Lyme Disease Educational Session & Evaluation in Nelson, Albemarle, and Henrico Counties, Virginia 2025

Photo Credit: Margo Millure/CVFWI/La Iniciativa

NCFH
National Center for Farmworker Health, Inc.

Contents

Acknowledgments

NCFH would like to acknowledge and thank the Central Virginia Farm Workers Initiative (CVFWI) for their dedication to implementing this project and their valuable feedback to improve this and future efforts to reduce the risk of tickborne diseases among outdoor workers.

We also want to thank the Centers for Disease Control and Prevention (CDC) staff for their ongoing support, which made this project possible.

I. Introduction

Lyme disease is spread seasonally in the United States by *Ixodes* ticks, also known as blacklegged or deer ticks. It is the most common tickborne disease in the country.[1] According to the Centers for Disease Control and Prevention (CDC), over 89,000 cases of Lyme disease were reported by state health departments and the District of Columbia in 2023,[2] and an estimated 476,000 people in the U.S. are diagnosed and treated for Lyme disease annually.[3] Although most cases of Lyme disease occur in the summer months of June and July, cases are reported throughout the year.

Outdoor workers may have an increased risk of Lyme disease and other tickborne diseases compared to the general population due to the time they spend outdoors in tick habitats; however, data are lacking to confirm this.[4] Current Lyme disease surveillance does not include data on occupation or occupational exposures, and existing literature has primarily focused on forestry workers.[5] Outdoor workers often experience worse health outcomes, and many lack basic worker protections.[6] Workers in outdoor jobs in the U.S. include many immigrants, guest workers, non-English speakers, and people with precarious employment and limited access to health care. Because delays in treatment can magnify morbidity from Lyme disease, it is imperative to understand and mitigate risk for this group.

Geographically, Lyme disease is highly localized, with infections concentrated heavily in the Northeastern, Mid-Atlantic, and upper Midwestern states. Cases reported from other regions are usually associated with travel to states with high infection rates. Exceptions occur along the West Coast in Northern California, Oregon, and Washington, where infected Western blacklegged ticks cause some cases of Lyme disease each year.[7]

The National Center for Farmworker Health (NCFH) initiated a multiphase project to evaluate the impact and effectiveness of educational interventions for outdoor workers in an area with high Lyme disease incidence. The project included three phases: 1) **train-the-trainer session** about Lyme disease for Community Health Workers (CHWs), farmworker leaders, and outreach workers (henceforth collectively referred to as outdoor worker educators) in Nelson County, Virginia; 2) **educational outreach** to approximately 100 outdoor workers by outdoor worker educators using a flipchart that highlighted key messages on Lyme disease prevention; and 3) **participant evaluation** through surveys and focus group discussions to assess what was learned about tick bite prevention and Lyme disease and to measure learning outcomes.

II. Train-the-trainer Session

NCFH identified the Central Virginia Farm Workers Initiative (CVFWI) as the primary partner to conduct the train-the-trainer educational session on Lyme disease, as well as to coordinate the subsequent educational outreach to outdoor workers and participant survey. CVFWI is a community-based organization located in Nelson County, Virginia, that aims to empower workers by providing them with healthcare and educational resources, while also advocating for their overall well-being.[8]

A. Participants

CVFWI recruited participants for the train-the-trainer session held on Sunday, May 25, 2025, in Massies Mill, VA. A total of 13 individuals attended, including 10 farmworker leaders, two community health workers (CHWs), and one outreach worker. The farmworker leaders were chosen to represent various communities in the county, and many of them also serve as board members for CVFWI. Some were temporary workers in the area, while others were long-term residents who had lived locally for several years, primarily employed in agriculture. CHWs serve as frontline healthcare workers, connecting individuals with healthcare services and providing preventive and health education. Outreach workers typically connect individuals with resources in their communities to address social, health, and economic challenges.

B. Results

The 60-minute training session was conducted in Spanish using a flipchart resource that included headings and pictures for participants to view. Key points that the facilitator followed during the training could be found on the back of each flipchart page, along with explanations of group activities, discussions, and demonstrations (see Appendix 3 to view the flipchart).

Participants were highly engaged during the training, which allowed for open discussion and an interactive question-and-answer period. The training reviewed specific tick bite prevention strategies, including wearing long sleeves and long pants, using bug spray containing DEET, and pre-treating work clothes with permethrin. Participants also discussed common ways of removing ticks, and the recommended tick removal process was demonstrated and practiced.

C. Session Evaluation

Participants of the Train-the-Trainer Educational Session were given a 6-question quiz to evaluate their knowledge about tick bites and Lyme disease before and after the training (Appendix 1). On average, participants scored 81% on the pre-test and 100% on the post-test.

Participants were asked to complete a training evaluation at the end of the session by scanning a QR code on their phones to access the questionnaire. Participants scored the different domains using a Likert scale to measure their opinions on various aspects of the training, including the content, the presenter's facilitation, their ability to apply the new learning, the new knowledge acquired, and any other suggestions they had. Responses ranged from 1 to 5, with 5 being "extremely satisfied" and 1 being "not at all satisfied". Average score results are reported in Table 1. Participants received assistance in accessing the QR code, but only five completed the evaluation. Overall, participants rated the training and the facilitator very highly. Participants mentioned various actions they will take to protect themselves from tick bites, including wearing appropriate clothing, using insect repellent, and promptly removing ticks if bitten.

Table 1: Train-the-Trainer Session Evaluation Results

Domain	Mean score
Overall satisfaction	4.4/5
Speaker's knowledge	4.8/5
Confidence in applying new knowledge	4.4/5
Changes to knowledge as compared to before the training	4/5

Figure 1: Picture from the train-the-trainer session about Lyme disease and tick bite prevention in Massies Mill, VA.
Photo Credit: Margo Millure/CVFWI/La iniciativa

III. Educational Outreach

In the second phase of the project, individuals who completed the train-the-trainer session were offered the opportunity to conduct educational outreach in their communities. Four outdoor worker educators who had completed the Train-the-Trainer program elected to participate and conducted 13 sessions with 100 outdoor workers across rural Virginia, including in Nelson, Albemarle, and Henrico counties. The outdoor worker educators recruited participants during visits to outdoor work sites. Outdoor workers or their family members who were at least 18 years old were eligible for participation. Participants were given a $15 token of appreciation. Outdoor worker educators were compensated $50 per hour to conduct the educational outreach sessions and administer participant surveys.

For each educational outreach session, the outdoor worker educators documented field notes to provide details about the training setting and any factors that may have impacted delivery of the materials. Field notes were recorded using KoboToolBox.[9]

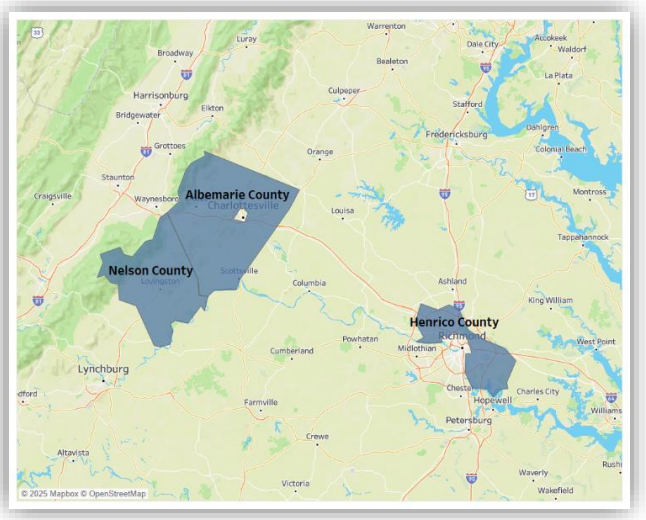

Figure 2: Educational outreach sessions about Lyme disease and tick bite prevention for outdoor workers took place in Nelson, Albemarle, and Henrico Counties, VA

IV. Participant Evaluation

A. Methodology

1. Outdoor worker survey

To evaluate the effectiveness of the educational outreach session on Lyme disease and its delivery to outdoor workers in rural settings, NCFH developed a 17-question post-session survey. The survey was developed using KoboToolBox,[9] an open-source software designed to collect, analyze, and manage data, available in both English and Spanish. The survey captured demographic information, key knowledge, and behaviors learned during the educational session. It also gathered data on barriers to applying risk mitigation recommendations, information about care-seeking, and openness to future vaccination against Lyme disease. Immediately following each educational outreach session, educators verbally administered the survey. To reduce response order bias through the introduction of possible answers, the educators were instructed to read the questions in the language preferred by the participant, but not the answer options. Instead, the educators selected the response options that most aligned with the responses provided by the participants. This evaluation assessed both the effectiveness and acceptability of the educational outreach session on Lyme disease, as well as the acceptability of in-person educational outreach sessions as a viable outreach method.

2. Outdoor worker educator focus group discussion

After all outreach educational sessions were conducted, NCFH held a virtual focus group discussion with two outdoor worker educators to debrief about the experience. The educators were asked about their experiences delivering the educational session, including challenges and successes, as well as recommendations for enhancing its effectiveness.

B. Results

1. Demographics of the outdoor worker survey

One hundred workers attended the educational sessions, and ninety-two workers successfully completed the post-session evaluation survey. Technical challenges or worker availability prevented the remaining eight surveys from being administered or recorded. Survey participants were predominantly male (94.6%), and the median age was 34 years (range: 20-68 years). Spanish was the preferred language of all participants. Participants had lived or worked in Virginia for a median of 7 years, with a minimum of 3 months and a maximum of 56 years. The majority worked in agriculture (72.8%), followed by landscaping (20.7%) (Table 2).

Table 2: Demographics of Outdoor Workers Receiving Lyme Disease Educational Session in Virginia, June 2025 (n = 92)

Sex	No.	%
Female	5	5.4%
Male	87	94.6%
Age (years)		
18-24	10	10.9%
25-44	60	65.2%
45-64	20	21.7%
65+	2	2.2%
Preferred language		
Spanish	92	100.0%
Current Industry*		
Agriculture	67	72.8%
Construction	6	6.5%
Landscaping	19	20.7%
Other (Cleaning)	3	3.3%
Years Living or Working in Virginia		
≤ 1	11	12.0%
2-10	53	57.6%
>10	28	30.4%
*Categories not mutually exclusive; will not total 100%		

2. Interest in and relevance of Lyme disease

Nearly all (96.7%) survey participants reported that Lyme disease was a relevant health topic to them, and 78.3% indicated that they would be open to receiving information about similar topics in the future (Table 3).

Table 3: Self-Reported Interest in and Relevance of Lyme Disease Educational Sessions among Outdoor Worker Survey Participants in Virginia, June 2025 (n = 92)

Was Lyme Disease relevant?	No.	%
Yes	89	96.7%
I don't know	2	2.2%
Blank	1	1.1%
No	0	0.0%
Are you interested in learning more about topics like this one?		
Yes	72	78.3%
I don't know	20	21.7%

3. Lyme Disease Knowledge Gained

Participants were asked to list new information learned from the educational session. The most frequently cited topics included what to do if they find a tick attached to their body (40.2%), how to identify symptoms of Lyme disease (35.9%), how to prevent tick bites (32.6%), and how Lyme disease is spread (29.3%). Nearly all participants (98.9%) reported learning new information about ticks or Lyme disease from the educational training. These findings suggest that pre-existing knowledge about ticks and the risk of tickborne disease among this population is low, and that the vast majority of participants benefited from the educational training. Observations from one of the outdoor worker educators agreed with this assessment, noting that before the educational session, workers weren't informed of proper tick removal methods and were using unsafe methods to remove ticks (Table 4).

> *"We found one guy who'd like burned a hole in his leg with a cigarette because he'd never had a tick on him before." Outdoor Worker Educator*

Outdoor worker educators noted an overall increase in awareness following the educational session, with one educator noting:

> *"There was a couple of times where they're like, [...]" now I know I'm not going to go walk into the grass like and be aware of going on to the grass. I think they all just became more aware. That's how I felt like, yeah, they seem to be a lot more aware afterwards, which is really nice, […]. I think they recognize that ticks are around and that it's problematic." Outdoor Worker Educator*

Following the educational session, outdoor worker participants were asked to name symptoms of Lyme disease. In response, 62.0% identified rash as a symptom, followed by fever or chills (52.2%), joint swelling or pain (42.4%), fatigue (19.6%), and muscle aches (16.3%). No participant reported being unable to recall a symptom of Lyme disease or that they did not learn new information related to Lyme disease symptoms (Table 4).

Table 4: Self-Reported Lyme Disease-related Knowledge Gained during Educational Session among Outdoor Worker Survey Participants in Virginia, June 2025 (n = 92)

New Information Learned*	No.	%
What to do if you find a tick attached to your body	37	40.2%
How to identify symptoms of Lyme disease	33	35.9%
How to prevent tick bites	30	32.6%
How Lyme disease can spread	27	29.3%
When tick bites are most likely to occur	5	5.4%
When to go see a healthcare provider after a tick bite	4	4.3%
I can't remember	1	1.1%
I didn't learn new information/I already knew this information	1	1.1%
Other information not listed here (specify below)	1	1.1%
Symptoms*		
Rash	57	62.0%
Fever or chills	48	52.2%
Joint swelling or pain	39	42.4%
Fatigue	18	19.6%
Muscle aches	15	16.3%
Headache	8	8.7%
Facial paralysis or droop	2	2.2%
I didn't learn new information/I already knew this information	0	0.0%
*Categories not mutually exclusive; will not total 100%		

4. Protective Behaviors and Barriers to Implementation

Outdoor worker participants reported learning several ways to protect themselves from ticks, including using insect repellent (55.4%), checking the body and clothing for ticks (42.4%), using insecticide-treated clothing (20.7%), and showering after coming indoors (19.6%) (Table 5).

When asked about how challenging it would be to follow these recommendations in daily life, the majority reported it would not be hard (59.8%), and only 11% reported that it would be somewhat hard or hard to implement. However, when asked about the barriers to implementation, the cost and time of washing clothing was cited by 25.0% of participants. Lack of access to a shower (21.7%) and the cost of repellent or gear (15.2%) were also listed as barriers to preventative measures (Table 5).

The outdoor worker educators reiterated these barriers. One educator noted:

> *"For these guys who live in big houses and stuff like they can't get take off their clothes before they go into the house." Outdoor worker educator*

"I don't know that any of them really have the possibility of like literally spraying their entire outfit and hanging it outside for 24 hours and then letting and then doing that with multiple outfits." Outdoor worker educator

Table 5: Strategies and Barriers to Lyme Disease Risk Prevention among Outdoor Worker Survey Participants in Virginia, June 2025 (n = 92)

Protective Behaviors Learned during Educational Session*	No.	%
Wear insect repellent	51	55.4%
Check my body/clothing for ticks daily	39	42.4%
Wear insecticide-treated clothing	19	20.7%
Shower soon after coming indoors	18	19.6%
Wash work clothes in hot water and a hot air cycle	13	14.1%
Wear adequate clothing (long sleeves/pants, face covers, hat, gloves, etc.)	8	8.7%
Try to stay out of brushy or wooded areas	4	4.3%
I didn't learn new information/I already knew this information	3	3.3%
Ensure my pets receive tick prevention medicine	1	1.1%
No answer	0	0.0%
Perceived Difficulty of Implementing Protective Behaviors		
Not hard at all	55	59.8%
A little hard	27	29.3%
Somewhat hard	7	7.6%
Yes, it will be hard	3	3.3%
Barriers to Implementing Protective Behavior*		
Cost and time to wash clothes after spending time outdoors	23	25.0%
Lack of consistent access to a shower soon after spending time outdoors	20	21.7%
Cost of bug repellent or proper gear	14	15.2%
Inconvenience of tick bite prevention methods	8	8.7%
Cost of getting my pet on tick preventive medicine	4	4.3%
Not remembering about risk for tick bites	1	1.1%
No barriers	23	25.0%
*Categories not mutually exclusive; will not total 100%		

5. Care Seeking and Vaccine Acceptance

The majority (53%) of survey participants stated that in the event of a tick bite, they would seek care or advice from the Central Virginia Farm Workers Initiative (CVFWI) – the agency that deployed the survey and conducts outreach to farmworkers in the region. It is essential to note that CVFWI does not provide medical services directly, underscoring the significant challenge of access to care for this population. Following CVFWI, participants listed community health

centers as another potential source of care, while 10.9% of participants stated they did not know where they would find care (Table 6).

Regarding a future vaccine against Lyme disease, 56.5% indicated they would receive the vaccine, and 27.2% stated they might receive the vaccine. However, while 43.5% cited a community health center as a place to get vaccinated, 38.0% did not know where they could get a vaccine (Table 6).

One of the outdoor worker educators highlighted this barrier as well, stating:

> *"How can they actually get help? Which is… often, the answer is, they can't. I mean, like, they can't. Yeah, yeah, and become increasingly so." Outdoor worker educator*

> *"It's different [access to healthcare] in different places. Like, maybe, if you ask this in North Carolina or in California, people would know. But here? People... you know, "nowhere" is the answer." Outdoor worker educator*

Table 6: Access to Healthcare among Outdoor Worker Survey Participants in Virginia, June 2025 (n = 92)

Likeliest Location To Seek Care or Advice	No.	%
Other (CVFWI)	49	53.3%
Clinic or migrant/community health center	18	19.6%
I don't know	10	10.9%
Hospital	7	7.6%
Private clinic or doctor's office	6	6.5%
Emergency room	1	1.1%
Urgent care	1	1.1%
Open to Lyme Disease Vaccine?		
Yes	52	56.5%
Maybe	25	27.2%
Unsure	11	12.0%
No	4	4.3%
Where would you get the vaccine?		
Clinic or migrant/community health center	40	43.5%
I don't know	35	38.0%
Private clinic or doctor's office	10	10.9%
Hospital	4	4.3%
I would not get the vaccine if it were available	1	1.1%
Employer	1	1.1%
Other (specify below)	1	1.1%

V. Experience and Acceptability of the Train-The-Trainer Educational Session

During the focus group discussion held by NCFH with CVFWI staff to debrief the train-the-trainer experience, outdoor worker educators noted that a longer training, ideally over the span of multiple sessions or days, would have been necessary to fully prepare them to deliver the educational content in the field to outdoor workers and to master survey data collection.

> *"Even though both of us are country women, and we bring experience with ticks and outdoors to the table, you need more training for that, and maybe more practice. Like I would say, maybe you may get a half day workshop or 2, half day workshops…. Then you got a chance to model it, and or you went out in the field and watched it being modeled. Because, and you know this, I'm sure, in order to have an effective trainer, they have to be able to understand the material." Outdoor worker educator*

A. Data Collection

KoboToolBox was used to administer the post-education session field survey and collect field notes. NCFH maintained access to the Kobo platform. Outdoor worker educators noted that additional training time to practice the data collection processes would improve confidence and reduce technical errors in data collection.

Additionally, CVFWI recommended closer data monitoring to ensure early identification of any data errors, noting that one educator struggled with the survey data entry and was unaware that participant responses were not being correctly recorded.

B. Lessons Learned and Recommendations for the Future

1. Modification to Educational Outreach Delivery or Materials

During the educational outreach sessions and at the debrief, CVFWI offered several suggestions for improving the educational session training and materials.

Outdoor worker educators recommended improved use of visual aids and props, noting the importance that all visuals represent what outdoor workers in the region would be most likely to encounter in the field. An outdoor worker educator also recommended using ticks suspended in an alcohol solution as an educational exhibit rather than desiccated ticks to offer participants a more accurate representation of what ticks look like when crawling or attached.

> *"[Using] desiccated ticks, while it seems like a fantastic idea. Anybody who ever has dealt with bugs knows that the real bug versus something that's been all dried up, that helpful. It's actually more of a distraction. So I mean, I personally have had more experiences than I would like to with bugs of the blood sucking type, and you know, I have found some success in putting them in alcohol." Outdoor worker educator*

Educators offered other suggestions to boost engagement by introducing additional props and humor into the educational session, noting that when participants were comfortable and laughing, they were more likely to engage with the content, ask questions, and actively participate.

> *"We supplied a mannequin for the training the guys like, because then you can go and kind of be, you know, do something. We found that when we actually went out, and maybe I'm jumping ahead now, but we took out handheld mirrors with us, and we took out little packs of tweezers, and you know, antiseptic stuff. Just a few little tools to just […] make it more engaging.*
>
> *Now, part of it is just the presenter, like the energy of the presenter, but at least giving all presenters enough tools or ideas to make it fun. We personally took out heart-shaped rhinestone-encrusted mirrors for the guys to examine intimate parts with, which got a lot of giggles out of everybody." Outdoor worker educator*

The partner organization noted that for future Lyme disease education, they would prefer to adapt the educational session into a video format, which could be disseminated both in person and electronically, alongside in-person outreach. This suggestion is strategic given the challenges of assembling farmworkers in a single location for an in-person educational session.

> *"Based on the training and our experience during the surveys, [we] developed a video… - around a minute, a minute and a half, using the main points from the whole thing and making it really funny, having me go, having itching, getting the points in there as something that could be shared. So you know, and funny it could be shared on WhatsApp." Outdoor worker educator*

2. Prioritize public health action over disease-specific expertise

Given the low awareness of ticks and their risks, as well as the emergence or resurgence of various tick-borne illnesses, outdoor worker educators suggest that the educational session maintain a focus on practical public health actions rather than technical Lyme disease expertise. They argue that regardless of the tick-borne disease or the type of tick that carries it, the key actionable message to outdoor workers is to practice tick prevention, identify and remove ticks as quickly as possible, and seek medical care if you find a tick attached to your body.

> *"I know that Lyme disease is definitely... There's a lot of Lyme disease here, but there's a lot of alpha gal. Also …. I've actually had one farm worker who…somehow he ended up going to the doctor, and then he's like, yeah. And now whenever I eat meat or no, he didn't say when he ate meat, he said he gets sick all the time. He's always sick. And finally he saw a nurse practitioner who diagnosed him with Alpha gal." Outdoor worker educator*
>
> *"Even going into the symptoms. And stuff is tricky. Right? […] Yeah, I mean, I mean, as I said before, my son had it, and we didn't catch it. I mean, I would. Took him to the*

doctor, had like a swollen ear, so I think it had bit him under his hair. And they're just like 'well, we don't know.' And eventually he ended up in the emergency room because it went to his joints and he couldn't walk." Outdoor worker educator

"Okay, Lyme disease is important. But if we look at the totality of the United States, where Lyme disease is, and where Lyme disease isn't, where ticks are, and where ticks aren't, you know? Perhaps a strategy that would make it a moot point. What kind of tick you had a picture of would be that, you know, these are ticks, whatever they look like, and you want to get them off, you and you can get diseases from them." Outdoor worker educator

C. Additional Challenges

Based on the discussion group feedback and additional correspondence between NCFH and CVFWI, challenges were also identified with participation in the educational session.

While it was initially assumed that the goal of 100 participants would be met in just a few sessions, the reality was that gathering larger numbers of workers in rural areas is difficult. CVFWI staff facilitated 13 educational sessions, eight of which had fewer than 10 participants. This resulted in a highly resource-intensive effort that required additional staff time and transportation costs, as outreach workers had to drive to dispersed locations.

VI. Conclusions

In conclusion, we found that an educational session can be an effective training tool for improving outdoor workers' knowledge of Lyme disease, particularly when facilitators are well-trained and can adapt the educational materials to their local circumstances. Very few outdoor workers reported previous exposure to this information, indicating that knowledge of vector-borne diseases, including Lyme disease, is limited among the outdoor worker population. Furthermore, workers accurately retained important information following the educational session and identified the information as valuable and relevant to their lives.

In low-resource settings where health literacy is limited and health outreach is challenging, high-value public health tools prioritize actionable recommendations over in-depth, disease-specific knowledge. Learning outcomes should be prioritized based on feasible and actionable steps workers can learn and take to reduce their risk. Additional formats, such as videos in languages preferred by outdoor workers, should be considered, given their ease of dissemination and ability to reach a larger subset of the region's outdoor workers.

Lastly, given the limited access to health resources in rural communities, equipping outdoor workers with first aid kits containing tweezers to safely remove attached ticks and bug repellent to prevent tick bites could be highly beneficial.

Appendix

1. Train-the-Trainer Educational Session Pre & Post-Test

Pre & Post-Test Questions

Please answer the following questions to the best of your knowledge.

Section I: Multiple choice questions

1. What is Lyme Disease?
    a. It is a viral infection that spreads to people through the bite of blacklegged ticks.
    b. It is a bacterial infection that spreads to people through the bite of blacklegged ticks.
    c. It is a cold that is spread by ticks.

2. What are some common places where you could get a tick bite?
    a. Wooden and bushy areas.
    b. Areas that have body water.
    c. Working under strong heat waves.

Section II: True or false statements.

3. Is more common to have Lyme Disease if you live in the northeastern and western regions of the United States.
    a. True
    b. False

4. A single dose of doxycycline taken within 3 days of a high-risk tick bite can prevent Lyme Disease.
    a. True
    b. False

Section III: Complete the following statements using the list of words provided below.

a. *Long sleeve shirts, pants, gloves, face cover, and closed shoes*
b. *Fever, chill, headache, fatigue, muscle and joint aches, and swollen lymph nodes may occur in the absence of a rash.*

5. Some common early symptoms of Lyme Disease can be:
    _____
6. Using _____ can help protect yourself from Lyme Disease.

2. Outdoor Worker Survey

NCFH Lyme Disease Training
Outdoor Worker Post-Training Survey

Eligibility Question

1. Are you at least 18 years of age?
   - Yes
   - No *(If under 18, please thank the participant and end the survey)*

Survey Questions

2. What kind of business or employer do you work for?
   - Agriculture
   - Construction
   - Landscaping
   - Fishing
   - Forestry
   - Hotel or restaurant
   - Other: _____

3. Was the Lyme disease topic relevant to you?
   - Yes
   - No
   - I don't know

4. What new information about Lyme Disease did you learn in this training? *Please check off all the choices that align with the trainee's response*.
   - How to prevent tick bites
   - What to do if you find a tick attached to your body
   - When to go see a healthcare provider after a tick bite
   - How Lyme disease can spread
   - When tick bites are most likely to occur
   - How to identify symptoms of Lyme disease
   - Other information not listed here (specify):_____
   - I can't remember
   - I didn't learn new information/I already knew this information
   - No answer

5. What new ways to protect yourself from tick bites did you learn today? *Please check off all the choices that align with the trainee's response.*
   - Wear insect repellent
   - Shower soon after coming indoors
   - Wear insecticide-treated clothing

- Wear adequate clothing (long sleeves/pants, face covers, hat, gloves, etc.)
- Check my body/clothing for ticks daily
- Try to stay out of brushy or wooded areas
- Wash work clothes in hot water and hot air cycle
- Ensure my pets receive tick prevention medicine
- Take other steps not listed here (specify): _____
- I can't remember
- I didn't learn new information/I already knew this information
- No answer

6. Do you think it will be hard to consistently follow the recommendations to protect yourself from tick bites?
- Not hard at all
- A little hard
- Somewhat hard
- Yes, it will be hard

7. Think about your environment and schedule. What could get in the way of consistently following the recommendations to protect yourself from tick bites? *Please check off all the choices that align with the trainee's response.*
- Lack of consistent access to a shower soon after spending time outdoors
- Cost of bug repellent or proper gear
- Cost and time to wash clothes after spending time outdoors
- Cost of getting my pet on tick preventive medicine
- Inconvenience of tick bite prevention methods
- Not remembering about risk for tick bites
- Other: _____

8. After attending this training, can you name one or two typical symptoms of Lyme disease? *(Multiple Choice)*
- Rash
- Fever or chills
- Headache
- Fatigue
- Muscle aches
- Swollen lymph nodes
- Joint swelling or pain
- Facial paralysis or droop
- I don't remember
- I didn't learn new information/I already knew this information
- Other

9. Are you interested in learning more about topics like the ones included in this training?
   - Yes
   - No
   - I don't know

Lyme Disease Vaccine

10. If you get bitten by a tick, where are you most likely to seek care?
   - Clinic or migrant/community health center
   - Private clinic or doctor's office
   - Hospital
   - Emergency room
   - Natural/herb store or homeopathic store
   - Traditional healer/curandero
   - Pharmacy
   - Urgent care
   - Employer
   - I would not seek care after a tick bite
   - Other (specify): _____
   - I don't know
   - No answer

11. If a safe and effective Lyme disease vaccine were available, would you get the vaccine?
   - Yes
   - Maybe
   - No
   - Unsure

12. If you got the Lyme disease vaccine, where would you get the vaccine?
   - Clinic or migrant/community health center
   - Private clinic or doctor's office
   - Hospital
   - Emergency room
   - Pharmacy
   - Urgent care
   - Employer
   - I would not get the vaccine if it were available
   - Other (Please, specify): _____
   - I don't know
   - No answer

Demographics

13. What is your sex?

- Male
- Female
- No answer

14. What year were you born? *Please enter as YYYY. If answer is don't know, enter '88', if no answer, enter '99'*

[open answer]

15. What is your preferred language?

- Spanish
- English
- Mixtec
- Zapotec
- Triqui
- Q'anjob'al
- Nahuatl
- Mam
- Tzeltzal
- Tsotsil
- Haitian Creole
- Patois
- Other:_____
- Don't know
- No answer

16. What U.S. state are you currently working in? Enter XX if participant prefers not to respond

[Open Response]

17. How long have you lived or worked in this state? *(Please indicate days if the respondent has been here less than 1 month; months less than 1 year; years if more than 1 year)*

[Open Response]

FOR COMMUNITY HEALTH WORKER ONLY:

What is your name? _____

3. Flipchart for Educational Outreach

Access the flipchart for educational outreach by following the links below. Available in English and Spanish:

- Flipchart in English https://www.ncfh.org/wp-content/uploads/2025/10/NCFH_LymeDisease_ENG_2025_13x8in.pdf
- Flipchart in Spanish https://www.ncfh.org/wp-content/uploads/2025/10/NCFH_Lyme-Disease_SPA_2025_13-x-8-in.pdf

Figure 3: Picture from the train-the-trainer session about Lyme disease and tick bite prevention in Massies Mill, Virginia. The facilitator is shown using a mannequin as a training prop.

Figure 4: Picture from the train-the-trainer session about Lyme disease and tick bite prevention in Massies Mill, Virginia. A participant is shown sorting pictures of ticks and their names.

VII. Bibliography

1. Centers for Disease Control and Prevention (CDC). Lyme Disease Continuing Education. Lyme Disease. January 31, 2025. Accessed April 8, 2025. https://www.cdc.gov/lyme/hcp/training/index.html

2. Centers for Disease Control and Prevention (CDC). Lyme Disease Surveillance and Data. Lyme Disease. July 7, 2025. Accessed August 11, 2025. https://www.cdc.gov/lyme/data-research/facts-stats/index.html

3. Kugeler KJ, Schwartz AM, Delorey MJ, Mead PS, Hinckley AF. Estimating the Frequency of Lyme Disease Diagnoses, United States, 2010–2018 - Volume 27, Number 2—February 2021 - Emerging Infectious Diseases journal - CDC. doi:10.3201/eid2702.202731

4. Schotthoefer A, Stinebaugh K, Martin M, Munoz-Zanzi C. Tickborne disease awareness and protective practices among U.S. Forest Service employees from the upper Midwest, USA. *BMC Public Health*. 2020;20(1):1575. doi:10.1186/s12889-020-09629-x

5. Magnavita N, Capitanelli I, Ilesanmi O, Chirico F. Occupational Lyme Disease: A Systematic Review and Meta-Analysis. *Diagnostics*. 2022;12(2):296. doi:10.3390/diagnostics12020296

6. National Center for Farmworker Health. Facts About Farmworkers. Accessed August 11, 2025. https://www.ncfh.org/wp-content/uploads/2025/04/facts_about_farmworkers_fact_sheet_1.10.23-1.pdf

7. Centers for Disease Control and Prevention (CDC). About Vector-Borne Diseases. Vector-Borne Diseases. June 26, 2024. Accessed November 15, 2024. https://www.cdc.gov/vector-borne-diseases/about/index.html

8. Initiative CVFW. Central Virginia Farm Workers Initiative. Central Virginia Farm Workers Initiative. Accessed September 10, 2025. https://cvfwi.org/

9. KoboToolbox. KoboToolbox. Accessed September 15, 2025. https://www.kobotoolbox.org/

This publication was supported by the Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award number 5 NU50CK000567-03-00. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, CDC/HHS, or the U.S. Government.