

Title: Tick Mitigation and Education at 4-H Camp Shankitunk

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Abstract: Every year, thousands of NY State youth attend summer camps to make friends, learn new skills, and enjoy nature. Camps are generally surrounded by wooded areas abundant with mammalian hosts, making campers more likely to encounter ticks than they would in the typical home environment. We implemented innovative tick control strategies at 4-H Camp Shankitunk in Delaware County. Concomitantly, we developed educational resources for three target groups: campers, camp staff, and parents. Our efforts spurred important discussion within and between target groups and greatly raised tick awareness. The results of this project have been shared with camp directors around the state, and they are eager to implement our methods this coming season.

Background and Justification: Delaware County CCE is the proud operator of Camp Shankitunk, the oldest continuously-operating 4-H camp in New York State. Situated on the Delaware River, the 165 acre camp features beautiful woods and open recreational areas. The camp is recognized for its high-quality programming and camper satisfaction. Compared to private and other public camps, the cost is affordable. Campers from diverse backgrounds come together from across the state for an intensive learning and recreational experience. The camp is operational for six weeks in the summer – one week of staff orientation and five weeks of camp sessions. The cool, moist mountain setting is ideal for camping, but is unfortunately conducive to tick activity. The host animals, namely deer and mice, are abundant in the woods surrounding the camp. Last year, ticks were removed from six counselors and one camper. Our concern is that bites may go unnoticed and untreated due to lack of awareness about ticks and the diseases they transmit.

Each year, the camp serves over 700 campers ages 6 to 16. The majority fall into the 8-13 year age bracket, which coincides with the population that is most at-risk for tick-borne diseases. The majority of the campers are from Delaware and surrounding counties, however, a large percentage (40%) come from the NYC metro area. While the incidence of tick-borne disease incidence has not been as high in these counties as in other parts of the state, it is on the rise. In Delaware County, reported cases of Lyme disease doubled between 2014 and 2016. Experts predicted that tick pressure would be high in 2018 because of the insulating effect of the unusually long-lasting snow cover.

In 2017, increasing reports of alarming diseases prompted Cornell Cooperative Extension of Delaware County to consult with Delaware County Public Health about raising tick awareness

for farmers and 4-H youth. The publications they recommended were published in our newsletters and distributed at public events. We decided to further target our efforts to the more susceptible youth population, and decided our camp would be the perfect environment for learning about ticks and IPM in general.

We took a multifaceted approach to reduce the incidence of tick bites at camp. Best management practices were developed and employed before, during, and after the camp season. "Tick Tubes" containing mouse bedding impregnated with permethrin, a low-toxicity pesticide, were put into place by a licensed applicator to reduce the tick population. We also launched an educational campaign to reach key audiences including parents, counselors, camp nurses, and campers. The finished materials, which were built off of and complement IPM's existing graphic resources, were made available for other summer camps to download and utilize.

The project fits within IPM's priority to *"develop, confirm and/or promote methods for reducing the impact of ticks in community settings"* as well as *"develop stored product pest information for the public or training materials to be hosted on the NYSIPM website"*.

Objectives: 1. Reduce tick population at camp 2. Increase parental awareness 3. Deliver staff and camper education 4. Project evaluation 5. Raise public awareness

Procedures:

1. Reduction of tick population at camp – We adapted the section on Landscape Management from the Tick Management Handbook (The Connecticut Agriculture Experiment Station) to our camp setting. Our grounds crew has always been diligent about mowing and keeping trees trimmed, however there were opportunities for improvement with regards to brush near buildings and raking in gathering places like the Vespers campfire area. A pre-opening work session (2 hours with 2 youth volunteers) was spent making improvements.

We contracted Pestech Pest Solutions to deploy "Tick Tubes" around the perimeter of the campground at key points in the tick life cycle. The technician, Brandon Scutt, happened to be a camp alumni and had a good sense of the grounds and potential rodent habitats. Over seven acres were protected including cabins, communal buildings, hiking trails, and outdoor gathering areas. Tubes were placed primarily in wooded areas and under/near buildings. The tubes were deployed on 6/15/18 and 8/23/18 (192 tubes each treatment).

2. Increased parental awareness – We developed a six panel informational brochure for parents. It contains basic tick facts and habitat information. It encourages packing and pre-treatment of appropriate clothing, as well as recommendations for selecting and using of insect repellents. It also includes post camp suggestions including putting clothing through the dryer and keeping an eye out for symptoms of tick-borne disease. Because tick checks are a private matter, we stressed the need for parents to teach their children how to do thorough tick checks in advance of camp. A helpful checklist is included to help parents discuss ticks with their campers. Web resources (including dontgettickedy.com) are

included for parents seeking additional information. The brochures were printed professionally by printdirtcheap.com.

The camp director created a welcome letter for campers and parents. With a reassuring tone, the letter explained our interest in tick safety and described the project. It included a picture of a tick tube, and why they should not be touched or moved. Shortly before our mailing, IPM published the “Don’t Get Ticked NY” infographics. We felt that the insect repellent use and clothing pretreatment flyers were particularly relevant, and had them professionally printed on a double sided sheet.

The brochure, director letter, and infographic flyers were packaged in letter-sized envelopes and mailed to 436 camp families.

3. Delivery of staff and camper education – Public Health educators gave an in-depth (45 minute) presentation to 45 staff members at orientation on 6/28. They talked in detail about tick borne diseases, tick habitats, and risks of improper removal. They provided many printed resources and showed videos as well. They specifically addressed the nurses in the audience to make sure they were all on board with proper removal procedures and disease symptoms. The educators were impressed with the number of questions asked by staff, and the level of engagement by the youth counselors and adult staff in attendance.

With the input of counselors, we developed a script for a fun and informative skit to present to campers at orientation on the first day of each camp week. The cast included four counselors – two played campers, one played a camper, and one played a supporting role holding up signage and assisting with props. The first camper dressed appropriately for the woods (hat, long pants tucked into socks) and modeled “tick smart” behavior. The second camper mocked the “tick smart” camper and made bad choices in risky environments, which resulted in large fuzzy ticks sticking to his or her costume. The skit incited lots of laughter, and campers were open and attentive to a brief presentation about tick safety afterward. Over 600 campers were reached over the course of five weeks.

Throughout each camp week, counselors reminded their campers to use repellents, shower, and do tick checks. In addition, signage and handheld mirrors were placed in restrooms and shower stalls to prompt campers to conduct frequent tick checks.

4. Project evaluation – The tick population was monitored using standard dragging procedures prior to and every two weeks throughout the camp season. Tick encounters were tallied as well.

We conducted parent surveys after each week of camp to determine if the pre-camp mailing influenced them to have discussions with their campers and/or influenced packing decisions. On the last week of camp, campers completed a brief survey.

5. Public awareness efforts – We created a poster display primarily for the Delaware County Fair (August 13 -18), but ended up presenting it at several events. At the fair, it was housed in the Human Ecology Building and was viewed by an estimated 2000 visitors over the course of the week. We provided printouts of “Don’t Get Ticked NY” infographics and Tick ID cards. It was also a highlight at our annual Board of Supervisors’ Picnic on 6/25, which was attended by local lawmakers including Assemblyman Bill Miller, and at our annual meeting on 11/7. Carla presented the poster at CCE Ag Inservice on 11/13. Corrine Tompkins presented the poster to a group of 4-H camp managers and state-wide specialists at their annual gathering on 10/16. Attendees were enthusiastic about the resources we developed, so we made them publically available on our website here: <https://ccedelaware.org/tick-free-camp/>
The camp website, which is currently under renovation, will also contain these resources, and a special Tick FAQ section will be added.

Results and discussion:

The combination of good groundskeeping practices and chemical intervention likely reduced the population of ticks at camp, however this is difficult to quantify because monitoring was unsuccessful. Only two ticks were found in an hour of flagging before the season began, and no ticks were found in subsequent sweeps. Based on discussions with IPM staff, this was not unusual this year. Ticks were indeed out there: Carla found one on her leg (unattached) after getting leaves for a skit. Four ticks (three attached and one unattached) were found by campers this year. Interestingly, no campers reported bites in 2017, but ticks were removed from six counselors. This year, ZERO counselors reported tick bites. We suspect that campers did indeed encounter ticks in 2017, but were not as likely to be checking for them on their bodies. This year, the three tick attachments were noticed at very early stages of attachment (no engorgement) and safely removed by camp nurses, greatly reducing the chance of disease transmission.

Survey Results – Parent Survey

The majority of the 94 parents surveyed indicated that they took at least one proactive measure in terms of packing and preparing their children for camp. Over 60% discussed tick checks with their campers, and more than 50% talked to them about each of the following: wearing protective clothing, proper use of insect repellent, and what to do if a tick bite is suspected. Over 25% of the parents surveyed said that the educational materials strongly influenced them to pre-treat clothing with permethrin. Almost all of the all of the parents surveyed encouraged their campers to shower during the week, which increases the likelihood of thorough tick checks. For the most part, parents were LESS concerned about ticks at camp after reading the materials, however some parents surveyed showed the opposite trend and were actually more concerned. This is still a positive outcome as it showed that awareness increased.

The full caregiver survey and responses are as follows:

<p>Did you receive our tick education materials before camp?</p> <p>Yes, and I read them – 81% Yes, but I didn't read them – 2% No – 17%</p>																																																
<p>Did you use the materials as a basis to discuss the following with your camper(s):</p> <p>Tick Characteristics – 36% yes, 64% no Protective Clothing – 56% yes, 44% no How to do a Tick Check – 67% yes, 33% no Tick Habitats – 35% yes, 65% no Proper use of insect repellent – 62% yes, 38% no What to do if a tick is found or a bite is suspected – 56% yes, 44% no</p>																																																
<p>On a scale of 1 to 5, how much did the tick education materials influence you to do the following? (Please circle a number, 1 is not at all influenced, 5 is greatly influenced. If you had already planned to take these measures, circle N/A)</p> <p>Pack clothing with long pants and long sleeves</p> <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>N/A</td></tr><tr><td>7%</td><td>9%</td><td>23%</td><td>18%</td><td>31%</td><td>12%</td></tr></table> <p>Check repellent labels for active ingredient type and concentration</p> <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>N/A</td></tr><tr><td>11%</td><td>4%</td><td>13%</td><td>22%</td><td>34%</td><td>16%</td></tr></table> <p>Pre-treat clothing with permethrin</p> <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>N/A</td></tr><tr><td>27%</td><td>7%</td><td>15%</td><td>1%</td><td>35%</td><td>15%</td></tr></table> <p>Encourage your camper to shower</p> <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>N/A</td></tr><tr><td>4%</td><td>6%</td><td>12%</td><td>14%</td><td>64%</td><td>0%</td></tr></table>	1	2	3	4	5	N/A	7%	9%	23%	18%	31%	12%	1	2	3	4	5	N/A	11%	4%	13%	22%	34%	16%	1	2	3	4	5	N/A	27%	7%	15%	1%	35%	15%	1	2	3	4	5	N/A	4%	6%	12%	14%	64%	0%
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<p>Did you visit any of the websites listed on the brochure?</p> <p>97% no, 3% yes – (yes responses - Cornell IPM, All of them, Can't remember)</p>																																																

On a scale of 1 to 5, how concerned were you about the following BEFORE receiving the materials (Please circle a number, 1 is not at all concerned, 5 is highly concerned).

Ticks at camp

1	2	3	4	5
15%	13%	39%	14%	19%

Staff training and awareness with regards to ticks

1	2	3	4	5
28%	15%	21%	15%	21%

Your camper's ability to recognize and react to possible tick bites

1	2	3	4	5
24%	18%	18%	20%	20%

On a scale of 1 to 5, how concerned were you about the following AFTER receiving the materials (Please circle a number, 1 is not at all concerned, 5 is highly concerned).

Ticks at camp

1	2	3	4	5
21%	20%	27%	17%	15%

Staff training and awareness with regards to ticks

1	2	3	4	5
40%	13%	24%	12%	11%

Your camper's ability to recognize and react to possible tick bites

1	2	3	4	5
29%	20%	20%	12%	19%

Are ticks a problem where you live?

60% yes, 40% no

Survey Results – Camper Survey

Of the 130 campers surveyed, 86% said that a parent talked to them about ticks before camp. About half of them reported that they learned something new about camps, and majority said they learned it from the skit rather than a counselor or other staff. From the results, it sounds like the counselors did a good job prompting campers throughout the week, and that campers took many measures to reduce the risk of tick bites.

The full camper survey and responses are as follows:

<p>Did a parent or caregiver talk to you about ticks before camp? 86% yes, 14% no</p>
<p>Did you learn anything new about ticks at camp? (please check one) 53% yes, 46% no</p> <p>If yes, from who or what? (please check all that apply) 30% checked Counselor 41% checked Skit 19% checked Signs 14% checked Other staff</p>
<p>Did your counselors encourage you to do any of the following? (please check all that apply)</p> <p>80% checked Do a tick check 62% checked Wear protective clothing 77% checked Take a shower 79% checked Use insect repellent 61% checked Avoid risky areas 69% checked Go to the nurse if a tick is suspected</p>
<p>Did you do any of the following things to reduce the risk of tick bites? (please check all that apply)</p> <p>81% checked Do a tick check 55% checked Wear protective clothing 82% checked Take a shower 75% checked Use insect repellent 68% checked Avoid risky areas 12% checked Go to the nurse if a tick is suspected</p>

We will likely repeat the educational component of this project in 2019. The other 8 camp directors are very interested in providing this education as well, so we are going to look at the possibility of bulk printing brochures for all of the camps. The other resources (signs, skit props, mirrors) are very inexpensive and can be worked into camp budgets. With the resources available on the web, it is our hope that other camps across the state and nation will personalize and use them as well.

Project location(s): Delaware County, NY (though materials were mailed all over the state and several went to other states/countries).

Samples of resources developed: Attached