

Appendix 1: Senate Joint Resolution 10



SPONSOR: Sen. Lopez & Rep. Schwartzkopf
Sens. Bonini, Cloutier, Ennis, Henry, Hoeker, Lavelle,
Lawson, McDowell, Peterson, Pettyjohn, Simpson; Reps.
Baumbach, Briggs King, Gray, Hudson, Kanton,
Kowalko, Miro, Osianski, D. Short, M. Smith,
Spiegelman

DELAWARE STATE SENATE
147th GENERAL ASSEMBLY

SENATE JOINT RESOLUTION NO. 10

ESTABLISHING A JOINT EXECUTIVE AND LEGISLATIVE TASK FORCE TO STUDY AND MAKE FINDINGS AND RECOMMENDATIONS REGARDING THE NEED FOR A UNIFIED STRATEGY TO COMBAT LYME DISEASE.

WHEREAS, Delaware has one of the highest incidences of Lyme Disease in the United States; and

WHEREAS, Lyme Disease poses a serious and growing threat to the health and safety of Delawareans;

and

WHEREAS, Lyme Disease requires not only a health strategy, but also input from our agricultural community, education system, and housing regulators to create a model for education, treatment, and prevention statewide; and

WHEREAS, Delaware can bring together many experts and stakeholders from our communities, Executive branch, and the General Assembly in finding innovative and coordinated efforts to address this persistent issue; and

WHEREAS, the key to past success in Delaware has been the input and co-operation of our resident experts for the common good of all our citizens.

NOW THEREFORE:

BE IT RESOLVED by the Senate of the 147th General Assembly of the State of Delaware, the House of Representatives concurring therein, with the approval of the Governor, that a Joint Executive and Legislative Task Force be established to study and make findings and recommendations regarding the need for a unified strategy to combat Lyme Disease in Delaware.

BE IT FURTHER RESOLVED that the Lyme Disease Prevention Task Force be composed of the following members:

1. A member of the Senate Majority appointed by the President *pro tempore* shall serve as a co-chair and a member of the Senate Minority appointed by the Senate Minority Leader shall serve as a member;

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2. A member of the House Majority appointed by the Speaker of the House shall serve as co-chair and a member of the House Minority appointed by the House Minority Leader shall serve as a member;

3. A representative from the Office of the Governor, appointed by the Governor;

4. The Secretary of the Department of Health and Social Services or a designee appointed by the Secretary;

5. The Secretary of the Department of Agriculture or a designee appointed by the Secretary;

6. The Secretary of the Department of Natural Resources and Environmental Control or a designee appointed by the Secretary;

7. The Secretary of the Department of Education or a designee appointed by the Secretary;

8. The Director of the Delaware Economic and Development Office or a designee appointed by the Director; and

9. Three public members; one appointed by the Governor, one by the President *pro tempore*, and one by the Speaker of the House

BE IT FURTHER RESOLVED that the President *pro tempore* of the Senate and the Speaker of the House, in co-operation with the Governor, jointly ask for representatives from the following Delaware Organizations to advise this Task Force:

1. Delaware Housing Authority;

2. Delaware Healthcare Association;

3. The Medical Society of Delaware;

4. Delaware State Education Association;

5. Delaware Nurses Association; and

6. The Delaware Veterinary Medical Association.

BE IT FURTHER RESOLVED that the focus of the Task Force's study, findings, and recommendations include, but are not limited to:

1. Education materials on Lyme Disease to be created and distributed to schools, animal shelters, treatment facilities, and civic associations where practicable;

2. Work to examine and advance detection and prevention services administered by medical professionals and institutions against Lyme Disease;

3. Examination of regulations including but not limited to carrying of ticks by pets and other domestic animals;

4. Investigation into child- and environmentally-safe methods of combating ticks and other carriers of Lyme Disease; and

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5. Appropriate tracking of data and coordination with neighboring states.

BE IT FURTHER RESOLVED that the co-chairs of the Task Force be responsible for guiding the administration of the Task Force by, at a minimum:

1. Setting a date, time, and place for the initial organizational meeting;
2. Supervising the preparation and distribution of meeting notices, agendas, minutes, correspondence, and reports of the Task Force; and
3. Ensuring that the final report of the Task Force is submitted to the President *pro tempore* of the Senate and the Speaker of the House of Representatives with a copy to the Governor and to the Director of the Division of Research of Legislative Council and to the Delaware Public Archives.

BE IT FURTHER RESOLVED that the President *pro tempore* of the Senate and the Speaker of the House direct the necessary staff of both houses to assist this Task Force.

BE IT FURTHER RESOLVED that the Joint Task Force shall report back to the General Assembly by June 1, 2015 any recommendations for legislative or executive action to meet the objective of coordinated efforts to prevent Lyme Disease. The Joint Task Force shall sunset at that time.

SYNOPSIS

This resolution establishes the Lyme Disease Prevention Task Force to promulgate a unified strategy to combat Lyme Disease in Delaware.

AUTHOR: Sen. Lopez

Appendix 2: Meeting Minutes, January 6, 2015

Lyme Disease Prevention Task Force Meeting Minutes- Tuesday, January 6, 2015

The Lyme Disease Prevention Task Force was called to order at 6:20pm by Sen. Lopez. Members present included co-chairs Sen. Lopez and Speaker Schwartzkopf, Sen. Ennis, Rep. D. Short, William Meredith, Linda Wolfe, Linda Parkowski, Sandra Reyes, Judy Setting, Marlena Gibson, Pamela Sidman, Donnie Hudson and Karen Panunto. Members participating via conference call included Danielle Blount, Dr. Heather Hirst, Dr. Steven Eppes and Dr. Kathryn Wotman.

Co-chairs Sen. Lopez and Speaker Schwartzkopf thanked the members of the Task Force for their participation and emphasized the seriousness of this issue to Delaware. Sen. Lopez highlighted the significance of numbers of co-sponsors the authorizing legislation, Senate Joint Resolution (SJR) 10, had in the 147th General Assembly.

The members introduced themselves sharing the constituency they represent as well as any personal interaction they had with Lyme disease.

The committee reviewed the provisions of SJR 10 including the reporting deadline of June 1, 2015. The committee reviewed additional materials including a pamphlet on the basics of Lyme disease and a presentation prepared by Dr. Kathy Spreen which provided a baseline of the scientific and medical information.

Speaker Schwartzkopf drew the committee's attention to the third slide in Dr. Spreen's presentation regarding her son's case of Lyme disease which described misdiagnosis, bouncing from doctor-to-doctor and Lyme denial. The Speaker emphasized the importance of making the process better for patients who have yet to be diagnosed. There are disagreements in the medical field over Lyme disease and its treatment. The goal is to try to find some standards to guide medical professionals.

The co-chairs then opened the meeting to member discussion. Judy Setting shared her experience with a severe case of Lyme disease. She emphasized the large population of people who are suffering and the disparity of treatment received by patients. She stressed the importance of doctors treating patients with Lyme disease for the long-term.

Dr. Eppes discussed the controversy among doctors who are willing to treat and test and others who are not. He identified prompt proper diagnosis as the key to improving patient treatment. Lyme disease testing has become increasingly more reliable, but it is still not perfect. He stressed the importance of balancing medical research with the anecdotal testimony the committee considers.

Speaker Schwartzkopf inquired about the testing options doctors have at their disposal and asked if cost was a consideration for doctors. Dr. Eppes felt that cost was not an issue, but that

providers have not been familiar enough with Lyme disease. The importance of education for doctors and physicians assistants cannot be understated.

Rep. D. Short provided prospective as a former employee of a health insurance company. The insurance company would only approve tests in Delaware and wouldn't allow patients to use a test from another lab. Delaware does not have any Lyme disease specialty labs and many patients want to use labs in Maryland.

Dr. Eppes explained that there are problems with insurance coverage for prolonged treatment. Rep. D. Short clarified that private companies can cover the cost of a patient going to a lab out of network, but that it is probable that companies would only approve tests from labs in network.

Sandra Reyes shared her experience with Lyme disease. She was able to get diagnosed once on her husband's better insurance plan; this required a spinal tap. She stressed the stigma that people think that Lyme disease is like a flu and not a serious prolonged illness.

Linda Wolfe asked if doctors are able to determine what test a patient should have and which lab to be sent to. She wanted to know if doctors have a rubric. Dr. Eppes explained that people who have Lyme disease and test negative are often in the first few weeks of the disease. After that time, the body will start to test positive. Negative tests when a patient is actually positive are not common after the first few weeks of the disease manifestation. Most negative results do not require treatment for Lyme disease on a prolonged basis.

The standard labs used in Delaware are LabCorp, MedAssist and Quest. There are specialized labs that use alternative technologies out-of-state. Some of those labs are using new technologies that have not been approved by the Federal Drug Administration. There are no Lyme disease specialty labs in Delaware. There is one in New Jersey and the most famous is in California. Most Lyme disease patients are paying out-of-pocket for these expensive tests. There are also no Lyme disease specialty doctors in Delaware, though there are some in Pennsylvania and Maryland.

Linda Parkowski requested that insurance companies join the conversation. She also suggested that the committee try to recruit a Lyme disease specialist to Delaware. Speaker Schwartzkopf felt that recruiting a specialist to Delaware could be a recommendation of the committee and could be tied in with an economic development program.

Bonnie Hudson shared that when she worked in Pennsylvania they regularly were diagnosing Lyme disease or other tick-borne diseases. As a school nurse in Delaware, she sees strange looking rashes and will refer the kids to their family doctors. But the family doctors haven't seen Lyme disease enough and often think the kids have ring worm. She suggests more education along with a prevention strategy.

Dr. Wotman shared the practices for treating animals with Lyme disease, predominately dogs. Veterinarians are comfortable recognizing the clinical signs of Lyme disease and are fully aware of the prevalence of Lyme disease in our region. Veterinarians trust the test and are very comfortable diagnosing animals.

Linda Parkowski asked why dogs have a vaccine but humans do not. Rep. D. Short and Dr. Eppes gave the history of the human vaccine. The vaccine was developed by a pharmaceutical company, but it had adverse side effects including arthritis. The company faced a class action lawsuit and pulled the product from the market. The vaccine had an 85% efficacy, but many people thought that they were fully protected. Rep. D. Short suggested a competitive grant to have Delaware come up with a better test making Delaware a leader on Lyme disease.

Bill Meredith shared the major concerns the Department of Natural Resources and Environmental Control (DNREC) has for Lyme disease. Many staff people especially those who work in mosquito control regularly enter high-risk inhospitable areas. Lyme disease is an occupational hazard for many of the employees. Back in 2007, DNREC worked with the Department of Public Health (DPH) to develop a proposal to address Lyme disease in Delaware. This proposal included adding a DNREC staff person who would serve as a researcher tracking and identifying hotspots and applying control measures. DPH would employ a trainer/educator to administer educational programs to the public and to the medical community. This proposal is shovel ready, but it never got off the ground due to funding problems. Sen. Ennis suggested leveraging federal grant money to pay for the proposal and not just relying on the state budget to get funding. Bill Meredith said he would look into funding from the Center for Disease Control.

Speaker Schwartzkopf brought the committee's attention back to Dr. Spreen's presentation. The map of cases of Lyme disease in the country shows that Delaware and our region as the epicenter. The image really depicts how significant the problem is. Bill Meredith explained that the deer population, terrain and climate contribute to this problem. The committee requested the case numbers for Lyme disease in Delaware as well as other tick-related diseases at the next meeting.

Judy Setting reiterated that most ticks are carrying many diseases and not just Lyme disease. She pointed out that there are people who do not ever have positive tests for Lyme disease, and she was one of them. If she didn't get the treatments for Lyme when she did, she would have died.

Linda Parkowski suggested linking up with National Lyme Disease groups. Speaker Schwartzkopf highlighted the need for better testing for early detection and the importance of working with insurance companies to use the best labs. We have a number of high-profile people in Delaware who have Lyme disease, including Elena Della Donne.

Sen. Lopez asked the committee members who have had Lyme Disease to identify one or two things they experienced that should never happen again. He suggested the committee attack the 'low-hanging fruit'.

Linda Parkowski said getting a family doctor to prescribe the antibiotics right away is essential to mitigate the impact of Lyme disease. Sen. Ennis suggested establishing standards of need-to-know information based on models of care seen for trauma patients.

Dr. Eppes explained that Lyme disease cases are notoriously underreported. Speaker Schwartzkopf asked if regional doctors realized the prevalence of cases compared to the rest of the country. Dr. Eppes felt that there was not widespread understanding of how common the

disease was among medical professionals. He reinforced the need for education among healthcare providers.

Speaker Schwartzkopf reminded the committee that Delaware is in a crisis zone. He suggested that medical professionals see the map to help them accept that this as a serious and valid disease. The Center for Disease control estimates 300,000 cases of Lyme disease in our region. Bill Meredith pointed out that the problem is not just the prevalence of ticks but how infected the ticks are. A Wesley College study in 1999-2000 showed that ticks carried Lyme disease at county-averaged rates of 62% for New Castle, 14% for Kent, and 40% for Sussex.

Linda Wolfe asked about prevention measures in Delaware. Pam Sidman shared that Delaware does do a good job posting warning signs in tick infested areas to remind people to spray and check themselves. Public awareness about checking for ticks is visible, but there is a lack of public understanding when people get Lyme disease.

Rep. D. Short recommended adding Lyme disease treatment to the list of 39 mandated coverage requirements for health insurance.

Sen. Lopez opened the floor to public comment. Beverly Sisson shared her experience traveling from doctor to doctor with her Lyme disease. She is now seeing a specialist in Maryland. She felt that each doctor was bouncing her to the next to treat individual symptoms of Lyme disease while not addressing the underlying cause. She felt that the medical professionals had a bias on this issue and that if you do not have a positive test that you are going to struggle to get treatment. Lyme disease can impact every organ in the body. She had two false negative tests and was finally clinically diagnosed.

Joe Setting agreed that having someone who is well-known in Delaware to help with the cause is essential. The worst experience when his wife, Judy, had Lyme disease was being told by a doctor that the Lyme disease diagnosis was a 'trashcan diagnosis'.

Bill Meredith recognized that the market is there for a vaccine with high efficacy and little side effects because the crisis zone runs from Boston to Washington DC.

The next meeting of the Task Force was set for Tuesday, February 3, from 6-8pm. The meeting adjourned at 8pm.

Appendix 3: Meeting Minutes, February 3, 2015

Lyme Disease Prevention Task Force

Meeting Minutes- February 3, 2015

The Lyme Disease Prevention Task Force was called to order at 6:10pm by Sen. Lopez. Members present included co-chairs Sen. Lopez and Speaker Schwartzkopf, Sen. Ennis, Rep. D. Short, William Meredith, Linda Parkowski, Sandra Reyes, Judy Setting, Bonnie Hudson, Karen Panunto, Dr. Stephen Eppes, Dr. Kathy Spreen and Dr. Awele Maduka-Ezeh. Members participating via conference call included Danielle Blount, Linda Wolfe, Dr. Heather Hirst, and Dr. Kathryn Wotman. Additional participants included Paula Eggers, Infectious Disease Epidemiologist Dept. of Public Health, William Kirk, Vice President Highmark Delaware, and George Meldrum, Senior Policy Analyst Nemours Foundation.

The committee reviewed the minutes of the first meeting. Speaker Schwartzkopf motioned to approve the minutes as amended by Judy Setting. Sen. Ennis seconded and the motion was approved unanimously.

Dr. Spreen gave a presentation highlighting why Lyme Disease is so complicated. This multi-system disease can be disabling, and there is a lot of inaccurate information written about the disease. Dr. Spreen read over 10,000 articles to write her book, “The Compendium of Tick-Borne Disease”. Many of the scholarly articles written about Lyme Disease are contradictory or just wrong.

Commonly patients experience a delay in diagnosis or a misdiagnosis of Lyme Disease as viral infection like the flu. Patients are often bounced from one doctor to another treating each symptom of the problem while not addressing the root, the underlying infection causing symptoms. Patients are often treated with disrespect and disdain. Some doctors refuse to diagnosis unless there is a deer tick present or a large target. Lyme bacteria are highly evolved to survive, making it difficult to kill completely. The bacteria can remain dormant in the body and flare up once conditions improve. Neuropsychiatric symptoms are common and patients experience cognitive deficits. Patients cannot focus for more than a few minutes at a time and have problems with memory and processing. The importance of doctors understanding the science of this bacterium can help them to prescribe treatment. Chronic, persistent and long-term side effects of Lyme Disease are seen in 30-40% of patients with a genetic predisposition. 7-10% of people are completely flattened and debilitated by Lyme Disease.

Dr. Spreen reviewed in detail the many myths she has identified about Lyme Disease, a few include:

- Myth: Patient must have a bull’s eye rash to have Lyme Disease.
Only 7-20% of patients will have the target lesion. About 30-40% of patients will have a maroon oval and most will have no rash at all. If you only diagnose Lyme Disease when a patient has a rash you will miss half the cases.
- Myth: You do not need to worry about a tick bite if the tick was attached for less than 24 hours.

It is true that the longer the attachment the more likely the transmission. So the likelihood of transmission goes down with shorter transmission times, but it does not mean you can rule out Lyme Disease if the tick was attached for less than 24 hours. It is also difficult to know exactly when a tick attached to the body.

- Myth: You need a positive lab test to have Lyme Disease.
The Center for Disease Control (CDC), National Institutes of Health and Federal Drug Administration agree that you have to diagnose Lyme Disease based on clinical symptoms not the lab test. Health providers and insurers cannot rule out Lyme Disease because of negative lab tests.

Dr. Spreen explained that Delaware is a tick paradise with the perfect habitat for ticks. Ticks thrive on the edges of farm land, beach grass and suburbs. Delaware also has a deer population that is exceeding capacity. In Delaware, patients have very few state providers and many providers do not believe in chronic Lyme Disease. There is no organized advocacy group in Delaware. Many Delaware patients reach out to the Lyme Disease Association of the Eastern Shore of Maryland.

Dr. Spreen identified healthcare provider education as an essential key to improving Delaware's management of the disease. Other proposed actions included:

- Shorten diagnosis periods to prevent the acute condition from getting out of control.
- Educating the public on symptoms and treatments, especially vulnerable populations who are desperate for treatment and may seek out unscrupulous practitioners.
- Protecting providers who may be afraid of treating Lyme Disease or even learning more about the disease because of the controversy. Ensuring that the State Medical Board is not going after practitioners who do not follow traditional Lyme Disease guidelines.
- Inform the public that they do not need a positive Lyme Disease test to be diagnosed with Lyme Disease.
- Improve insurance coverage for long-term Lyme Disease treatment. Coverage has been denied by some providers if patients did not have the positive lab test.
- Prevent transmission by better controlling deer and tick populations and treating pregnant women who can pass the disease to their child.

Dr. Spreen explained that the CDC reported cases for Delaware are only reflecting cases with positive lab tests based on surveys and insurance claims. Rep. Short asked what the recommendation would be for properly diagnosing patients. Dr. Spreen felt that the test was a piece of the diagnosis but that you cannot rule out Lyme Disease if the test is negative. She wants to see treatment start earlier. Ideally, the blood culture would be the first test taken, but it is expensive and some doctors feel that there are too many positive with the blood culture. Dr. Spreen felt that if the test is going to be used doctors, they need to be more educated on the validity of the test.

Dr. Maduka-Ezeh shared that Delaware has consistent reporting procedures unlike other states and introduced Paula Eggers who tracks the data each year for the State of Delaware.

Brian Bennett, a Lyme Disease patient, shared his experience with insurance not covering his treatment because a doctor did not diagnosis him with Lyme Disease. He travels to Baltimore to see an out-of-network specialist.

William Kirk with Highmark Blue Cross Blue Shield shared his background. He explained that he mission of Highmark to improve the health of the community and participated in the meeting to better understand the scope of the problem as it relates to health insurers.

Dr. Eppes shared that education at for all medical professions, including doctors, nurses and school nurses, is needed. When medical professions are shown the right thing they will do it; they just need the right information to work from. The Medical Society expressed its support of medical professional education on Lyme Disease.

Dr. Maduka-Ezeh shared her appreciation for the passion and energy in the room and asked the committee to focus on the low hanging fruit including public awareness and provider education.

Sandy Reyes noted that Lyme Disease has not received federal funding for research. In order to receive funding for research the disease would have to be designated as a “listing” through the U.S. Department of Defense by the Delaware congressional delegation. Amyotrophic Lateral Sclerosis (ALS), for example, has been designated approximately \$15 million through this funding stream.

William Meredith reviewed the 2007 proposal by the Department of Natural Resources and Environmental Control (DNREC) and the Department of Health and Social Services (DHSS) with the committee. The Department of Public Health would provide an aggressive outreach program to healthcare providers and the public, while the DNREC would work on controlling ticks by identifying hotspots and performing tick related research and application. The proposal emphasizes awareness, deer population control and alerting the public to high infestation areas. There is also the ability for DNREC to use small scale pesticides to control tick populations.

George Meldrum explained that Lyme Disease has not been as prominent an issue the way obesity and smoking has been for children. He planned to discuss with the Nemours Foundation what they are doing on this issue and who would be interested in doing more. He was interested in the impact Lyme Disease has on children. Marilyn Williams with the Lyme Disease Association of the Eastern Shore of Maryland stated that children are the most susceptible.

Linda Parkowski asked about legislation in other states that had failed because advocates fought against them. Marilyn Williams explained that in Maryland a rogue member of the advocacy groups created an ugly situation in the Maryland state legislature. Linda Parkowski reiterated the key issues to be addressed were protecting physicians, funding research and mandating coverage. Speaker Schwartzkopf gave an overview of the categories of action identified by the committee, Education, Prevention, Diagnosis and Treatment, Health Insurance Coverage. He suggested reaching out to Delaware’s congressional delegation to request funding from the federal

government. The Speaker emphasized the importance of having the right people at the table to get results.

Rep. Short asked about the exact lab test costs. Marilyn Williams shared that the Western Blot test can range in price from \$150- 200 and a blood culture from \$500-600. Speaker Schwartzkopf reviewed the legislation of other states and noted that Maine went beyond just education requirements and required health coverage for the detection and treatment of Lyme Disease.

Dr. Spreen reminded the committee that not all labs are created equally so moving from the traditional test to the blood culture is not a silver bullet. Doctors are using the CDC surveying guidelines as the basis for Lyme Disease diagnosis. Dr. Spreen noted that this is disease is actually quite young, 40 years old, and there is not enough good data to use. Dr. Desmond Kahn suggested allowing treating physician to make the decision on diagnosis by evaluating the symptoms.

Speaker Schwartzkopf highlighted the cost difference between patients treated quickly and patients who are not diagnosed. Patients receiving treatment earlier have significantly reduced costs in the long run. Marilyn Williams added that in 1998 the CDC quantified the cost of Lyme Disease if treated early as \$400 while the untreated cost is \$60,000.

Marilyn Williams highlighted the importance of testing for co-infections that come along with Lyme Disease not just the Western Blot test. These tests for co-infections include babesia microti, babesia duncani, bartonella hensalae, bartonella Quintana, mycoplasma fermentens and mycoplasma pneumonia

Dr. Maduka-Ezeh said that the CDC is not just looking at the tests when compiling case data but also counting diagnosis based on Erythema Migrans rash. She noted that the additional testing will increase costs without adding value. She felt the group should start smaller.

William Meredith did anonymous survey of Fish and Wildlife employees earlier in the month. Of the 100 employees her surveyed, 61 said they routinely work in the field. Of the 61 who work in the field, 11 had been diagnosed conclusively for Lyme Disease and 15 had suspected Lyme Disease. That is 41% of the employees who are working in the field. Of office workers with occasional outdoor recreation, 13% conclusively had or suspected having Lyme Disease.

Lisa Ray, a Lyme Disease patient, shared her experience with hundreds of hospital stays and four surgeries. She has been denied disability coverage four times. Elise Kenton, Lisa Ray's mother, shared her perspective as a caregiver.

Marilyn Williams explained the history of the Lyme Disease Association of the Eastern Shore of Maryland. It was started by mothers who couldn't get help for their children. The organization focused on community awareness and is now trying to bridge the gap with the medical community. She shared the upcoming events of the association and noted that psychiatric manifestation of Lyme Disease has increase in the last year. The Association has found that peer pressure has been a barrier to doctor education. The Association has made videos of conference

speakers available online. Disability coverage is also a problem for patients struggling to keep their jobs while debilitated. Since Lyme Disease is not understood as a chronic debilitating disease, patients are not getting approved for disability coverage.

Dr. Desmond Kahn thanked the co-chairs for this hopeful effort. He was infected in 1989 and was re-infected in 2013 producing a positive blood test. He took antibiotics for a month which helped eliminate symptoms, but after he went off antibiotics the symptoms can back. Since Lyme Disease can remain in the body dormant this is not surprising. But, his doctor would not prescribe antibiotics again because the doctor felt if symptoms had gone away for a time the Lyme Disease was killed. Dr. Kahn wants to see doctors who treat Lyme Disease effectively protected by the law and that poor guidelines from infectious disease associations are addressed. He recommended the documentary "Under our skin". Judy Setting and her husband provided copies of the documentary to the committee.

Brian Bennett suggested getting a Lyme literate doctor (LLD) in Delaware. Marilyn Williams shared the challenges with doctor payment structure for Lyme literate doctors. Your first visit with a LLD is extensive, potentially two hours long. Doctors need a full history and a comprehensive meeting. Doctors cannot take the regular payment for a typical doctor visit that lasts ten minutes. But the insurance payment structure is not properly compensating for these important longer visits.

Rep. Short stated that he would not be satisfied if the committee just went after the low hanging fruit. With such a large group brought together and focused on this issue, now is the time to aim high. He reminded the committee members that they are the best advocates for new policies. Speaker Schwartzkopf added that the more legislators the committee can expose to this information the better chance at accomplishing change.

Marilyn Williams added that the goal with public education is not to scare people but to empower people.

Sen. Ennis reminded the committee that they are tasked with reporting back recommendations and to coordinate efforts to see through Lyme Disease prevention efforts.

The next meetings were set for the evening of Tuesdays March 3, April 7 and May 5. The meeting was concluded at 8:30pm.

Appendix 4: Meeting Minutes, March 23, 2015

Lyme Disease Prevention Task Force

Meeting Minutes- March 23, 2015

Lyme Disease Prevention Task Force was called to order at 6:10pm by Sen. Lopez. Members present included co-chairs Sen. Lopez and Speaker Schwartzkopf, Sen. Ennis, Dr. Awele Maduka-Ezeh, William Meredith, Linda Parkowski, Pamela Sidman, Bonnie Hudson, Karen Panunto, Dr. Stephen Eppes and Dr. Kathy Spreen. Members participating via conference call included Linda Wolfe, Judy Setting, Dr. Heather Hirst. Additional participants included Paula Eggers, Infectious Disease Epidemiologist Dept. of Public Health, George Meldrum, Senior Policy Analyst Nemours Foundation, Marilyn Williams and Pamela Andrews with the Lyme Disease Association of the Eastern Shore.

The committee reviewed the minutes of the previous meeting. Speaker Schwartzkopf motioned to approve the minutes. Sen. Ennis seconded and the motion was approved unanimously.

Dr. Eppes began his presentation about the diagnosis, management and prevention of Lyme disease pulling from his experience treating about a thousand patients with Lyme disease. The polarization of the Lyme community and mainstream medicine is pronounced, but together in Delaware work can be done to improve the situation.

He identified the stages of Lyme disease: early localized, early disseminated and late disease. Facial palsy is the most common neurologic finding along with arthritis and joint fluid. Many of the Lyme disease symptoms are not specific to just this disease so you can have twenty symptoms on the list and not have Lyme disease.

Dr. Eppes went on to discuss diagnosis. If a patient has a rash, there is no need for a test. The test is typically positive you the third week of infection. Medical professionals need to take precautions when interpreting test results. Communities in our area will have larger base numbers of people with Lyme disease. The Center for Disease Control (CDC) recommends the test approach with an ELISA reflexing to a Western blot. Other tests have been developed, but have not been verified or standardized.

Some have suggested testing the tick itself for Lyme disease, but that is not recommended for a number of reasons. One reason being, that a negative test result can lead to false sense of assurance. For example, you may have been unknowingly bitten by a different tick that was infected.

The only thing that works to treat this disease is antibiotics because it is an infectious disease. Ineffective treatments such as chelation therapy and rife machines have been used by desperate patients. Antibiotic treatment durations are put forth in the guidelines. Direct and indirect costs associated with delayed diagnosis are significant. Delayed diagnosis also results in greater long term problems for the patient. Permanent damage can be done that more antibiotic treatment cannot help.

Many ask why not just treat patients with Lyme disease for prolonged period of time with antibiotics. Dr. Eppes explained that antibiotic side effects, complications with PICC lines,

financial costs and neglect of the correct diagnosis contribute to resistance to prolonged antibiotic treatment.

Dr. Eppes showed the preferred method of removing a tick and shared the importance of people wearing protective clothing, looking for ticks, identifying them and removing them as well as using chemical repellants and controlling the tick populations on our properties.

Next, Dr. Maduka-Ewele presented on behalf of the Division Public Health (DPH). Delaware was the state with the sixth-highest incidences of Lyme disease in 2013. This is not just a Delaware problem. She explained what the DPH is doing now to address Lyme disease including ongoing surveillance, “Got Ticks” billboards, cinema advertisements and pamphlets. Outreach is limited due to staffing and funding limitations. Funding has been coming from the federal government with shrinking contributions each year.

Dr. Maduka-Ewele discussed targeted education focusing on the public, employers of outdoor workers, and healthcare providers and approaches for tick mitigation including expanding the governing the statute of mosquito control section of DNREC to allow them to address ticks.

Dr. Maduka-Ewele called for Delaware specific research through collaboration with Delaware universities in order to look at the density of tick populations, why is the rate of infection is so high, which factors can be modified and the impact of interventions on tick density.

Sen. Lopez opened the floor to question of the task force members. William Meredith explained that Lyme disease cases are seasonal with ticks being active from April to October, but not in the winter. Ticks have a two year life cycle. Dr. Spreen encouraged striking while the iron is hot and emphasized the importance of not telling physicians how to practice medicine, but giving them the permission to consider options and alternatives.

Sen. Ennis shared the importance of more recognition of the problem in Delaware. As a member of the Joint Finance Committee, he explained that challenges they have faced just keeping funding for the mosquito control as is and the need to make better efforts.

Chuck Mulholland pointed out the need to control the deer population and suggested extending the hunting season. Dr. Meredith pointed out that the small rodent population contributes as well as the deer population.

Brian Bennett asked if protocols can be given to hospitals. Dr. Spreen suggested that 4 hour continuing medical education courses in hospitals would be cost effective. Dr. Eppes shared that the Medical Society agrees and is willing to fund these trainings.

Marilyn Williams asked for more information on the outreach materials used by DPH. Paula Eggers shared that outreach materials are consistent with CDC messaging. DPH only receives the positive results from testing labs. The positive test generates a letter back to the provider who ordered the test. There is slightly different protocol for other tick related diseases. DPH also receives the clinical diagnosis.

The committee discussed establishing subcommittees and settled on the following subcommittees:

Public Education and Awareness
Medical Professional Training
Prevention and Tick Population Control
Legislative

Marilyn Williams expressed concerns with using hardline guidelines from the CDC. Patients are suffering, and she does not want additional misguided information being disseminated.

Alina Pfeifer emphasized the importance of prevention education for children and parents. She suggested especially teaching mothers who can be gatekeepers for their families. Annual special events can be used to raise money for outreach efforts.

Russell Larson asked if there is a list of approved doctors a person could go to if they thought they had Lyme disease. The International Lyme and Associated Disease Society's website has doctors listed in our area, but that is based on who is a dues paying member to the society. It is difficult to find someone in Delaware. Dr. Maduka-Ewele suggested that patients should be going to their internists.

Pamela Andrews shared her personal experience with her daughter and granddaughter's Lyme disease. She emphasized the need to have an open mind when dealing with this disease.

Dr. Childers shared that most physicians do not realize that Lyme disease is pandemic and just don't have the time for additional education. Speaker Schwartzkopf asked about who makes the decisions on credit hours for continuing education for medical professionals. Elsie Kenton shared that the emergency room doctors at the Nanicoke hospital in Seaford had no idea about Lyme disease when she went there. Brian Bennett focused on the need to teach primary care doctors to refer patients to knowledgeable physicians on Lyme disease if they are not well-educated. Dr. Spreen encouraged legislation drafted by the task force to use commonsense and be flexible. The CDC has contradictory information on their own website.

Mike Pfeifer suggested having a clinic each year and offered his video production company to help get the message out. When asked about training costs, Andrew Wilson with Medical Society of Delaware explained that it really depended on the type of training to determine cost.

Sen. Lopez shared that his goal is to pursue legislation this year to address some of these issues. Nothing came out of the task force established 8 years ago to address this issue, but this task force will produce change. The meeting was adjourned at 8pm.

Appendix 5: Meeting Minutes, May 4, 2015

Lyme Disease Prevention Task Force

Meeting Minutes- May 4, 2015

Lyme Disease Prevention Task Force was called to order at 6:10pm by Sen. Lopez. Members present included co-chair Sen. Lopez, Rep. Short, Linda Parkowski, Marlena Gibson, Pamela Sidman, Bonnie Hudson, Karen Panunto, Dr. Stephen Eppes and Dr. Kathy Spreen. Members participating via conference call included Danielle Blount, Linda Wolfe and Sandra Reyes. Additional participants included Paula Eggers, Infectious Disease Epidemiologist Dept. of Public Health and Marilyn Williams with the Lyme Disease Association of the Eastern Shore.

Linda Parkowski recounted that the week before the meeting the legislature passed House Concurrent Resolution 24 recognizing May as Lyme Disease Awareness Month. She shared the moving remarks Speaker Schwartzkopf and Rep. Short shared with their colleagues on the House floor.

The committee reviewed the minutes of the previous meeting. Rep. Short motioned to approve the minutes. Linda Parkowski seconded and the motion was approved unanimously.

The committee then went on to review the subcommittee minutes and reports. Linda Parkowski motioned to approve the public education subcommittee minutes and Paula Eggers seconded. The motion carried. Subcommittee minutes for the medical professional education subcommittee were edited. Karen motioned for approval; Dr. Spreen seconded and the motion carried.

Subcommittee report: Public Education and Awareness

Linda Parkowski explained that the subcommittee recommended a robust awareness campaign. Public awareness is crucial for all groups including the following targeted audiences; general public, schools/children, outdoor workers, outdoor enthusiasts and healthcare providers. This type of large awareness campaign would be run by a professional firm. Outreach would be expanded through agencies and presence at community events such as AG Day at the University of Delaware. The subcommittee recommended attempting to secure funding for this project through the tobacco settlement money governed by the Delaware Health Fund Advisory Committee. Dr. Spreen noted the connection between tobacco harvesters and Lyme Disease particularly in the Amish population.

Subcommittee report: Medical Professional Education

Karen Panunto shared that the goal of medical professional education is to ensure healthcare providers have a high index of suspicion of Lyme Disease in their patients and can diagnose patients clinically. The subcommittee recommended the creation of an oversight board to oversee the content of the education for medical providers. Bridging the gap with insurance coverage is important to medical providers as well. The subcommittee would like to see continuing medical education (CME) credit course provided on Lyme Disease as well as webinars. Dr. Spreen offered to prepare a 4 hour CME course for the oversight committee to approve. Rep. Short asked about how medical professionals pick their credits and if they have to take particular courses. Course material must be approved by the organization and the presenter has to submit

their credentials. Nurses are required to do 30 hours of CME. Healthcare providers are required to take a substance abuse course.

The committee discussed the importance of insurance coverage for patients who have negative tests but are clinically diagnosed by a licensed physician.

Brain Bennett asked who enforces the CME credits. Karen Panunto explained that the professional boards require certification that a professional has completed required hours. Brian noted that this is not ensuring physicians have the knowledge just that they took the course.

Subcommittee report- Prevention and Tick Population Control:

This subcommittee recommended a statewide science-based integrated-pest management strategy which would include: acaricide use, biological controls, management of tick-host animals and backyard habitat management. For DNREC Mosquito Control to be involved in field control operations for ticks, the enabling statute would need to be modified. The subcommittee recommended implementing the DNREC/DHSS proposal- "Development and Implementation of a Tick-borne disease prevention/abatement program". They also emphasized the importance of encouraging and soliciting additional research on tick biology and ecology with a Delaware specific focus. The subcommittee cautioned work already being done by for profit pest control operators.

Marilyn Williams pointed out that researchers have found that the fewer deer in an area the higher incidents of Lyme Disease in that area. She shared work being done at University of Delaware on invasive plants and its connection to Lyme Disease. She suggested that the educator position recommended in the DNREC/DHSS proposal be housed under DNREC since the Department of Public Health has to follow Center for Disease Control guidelines. Marilyn also recommended including continuing education funding in the position description of \$3,500 for conferences and a library, as well as increasing funding for insect testing.

Sen. Lopez reviewed the recommendations presented by the subcommittees.

1. A comprehensive public awareness campaign and funding source.
2. Changing the enabling statute of Mosquito Control to allow them to work on tick mitigation.
3. Secure funding for implementation plans in agencies.
4. Encourage additional research on ticks in Delaware.
5. Establish a medical professional education oversight board to implement an educational campaign for providers.
6. Develop a continuing medical education course.
7. Work to educate all healthcare providers to have a high index of suspicion of Lyme Disease in their patients.
8. Connect Lyme Disease patients to educated providers.
9. Improve insurance coverage so if patients are clinically diagnosed by a physician their treatment is covered.

Fraunhofer USA representative, Bill Freeborn, shared about how this non-profit organization develops vaccines and diagnostics using tobacco plants to quickly produce proteins. The organization has worked with the federal government to develop vaccines for Ebola and Antrax. The organization is moving forward to develop better diagnostics for Lyme disease.

Dr. Spreen discussed the different antibiotics used to treat Lyme Disease. She explained that half the people who get antibiotics will get well, but a significant subpopulation will have persistent symptoms. This may be due to genetic differences, additional stress or co-infections. She wants to see physicians treat the individual patient and not stamp each patient with the same treatment.

The committee discussed vaccines for Lyme Disease. Marilyn Williams cautioned that due to co-infections the vaccine will not be a silver bullet.

Sen. Lopez shared that he runs 4-H camp for 200 children each summer and this year the most important supply will be bug spray. Parents are starting to get information on Lyme Disease and continual reinforcement of this information is needed.

Pamela Sidman reminded the committee of the delicate balance in Lyme education so not to scare people away from the outdoors. Pamela suggested having a dollar from state parks, golf courses or camps go to a tick-borne disease prevention fund.

Elise Kenton reminded the committee that people do not believe that Lyme Disease can cause the long-term debilitating effects she has seen in her daughter. Rebecca Benson also reminded the committee of the importance of protecting providers who do treat Lyme and working to end the fear physicians have to treat.

Sen. Lopez shared that the public mood is different and changing on this matter. There is a much stronger sense of general awareness and behind that a motivation to implement change.

Alina Pfeifer shared the difficulty for Lyme patients who are trying to continue working with long-term symptoms. Dr. Spreen noted that the Miss Delaware organization did not allow the Miss Delaware 2009 winner to use Lyme Disease as her platform.

Sen. Lopez concluded the meeting at 7:40pm.

Appendix 6: Public Education and Awareness Subcommittee Meeting Minutes, April 13, 2015

Public Education & Awareness Subcommittee Meeting

Meeting Minutes- April 13, 2015

The meeting was called to order by Subcommittee Chair, Linda Parkowski at 10am. After sharing the Delaware Department of Economic Development's interest in this Task Force, she asked the members present to introduce themselves. Members participating included Paula Eggers, Sandra Reyes and Linda Wolfe. Additional participants included, Marilyn Williams and Pamela Andrews representing the Lyme Disease Association of the Eastern Shore and members of the public, Chuck and Dianne Mulholland.

The subcommittee discussed their goals of answering the following questions:

Who do we want to target/who is the audience in a public awareness campaign?

What is that message?

How do we fund it?

Sandra Reyes remarked that when she has tried to educate people to protect themselves from Lyme Disease, they are often afraid and turned off by the information. Marilyn Williams shared that the goal is to empower people to go outside safely.

Paula Eggers explained what the Division of Public Health is doing right now for public awareness of Lyme Disease. Currently, her office gets \$28,000 in Federal grant funding which allows them to do a limited campaign targeting the general public. This includes billboards with the "Got Ticks" campaign that run in May, June and July in the highest traffic areas in each county. As well as a commercial that runs before movie screenings during May, June and July and pamphlets and magnets distributed by request at health fairs and the state fair. The Division of Public Health works well with the Department of Education to communicate with school nurses each year and includes information on Lyme Disease in the school newsletters annually.

The subcommittee suggested the Division have a presence at the University of Delaware's Agriculture Day and Coast Day in the future.

Paul Eggers explained what the CDC surveillance of Lyme Disease means for in the Division of Public Health. She receives an electronic notification every time a lab gets a positive test for Lyme Disease. She automatically sends a letter to the physician who ordered the test following up. This letter includes resources for the physician with links to continuing medical education on the subject. If a physician does not order the test, the CDC will never get that report included in its case numbers. It is understood that Lyme Disease is severely underreported.

The committee decided on the target audiences.

Target audiences:

Children

Connect through: School Nurses, PTA, scouting events

Schools- all levels; including Universities for potential research opportunities

Health Providers

Outdoor Workers

Subgroup- Agriculture workers

Outdoor Enthusiasts

Subgroup- Hunters

General Public

Marilyn Williams shared that an educational program for children in schools was developed by a coalition of stakeholders. Dr. Nancy Fox of Maryland is involved and is seeking schools for her to present information designed for kids. Marilyn agreed to get more information for Linda Wolfe on this as an opportunity to go directly to schools to share this information.

The committee recommended that in addition to the feature in school newsletters, that schools post on their websites a link to the Division of Public Health's Lyme webpage, <http://www.dhss.delaware.gov/dph/epi/lyme.html>.

The subcommittee agreed that they want a robust website that can handle each targeted audience as a landing place. People would be directed to the website through publications for more information. The subcommittee noted that the diversity in the Task Force membership brings personal reach to so many different organizations. These personal connections with professional associations should be utilized to disseminate information.

The subcommittee discussed messaging. Marilyn Williams expressed desire to find a middle ground rather than just pushing the CDC information.

Prevention is the first and main message; the next is Lyme Disease awareness and clearing up myths. The subcommittee requested information from other states to see what messages have been successful from a prevention standpoint. Though they recognized the difficulty to evaluate and measure the effectiveness of these campaigns, information from other states can be helpful.

Recently there have been two major patient surveys while the Infectious Disease Society of America is reviewing their guidelines on Lyme Disease. Patients were asked how many doctors they saw and how long they had been sick before a diagnosis.

The subcommittee recommended an all-encompassing public awareness campaign that would include a robust website, social media, print, radio, presence at community events, and direct outreach etc. The subcommittee recommends utilizing agencies and associations across the state to disseminate the information.

The Division of Public Health has experience hiring public relations firms for campaigns in the past on smoking cessation. The subcommittee was interested in using tobacco as a model for an awareness campaign.

Chuck Mulholland shared his frustrations that realtors do not share with out-of-staters the prevalence of deer or Lyme Disease in Delaware. He would like information disseminated through realtors as people come into the state.

The subcommittee discussed funding needs. A robust awareness campaign would need significant funding of at least \$500,000. The subcommittee suggested looking into the Delaware Health Fund and appealing to the Delaware Health Fund Advisory Committee for funding. This fund is used for promoting preventative care in Delaware and has annual allocations of \$25 million. Other funding suggestions included the Longwood Foundation.

The meeting was adjourned at 11:20am.

Appendix 7: Medical Professional Education Subcommittee Meeting Minutes, April 20, 2015

Lyme Disease Prevention Task Force- Medical Professional Education Subcommittee Meeting
Minutes- April 20, 2015

The meeting was called to order by subcommittee chair, Dr. Karen Panunto at 6pm. Members participating included Dr. Spreen, Judy Setting, Bonnie Hudson, Dr. Eppes. Additional participants included, Marilyn Williams representing the Lyme Disease Association of the Eastern Shore. Guests present included Joseph Setting and Rebecca Benson.

Dr. Spreen worked with Canadian legislators who passed legislation on Lyme disease. She said the ideal legislation would have protected physicians and not only educated the public but ensured that physicians were educated so patients do not hit a brick wall when following up on symptoms.

Marilyn Williams shared a list of improvements needed from the medical community recommended by the Lyme Disease Association of the Eastern Shore including: recognition of atypical rashes, willingness to treat positive test results, better understanding of the wide range of potential symptoms, consideration of clinical evidence in absence of positive lab results, knowledge of the common tick-borne co-infections, perseverance for an answer and compassion for the patient when symptoms continue despite treating Lyme disease according to the Infectious Disease Society of America (IDSA) guidelines, exposure to diagnostic and treatment guidelines other than those offered by the IDSA.

Dr. Spreen explained that infectious disease physicians can be intractable in their views on Lyme disease and shared her concern that the new guidelines being developed by IDSA will be the same as the old guidelines.

The subcommittee wants medical professionals to consider that Lyme disease can be diagnosed clinically, based on history, physical exam and review of systems. The test can confirm a clinical diagnosis.

The subcommittee discussed how to get the information to healthcare providers through continuing education courses (CME).

Dr. Eppes shared the educational opportunities suggested by the Medical Society including:

- Hot Topic series CME- MSD has a new program called “Hot Topic” which is designed to give much-needed information around a topic of immediate importance. Use this series to talk about Lyme disease when the public health campaign is rolling out.
- Journal CME- Through the Delaware Medical Journal, membership can be told about the importance of the issue and incentive members to read closely because they can receive 1 CME credit for returning a short quiz on the article
- Online CME- The best way to reach a wider net. It is fairly expensive to develop
- Specialty Societies- Use the professional societies to get out targeted information to the front lines

- Public Road Show- Hosted by DHSS/DPH to inform the public at large about Lyme disease, work in tandem with those efforts for healthcare provider education
- WILM broadcast- Informational interview scheduled to air June 6.

The audience for medical professional education includes all healthcare providers including: physical therapists, occupational therapists, physicians, nurses, physicians' assistants, emergency room doctors, primary care doctors, pediatricians, chiropractors, internists and psychologists.

The subcommittee recommended encouraging healthcare providers to take CME credits on this topic. Dr. Eppes suggested that making this topic attractive to make doctors want to take the courses. The subcommittee wants to make sure the message is layered and delivered in different ways.

Dr. Panunto asked how we get to all healthcare providers even those without a direct interest. The subcommittee discussed targeting audiences and getting them to buy-in to the importance of Lyme disease as a provider with an interest in the overall health of a patient.

Dr. Eppes emphasized the need to utilize the associations and local chapters of professional associations. Bonnie Hudson reminded the group that word got out effectively through the Medical Society and other organizations after the Earl Bradley case. She remarked that she is now describing the rashes better than ever before.

The subcommittee concluded that the goal is to have all healthcare professionals have a high index of suspicion since we are in an endemic area. Education should be done in a way that provides diagnosis and treatment options in a balanced way.

The subcommittee recommended that potential legislation include educational requirements as well as changes to insurance coverage to ensure that companies cannot refuse to pay for treatment if a licensed physician has diagnosed Lyme disease.

The subcommittee outlined their goals:

1. Health care provider education.
2. Determine a list of venues to educate physicians.
3. Determine the level of detail of content of education.
4. Educate in order to give healthcare providers the permission to use clinical judgement in diagnosing and treating Lyme disease.
5. Do not tell healthcare providers how to practice medical but provide alternatives.
6. Balanced education will be used to address the controversial issues so that healthcare providers can make decisions.

Dr. Spreen added that patients are complicated and some can even be tough to like. Dr. Spreen felt that it is essential to protect healthcare providers from medical boards in order to give them permission to assess patients and to get more education on Lyme disease without fear of repercussions.

Dr. Panunto added that conference or CME credits should be inclusive to all healthcare providers and bring everyone together for collaboration. Dr. Eppes added that conferences at hospitals are

successful at bringing all types of providers together. The Medical Society is willing to fund a training session in each county.

The subcommittee recommended an oversight board be established for medical professional education on Lyme disease with representation from the board of medicine, patient advocates and Task Force members. The oversight board would be responsible for determining the content of the educational materials to ensure balanced medical education.

The subcommittee recognized the importance of the insurance component to Lyme disease. Insurance coverage impacts medical decisions, so coverage must be bridged for physicians making a clinical diagnosis of a patient.

The subcommittee wants to ensure that educational information is balanced and to create a mechanism to connect patients to providers. The subcommittee suggested that Lyme education be modeled after the work used to create top notch trauma center.

The meeting was adjourned at 7:40pm.

Appendix 8: Subcommittee Reports

Lyme Disease Prevention Task Force Public Education and Awareness Subcommittee Report/Recommendations

The need for a public campaign on Lyme Disease Prevention and Awareness is critical. This is a condition that potentially impacts every Delawarean, unlike most conditions that impact defined cohorts of people, e.g. by age, geographic residency, or underlying health conditions. Lyme disease can be prevented, but it requires every person to take personal responsibility for prevention and early identification.

Public Awareness Campaign Strategy/Recommendations:

1. Targeted audiences:
 - General Public
 - Children/Schools – all levels
 - Outdoor Workers (subgroup: Farmers/Agriculture workers)
 - Outdoor Enthusiasts (subgroup: Hunters)
 - Health Care Providers
2. Message:
 - Prevention
 - Lyme disease awareness
3. Medium:
 - To secure a comprehensive Lyme disease public awareness campaign to include but not limited to: print, digital, radio, billboards, cinema, television and social media advertising. (Realizing how different audiences will receive the messaging we want to keep this broad and flexible as the technology changes.)
 - To expand outreach to disseminate information through agencies and professional associations and to establish a more significant presence at community events throughout the state.
4. Funding:
 - The Task Force recommends that sources of sufficient funding for a statewide public awareness campaign be identified. One source to explore may be the Delaware Health Fund (www.dhss.delaware.gov/dhss/healthfund/about.html). One of the primary purposes of the Fund is to “promote preventive care for Delawareans in order to detect and avoid adverse health conditions.” Clearly, Lyme Disease prevention meets these criteria.

**Lyme Disease Prevention Task Force
Medical Professional Education Subcommittee
Report/Recommendations**

Recommendations:

- Educate all healthcare professionals have a high index of suspicion for Lyme disease since we are in an endemic area. Education should be done in a way that provides diagnosis and treatment options in a balance way.
- Educate all healthcare professionals that Lyme disease can be diagnosed clinically, based on history, physical exam. The test can confirm a clinical diagnosis.
- Encourage CME credits on Lyme disease and make this topic enticing to get medical providers to take courses now.
- Host CME credit trainings in all three counties. Try to host conferences in hospitals to get the most medical professionals together at once.
- Layer messages and deliver in different ways using professional associations, medical journals, radio and conferences as well as linking medical training with the public awareness campaign. Try to bring all healthcare providers together for collaboration.
- Potential legislation should include educational requirements as well as changes to insurance coverage to ensure that companies cannot refuse to pay for treatment if a licensed physician has diagnosed Lyme disease.
- Create an oversight board to implement medical professional education on Lyme disease and to determine the content of medical education materials ensuring quality and balanced medical education. The board should have representation from the board of medicine, patient advocates and Task Force members.
- Create a mechanism to connect patients to providers.

Lyme Disease Task Force Prevention and Tick Population Control Subcommittee Report
April 29, 2015

Tick population control to help suppress tick-borne diseases

Bill Meredith
Awe Maduka-Ezeh
Heather Hirst
Kathryn Wotman

Executive Summary

- Keeping tick populations at acceptably low levels, especially within localized areas, can help prevent or lower transmission of tick-borne diseases, with Lyme disease currently of most concern.
- More applied research having a Delaware-specific focus is needed concerning tick biology and ecology. Better understanding of tick biology and ecology is essential for developing and implementing an optimal tick population control strategy.
- There's a wide range of tick population control products or methods that could possibly be employed – e.g. acaricide use, biological controls, tick-host animal population controls, habitat management, etc. Various control methods need more study or assessment in terms of their actual control efficacies, their practicability and feasibility for field use, their economic costs, and any corollary adverse non-target organism impacts or environmental effects.
- Essentially what's needed in Delaware is to develop and implement on a statewide basis a science-based Integrated Pest Management (IPM) strategy for tick population control.
- A public education/outreach component as part of this IPM approach is also needed for increasing public awareness about tick biology and ecology, and to inform the public about optimal ways to control tick populations.
- State agency involvement in the applied research, and for developing and implementing an IPM plan for tick population control, could be spear-headed by DNREC's Mosquito Control Section (after undertaking some slight tweaking of Mosquito Control's enabling statute). Estimated total annual costs for Mosquito Control's possible involvement in such endeavors would amount to about \$106,000/year in additional funding. *Without such additional dedicated support, Mosquito Control won't be able to participate.*
- The private sector in manner of for-profit pest control operators (PCOs) might also play a substantial role, particularly for providing backyard barrier treatments using residual acaricides. In past few years there's been an explosion by PCOs for making mosquitocide barrier treatments, primarily in response to hard-to-control adult Asian tiger mosquito problems, whereby such treatments if tweaked a bit can also do "double-duty" for tick control. However, more consideration is warranted pertaining to possible non-target organism impacts from this type of treatment, especially regarding cumulative

effects, and as such there might be need for better coordination or regulation of these activities.

Preface

First, here's what this "Prevention & Tick Population Control" subcommittee report will not address – the prevention of Lyme Disease and other tick-borne illnesses via people taking personal protection measures (PPMs) to avoid or reduce tick bites, such as wearing appropriate clothing, properly using repellents, avoiding tick-infested areas, carefully checking one's body after being in the field for ticks, safe removal of attached ticks, etc. Such topics should be purview of the "Public Education & Awareness" subcommittee. And for purposes of implementing such public education and awareness, the Delaware Division of Public Health (DPH) should take the lead for this type of public outreach, with the Delaware Department of Natural Resources and Environmental Control (DNREC), the Delaware Department of Agriculture (DDA), and other entities also helping as possible.

What this subcommittee report will focus upon are some Delaware-specific applied research needs relative to tick biology and ecology, and upon various tick population control methods to be further considered for possible use or implementation. This subcommittee report will also examine possibly enhanced roles for state agencies in such matters, with particular focus on DNREC's Mosquito Control Section and need for additional support if Mosquito Control is to play a role here, and also upon possible roles for private sector pest control companies to help achieve some desired outcomes. As with encouraging the use of PPMs that should now be addressed by the "Public Education & Awareness" subcommittee, there also needs to be a public outreach component to help provide people with basic knowledge about tick biology/ecology and tick population control options, which this "Prevention & Tick Population Control" subcommittee report will now touch upon, and which at a state agency level could fall upon DNREC to lead.

Applied Research Needs in Tick Biology and Ecology

A reasonable working premise at a most fundamental level is that the fewer disease-carrying ticks there might be in the environment, then the less chance for a person contracting a tick-borne disease. As such, various tick population control methods might be employed to reduce or even eliminate tick populations, if not over widespread areas at least within localized areas. But in order to select and implement the most optimal tick population control methods, it's imperative that we know something about tick biology and ecology, and for the purposes at hand the more Delaware-specific this understanding might be the better.

List of research areas in need of work for tick biology and ecology, to have a Delaware-specific focus:

- Types of ticks
- Geographic range of ticks and population densities
- Environmental factors or conditions that affect type, range and density of ticks
- Types of diseases carried by ticks
- Rate of infection of ticks with Lyme pathogen
- Roles of various hosts in transmission

DETAIL:

- Types of ticks found in Delaware, including for each species its geographic range or occurrence throughout or within the state, its preferred habitats, population densities, life history strategies, life cycle stages (egg, larva, nymph, adult), seasonality of occurrences, preferred foods or hosts, internal amplifications of disease-causing pathogens, modes for pathogen transmissions, etc. Better understanding is needed for what areas in Delaware have high tick population densities vs. areas having lower densities, and what areas have ticks with high Lyme disease infection rates vs. areas having lower rates, and then what are the environmental factors or conditions that determine or influence these densities and rates in different areas.
 - Deer tick or Black-legged tick – *Ixodes scapularis*
 - American Dog tick or Wood tick – *Dermacentor variabilis*
 - Brown Dog tick -- *Rhipicephalus sanguineus*
 - Lone Star tick – *Amblyomma americanum*
 - Any other tick species of importance in Delaware?

- Types of diseases carried by ticks – for each species below, not only the types of pathogens they might harbor or diseases they might transmit, but also the frequency or rate of their infection with such pathogens or diseases at various times of the year, for various locations around the state, and within various types of habitats.
 - Deer tick – Lyme disease, anaplasmosis, babesiosis, ehrlichiosis, Powassan disease, bartonella
 - American Dog tick – Rocky Mountain spotted fever, tularemia, possibly human granulocytic ehrlichiosis, tick paralysis
 - Brown Dog tick – Rocky Mountain spotted fever
 - Lone Star tick -- human monocytic ehrlichiosis, tularemia, STARI, heartland viral disease, possibly Rocky Mountain spotted fever, and possibly suspect for Lyme disease
 - Any other tick-borne diseases of note and their vectors?

- Roles of various hosts in tick-borne disease occurrences and transmissions, either for ticks themselves and/or for pathogens that ticks carry.
 - White-tailed deer
 - White-footed mouse, other types of mice, rats or voles
 - Shrews
 - Squirrels, chipmunks
 - Opossums, raccoons, skunks, foxes

- Songbirds
- Domestic pets – dogs, cats, etc.
- Domesticated animals – horses, cattle, swine, poultry, etc.

Planning, coordinating, supervising, performing or analyzing this type of applied research could be tasks for a state agency to spear-head or undertake (e.g. DNREC's Mosquito Control Section), and in part would probably also involve some involvement by academic-based researchers (e.g. University of Delaware, Delaware State University, Wesley College). Involving academic researchers in such research might be done via contractual arrangements with a state agency, or via other sources of research support for academic researchers, relying upon a university's or college's own devices.

Tick Population Control Methods and Options

For whatever tick population control methods that might be considered, one has to consider the following factors before further trying to promote or use a product or method:

- Actual effectiveness in eliminating or reducing tick populations, either on a widespread basis or at least locally.
- Practicability or feasibility of using a control product or implementing a control method, either on a widespread basis or at least locally (many control approaches that might look good in the lab or on a small-scale basis often don't translate very well in mark-up for larger-scale operational applications – essentially a matter of scalability issues).
- Economic cost considerations – either for a control product itself, or for the labor to use it or to implement other control approaches, all which also need to consider matters of scale.
- Longevity of a control product or method for providing satisfactory control; need for repeat use or applications.
- Non-target organism impacts when using a selected control product or method, or for concerns about other adverse environmental impacts. Assessments of non-target impacts needs to be done not just on a one-time, single treatment basis, but also on cumulative basis in terms of temporal effects from repetitive treatments, and spatial effects from adjacent or other nearby treatments (concerns about cumulative impacts might be most germane for things like frequent barrier habitat pesticide treatments using residual products or when treatments are geographically closely spaced).
- Statutory or regulatory constraints when using a control product or for implementing a control approach, including as needed or required a product or method being duly registered or legally recognized for such application.
- Public acceptability for a control product or approach (matters of public relations).

It is also imperative that whatever type of control method(s) that might be considered and then selected be used or implemented in Integrated Pest Management (IPM) manner, in accordance with sound IPM principles. As such in adhering to IPM, it's probable that any tick-control treatment strategy will be some selective combination of two or more of the methods listed below. Some of these methods at this point in their development or use might be a lot more

“novel” (and possibly “unproven”) than alternative methods, and hence might still involve a lot more investigation or assessment before their possible adoption for widespread operational use. Developing a Delaware-specific IPM approach to tick population control is an area ripe for more applied research. Here’s a possible universe of tick control methods and options:

- Acaricide Use (pesticide spraying to ticks) – to only occur in selective, judicious manner.
 - A plethora of possible acaricide products to choose from – 1717 pesticide products with “tick” on the label, 97 different active ingredients in 19 different types of basic formulations, 215 registrant companies.
 - The most commonly used acaricides are applied to vegetation as residual barrier treatments, either in liquid or granular formulations. Treated areas or surfaces can involve shrubbery up to 5 feet high, tree trunks, ground cover and lawns, fences, undersides of deck and porches, etc.
 - Due to non-target impact concerns, most organophosphate (e.g. chlorpyrifos, diazinon) and carbamate (e.g. carbaryl) products used in the past for tick control are either no longer allowed for such use in residential areas, or are now not viewed very favorably for tick control purposes due to non-target impact concerns; instead most acaricides now in use are various types of synthetic pyrethroids or natural pyrethrins (these products also often involve piperonyl butoxide or PBO as a synergist), where such non-target impact concerns are a bit lower. Examples of such products include:
 - bifenthrin – Talstar, Wisdom, Ortho products
 - cyfluthrin -- Tempo, Cy-Kick, Powerforce
 - deltamethrin – Suspend, DeltaGard
 - lambda-cyhalothrin – Scimitar, Demand
 - permethrin – Astro, Bonide products, Ortho products, Tengard
 - tau-fluvalinate – Mavrik
 - pyrethrin – Pyrenone, Pyrethrum, Kicker
 - Using these products as residual barrier sprays for tick control might involve only 1-2 treatments each year, applied at critical life stage times, perhaps sometime in late spring for nymph stage control (the stage most likely to transmit Lyme disease) and then sometime in early fall for adult control. A concern with acaricide use in addition to non-target organism impacts is not to overuse these products in manner that might then lead to pesticide resistance within local tick populations.

- Please also note that in the past 2-3 years there has been quite a proliferation (or more like an explosion!) of private, for profit pest control operators (PCOs) starting to provide residual barrier treatments in urban/suburban backyards for better Asian tiger mosquito (*Aedes albopictus*) control, quite often using the same types of products shown above at the same application rates; but in contending with Asian tiger mosquitoes, such treatments have to be made about every 21 days, resulting in a half dozen or so applications from May through September. This type of treatment when done for Asian tiger mosquitoes probably also helps to reduce backyard tick populations, and in the future will probably be marketed even more aggressively by PCOs as not just being for Asian tiger mosquito relief but for tick population suppression too. All of this can then be a good thing relative to tick control, but at the same time there also has to be some concern for cumulative non-target organism impacts, and for possibly promoting pesticide resistance.
- Homeowners can undertake acaricide applications on their own property, but great care must be taken when making such treatments, especially if any Restricted Use products are involved, and all product label conditions and requirements have to be scrupulously followed. There can be some real safety (along with legal) concerns if unknowledgeable or careless parties start to apply pesticides. In light of such concerns, complications and demands, it might be best for homeowners to hire a private PCO for this work.
- There are also many touted “natural” products [e.g. rosemary or peppermint oils, or various types of garlic extracts, all grouped by EPA under FIFRA as non-insecticidal Section 25(b) products not subject to EPA’s product registration screening process] that supposedly work more as tick repellents than tick killers, but their abatement efficacies probably aren’t near as great as with registered acaricides.
- Lyme disease in pets.
 - Use of acaricides -- for better canine and feline health and to help reduce human (pet owner) exposures to ticks. This might involve dusts or sprays, impregnated collars, or topical treatments, which for some products might also be absorbed into blood stream to kill ticks that attach and feed. Some of these products might also work as repellents to reduce ticks coming in contact with pets. Examples of these acaricide products include fipronil (Sentry, PetArmor), amitraz (Mitiban), and permethrin.

- Lyme disease vaccinations for dogs -- Lyme disease can also be largely prevented in dogs via vaccination with products like LymeVax or Duramune. However, possibly choosing to do this should be in consultation with a veterinarian.
 - Other prevention measures -- dogs and cats should be kept out of tick-infested areas, possibly involving fencing to do this. Dogs and cats that have been outside in tick-prone areas should be carefully checked for ticks before allowed inside, although seeing the immature stages of deer ticks in long-haired or dark-haired animals can be very difficult to do.
- Biological Controls
 - Introduction of entomopathogenic organisms in manner of viral, bacterial, protozoan or fungal pathogens fatal or detrimental to ticks. Some pathogenic fungi that might be formulated into perimeter treatments have shown some promise. But much more research and development is needed here.
 - Cultivation and release of tick parasites – parasitic wasps, parasitic nematodes (results thus far have been marginal at best).
 - Introduction of tick predators – domestic chickens, turkeys, guinea fowl (questions here about actual control efficacies).
 - Pheromones – pheromone use to possibly disrupt tick life cycles (much more research is needed here).
 - Essentially most all of these biological controls are in developmental stages requiring more research and field trials, and not yet ready or feasible for widespread or even local operational use.
 - Management of Tick-Host Animals
 - White-tailed Deer management and treatments – deer can be significant hosts for deer ticks, and as such are often locally important in cycling and maintaining Lyme disease. But deer themselves don't appear to be important reservoir hosts for the Lyme disease spirochete per se (i.e. deer are not very “vector competent,” but rather nurture and transport spirochete-infected deer ticks that are the primary vectors of Lyme disease). However, abundance and distribution of deer ticks have been documented to be directly related to the size of deer populations, so reduction in deer population sizes at least in theory should then help reduce deer tick populations, and thereby help reduce Lyme disease transmissions too.
 - Deer population reduction and management – typical suburban deer populations can be around 30-60 deer per square mile, which for many

reasons beyond just tick population control can be unacceptably high densities. To have a significant effect on reducing tick populations, deer densities might have to be reduced to as low as 8 deer per square mile or fewer to then disrupt transmission of Lyme disease, with such low deer densities often impracticable to achieve. Deer population management is a very complex undertaking with many competing needs and interests, and is best left to state fish-and-wildlife management agencies that have to consider and integrate a host of factors when crafting or implementing deer management plans.

- Discourage deer on a property
 - Use of fencing (including electric fences)
 - Landscape with deer resistant plantings
 - Use deer repellents on shrubs, small trees

- Acaricide applications to deer – this involves use of a “4-poster” feeding station device to attract deer that are then exposed during feeding to self-treatment when brushing against up to 4 rollers laden with a topical acaricide (e.g. amitraz, permethrin). But the effectiveness of this approach for widespread use and achieving satisfactory tick control is much in doubt, especially in terms of practicability or feasibility for the labor and materials involved when attempted over widespread areas and for being a good return-on-investment. There are also concerns about how many years of such “4-poster” treatments are needed to observe any significant effects on tick populations in a given area, and also over the attractiveness of these feeding stations for deer when more desirable alternative food sources are available. The use of “4-posters” might have most chance for success when a deer herd is in a relatively small, locally-confined area, and then only as part of a neighborhood or community coordinated program to reduce tick populations that simultaneously employs other control measures too.

- Rodent population management and treatment – while many types of rodents can host Lyme disease-infected deer ticks and also carry the Lyme disease spirochete themselves, including meadow voles and chipmunks, the primary culprit here for Lyme disease cycling is probably the white-footed mouse (*Peromyscus leucopus*). As such and at least in theory, anything that can be done to reduce white-footed mice populations, or the frequency of the Lyme disease spirochete in these mice, should then help to lower Lyme disease transmissions. This can also involve locally managing habitats to not favor or to discourage rodent populations.

- Natural predators of white-footed mice and other rodents – mice or rodent populations are helped kept in check via natural predators such as foxes (red and grey foxes), weasels, snakes, hawks and owls, with foxes perhaps having the most effect. Anything that can be done to maintain natural predator populations then probably helps to lower mice or rodent populations. But an interesting sidebar is that coyotes are not as effective predators on mice and other rodent populations as are foxes, and that when coyotes are present they prey upon foxes or will drive foxes away. As such, controlling coyotes for many good reasons that then also helps to benefit fox populations indirectly helps to control mice and other rodent populations, which in turn then helps with Lyme disease prevention and control.
- Acaricide applications to mice and other rodents.
 - Use of small cardboard tubes (toilet paper roll tubes) scattered throughout mice habitat stuffed with permethrin-laced (Damminix-treated) cottonballs. The idea is that white-footed mice will take cottonballs for their nesting material that in turn will help control larval and nymphal stages of deer ticks, but this hasn't proved to be very effective.
 - Use of bait boxes for topical applications to mice of an acaricide (e.g. fipronil). This approach has now been commercialized as the Maxforce tick bait-box system, involving a small box containing a food block and an acaricide applicator wick that treats mice upon their entering the box to feed, which in turn can kill larva and nymph stages of deer ticks on the mice. This has demonstrated some limited success in small treatment areas, but it's labor intensive, there are questions of control effectiveness on larger scales, and it might also take several years of use in a given area to see any effect.
- Treatment of mice and other rodents with a Lyme disease vaccine – a new approach involving scattering around mice habitat food pellets that contain a Lyme disease vaccine might hold promise (involving LymeShield by U.S. Biologics). Mice eat the pellets and in so doing are then supposedly vaccinated against picking-up and amplifying Lyme disease spirochetes (although it might not do much for mice that already have the disease).

This somewhat novel new approach is still pending USDA registration/approval for operational use, and probably also requires more research as to its scalability, practicability and effectiveness.

- Songbirds and deer ticks – songbirds commonly found in woodland or backyard habitats can also harbor immature stages of deer ticks. They might also serve as reservoir hosts for the Lyme disease spirochete itself, but are believed not to be as “vector competent” as white-footed mice and other rodents in doing such. Setting-out and using bird feeders from late autumn through winter into early spring presents little risk of enhancing Lyme disease transmissions, since deer ticks are not active at that time. However if bird feeders are used during warmer times of the year, it is prudent not to locate such within woodlands or too near woodland or shrubbery edges.
- Backyard Habitat Management – people should be encouraged to take various measures to reduce tick-favorable habitats on their properties, to then create “tick safe zones”:
 - Clear tall grasses and brush around homes and edge of lawns.
 - Remove leaf litter.
 - Mow lawn frequently.
 - Might want to create a 3-ft wide barrier of wood chips or gravel between lawns and wooded areas.
 - Keep playground equipment, decks and patios away from yard edges and trees.
 - To discourage rodent populations, remove yard clutter and debris, stack any firewood wood neatly and in a dry area.
 - Use plantings that won’t attract deer, or exclude deer via fencing.

Possible state agency involvement in a tick population control program

If a state agency is to become involved in a tick population control program in Delaware, and to then possibly take the lead in such effort, quite logically one might think of this as being DNREC’s Mosquito Control Section (which is actually housed in DNREC’s Division of Fish and Wildlife), especially in terms of possible acaricide use, tick-host population management or treatments, tick-prone habitat management, and for fostering applied research. However, before such involvement might occur to any great extent, it would be both desirable and necessary to carefully amend Mosquito Control’s enabling statute (Delaware Code Title 16, Chapter 19), to then authorize and accommodate such expanded roles, duties and responsibilities for the Mosquito Control Section. This should not be too difficult to do.

DNREC and the Delaware Division of Public Health released in September, 2007 a joint proposal titled “Development and Implementation of a Tick-borne Disease Prevention/Abatement Program,” which had a lead role for the DNREC concerning a tick population control program and some applied research to help foster this (the DPH had a lead role for general public education and outreach, and for outreach to the medical community and

professional health care providers, concerning Lyme disease prevention measures not directly involving tick population control activities, and for matters of Lyme disease detection and treatments in humans). Unfortunately, the drastic economic downturn of 2008 put an end to most all new state-level initiatives at that time, and not until the current Lyme Disease Prevention Task Force surfaced last summer did any thinking about this possibility then resurface. The roles for DNREC's Mosquito Control Section were envisioned as follows, which have now been updated to the present time versus the 2007 proposal, including estimated costs. In order to undertake this new program, there will be need to hire a new employee for the Mosquito Control Section dedicated to tick control work, and to provide additional funding for this new position along with operational support funds (to truly be "new money" for Mosquito Control above-and-beyond the Section's current funding levels), which if not provided would then not allow or would negate Mosquito Control's participation in this new program. Please understand that Mosquito Control's current staff size and operational funding are but marginal at best just for the Section's mosquito control duties, responsibilities and work, and as such the Section would be unable to divert any of its existing mosquito control resources into then also trying to tackle new tick population control work.

Need to hire for the Mosquito Control Section a **new DNREC Environmental Scientist II** (PG-13 at 80% mid-point) = \$38,515/yr + 46.5% fringe costs = **\$56,424/yr** for employee costs. This should be a full-time, year-around Merit-system position. Duties, responsibilities and roles for this new ES-II would in part include the following:

- Plan, coordinate, supervise, perform or analyze applied research concerning tick biology and ecology, to have a Delaware-specific emphasis and utility. In part this would include conducting tick population surveys around the state, analysis of ticks for presence/frequency of tick-borne pathogens affecting human health, and locating tick population "hot spots," particularly on public lands [these studies might also be done in collaboration with contractual researchers, as authorized and coordinated by the ES-II].
- Assess the range of tick population control measures possibly available for operational use, and then develop and implement a Delaware-specific IPM strategy for tick population control. This would be a major undertaking. Assessment and development of such an IPM strategy would involve examining what's known in the literature, discussions with tick biologists and tick control professionals, the actual performance and results of applied research projects, and operational trial-and-error experiences. And of course any-and-all components of an IPM strategy would need to yield good control efficacy, be practicable and feasible to implement, and be affordable to use. As such, it's probable that any "final" IPM strategy will slowly evolve over time.
- Part of taking an IPM approach (and possibly a very important part) might involve performing prescriptive, limited acaricide treatments as warranted in "hot spots," done for selected public lands in high public use locations (e.g. along popular hiking trails, around edges of playgrounds, in the vicinity of publicly-accessible buildings or public parking lots, etc.). At present, the Mosquito Control Section doesn't envision performing

acaricide treatments on private lands, due to several confounding factors including possibly greatly expanded labors and costs, along with possible complications concerning property access and landowner permission or cooperation – this might have to be left to private PCOs to undertake, which will be discussed in the last section of this report).

- Locate and place warning/advisory signage in high tick infestations areas on public lands (in high public use locations).
- Provide tick species identification services upon demand for private citizens, physicians or government agencies; train university-affiliated, county-based Cooperative Extension agents to be able to do the same, and help publicize such species identification services by these agents.
- Prepare, coordinate, and conduct a public information and education outreach campaign to inform the public about tick biology/ecology, tick life cycles and reservoir hosts, and the characteristics of tick-infested habitats, along with tick population control efforts that landowners might be able to undertake themselves.

Annual operating expenses to support the ES-II's work would in part include:

- Vehicle use/rental, including gas & oil = \$6000/yr
- Office supplies and overhead = \$4000/yr
- Scientific sampling equipment, field gear, spray application equipment, lab supplies = \$6000/yr
- Acaricide product purchases (for limited, prescriptive treatments of “hot spots” on selected public lands) = \$5000/yr
- Funds for awarding to contractual researchers for tick survey collaborations and other types of applied research = \$10,000/yr
- Laboratory analyses for tick-borne pathogens (done in-house and/or via contractual outlays) = \$15,000/yr
- Public education outreach materials, communication outlets = \$4000/yr
- TOTAL operational support costs = **\$50,000/yr**

TOTAL annual costs for new ES-II = \$56,424/yr in employee costs + ca. \$50,000/yr for operational support = ca. **\$106,424/yr.**

Without such additional dedicated support, Mosquito Control won't be able to participate.

Possible private sector roles in tick population control

The possible treatment of private lands with acaricides applied as residual barrier sprays on backyard vegetation and other surfaces is probably best left to private, for profit pest control operators (PCOs), and whatever this might amount to for whatever might occur will then also be

determined by market forces. The demand for this type of treatment on private properties could be tremendous, far exceeding whatever a new Mosquito Control ES-II would be able to do (as such, any acaricide applications by the ES-II would be confined only to public lands, whether federal, state, county or municipal lands, and only be done with permission and cooperation of public lands managers).

As mentioned earlier, the private sector is already starting to tackle this type of work (in quite explosive manner!), primarily driven by needs to better control the quite difficult to control Asian tiger mosquito. As such, doing something like this for tick population control on the private sector's part in many ways is now actually being done almost inadvertently, concomitant with mosquito control measures. In fact for properties receiving such mosquito control treatments, it's being done even more frequently throughout the season than what's actually needed for tick control. However, dependent upon the mosquito control adulticide barrier spray product being used, in order to then also function as an acaricide this might require that a little higher product application rate be used, as long as whatever rate is used is still within permissible limits shown on product labels.

But there could be two downsides for the private sector's involvement here, whether these types of barrier spray applications are done just for tick control or in conjunction with mosquito control efforts too.

- As mentioned earlier, there can be some concern from an environmental standpoint for non-target organism impacts stemming from the extent and intensity of such residual barrier spray treatments (primarily relative to the frequency of treatments, and the spacing or density of such treatments), with special concern for what might be cumulative effects. While overall under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) pesticide use is regulated in pretty satisfactory manner, a weakness still remains for addressing cumulative impacts to the environment or non-target organisms when multiple pesticide applicators and repeat applications might be involved. Product use prescriptions on product labels are now starting to better address cumulative frequency of use issues, by starting to prescribe allowable time intervals between repeat treatments, or by prescribing total amount of product that can be applied to any given site during a set period of time, but trying to do something about spatial or proximal area use issues relative to cumulative impacts still lags behind. There's really very little planning or coordination among multiple pesticide applicators, nor little if any cumulative, area-wide tracking for these types of treatments. And while each individual applicator making individual treatments that are done in full compliance with all product label conditions and requirements would then be something 100% legal for an applicator to do, addressing the possible adverse cumulative impacts from each applicator "doing their own thing" then seemingly falls through the cracks.

As such, it's difficult to determine whatever any cumulative adverse impacts might be, or what to do about such if observed. The concerns here for a subdivision having 100

houses where perhaps 5 scattered properties are receiving residual barrier sprays might be quite different from a situation where perhaps 80 properties in this same subdivision, now involving in part some entire blocks, are subscribing to these treatments. All of this might then warrant some additional or increased pesticide use regulation or oversight, which in Delaware should then be purview of Delaware Department of Agriculture's Pesticide Compliance Section.

- Another possible concern with relying upon the private sector for this type of work might be one that has an "environmental justice" slant. Obviously, there's a charge by private PCOs for their services (e.g. the cost for one barrier spray treatment on a property might be about \$70, and this service might then be provided every 21 days for Asian tiger mosquito control, amounting to a total cost from May through September of about \$420/year; and even if such treatment might be done only twice per year just for tick control, perhaps once in the spring and again in the fall, the cost to a homeowner might still be at least \$140/year).

As such, it wouldn't be a stretch to imagine that relative to provision of tick population control measures via acaricide barrier spray treatments, done to help protect people from Lyme disease and other tick-borne maladies, more affluent individuals or neighborhoods could more readily realize this, whereas poorer residents or neighborhoods wouldn't (the latter less affluent folks might then also be more prone to trying to do this type of treatment on their own, possibly presenting some safety issues). But in the end it simply might not be possible due to costs to provide this type of treatment for all properties or areas where such might be beneficial or needed, since public coffers really couldn't afford to do this, whether these private property barrier treatments might be provided by what would then have to be a very significantly ramped-up Mosquito Control Section, or by direct public payments to private PCOs, or by public subsidies to homeowners. It might then well be that as with many things pertaining to what is really a type of health care provision (in this case in manner of barrier spray treatments), unfortunately there'll be inequities.

Appendix 9: DNREC/DHSS proposal- “Development and Implementation of a Tick-borne disease prevention/abatement program”

Development and Implementation
of a Tick-borne Disease Prevention/Abatement Program



A joint proposal from the
Delaware Department of Natural Resources and Environmental Control
and the
Delaware Department of Health and Social Services

September 4, 2007

Technical Points-of-Contact:

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Development and Implementation of a Tick-borne Disease Prevention/Abatement Program

DNREC and DHSS desire to jointly develop and implement a tick-borne disease prevention and abatement program to better address some potentially severe human health problems. Lyme disease is the most prevalent tick-borne problem in Delaware and is transmitted by black-legged (deer) ticks. However, other tick-borne diseases of note that are probably under-diagnosed/under-reported in Delaware include Rocky Mountain spotted fever, human ehrlichiosis (HGE/HME), and babesiosis, with American dog and lone star ticks also becoming vectors of concern in addition to black-legged ticks. During 2006 there were 478 newly confirmed cases of Lyme disease in Delaware, and human cases have typically ran in the hundreds each year over the past several years. Based upon the best available data in Delaware stemming from a Wesley College study in 1999-2000 (which admittedly are somewhat limited data and now a bit dated), black-legged ticks collected from several natural areas in Delaware were found to carry Lyme disease at county-averaged rates of 62% for New Castle, 14% for Kent, and 40% for Sussex. Contracting Lyme disease is sometimes difficult to avoid; often difficult to diagnose in its early stages and difficult to treat in its latter stages; and can lead to serious medical complications including arthritis, neurological system disorders, heart rhythm irregularities, and learning/cognition problems. Several approaches will be employed toward an overall goal of significantly reducing the frequency of tick-borne disease cases in Delaware:

- Develop and promote an aggressive public outreach information/education campaign, involving production and dissemination of brochures and other written materials; posting advisory or warning signs in high tick infestation areas on public lands (in high public use locations); giving public/school talks; manning exhibits at public events; issuing frequent press releases; posting newspaper/magazine notices; using or making TV or radio spots (utilizing free PSA or paid commercial airtime); contracting for roadside billboard announcements; educating medical community; providing school nurse training; etc., to achieve or encourage for the public good:
 - A basic understanding by the public of tick biology/ecology, including awareness about different tick species and their identification, their life cycles and various reservoir hosts, and the medical risks that ticks present.
 - Learn to recognize/avoid habitat types prone to high tick infestations.
 - Take personal protection measures when outdoors – wear proper clothing, conscientious use of tick repellents.
 - The need to carefully check for ticks when returning from outdoors, and how to properly remove any embedded ticks.
 - The ability to recognize symptoms of having contracted a tick-borne disease, and to then quickly seek medical attention.
 - Proper vegetation management around residences to reduce tick-preferred habitats.
 - Better protection of pet dogs/cats from tick infestations, and what to do if infested.
- Create a better understanding in Delaware of local tick population densities and the presence/frequency of tick-borne pathogens – perform and/or contract for tick surveys/studies.
- Increase awareness about or initiate chemical control measures to locally reduce severe tick infestations in problem areas (using EPA-registered acaricides). While effective tick control can be achieved with acaricides, due to the potential for adverse impacts to non-target organisms such spray applications should be limited in scope (area) and must be carefully made.
 - Make homeowners aware of the possibility for periodic applications of local barrier sprays at the interface of their lawns or gardens and any nearby grassy, shrubby or woody areas harboring ticks, to be done at a landowner's own expense and initiative, usually requiring the services of a certified pesticide applicator.
 - Undertake some limited barrier spraying in high public use areas (e.g. along well-traveled trails, around picnic areas) having high tick infestations, to occur in State Parks, State Wildlife Areas or other public lands. If Mosquito Control personnel were to do this, it would be desirable to amend Mosquito Control's enabling statute (Title 16, Chapt. 19) to officially establish such authority, and then allow/provide concomitant additional resources to undertake this work.
- Programmatically, recognize tick-borne disease prevention/abatement as another important reason for controlling excessive deer populations in certain areas of the state (along with reducing vehicular accidents, plus dealing with ornamental plant and crop depuration issues).

Budget Sheet

New position/hire – Delaware Department of Health and Social Services, Division of Public Health:

DPH Trainer/Educator III (PG-15) = \$42,801/yr + 46.5% fringe = ca. **\$63,000 /yr** [Note – the DHSS/DPH has already initiated separate actions to request this position as part of their FY09 budget request.]

- Prepare, coordinate, and conduct a public information and education outreach campaign to alert the general public about the symptoms, human health medical complications, and treatments for tick-borne diseases, along with personal protection measures to take to avoid tick-borne diseases.
- Prepare, coordinate, and conduct an information and education outreach campaign for Delaware’s medical community concerning the symptoms, human health medical complications, and treatments for tick-borne diseases, focused on physicians, hospital personnel, and school nurses.

New position/hire – Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife, Mosquito Control Section:

DNREC Environmental Scientist II (PG-13) = \$37,386/yr + 46.5% fringe = ca. **\$55,000/yr**

- Prepare, coordinate, and conduct a public information and education outreach campaign to inform the public about tick biology/ecology, their life cycles and reservoir hosts, the characteristics of tick-infested habitats, and measures to take to avoid tick bites;
- Locate and place warning/advisory signage in high tick infestations areas on public lands (in high public use locations);
- Provide tick species identification services upon demand for private citizens, physicians or government agencies; train university-affiliated, county-based Cooperative Extension agents to be able to do the same, and help publicize such species identification services by these agents.
- Conduct tick population surveys around the state, analyze ticks for presence/frequency of tick-borne pathogens affecting human health, and locate tick population “hot spots,” particularly for public lands [these studies might also be done in collaboration with contractual researchers].
- Perform prescriptive, limited acaricide applications as warranted in “hot spots” for selected public lands in high public use locations (done as a stand-alone control measure, or in conjunction with also placing advisory/warning signage in high tick infestations areas).
- Educate private landowners about the use of limited scale, barrier acaricide applications for their properties, particularly in areas where tick infestations are high, to then possibly be undertaken by landowners or their private contractors at landowners’ expense. As an alternative to acaricide spraying, might also provide advice about techniques to try to treat reservoir hosts (deer, small rodents) with topical acaricides (but this is a less effective and more labor intensive approach).

Public information and education outreach campaigns -- for contractual services and supplies & materials (funds to be managed by DPH’s T/E-III, with input from DNREC’s ES-II) = **\$40,000/yr**

- For development, publication and dissemination of informational brochures, pamphlets, posters and other publications; for preparation of I&E exhibits; for advisory/warning signage in the field.
- For I&E outreach efforts involving newspaper/magazine notices; preparing/running TV or radio spots (either commercially paid or as free PSAs); placing billboard announcements; etc.

Operating expenses for DPH’s T/E-III = **\$7000/yr**

- Vehicle use; gas & oil; office supplies & overhead; etc. = \$7000/yr

Operating expenses for DNREC’s ES-II = **\$35,000/yr**

- Vehicle use; gas & oil; office supplies & overhead; etc. = \$10,000/yr
- Scientific sampling equipment, field gear, spray application equipment, lab supplies = \$5000/yr
- Acaricide product purchases (for limited, prescriptive treatments of “hot spots” on selected public lands) = \$5000/yr
- Funds for awarding to contractual researchers for tick survey collaborations = \$5000/yr
- Laboratory analyses for tick-borne pathogens (in-house and/or contractual outlays) = \$10,000/yr

TOTAL = **\$200,000/yr**