Emergence of Anaplasmosis in New York, 2010–2018

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Sarah Gregory] Hello, I'm Sarah Gregory, and today I'm talking with Melissa Prusinski, a research scientist and laboratory supervisor at the New York State Department of Health. We'll be discussing cases of anaplasmosis in New York during 2010–2018.

Welcome, Melissa.

[Melissa Prusinski] Thank you. It's really great to be here.

[Sarah Gregory] What is anaplasmosis and how is it different from other tickborne diseases?

[Melissa Prusinski] Well, anaplasmosis is a bacterial infection caused by *Anaplasma phagocytophilum*. It's transmitted by ticks, as you mentioned. And globally, if we take a perspective that way, it's found in North America, Europe, and Asia. But here in the U.S., there are just eight states that account for nearly 90% of all reported cases nationally, and so these are Minnesota and Wisconsin in the Midwest and Vermont, Maine, Rhode Island, Massachusetts, New Hampshire, and New York in the Northeast.

People with anaplasmosis often experience fever, headache, chills, and muscle aches a week or two after being bitten by an infected tick. And these are common early symptoms shared with many illnesses including COVID-19, for that matter, and with other tickborne infections like Lyme disease, babesiosis (which is a malaria-like illness transmitted by ticks), Rocky Mountain spotted fever, tularemia, and others. So in that regard, I would say it has more in common with other tickborne diseases than differences, really. Rash is uncommon with anaplasmosis, where it is seen in some of the other tickborne. However if treatment is delayed or if there are other underlying medical conditions, anaplasmosis can cause really severe illness with difficulty breathing, bleeding problems, organ failure. This can lead to hospitalization or even death. The hospitalization rate for anaplasmosis is higher than that for Lyme disease but lower than that of babesiosis, and the case-fatality rate of half a percent is much lower than the six and a half percent that we've seen in babesiosis patients in New York state. So unlike Lyme disease, which has similar early symptoms that can become debilitating but rarely causes death, anaplasmosis can kill if left untreated.

[Sarah Gregory] What are the most common tickborne diseases in New York?

[Melissa Prusinski] So Lyme disease by far is the most common tickborne illness reported in New York state and nationally, for that matter. We see about 8,000 cases of Lyme reported each year in New York state. In 2017, which was a boom year for Lyme, that number was close to 10,000 cases. Anaplasmosis has recently become the second most common in New York at about 1,000 cases each year, and that's followed by babesiosis with about 700 cases, ehrlichiosis with 200 cases, and then we see 50 cases or less of Rocky Mountain spotted fever, and a handful of Powassan encephalitis cases each year.

[Sarah Gregory] Anaplasmosis accounted for approximately 11% of tickborne disease cases in New York state during 2018. Is that an increase?

[Melissa Prusinski] Yeah. Anaplasmosis continues to account for a growing proportion of our tickborne disease cases in New York each year and while 11% might not sound like a lot, that number was only 4% in 2010. So the proportion increased nearly three-fold in less than a decade,

and that's a recent and rapid increase for us. New York state has reported the second highest number of anaplasmosis cases of any state, closely behind Minnesota, so it's a growing concern.

[Sarah Gregory] You mentioned getting treatment immediately, so I guess there is a treatment. What is it and how immediate is immediate?

[Melissa Prusinski] Yes, thankfully there is a treatment. Anaplasmosis is treated with the antibiotic doxycycline, usually for 10–14 days. But the key is that treatment should be started immediately for anyone suspected of having anaplasmosis. So if you have symptoms consistent with the disease that I had mentioned earlier and possibly a known history of a tick bite, even before the results of your diagnostic blood work come back and confirm infection, you really need to start the antibiotic. This prevents severe disease and potentially death. In New York, over a third of our anaplasmosis patients were hospitalized and half a percent died. So this is a serious illness and patients can really deteriorate rapidly. Their liver enzymes can increase dramatically and their platelets (which help with blood clotting) can fall to really dangerous levels, so prompt treatment is really critical. It's also important to mention that there are alternative antibiotics for people who can't take doxycycline, but for all others it's really the recommended medication. And the good news is that most folks with anaplasmosis make a complete recovery following treatment.

[Sarah Gregory] Early on you mentioned that anaplasmosis mimics (or symptoms mimic) all these other illnesses. So what do you do? How do you know? You sort of have this...should you just go ahead and get a prescription and take it?

[Melissa Prusinski] That's really a good question. The thing with anaplasmosis is the seasonality of it. The vast majority of cases occur during the summer months (so May, June, July) when people are outdoors spending time in nature and the immature ticks and nymphal ticks are active and they're sometimes hard to spot on yourself. But if you do spend time in areas where ticks are known to be or if you have a history of a tick bite and you come down with these symptoms, it should be one of the first things that comes to mind for yourself and for your medical provider. Tickborne illness, you know, flu-like symptoms in the summer really should have a lightbulb coming on that it may be a tickborne illness like Lyme disease or anaplasmosis.

[Sarah Gregory] Your article describes *Anaplasma phagocytophilum* as an obligate intracellular bacterium. What's that mean?

[Melissa Prusinski] So that's really just a fancy way of saying a type of bacteria that needs to infect living cells of another organism in order to survive and reproduce. So in the case of *Anaplasma phagocytophilum*, the bacteria invade our white blood cells (specifically the granulocytes) and these guys are part of our immune response—they're really on cleanup crew. The white blood cells normally engulf foreign bacteria in our bodies and destroy them, preventing infection. But *Anaplasma* survives this process. In fact, it thrives and reproduces in the granulocytes, resulting in the illness.

[Sarah Gregory] Can you get it from any kind of tick, or is it just a certain tick or certain species?

[Melissa Prusinski] Anaplasmosis is spread by the same two tick species known to carry Lyme disease in the United States: the blacklegged tick (*Ixodes scapularis*), commonly called the deer tick, and that's found in the northeast and midwestern regions; and the western blacklegged tick (*Ixodes pacificus*) on the West Coast.

[Sarah Gregory] Okay. Where is this tick usually found?

[Melissa Prusinski] Blacklegged ticks live in shady, wooded, humid areas at ground level. They can be found in fallen leaves and they'll cling to grasses and shrubs usually, no more than two to three feet above ground. They also live in lawns and gardens, especially at the edge of the woods and around old stone walls and wood piles. They hitch rides on a great variety of animals that they feed on—so mice, chipmunks, dogs, birds, deer. Anywhere you see these animals, ticks could potentially be found.

[Sarah Gregory] Okay. Anaplasmosis used to be called something else. What was that and why the name change?

[Melissa Prusinski] So it used to be called human granulocytic ehrlichiosis, and they didn't just change the name for my benefit, because it's easier to say. But it's really a story about the advancement of science and diagnostic techniques. So back in 1990, this previously unknown human pathogen was first seen in the white blood cells of a Wisconsin patient who was hospitalized with a severe febrile illness and who died two weeks after a tick bite. When looking at the diagnostic blood smear under the microscope, these organisms looked very similar to known species of bacteria in the genus *Ehrlichia*, so they were initially named *Ehrlichia phagocytophila* and they were lumped with that group based largely on their appearance and the clinical illness that they caused, which was termed human granulocytic ehrlichiosis (or HGE for short). But with the advent of DNA sequencing and advancements in phylogenetics (that's the study of how different organisms are related to one another), scientists determined that *Ehrlichia phagocytophila* was quite different from the other *Ehrlichia* species genetically and really should be reclassified into a separate new genus called *Anaplasma*. So the name of the bacteria was changed to *Anaplasma phagocytophilum* in 1994, and the resulting infection was changed from HGE to human granulocytic anaplasmosis or simply anaplasmosis, which is much easier to say.

[Sarah Gregory] Much. Okay, let's talk about your study. What was the goal?

[Melissa Prusinski] So as I mentioned, anaplasmosis continued to account for a growing proportion of our tickborne disease cases in New York each year. And it was really important to document this increase, but also it's critically important to investigate the environmental and epidemiological or human factors that are contributing to this increase to better understand why and how risk for this serious illness was increasing. So those were the goals of our study.

[Sarah Gregory] And why did you do this study? I mean, beyond what you just said. And why is it important to know how many cases?

[Melissa Prusinski] Well, firstly it's important to understand and document the burden of any communicable disease, really—how many people are being affected, who are they, where do they live. You know, in public health we ask these types of questions to gain a better understanding of disease risk. This may potentially lead to discoveries of new interventions to reduce case numbers, and in the very least will help guide targeted strategies to prevent anaplasmosis which is ultimately our goal as public health researchers.

[Sarah Gregory] For the study, you divided New York state into four regions. Tell us about those regions.

[Melissa Prusinski] This is where a picture is truly worth a thousand words, but I'll do my best. The regions defined in our study include western New York—so these are the 17 westernmost counties of the state, including counties along the borders of the Great Lakes Ontario and Erie as well as an area known as the southern tier, which borders northwestern Pennsylvania. Our central

New York region spans from the Canadian border counties south along the eastern shores of Lake Ontario through the heart of the state and down to the Pennsylvania border. This area includes the Finger Lakes wine region and the Thousand Islands regions of New York state, which are both popular tourist areas. And then the Capital District Region counties border Vermont and Massachusetts to the east and Canada to the north. This region includes the Adirondack Mountains, parts of the Catskill Mountains, and the Mohawk and Hudson River valleys. Albany, the state capital, is also in this region. And lastly, the metropolitan region includes the seven counties along the Hudson River Valley north of New York City, bordering Connecticut to the east and New Jersey to the south, as well as Long Island. Those were our four areas.

[Sarah Gregory] Your study didn't include data from New York City, how come? And just stopping here a minute, if listeners care to listen, I did a podcast on Lyme disease in New York City in 2019 and that can be found online with our other podcasts.

[Melissa Prusinski] So that's a good question. Not exactly an easy, simple, straightforward answer, but reported cases of anaplasmosis have to meet an official case definition with regards to the symptoms experienced and the diagnostic results that are received for each patient. And these are outlined by the Centers for Disease Control and Prevention to be officially counted at the national level. The New York City Department of Health and Mental Hygiene tracks and reports communicable disease data (including tickborne disease case numbers) for New York City residents separately from the rest of New York, where reporting is overseen by the New York State Department of Health. So while New York City communicable disease data are reported publicly on our New York State Department of Health website and with our statewide data—and New York City certainly has anaplasmosis cases—they are listed separately and they're not really our data to play with, so to speak. We don't have access to the individual patient records, and we can't confirm all of the information that would determine whether the cases met the case definition for reporting.

Additionally, risk factors for tickborne illness in a large urban environment like New York City are likely to be very different than other parts of New York state. New York City residents often travel to other areas outside of the city for outdoor recreation. So if travel history isn't complete or accurate for these patients, their case numbers could really be misinterpreted. So for all of these reasons, we elected to exclude New York City data from our study. But they are publicly available on our website.

[Sarah Gregory] Okay. So speaking of data, what kind of data did you use for this study?

[Melissa Prusinski] We used two types of data in our study. The first is human anaplasmosis case data from 2010–2018, and these were reported by medical providers who diagnosed patients with anaplasmosis and also electronically through positive laboratory test results for anaplasmosis as mandated under New York state public health law. The second set of data came from our statewide New York State Department of Health tick and tickborne pathogen surveillance efforts. So these data included information on the abundance of blacklegged ticks and the *Anaplasma phagocytophilum* pathogen at hundreds of publicly accessible locations across New York state (like parks, nature preserves, historic sites), all typically with hiking trails and potential exposure to ticks.

[Sarah Gregory] And I know you looked at spatiotemporal patterns. What does this mean and where was this data available?

[Melissa Prusinski] Spatiotemporal means relating to space and time. So in our study, we looked for patterns in our anaplasmosis cases and in *Anaplasma*-infected ticks across the whole geography of New York state in over the nine years included in our study. Were cases occurring in some regions more than others and how did this change over time? Where were we finding the pathogen in ticks from year to year? Was there spread, and if so, what pattern did that spread take? These were the types of questions we hoped to address with spatiotemporal analysis. And as I mentioned, the data that we used in our study is publicly available and summarized at the county level on the Communicable Disease Annual Reports of the New York State Department of Health public website. And our tick surveillance data are available on the Health Data NY website, and our human case and tick data are both reported to CDC annually.

[Sarah Gregory] Surveillance for tickborne pathogens often includes something called a drag survey. Would you explain this process?

[Melissa Prusinski] Sure. I'm going to ask your listeners to use their imagination again and kind of envision. Drag sampling for ticks involves brushing a square piece of light-colored, soft fabric along the ground in low vegetation where ticks may be found, like along hiking trails. In our study that piece of fabric was one meter by one meter square, and it's supported by a long wooden dowel along the top edge with a rope handle for the person sampling to hold on to. And it's weighted down along the bottom edge with a length of chain that's sown into a pocket and this keeps the cloth square and laying flat on the ground for maximum contact with the ground. After walking a set distance pulling the drag, the collector then flips the cloth over, examines it, and removes any ticks that are clinging to the fabric with fine-pointed tweezers. We usually put them in a vial with alcohol for transport back to the laboratory to be counted, identified, and tested for pathogens.

In our study, we sampled a minimum of 1,000 square meters per visit to each location to really get a good idea of tick abundance and also to get a large enough sample size of ticks to really accurately determine pathogen prevalence. Using this technique enables us to calculate tick population density (so the number of ticks collected per square meter sampled) at each location, as well as making valid comparisons between locations and over time because the measures are all standardized and the collections are always done the same way.

[Sarah Gregory] Sounds like a fun outing.

Once you collected the ticks, how could you tell if they were infected?

[Melissa Prusinski] We use a two-step testing process. First, we grind up the individual ticks and put them through a process to extract the genetic material (the DNA) from each sample. And then we use a sensitive molecular technique called polymerase chain reaction that detects a unique DNA sequence of *Anaplasma phagocytophilum*. So only ticks that were infected would test positive.

[Sarah Gregory] Okay. Your study also measured something called entomologic risk index. Tell us what that is.

[Melissa Prusinski] Entomologic risk index (or ERI for short) is really the density of infected ticks in the environment. It's an estimate of risk of encountering infected ticks as you're walking along, say, on a trail. And in our study it was calculated as the tick population density—so the number of ticks per 1,000 meters squared sampled, multiplied by the percentage of *Anaplasma*-infected ticks at each location for each collection site. We calculated rates for the immature ticks

and nymphs and the adults separately because nymphs statistically have only had one opportunity to pick up the pathogen in their lifecycle. And so we report those two separately because nymphs are usually less likely to be carrying a pathogen than adults for each sampling event and also each year.

[Sarah Gregory] And after you did all this, what did you find?

[Melissa Prusinski] Well, what we found was that anaplasmosis has really increased dramatically in certain regions in New York state in recent years, and this was driven partly by an increase of infected ticks in these areas. The human case statewide incidence increased nearly four-fold over our study period from two cases per 100,000 people during 2010 to nearly eight cases per 100,000 population during 2018. And we had a peak incidence of nearly 10 cases per 100,000 persons during 2017. The most substantial increase occurred in the Capital District Region, which showed an eight and a half–fold increase. Our spatial analysis showed an inland hot spot of anaplasmosis centered in this Capital District area. We tested over 44,000 ticks over the timeframe of our study, and we found that the prevalence of *Anaplasma* in ticks as well as the anaplasmosis ERI that we calculated (that risk index) increased substantially as well, again, particularly in the Capital Region. And this area might be located within a local epicenter of anaplasmosis emergence in the northeast U.S. because case data for the neighboring states indicate increasing anaplasmosis incidence in the counties that are—that border New York state over the timeframe of our study.

[Sarah Gregory] Forty-four thousand ticks, I mean they're tiny, tiny, tiny and you said you ground them up. I just have to ask, what happens to all that matter when you're done with it?

[Melissa Prusinski] Well, actually we have a very large freezer archive of ultra-low temperature freezers. So we store the tick samples and the DNA samples so that we can go back and retrospectively test for other tickborne pathogens as new illnesses inevitably emerge. So over time, it's been very rewarding to have that large collection of DNA archives, so to speak, so that we can go back and test to see if certain things showed up and where they showed up and when. So that's what we do with the samples.

[Sarah Gregory] How really interesting. So where is this freezer?

[Melissa Prusinski] I work in a large state facility and we have freezer banks for large areas that are just ultra-low temperature freezers. So they're located there and in our laboratory.

[Sarah Gregory] Sort of like our labs here at CDC where we have stored samples of things. It's kind of the equivalent of that then, yes?

[Melissa Prusinski] Yes, very much. Just, you know, focused more on New York state where CDC would be on a national scale.

[Sarah Gregory] You looked at disease rates in people and pathogen infection rates in ticks. Were they correlated?

[Melissa Prusinski] Yes. We found that anaplasmosis ERI (that risk index) in ticks was significantly correlated to anaplasmosis incidence in people at the USPS ZIP code level for both nymphs and adult ticks across the study period. And then our spatial analysis showed that the

majority of sites with the highest predicted anaplasmosis risk, based on the tick data, fell within the hot spot of reported anaplasmosis human cases.

[Sarah Gregory] In the article, you say that the tick surveillance data doesn't fully explain the rise in human cases. Why is that?

[Melissa Prusinski] So most, but not all, of our sites with high anaplasmosis risk fell within the observed hot spot of cases. But there were multiple high ERI tick surveillance sites, especially within the Hudson Valley/Metro region and the Western New York regions, and they were located well outside of the anaplasmosis hot spot each year consistently. And relatively high prevalence rates for *Anaplasma* have been documented in *Ixodes scapularis* ticks from the Hudson Valley region of New York as early as 1996. So clearly *Anaplasma phagocytophilum* has been present at appreciable levels in that Metro Region tick population well before the recent increases of anaplasmosis cases in the Capital Region. And the Metropolitan Region, while they have anaplasmosis cases, did not experience a major emergence with a recent rapid increase in cases as we saw in the Capital Region.

[Sarah Gregory] Going back over maybe a little of what we covered, but why did the prevalence increase so much during 2010–2018? Especially around this Capital area—and as you said, Albany, not New York City.

[Melissa Prusinski] So that's the big question. Small mammals like mice, shrews, voles, and chipmunks serve as a source of many tickborne pathogens in nature, including *Anaplasma*. It's likely that changes in both tick populations and in small mammal populations have a big impact on tickborne disease risk. Another important point to consider is that there are multiple genetic variants of *Anaplasma phagocytophilum* bacteria. Many people have become familiar with the concept of genetic variants during the ongoing COVID-19 pandemic, you know, that some variants have the greater potential to cause disease than others.

So with *Anaplasma*, there are two main variants in the United States: the human-active variant, which is associated with small mammals like mice and chipmunks and causes illness in people; and then there's a nonpathogenic variant that's associated with white-tailed deer. Our tests used to detect *Anaplasma* in ticks for this study didn't differentiate between the two genetic variants, but we suspect the human-active variant will be more prevalent in circulating within animals and ticks in the hot spot in the Capital District, leading to these areas of increased anaplasmosis risk. So, this is the focus of our ongoing research.

[Sarah Gregory] Okay. So clearly the disease is becoming more common. But is it also spreading geographically into new areas?

[Melissa Prusinski] Yes. So in our study, the size of the area most impacted by anaplasmosis shifted northward and westward and expanded over time, placing more New York state residents at risk. The outward, sort of radial spread of anaplasmosis from this inland hot spot that we described in our research is very different than the gradual diffuse spread of Lyme disease and babesiosis that we've observed in New York state spreading from sort of the coastal areas in the southeast, northward and westward across the state. So it's very different. But nationally anaplasmosis is also likely to spread as blacklegged tick populations expand into new areas.

[Sarah Gregory] You found that most patients were white (non-Hispanic), male, and/or over 50. Do we know why this is?

[Melissa Prusinski] Exactly why, no. But tickborne diseases in general are reported more often in white males. The racial and gender disparities may be due to residential and behavioral factors that increase the risk for tick bites in this group. Additionally, the geographic area with the highest prevalence of anaplasmosis in our study (the Capital District Region) is less racially diverse as a whole than some other regions of New York. So where most of the cases were occurring happen to be largely white area of the state.

[Sarah Gregory] We often hear about checking ourselves for ticks after spending time outdoors as a preventative measure. Do you have any tips for an effective tick check?

[Melissa Prusinski] I spend a lot of time in tick habitat, both for work and for recreation. So it's important to check yourself frequently when spending time outdoors and after returning indoors. This is where wearing light colored clothing is important so that you can easily spot ticks (even the tiny ones) and sort of flick them off before they attach to your skin. Consider proper use of repellants to reduce contact with ticks in general. But once you return indoors, you really should remove and launder all your clothing or toss it in the dryer on high heat to kill ticks and then do a full body tick check, paying close attention to the areas where clothing is in close contact with your skin (so, you know, the backs of your legs and thighs, your arms, your shoulders, the waistband) anywhere the skin folds (so your ears, the back of your ears, between your toes, your armpits, your bellybutton, the groin). Full length or handheld mirrors are especially helpful. You need to remove any ticks with fine-pointed tweezers and shower preferably immediately after your tick check, or at least within two hours of returning indoors, to better spot ticks and wash off any that haven't attached yet.

[Sarah Gregory] Does the temperature of the shower matter?

[Melissa Prusinski] No, not necessarily. It's more just having an opportunity to wash off any that are still just sort of, you know, crawling around looking for a place to settle down and to be able to better see any that have attached to your skin.

[Sarah Gregory] Okay. So what does all this mean for the general population?

[Melissa Prusinski] Awareness is key. People should really continue to enjoy the outdoors. You know, in public health we're responsible for informing folks of the risks that are posed by ticks and educating and empowering them to take precautions to help prevent illness. There's no vaccine to prevent anaplasmosis, but there are several simple steps that people can take to prevent tickborne disease by avoiding tick bites. In tick-infested areas, the best protection is to take precautions like I mentioned about the light-colored clothing with a tight weave, using insect repellant, closed-toed shoes, maybe treating your clothing or your shoes with compounds that kill ticks, checking your clothing and skin frequently while outdoors and after you get inside, and showering soon after you spend time outdoors. There are additional prevention tips that can be found on the New York State Department of Health or CDC websites. But physician awareness is also critical. Anaplasmosis is a bacterial infection of the white blood cells. Like many bacterial infections, prompt medical diagnosis and appropriate treatment really greatly improve patient outcomes. So that's important as well.

[Sarah Gregory] How do you hope this study will help public health fight tickborne diseases in the future?

[Melissa Prusinski] Well, studying disease clusters over time and geography really allows us to sort of pinpoint the populations at highest risk and anticipate when and where the disease will spread in the future so that public health efforts can be targeted towards populations who might benefit the most.

[Sarah Gregory] And what follow-up studies would you like to see done?

[Melissa Prusinski] Well, every study leads to so many additional questions. And this unique, geographic pattern of anaplasmosis spread in New York state and elsewhere leads to many further research questions. What's going on with the pathogenic and nonpathogenic genetic variants of *Anaplasma phagocytophilum* in nature? Are there personal or societal factors that influence anaplasmosis risk for certain groups of people? Ecology is very much a web of interacting biological and environmental factors, and then you add humans and human behaviors to the mix and the situation becomes immensely complex. So further studies to learn all that we can about this sort of dynamic disease system will help us better identify at-risk populations and may even lead to novel ways to prevent anaplasmosis.

[Sarah Gregory] Melissa, tell us about your job. What's involved (besides running rags around the ground) and what do you like most about it?

[Melissa Prusinski] Well, for more than 20 years my work with the New York State Department of Health has focused on the vector ecology and epidemiology of diseases transmitted by ticks, mosquitoes, and other creepy crawlies. So I currently coordinate our statewide tick surveillance sampling and testing, and I collect ticks throughout the 17-county Capital District Region of New York state. I like to tell people that I get paid to hike in the woods, since I spend about six to seven months of the year out in nature across one of the most beautiful regions of New York state, in my opinion. All of the molecular testing for the ticks collected by our staff and partners gets done in my lab as well. So that's what we work on during the cold and rainy weather when the ticks aren't out. And shifting between both the field and the laboratory for certain points of time during the year is really what I like most about my job. But also as vector populations shift (and have shifted) over time and additional tickborne pathogens are discovered, I'm continually learning new things, which is always great. I mean, it is unfortunate that a new tickborne disease comes out every five to ten years, but it does mean that it keeps me on my toes and I'm constantly learning. And the work that I do helps shape public health policy and tickborne disease prevention efforts that directly benefit the residents of New York state, which is really rewarding personally.

[Sarah Gregory] Well, we thank you for all of that.

Well, you said that, you know, you get to walk out in the woods as part of your job. But is there anything else you've been doing for fun and relaxation during these sort of stress-filled, crazy times?

[Melissa Prusinski] Clearly writing scientific papers. Isn't that what everybody does to relax? No, I'm just kidding. Like many folks these days, I've been enjoying a lot of time with my family, working on home improvement projects, trying my hand at gardening, and cooking new cuisines. I enjoy motorcycle rides and hiking and biking with my friends and family. So that's how I've been spending my time recently and trying to destress.

[Sarah Gregory] Well, thank you so much for taking the time to talk with me today, Melissa.

[Melissa Prusinski] Thank you so much for inviting me. This is a great opportunity, and I really appreciate it.

[Sarah Gregory] And thanks for joining me out there. You can read the August 2021 article, Epidemiology and Spatial Emergence of Anaplasmosis, New York, USA, 2010–2018, online at cdc.gov/eid.

I'm Sarah Gregory for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit cdc.gov or call 1-800-CDC-INFO.