **www.dhs.wisconsin.gov** or **www.co.la-crosse.wi.us/health/Vector**
- When outdoors, wear long-sleeved shirts and pants along with socks and shoes.

A Message for Classroom Teachers:

- The Internet provides instant access to volumes of information about West Nile virus.
- You can find the latest Wisconsin facts about West Nile Virus, La Crosse Virus, and other mosquito-borne virus' at: **www.co.la-crosse.wi.us/health/Vector** or **www.dhs.wisconsin.gov**
- The Centers for Disease Control and Prevention website also offers information: **www.cdc.gov.**
- Allowing students outdoors for recess poses no greater risk to mosquito-borne virus than if they were outside at home – just be wary of mosquitoes.

A Message for Activities & Athletic Directors & Staff:

- Early morning, near dusk, and after dark events pose a potential risk for you, your students, and other people attending or participating. These are the times when mosquitoes are most likely to be out feeding.
- You can help protect students and spectators from mosquito-borne virus.
- Work with your school's administration and the safety officer to eliminate standing, stagnant water, which is a prime breeding area for mosquitoes.
- Talk to local mosquito control officials about pre-event surveillance and control of both larvae and adult mosquitoes.
- Remind students and spectators of the importance of using DEET repellent products according to the directions on the label. Encourage them to wear long sleeves and long pants if possible.
- Encourage children to participate in clean-up campaigns at school.
- At events, remind the crowd to protect themselves and their communities by helping eliminate mosquito breeding areas.

A Message for Administrators:

- Reduce the mosquito breeding sources – the most effective and economical method toward long-term mosquito control.
- Check for and rid your campus of easily recognized mosquito breeding areas: containers of stagnant water, especially cans near cafeteria exteriors; used tires; gutters; grassy ditches and pools of standing, stagnant water, especially with organic debris; and construction sites or vocational-technical arenas that might harbor standing water.
- Call your local health department to report all species of dead birds. Find ***Health Info*** and county info at: **www.co.la-crosse.wi.us/health** or **www.dhs.wisconsin.gov**
- Communicate to your faculty, staff, and students – make sure they know how to protect themselves and what you're doing to assure a safe campus.
- Contact your local mosquito control officials or city public works department for information about mosquito control in your area.
- Consider scheduling outside events during daylight hours rather than in the evening.

WHEN USING REPELLENTS, ALWAYS FOLLOW THE LABEL DIRECTIONS AND KEEP OUT OF THE REACH OF SMALL CHILDREN (MAY BE TOXIC IF INGESTED).
POISON CONTROL: 1-800-222-1222

La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Simple Steps Communities Can Take

By taking active steps to educate and promote awareness of vector-borne illness, individual communities can have a significant impact on the health and well being of their residents as well as guests. Promotion of educational programs through schools, clubs, community organizations, common interest groups (hunters, agriculture), and continued involvement with university extension are just a few simple ways.

Mosquito-Borne Disease

1. Have signage or educational posters in public buildings concerning steps individuals can take to decrease habitat for mosquito-borne diseases.
    a. Promote reporting of sites that offer habitat.
    b. Promote personal protection like repellent (making sure to read label), making sure screens are in good repair, cutting down weeds or other high vegetation which can offer daytime harborage for mosquitoes.
    c. When outside at dusk or dawn (high mosquito feeding periods) take precautions such as repellents.
2. Promote waste tire disposal by having cost efficient, easily accessible tire recycling sites.
3. Educate governmental staff to recognize mosquito-borne disease habitat, such as untrimmed tires, uncovered boats, buckets and other contains and report the sites to public health for inspection.
4. Try to engineer ditches and culverts to promote water flow and prevent long-standing water pools.

Tick-Borne Disease

1. Signage for prevention as for mosquitoes.
2. Signs in parks explaining tick disease prevention.
3. Widen paths, limit high grass and weeds were ticks thrive.
    a. Thin out trees and cut low vegetation around parks or public area's that offer habitat for small mammals (the reservoir for tick-borne diseases) and for tick vectors for disease.
4. Educate pet owner to the threat of pets bringing ticks into their home by allowing pets to walk through high vegetation or to run at large without supervision.
5. Remind the public that even small areas of high vegetation can offer good tick habitat.

Taking Action to Prevent Vector-Borne Disease Significantly Contributes to the Overall Health of a Community

Additional Steps Communities Can Take

1. Promote mosquito disease prevention through electronic media and local media. Repetition of the same messages is always important but try to add new information with these messages.
2. Communities can work with their state department of environmental protection to have a date and site where citizens can dispose of tires free of charge.
3. Government officials have legal authority to manage an area if it poses a public health risk. Local communities can develop ordinances dealing specifically with vector control including definitions of violations, control measures, and penalties.
4. Have mosquito habitat clean-up efforts in areas with a high prevalence of disease. Additional resources to prevent tick-borne disease through landscape management is found at http://www.cdc.gov/lyme/prev/in_the_yard.html
5. Actively look at local, regional, and national incidence of mosquito-borne disease in CDC ArboNET. If the mosquito data shows disease infection above a threshold, increase the message of mosquito-borne disease prevention and increase efforts at local mosquito control. High mosquito infection rates are a precursor to future high human disease incidence.
6. Local health departments and communities should finish case reviews promptly and accurately. Prompt environmental assessments (and following community intervention) allow us to prevent future disease incidence.
7. Ask state health departments for assistance with vector-borne disease issues.
8. Local health departments and communities can offer internships for public health students interested in vector-borne disease. Students want to learn new skills and public health interns are positive about vector-borne disease projects. Vector-borne disease projects offer many different experiences in public health, from outdoor fieldwork to community intervention to laboratory work to data analysis.
9. Assist with state mosquito and tick surveillance programs. State government has resources (or has connections) to test mosquitoes and ticks for human pathogens.
10. Share mosquito-control resources with neighboring communities.

References

American Mosquito Control Association

http://www.mosquito.org/control

Metropolitan Mosquito Control District

http://www.mmcd.org

Wisconsin Department of Health Services

http://www.dhs.wisconsin.gov/eh/MosquitoControl/index.htm

Centers for Disease Control and Prevention

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm

http://www.cdc.gov/ticks/

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Developing an Educational Program

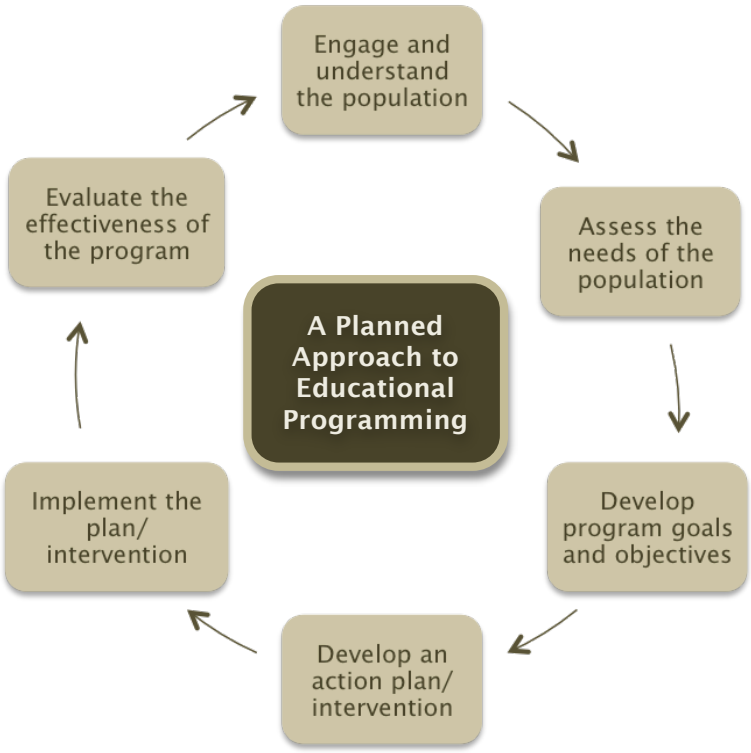
La Crosse County Health Department *400 4th St. N, La Crosse, WI 54601* *(608) 785-9872*

Where to Start

Health educators frequently use planning models when developing programs. Planning models are used for planning, implementing, and evaluating health education programs, and for providing a framework on which to develop a plan. A number of planning models have been developed over time, but most consist of these basic components (Cottrell, Girvan, & McKenzie, 2009).

1. Engaging and understanding the priority population
2. Assessing the needs of the priority population
3. Developing program goals and objectives
4. Developing an action plan/intervention
5. Implementing the plan/intervention
6. Evaluating the effectiveness of the planning process and program

The figure below is a planning model showing the cyclical process involved in developing a community health educational program.



Note. Based on an original model, *A generalized model for program planning*, and expanded to include engaging and understanding the population.

Adapted from An introduction to community health, 6th edition (p. 135), by J. F. McKenzie, R. R. Pinger, J. E. Kotecki, 2008, Sudbury, MA: Jones and Bartlett Publishers. Copyright 2008 by Jones and Bartlett Publishers, Inc.

1. Engage and understand the priority population

Communicate and become familiar with the population you wish to work with. Be aware of the characteristics of the population (e.g., age, race, rural/urban) and consider these when developing your program.

2. Assessing the needs of the population

Once again, keep in mind what makes up the population you wish to serve. Although you may have a priority you already want to address, be sure to assess the needs of the population.

Identify current vector control needs, resources, and constraints of the priority population, as they relate to the development of your program. The purpose of this is to determine whether the needs of the population are being met (Gilmore, 2012).

3. Developing program goals and objectives

After identifying the needs of your population, goals and objectives must be specified.

Goals are broad statements that identify long-term outcomes. Your goal(s) should include two basic components, who will be affected and what will change because of your program.

Example: To better educate students on the health effects of Lyme disease.

Objectives are the steps that must be accomplished before a goal can be met. Objectives identify the action to be performed and should be stated in specific, measurable terms. Specific objectives are important because they will become the focus of the evaluation plan that you will develop (Cottrell et al., 2009).

Objectives should be made up of four parts (who, what, when, and how much) and outline changes that should result from the implementation of the program.

Example: When asked in class, 60% of the students will be able to list 3 symptoms of Lyme disease.

4. Develop an action plan/intervention

An action plan is a strategy for meeting the identified priority, from the needs assessment. It answers the question, what can be done to resolve identified needs or problems? It focuses on examining the need, setting priorities for goals and objectives, identifying strategies to accomplish objectives and goals, explains the specific activities needed to complete each strategy, establishes timelines, and identifies evaluation procedures.

An intervention is an activity, or activities, designed to create change in people. This intervention represents the program that the priority population will experience. Your intervention can include any number of activities. Although there is no exact number, it has been shown that multiple activities are often more effective than a single activity (McKenzie et al., 2008).

***When developing your intervention be sure to utilize the contents of this toolkit. It was created for your use as an informational and educational resource, and intended to improve your vector-borne disease prevention efforts.*

5. Implement the plan/intervention

After your action plan/intervention has been developed it is time to put it to work. Implement your intervention by carrying out the activity or activities that make up your program. When implementing your plan be sure to document the steps you took, following the completion of your program you can reflect on this process and determine if any changes should be made, should you choose to implement this program again in the future.

A simple way to become more comfortable with the implementation of your program is a process called “phasing in.” To do so, simply implement your intervention to a small group, or series of small groups, instead of the entire population. This will provide a smaller audience as you become more comfortable with this process (McKenzie et al., 2008).

6. Evaluate the effectiveness of the program

Although evaluation is the final step in this planning model, however it really takes place in all steps of program planning. The purpose of this is to evaluate the efforts and success of your program. Evaluation procedures should be developed during the planning process.

Two main categories of will make up your evaluation:

Ongoing or formative evaluation guides program implementation. This is the evaluation that is conducted during the planning and implementing processes to improve or refine your program.

Outcome or summative evaluation determines program effectiveness. This is the evaluation that determines the impact of your program on the priority population.

Evaluation of the program planning process can also be conducted to determine if the goals, objectives, strategies, activities, personnel, and time frames were appropriate, achievable, and acceptable to community standards (McKenzie et al., 2008).

References

Cottrell, R. R., Girvan, J. T., & McKenzie, J. F. (2009). *Principles & foundations of health promotion and education* (4th ed.). San Francisco: Pearson/Benjamin Cummings.

Gilmore, G. D. (2012). *Needs and capacity assessment strategies for health education and health promotion*. (4 ed.). Burlington, MA: Jones & Bartlett Learning.

McKenzie, J. F., Pinger, R. R., & Kotecki, J. E. (2008). *An introduction to community health* (6th ed.). Sudbury, Mass.: Jones and Bartlett Publishers.

Additional References

CDC Healthy Communities Program – Tools for Community Action

http://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/tools/

The University of Kansas – Community Tool Box

http://ctb.ku.edu/en/get-started

World Health Organization – Health Education: Theoretical concepts, effective strategies, and core competencies

http://applications.emro.who.int/dsaf/EMRPUB_2012_EN_1362.pdf

Healthy People 2020 – Educational and Community Based Programs

http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=11

APPENDIX E

ORAL DEFENSE POWERPOINT PRESENTATION

THE FURTHER REFINEMENT OF THE LA CROSSE COUNTY VECTOR CONTROL ELECTRONIC TOOLKIT BASED UPON PARTNER FEEDBACK IN A WESTERN WISCONSIN SERVICE REGION

Author: Adam Berg, MS CHE candidate

What is a vector?

An organism, typically a biting insect or tick, that transmits a disease or parasite from one animal or plant to another.

Source: (CDC, 2011)

Vector-borne Diseases

- Tick-borne
  - Lyme disease
  - Anaplasmosis
  - Ehrlichiosis
- Mosquito-borne
  - West Nile
  - La Crosse viral encephalitis (LVE)

Vector-borne Diseases

- Lyme disease
  - Reported cases in 2012, in the U.S.
    - 22,014 confirmed
    - 8,817 probable
  - Symptoms include: fever, joint pain, headaches
    - If untreated infection can spread to heart and nervous system

Source: (CDC, 2013)

- La Crosse viral encephalitis (LVE)
  - Symptoms include: headache, nausea, fever, vomiting, tiredness
    - Tends to affect elderly and young children
    - Can result in nervous system problems and swelling of the brain (encephalitis)

Source: (CDC, 2009)

LCHD Vector Control Division

- The Vector Control Division of the LCHD serves a 12 county area throughout Western Wisconsin and Southeast Minnesota
  - 11Partner Counties
- Dave Geske, Vector Control Manager
- Vision:

  The La Crosse County Vector Control Division is committed to serving and protecting the La Crosse County area from animal disease and nuisance along with providing timely response to community health issues (LCHD, 2012).

La Crosse County Vector Control

- The LCHD Vector Control Program began in 1979
  - to control for the mosquito vector for La Crosse viral encephalitis (LVE), Aedes triseriatus.
  - Six-county program
- Cases of LVE statewide decreased from:
  - 1978-1982 annual average of 27 cases/year
    - 10-36 cases per year
  - 1983-195 annual average 10.5 cases per/year
    - 2-19 cases per year

Source: (Geske & Parry, 1995)

La Crosse County Vector Control

- Grant funded project 1994-1995
  - To determine an increase in cases of LVE in 1993
  - Additional resources provided an opportunity for community outreach and interaction
- Since 1995, the area served by the LCHD has averaged fewer than 5 cases of LVE annually
  - including one case in 2011 and zero cases in 2012

Source: (Geske & Parry, 1995), (LCHD, 2012)

Current LCHD Vector Control Efforts

- Current efforts of LCHD are currently limited primarily to:
  - Surveillance, habitat elimination and habitat management
  - Less on community outreach
    - Due primarily to time and fiscal restraints
- Dave Geske maintains this philosophy:
  - Communication and interaction with the public are still a vital part of the vector control process.

Source: (D. Geske, personal communication, April 16, 2013)

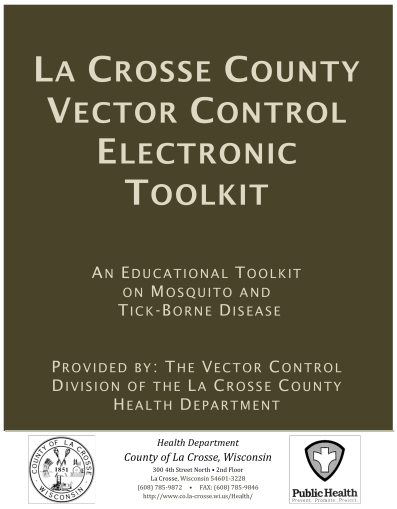
Emergence of Other Diseases

- In La Crosse County alone, reported cases of Lyme over a five year period were:
  - 2007: 31
  - 2008: 97
  - 2009: 150
  - 2010: 181
  - 2011: 171
- Also, in 2012 La Crosse County recorded its second ever human case of West Nile virus

Source: (LCHD, 2012)

Vector Control Electronic Toolkit

- Request for concise scientific documents pertaining to mosquito and tick-borne disease
- Enlisted the assistance of two health education students
  - CHE Graduate Student
    - Adam Berg
  - CHE Undergraduate Student
    - Tessa Whitemarch



Toolkit

- Began as a series of documents intended to aid health professionals
  - For use as an informational and educational tool
  - The original location intended to be the home page of La Crosse County Health Department's
- The number of documents continued to grow
  - Determined the abundance of information needed to be logically organized

Toolkit

- The idea for a "toolkit" emerged
  - This toolkit could be used as a practical resource not only for health professionals, but also for:
    - Health departments, municipalities, and other community organizations
  - Just prior to the summer of 2013, these documents were organized, resulting in the very first *La Crosse County Vector Control Electronic Toolkit*

Toolkit

- Following its approval of content by the LCHD it was distributed electronically to:
  - All of the counties served by the LCHD
  - The State of Wisconsin Division of Public Health
  - North Central Mosquito Control Association (NCMCA)
  - The National Association of County & City Health Officials (NACCHO)
- For further use and dispersal at their discretion

Goal

To increase vector-borne disease prevention and control efforts between the La Crosse County Health Department (LCHD) the counties they serve.

Objectives

- Identify the needs of each individual county regarding vector control.
- Determine the capacity of each county as it pertains to achieving their vector control goals.
- Evaluate usefulness of the La Crosse County Vector Control Electronic Toolkit as an informational and educational resource.

Need vs. Capacity

- Need: "the difference between the present situation and a more desirable one"
  - Needs assessment: "a planned process that identifies the reported needs of an individual or a group"
- Capacity: "both individual and collective resources that can be brought to bear for health enhancement"
  - Capacity assessment: "a measure of actual and potential individual, group, and community resources that can be inherent to and/or brought to bear for health maintenance and enhancement"

Source: (Gilmore, 2012)

Methods

- Developed a Needs and Capacity Assessment to:
  - Evaluate each counties awareness regarding vector-borne disease and control
  - Recognize each counties receptivity to the current services provided by the LCHD
  - Identify the existing resources of each county as they relate to vector control
  - Evaluate the contents of the toolkit and its use as an informational and educational resource
  - Incorporate preliminary updates into the toolkit

Needs and Capacity Assessment

- Survey
  - Distributed electronically to representatives from each of the 11 partner counties
    - Health Officer or Environmental Health Specialist
  - Consisted of four sections:
    - Content of the toolkit
    - Use of the toolkit
    - What is missing from the toolkit
    - Capacity enhancement

Needs and Capacity Assessment

- Key Informant Interviews
  - Representatives from four different partner counties
    - As selected by Dave Geske
  - Interviews sought descriptive insight regarding:
    - The value of the toolkit as a resource
    - Community recognition of vector control
    - A Push for further action (e.g., policy)
    - Continuing a collaborative partnership with the LCHD

Findings - Survey

Content of the toolkit	Use of the toolkit	What is missing from the toolkit	Capacity enhancement
All respondents viewed the toolkit as a useful resource and believed the toolkit clearly detailed vector-borne disease.	All respondents saw the toolkit being used for educational material. Over half believed it had value in educational programming and trainings.	Information endemic nature of Lyme disease in WI, and Lyme disease testing. PowerPoint templates were also suggested for educational purposes. Additional places/ partners to provide with vector related information.	Time, funding, and personnel were identified, by all counties, as major barriers influencing their vector control efforts. All counties recognized the threat/impact of vector-borne disease. Vector control was identified, seasonally, as a high priority by all counties, but fell as an annual priority

Findings – Key Informant Interviews

Value of the toolkit	Community recognition of vector control	Push for further action	Continuing a collaborative partnership
Toolkit is easy to read and navigate, and is a valuable resource toward public health efforts. Toolkit will save on valuable county resources. (e.g., time, money, personnel) Greatest value is to the general public as a whole because of its depth of content and the variety of ways it could be utilized.	Communities recognize the annual work done by the LCHD, and that vector-borne illness is an issue, but show little concern unless significant issues arise. Individual counties cannot, and do not, do a lot outside of the services provided by the LCHD, due to limited resources. Identified these limited resources as: time, money, and personnel	A resource like the toolkit would be influential in the forward movement on issues regarding vector control. There is value in the toolkit and its contents as a concise way to approach their decision makes (e.g., county board of health) directly, and as an aid in developing materials to do so.	All participants expressed positivity toward their existing relationship with the LCHD, and toward continued collaboration. Acknowledging that Dave Geske has always been willing to work with them whenever problems arose.

Toolkit Refinements

Recommendations for continuation and refinement	Immediate revisions
Additional documents continuing educational information, and information on the endemic nature of Lyme disease The addition of sections addressing the treatment of Lyme disease and Lyme disease testing . PowerPoint templates, or links to PowerPoint templates, for educational use. Annual updating of disease information and statistics.	The addition of documents detailing community action, and ways local health departments can effectively circulate information contained within the toolkit. Suggested places/partners health departments can collaborate with to strengthen vector control efforts A guidance system for the development of a community health education program. Including easily accessible resources outside of the LCHD.

Recommendations Aligned with Conclusion I

- Given the limited resources of their partner counties, the LCHD must continue to educate the population they serve, making education a priority, in their vector control efforts.
  - Recommendation I:
    - Encourage each county to promote and circulate the toolkit to all communities within the county.

Recommendations Aligned with Conclusion II

- Communities recognize the threat of vector-borne disease, but lack the resources to act independently in their vector control efforts.
  - Recommendation II
    - Stimulate each county to communicate with community organizations to coordinate preventive efforts; as well as provide community organizations with guidance to promote preventive vector control efforts.

Recommendations Aligned with Conclusion III

- Annually vector control is not recognized as a high priority within the counties served by the LCHD, contributing to the lack of resources.
  - Recommendation III
    - Encourage the counties to develop a plan, among health educators and other public health professionals, to approach their county board of health addressing issues pertaining to vector-borne disease and control.

Closing Thought

"Education of the public still remains one of the greatest allies in overcoming the risk of La Crosse viral encephalitis. Habitat reduction and proper management of old tires are important measures the public can take to help avoid having their children suffer the effects of La Crosse viral encephalitis. During 1994, 46 public educational programs were provided; during 1995, 29 programs." (Geske & Parry, 1995, p.11)

Acknowledgements

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Supervisor: Dave Geske

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- Sharon Nelson
- Gloria Wall
- And all others who contributed to the success of this project.

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Questions?