Moderator: Hello, and welcome to Public Health Live, the third Thursday breakfast broadcast. I am Rachel Breidster and I’ll be your moderator today. Before we get started, I would like to ask that you please fill out your on-line evaluations at the close of today’s broadcast. Continuing Education Credits are available after you complete our short post-test and your feedback is helpful to us in planning future programs. We encourage you to let us know what topics are of interest to you and how we can best meet your needs. As for today’s programs, we will be taking your questions throughout the hour by phone. You can call us at any time at 1-800-452-0662 or send us an email at phlive.ny@gmail.com.

Now we do review the feedback and evaluations from each program and so it’s come to my attention that viewers have expressed an interest in hearing more of the questions from our audience. So, with that in mind, I would like to strongly encourage you to submit questions to us throughout the program whether by phone or email. You don’t have to wait until the end of the show and in fact, I would encourage you not to, to ensure that we get your message before the show is closing out. We do look forward to hearing from you and hope to have lots of questions to answer today.

Today’s program is Setting Ourselves Up for Success: Extreme Weather, Climate and Health. Our speaker is Dr. Nathan Graber, the Director of the Center for Environmental Health at the New York State Department of Health. Nathan, thank you so much for being here today. We are really excited for the show.

Dr. Nathan Graber: Thank you for having me. I think this is a great way to start out in my new position to be speaking about this topic.

Moderator: Excellent. So, certainly when we picked this topic several months ago, it was relevant. It was important. But now, as we are sitting here in the midst of this heat wave, I’m thinking to myself, I can hardly imagine a better time to be having a conversation about extreme weather and public health. So, why don’t we just start kind of talking about where we are right now and what’s actually going on.

Dr. Nathan Graber: Well, I think this is—you’re right—this is an extremely relevant time to be speaking about climate and it’s impacts on health and also what we should be doing about it.

Now, if I think back to when I first got involved in climate and how it relates to health, one of the first things that it seems that we had to tackle was the understanding that first, the climate is changing. And another thing that we sort of had to – another hurdle we had to overcome is – how is that associated with health. When we first started talking about heat waves in general were public health professionals thinking about how heat waves are impacting on health. And, I think we’ve passed that hurdle. And, I think that we have passed the hurdle with an understanding that the climate is in fact changing. I’m going to talk about that today.

And if you look at the local—most recent news, you know, we started out this year with sort of remote news showing us that there were extreme heat waves throughout and wildfires in the southwest. Well,
now we are experiencing it here in the northeast and here in New York State. In addition, we’ve had severe flooding in Central New York this year.

Moderator: So certainly a lot of the very relevant weather events are happening right here – not out there in the other world – but directly impacting us. Now, as we are having this conversation, there are some key ideas that I think to just lay the foundation of what do we mean by weather, what do we mean by climate. So what are some of the terminology that you think people need to know to have these kinds of discussions?

Dr. Nathan Graber: Right, I think that it’s important that we all understand this different terminology because it’s relevant in how each of these different exposures – such as weather, extreme weather events, climate, climate variability, trends and projections – how that all will relate to those health outcomes. But we also should understand the risk factors, both the risk factors for individuals as well as the risk factors for communities as a whole. As well as risk factors for infrastructure and then hopefully – you know – we’re going to be talking a lot about and get some good information today on our interventions which could take the form of adaptation, could take the form of mitigation – which all will hopefully lead towards this concept of resilience, which I hope to convey today.

Moderator: Excellent. So let’s start by just looking at some of those more basic terminology – and start – tell us about weather. What do we mean when we say the word “weather”?

Dr. Nathan Graber: Okay, so when we talk about weather, we are talking about the current state of atmospheric conditions. So, that’s like temperature, humidity, wind speed, the amount of sun exposure and so on. So, that’s what’s happening sort of right now. And associated with that, we sometimes hear about extreme weather events. Now, extreme weather events – that’s something that’s occurring outside of the ordinary.

But, what’s important about it – the important concept I think for public health – is understanding that the way national weather service has definitions for those extreme weather events, and they put together with those thresholds and triggers for releasing advisories and alerts, and warnings and watches. And, those are then used to then trigger responses both from emergency response and preparedness. So, extreme weather events and understanding how those are defined and triggered is important also in terms of planning for public health responses.

Moderator: Sure. Now, one of the other terms you were going to address is climate. And, sometimes people use weather and climate interchangeably. But, in fact, they are two separate ideas.

Dr. Nathan Graber: That’s right. And, it’s really important to understand that because weather is what’s happening right now. That is what we are being exposed to. Climate is sort of an average of the weather over time and that can be over decades. That can be over years. And, when we take a look – like we have this map up here right now – which is showing that what we’re looking at in the last few months here in New York State is that certain parts of New York State have experienced above normal precipitation. What that means is that there is more rain than what would be expected for this particular time of year in those particular geographic locations. And, along with that is this concept of climate variability. So,
just because it’s outside of what’s expected, it doesn’t mean that we’ve demonstrated necessarily a
trend in this case, but what we see is that something called climate variability. In other words, climate’s
the average. And, the variability is how that – the range of the different extremes of that – of the
weather during that time.

**Moderator:** And now, when we look at weather over time – looking at New York State over the last
century – what are the trends we have seen?

**Dr. Nathan Graber:** So, if we take a look at the climate of the last 100 years – we have these maps up
here on the next slide we’re going to see – and if you take a look at these, you can see that it’s not
uniform across the state – so you see the different colors represent different variations where the
extreme on the left – we are looking at the heat waves, extreme heat and so – you will see that for some
parts of the state, there has been a big change. There has been a larger change – I’m sorry – toward a
much hotter climate. And – you know – some small pockets in some local areas – you know –have also
shown a trend. Some of them have stayed basically about the same, but other areas have gotten – some
small areas – have gotten a little bit cooler over the last 100 years. And we see the same kind of
variations – geographic variations – for precipitation. So, the important point here is, yes we have
demonstrated over the last 100 years that the climate is changing. We’re seeing more rainfall. We’re
seeing more heat overall. And, yes there is variation based on geographic location.

**Moderator:** Now, when we look at the last couple of years and then looking to the future, what sort of
trends have we seen and what can we project is going to happen?

**Dr. Nathan Graber:** Well, I think it’s important how we look at projections, right? Because those are –
you know – there is a lot of uncertainty in what is going to happen in the future. I mean, that’s just the
way things are. So, when we take a look at this – you know – first of all, we have to look at the historical
data that shows that things have changed; that we are now seeing more extreme weather events; that
now the temperature is hotter and now we’re seeing the spread of vector-borne diseases as a result of
it. We are seeing things that are happening because of it.

So, going forward – you know – there are projections that say we may continue in the same path. What
we don’t see in these projections – it doesn’t take into account – is what’s going to happen in terms of
climate variability. Climate variability can have a very big impact on health as well in a different way. You
know? Se we have kind of the extreme weather events that can have an impact on health. We have that
climate variability, which are those shifts and changes. And we see that sort of over the shorter season,
like in the spring and in the fall – where rapid changes in temperature can have a bigger impact on
health than even more extreme temperature during the middle of the season. So, going forward – when
we take a look at these projections – there is uncertainty, but we see that the general trend has been
towards a worsening of these weather conditions. And that’s where we are right now.

**Moderator:** So, in looking at – you know, we can identify what the trends have been and we can do a
projection of what’s going to happen in the future. How does that relate to health? I mean, when we tie
it all together, what’s going to be the impact on public health as a result of this changing climate?
Dr. Nathan Graber: Well you know some of the impacts – I think generally like public health professionals – we have become pretty familiar with this. I spoke about that already. We know that things are happening. And, we see it at the local health departments are dealing with this as well as the state and so on. But, some of them are direct impacts. So when we think about heat – extreme heat events – so you’re going to have people who are effected and they have some type of heat illness like heat stroke or hypothermia.

And then we may see sort of a – an impact on individuals who can’t, you know, adjust as well. So, for instance, people with underlying cardiovascular disease or pulmonary disease. And that shows up as sort of excess mortality so more people are dying than what’s been expected because of the increasing temperature.

And, you know, so we see sort of the direct impacts of extreme weather alerts, floods, and a lot of floods like Sandy recently. And with each of those, you see the immediate effects. People with direct injuries, people drowning, electrocution; things happening during the event itself and things secondary to that event – so health effects from displacement, sheltering, moving to a shelter. And those can be impacts like discontinuation of chronic – management of chronic diseases – those can be impacts on mental health and mental illness. We have to always – you know – think about other impacts such as shelters, the types of injuries that can occur from living in a home that has been damaged, such as carbon monoxide poisoning or overall indoor air quality impacts from restoration and recovery work.

So, there are a lot of things that we have to consider that – you know – some of these relationships are very straightforward and direct, but some of them are more complex. Some of the more complex ones are the interaction between a changing environment, impact on sort of agriculture and food supply yield and impact on socioeconomic factors that then can impact on health. So, we have some of the direct, we have the secondary impact and then we have these more distant sort of tertiary impacts.

And, in New York State, we think about it. Alright, so we have increasing temperature, increased frequency of extreme weather events, worsening air quality related which is sort of secondary, to a lot of these extreme temperature events, altered – quantity is a concern of ours. That’s another impact. And then ecosystem changes; and one of the ecosystem changes we think about it – if the temperature is changing, we are becoming more like Georgia than New York State, then what’s going to happen with some of the vectors that carry disease in New York State? So, that’s another thing we have to consider is that there is going to be a shift in vector-borne diseases.

Moderator: So, that’s a pretty big scope right there, I mean there is the things that we immediately think of; the aftermath of what happens right there. But, I mean this kind of goes on the reaches of climate change and extreme weather events. I mean this really ties into so many different aspects of our lives.

Dr. Nathan Graber: That’s right.

Moderator: So, one of the things that Nathan mentioned was the changes in water, air and vector-borne diseases. We met with Bryon Backenson from the New York State Department of Health to talk
about some of those changes in what we are seeing here in New York State. Let’s take a look at what he had to say.

**Bryon Backenson:** My name is Bryon Backenson. I am here in the Bureau of Communicable Disease Control at the State Health Department. We investigate outbreaks and disease. We also do a number of things with vector-borne diseases as well – things carried by bugs – things like Lyme Disease, West Nile Virus, and so forth.

So, when people start to think about climate change, oftentimes they tend to think about big storms like Hurricane Irene or Sandy or whatnot and sometimes it’s the more kind of insidious aspects of changes in climate that have real impacts in diseases – diseases carried by ticks and diseases carried by mosquitos for example can really increase their range with just a degree or half a degree either for the mosquitos or the ticks themselves or even for the vector, the host, the things that they feed on. Lyme Disease, we have seen move from being a disease that was basically just in Long Island and north of New York City to now as far north and as far west as Syracuse and Binghamton.

A disease like vibriosis is one that is associated with shellfish consumption. A lot of the shellfish we consumer is from shellfish beds in Long Island Sound. Long Island Sound is relatively shallow and the shellfish beds themselves are very sensitive to changes in temperature. And right now as we are taping this in the beginning of July, there is one shellfish bed in Oyster Bay that has been closed and it’s unclear how long it is going to stay closed and a lot of this is because of the increase in water temperatures. If we wind up having these water temperatures increase be consistent, we may have these shellfish beds closed for a short period of time, a long period of time – and that has impacts on both public health and the economy.

So surveillance is something that we do to basically monitor for diseases across the state. We do it year-round. We’re basically always doing it; 24 hours a day, 7 days a week, 365 days a year. That kind of gets ramped up at times after we’ve had certain large events, again like a Hurricane Sandy or a Hurricane Irene. We’re basically – what we’re going to do – is we’re going to focus on the specific geographic area. We are going to look to see if there is increases in diseases that might be associated with the storm.

So, one of the things that we do with regards to surveillance – it’s like a big circle – what we learn from seeing ill individuals sometimes leads us to go back and look at other aspects of the disease. With bug-borne diseases for example, we saw an increase in cases of babesiosis tick borne-illness in areas where we have never seen it before. We then went out and got our people in the field to go collect ticks from those particular areas. They collected those ticks, tested those ticks and found not just babesiosis but they found another pathogen as well. We then turned that back around and then started to look and try and find more cases of the disease that was caused by that pathogen - one called anaplasmosis in this area as well. We found those cases.

They then lead to increases in education so we can then reach out and basically tell the public, providers, the press that these are diseases to be on the lookout for. We know now that they are in this particular geographic area and to tell people what they can do to either diagnose or prevent getting diseases in the first place.
The role of climate in health is one that is intertwined. It’s one that people don’t necessarily think about all the time. They think about the big storms that impact them. But, there is a lot of little things in there as well that can potentially lead to impacts in health.

Moderator: So now, one of the things that I find really interesting is, you know we see these weather events and we think of the direct impact but looking at how far-reaching the effects of climate change are I find very interesting. Now, as we consider the impact on different populations – and I think you referenced this earlier – but are some people more vulnerable to these impacts than others?

Dr. Nathan Graber: That’s right. And, I think you know, that we should be thinking about that in a lot of different ways because there are multiple factors and it’s kind of like a venn diagram. So, you have sort of the physical environment. So, what is the – are people living in a flood plain and are they at risk for a lower coastal flood zone? Are they at risk for flooding? Then we have the physical structure they live in. Are those resistant to the impacts of extreme weather events, or you know, adaptable to the sort of the more sort of trends and changes and let’s say temperature. You know, could – sort of the physical structure, do the homes stay cool? With the physical structure, can they resist those? Do they have the – you know – the right kind of structure to be – you know – a safe environment. So, if you think about people who, you know, could be exposed to extreme heat; they live under a black tar roof in a brick building. Do they have, you know, the physical – do they have air conditioning? But also, let’s think about this.

It’s also community adaptability and resilience. And that is, you know, does that – that adaptability kind of speaks to are they resistant to the – the impacts of these health outcomes, you know, when things happen. Do they have ways to – are people using air conditioners when heat waves come? And then there is resiliency which is also about – not just about that resistance but also about how quickly they can recover. So, do the sort of acts – the things that are required for daily living – are those things that come back very quickly? Are the supermarkets reopened? Is transportation restored quickly? And so on.

And then, you know, sort of overlapping with that – are some of the sort of individual sensitivities. And, I just forgot to mention, you know, sort of like physical settings there are other settings that kind of cross-cut as well and those are related to socioeconomic status like environmental justice issues. So, in terms of individual sensitivity, this is where we talk about individual risk factors. Can a person respond to, you know, extreme weather events? Can they respond well to just sort of changing trends in those weather exposures, those temperature extremes.

And, so in those respects, you know we think about – do people have the physiological ability? Is it hampered because of normal aging or because of underlying chronic disease or do they not have the ability to sort of control their own environment either because of severe mental illness, substance use or because they don’t make clear decisions about, you know, about what’s the right way to conserve – control their own environment and reduce their exposures. Do they have a social support network that is helping them and is available to them to guide them through those decisions or to make, you know – help them make those decisions in a way that is going to be most protective of health?
**Moderator:** So, in considering these different vulnerable populations, I understand you have spoken with some stakeholders, other organizations and it would be great if you could talk a little bit about what has their focus been on in terms of addressing climate change.

**Dr. Nathan Graber:** So, I’m going to talk a little bit more, but we here at the State Health Department have done a number of surveys to understand how – to understand a number of different issues around climate and health and how public health can respond to them. And so stakeholders have, you know, been particularly good it – because they sort of broaden our reach. And we’ll talk about that a little bit more. But, what’s interesting from the survey is that this is important in terms of thinking about interventions that some of the stakeholders that were surveyed there mostly involved in mitigation activities.

And mitigation, and when we speak about that term, that’s the reduction in the sort of causes of the climate change. So, sort of like reduction in greenhouse gas emissions, is one good example. So, what are they doing to create or reduce those emissions? And then the other group – other groups were involved in what we call adaptation. So, we know the climate change. We know it’s strong potential for this to continue in the future. It’s going to happen. And so, let’s accept that that’s happening and it’s happening right now. So, we need to adapt to it. We need to change our physical structures. We need to change our behaviors. We need to change activities and interventions. So, a lot of the stakeholders were involved in that as well.

**Moderator:** And now, you mentioned that the Department of Health has done certain assessments and – about the – I believe, about the opinions of the roles of local health departments and things of that nature. Can you talk about that?

**Dr. Nathan Graber:** Yeah, and we’re going to talk a little bit about the survey results. I just want to mention that it was sort of a broad survey. We surveyed a number of different groups including leaders here at the Department of Health, those people working on the activities that would be integral to a climate health response, and local health departments as well as stakeholders.

**Moderator:** So, what are some of the things that you found? Did local health departments believe it was important to focus on climate health?

**Dr. Nathan Graber:** So, I think this is really great news, right? Because overall – and this survey is a couple of years old already – overall, what we found is that local health departments believe that it’s really an important focus for the health department.

**Moderator:** Great. And, did they feel like they had the resources available to address these things that they felt were important?

**Dr. Nathan Graber:** I think this is also great news because it shows that, you know, the fact that they disagree that there are enough of the sort of information that they need in order to respond – like what are good interventions and do we have local surveillance data that’s informative. So, they realized that they need more information in order to proceed.
**Moderator:** So, what were some of the key conclusions that you were able to draw from the assessments that were done?

**Dr. Nathan Graber:** So here again, I’m going to reinforce what I have said at the beginning. There has been a paradigm shift. So, now there is no question that there is an understanding that this climate and weather impacts on health. And because of that, there is this conclusion at the local health departments. They concluded that, yes, it’s important and it’s a huge scale and scope; it’s big. And, you know, I think that that may be intimidating, right, so I want to comment on that, just really briefly that these are things not unfamiliar to us.

So, when we talk about the fact, you know, not just the fact that we’re dealing with a lot of extreme weather events, but a lot of activities necessary to require, you know – require to respond to climate and public health impacts are things that we already do as public health professionals. It’s not something new. And I think they also, you know, they cited sort of a lack of direction. And I think that’s something that we can work together to provide, you know, what are the priority areas and what’s the most important things to be working on? And then, you know, there’s also the opportunity to partner in the importance of collaboration. And so I think that is really – I think these are all very positive responses.

**Moderator:** Great. And I know you’re going to talk more a little bit later about the opportunities for collaboration as well. So, we’ll get to that.

Now, I think many organizations probably struggle a little with a lack of resources or lack of adequate information. And, the Department of Health has recognized some of those concerns. We spoke with Eric Wiegert about an innovative tool that was developed to help serve as a resource and improve efficiency for local health departments. We are going to take a moment now to hear from him about the process of developing that tool.

**Eric Wiegert:** Hi, I’m Eric Wiegert. I’m with the New York State Department of Health, Bureau of Community Environmental Health and Food Protection. I work in the regulatory program of pools and bathing beaches.

Harmful algae blooms are concentrations of algae or other organisms that can cause health, ecological or even economic impacts. Blue-green algae is not even algae at all. It’s a type of bacteria – cyanobacteria to be exact. And, if the conditions are right, it can cause dense blooms. Some blue-green algae blooms can cause illness if contacted or ingested in significant amounts. The most commonly reported symptom from blue-green algae is rash, throat irritation, gastro-intestinal symptoms such as nausea, diarrhea or vomiting.

Some types of blue-green algae can release toxins such as hepatotoxins, which can impact the liver or neurotoxins, which can impact the nervous system. Those types of symptoms are very rare, but they can occur and can be quite severe and cause illness in humans and in animals; and we have even had some dogs die as a result of their exposure to blue-green algae blooms that are releasing toxins.
One of the outcomes from the Center for Environmental Health’s workgroup for harmful algal blooms was some guidance for responding to blue-green algae at bathing beaches and also for non-regulated settings and water bodies. And, what we developed was an interactive guidance tool, which is responsive to the needs of local health departments and others that need to be able to respond.

With the guidance and the tool being developed through this multi-disciplinary approach, I really think it can serve as a template for responding to climate change issues in the future; serving as a model to provide the communication framework and all the interdisciplinary specialists that all work together to develop this tool and come forth with a product that is useable at the local health department level, where it’s most important to be able to apply practices to protect public health.

And, I think another important aspect of the tool to emphasize is actually citizen level involvement that we’ve had, and seeing where we’ll have reports of blue-green algae blooms coming in that people have snapped via their cell phones and sent them to the Department of Environmental Conservation or to their local health department and it’s really helped us in diagnosing blooms and being able to respond in a timely manner.

**Moderator:** So, I think it’s really interesting and great, actually, to see – you know – health departments have said that maybe we need a little bit more direction, more resources and it’s great to see some of the things the Department of Health is developing and doing to be response to the needs of health departments and other organizations.

Now, in the surveys that you have done, who are some of the stakeholder groups that were surveyed?

**Dr. Nathan Graber:** Well, you know, I think we have a slide and I’ll throw it up there, you know, because it’s a really – it’s a diverse, wide-ranging group of stakeholders who really represent New Yorkers in many different ways. And, I think one of the great things about identifying stakeholders and maybe non-traditional public health partners is that, you know, many of the interventions for public health outcomes for preventing public health outcomes of climate and for climate change are, you know, not necessarily within – within the avenues we can directly impact on. But, through stakeholders and through these collaborations, we can certainly do that.

**Moderator:** And, so the stakeholder organizations represent a fairly broad and diverse body of individuals. What did you learn from them about ideas that they had and barriers they felt they were facing?

**Dr. Nathan Graber:** I think what’s great about, you know, some of the ideas that we had is that it shows and demonstrates a shared interest, right? They see the need for increased outreach in education. They see the need for improvements in policy development and media outreach and different ways for doing that. And so you know, I think that provided us additional support for a lot of the work that we believe we should be doing going forward.

**Moderator:** Now, in terms of the work you’re doing going forward and designing different interventions, can you talk to us about some of the different types of interventions because I know some of them are
likely to have more of an impact or less of an impact. And, can you talk about some of the different things you might be doing?

**Dr. Nathan Gruber:** Right, yeah, so I think now many public health professionals are very familiar with the health impact pyramid, and I think we’re using that as sort of a framework for how we design and think about different interventions. And, I think we have to try to think about – we should all be thinking about this in terms of our response to climate change.

So, you know, at the very top of this pyramid are the interventions that we expect to have sort of the smallest impact. There are, you know – these are sort of things that require sometimes less sort of political and financial capital to implement. But – and they may not have as big an impact.

But, at the bottom of the pyramid are the areas of interventions that can have the largest impact. And, so if we take a look here, it’s not that we should be mutually exclusive and not spend time at the top of the pyramid because the truth of the matter is outreach and education – getting this information to the right stakeholders, getting them to the populations that are most at-risk, getting them to understand those risks is extremely important.

**Moderator:** Sure.

**Dr. Nathan Gruber:** Now, when they have in the counseling and education actionable items, a lot of those are tied into interventions that fall lower on the pyramid or, you know, where you have the bigger impact.

So, if we think about clinical interventions, you know, what’s a good clinical intervention during an extreme weather event or emergency? It’s having, you know, teams of outreach folks to go out and identify those at risk and check on them on a regular basis or having networks to do that. And then longer lasting protective interventions, you know, maybe infrastructure, you know, more infrastructure change – I’m sorry, not infrastructure changes but more like opening cooling centers or a provision for free air conditioners. And then, you know, changing the context.

This is where I think a lot of environmental health work lives right now anyway. Because a lot of the work we do allows people to sort of live their lives without having to think about these decisions that are impacting our health. You don’t think about whether your tap water is going to make you sick or you’re going to go to a restaurant and eat food, you know, you don’t have to make decisions about those things because that’s what environmental health workers have been sort of changing the context. So, they’re sort of general environmental issues and a lot of the climate change work is going to be in this area where it’s building that resilience. So, that’s where we’re going to focus. And then, of course, the socioeconomic factors that we want to impact on.

**Moderator:** So, lots of different ways of conducting interventions with different resources available, different impacts. Now, how does this relate to some of the activities of local public health programs?

**Dr. Nathan Gruber:** Right. So, you know, I throw on a slide all the activities I could think of and sort of try to categorize them and rearrange them and it all comes back to sort of the ten essential functions of
local public health departments, right? So, we look at the work that we do and we have to see, where can we integrate the climate work that we want to do. Remember, this is nothing new. I mean these are, you know – we are doing surveillance activities, but we’re doing surveillance activities for health outcomes that are directly related to these exposures when it comes to changes in the climate. Risk assessment, outreach education, exposure/hazard assessments, outbreak investigations – you know, it’s all part of our general response. And so there are, you know, interventions. We look at each one of these and say, you know, where is the work? You know, this is the kind of work we already do. And are we taking into account climate in everything that we do?

**Moderator:** And now, how does this fit in with public health values?

**Dr. Nathan Graber:** So, so I thought I would just mention here, we want to build resilience, so that’s successful adaptation. We want to do that. And, in the process, you know, we just have to just a quick reminder that – we work for the taxpayers, we have to be a worthy steward of their trust. How do we do that?

Once again, we have to focus on those health outcomes. We have to focus on outcomes and interventions. We have to build on what works, so if we know that something works, we should try to spread that around and try to keep doing it. We have to foster innovation and creativity, which speaks to, you know, looking for, you know, solutions that are sort of outside of what our normal thinking about responding to public health issues. But – and then, it has to support benefits for all.

**Moderator:** So, I think, talking about that and public health values is the perfect segue to talk about what work has already been done. You mentioned building on what exists and coming up with creative and innovative ideas. So, let’s talk about some of the work that’s been done and resources that are already available.

**Dr. Nathan Graber:** Okay. Well, you know, I think what’s really important is that there have been a number of, you know, sort of task forces and put together and work groups. And, they’ve come up with a number of different plans specific to New York State and I think we should all be familiar with these. And within those are recommendations for adaptation, recommendations for addressing public health outcomes. And I – and, you know, that’s a place to build on. It also demonstrates the amount of support we have for the work going forward.

**Moderator:** Sure. Now, I think that one of the things that is really important to highlight with all of this is that New York State and local health departments are not alone in these efforts. We had an opportunity to talk Jan Storm from the New York State Department of Health about some of those collaborative efforts taking place and their successes. Let’s hear what Jan has to say.

**Jan Storm:** My name is Jan Storm and I work in the Bureau of Toxic Substance Assessment in the Center for Environmental Health. Our job is to basically protect public health. And so, the way we want to do that in the face of unavoidable climate change is to develop and implement adaptations. Sometimes they’re called interventions.
And, there’s basically two different kinds of adaptations and interventions. We could have general interventions or adaptations. We could have general interventions or adaptations or specific interventions. And the – an example of a general intervention is just developing and implementing outreach and education information that clearly explains the link between climate and climate change and health outcomes. And, that’s important to do, because the more public and private stakeholders know about climate health, climate and health, the more likely they are to engage in activities that will help us mitigate and reduce the impact of climate change on public health.

There’s a number of state and local partnerships. But, two examples of those state and local partnerships are the New York State Climate Smart Communities Program and the NYSERDA Greener, Cleaner Communities Program, which I’ll talk about in just a minute.

The New York State Climate Smart Communities Program is a collaboration or a partnership between six different state agencies, and local communities. And in this case, the local communities are towns, villages, counties across New York State. The Climate Smart Community Partnership has a lot of different components to it. A very important component is to help the Climate Smart Communities reduce their emissions of greenhouse gases. As the same time, it wants to help communities build resiliency or sustainability into their communities by modifying their transportation systems, by better controlling surface water flow, to control flooding. While, at the same time, maybe building an economic incentive.

So, the Greener, Cleaner Communities Program is really a program which is initiated by NYSERDA – New York State Energy Research Development Authority. And it was really designed as – in two phases. In the first phase, NYSERDA provided about $10 million to – overall, to the ten Regional Economic Council Regions that the governor established in 2011. And the money was to be used to develop sustainability plans for those regions. And with the sustainability plan, you know, we needed to be consistent with the Strategic Economic Plans which had already been developed for those regional areas. And, phase two is now under way. In phase two, NYSERDA is providing up to $90 million, again, competitively, across the Regional Economic Council Regions, to actually implement projects that were laid out in those sustainability plans.

The way that connects to the Climate Smart Community program is that NYSERDA is working very closely with the Climate Smart Community Program. And in evaluating those applications, if the project is going to occur in a Climate Smart Community, then that applicant gets extra points. So, that’s another benefit of, you know, being a Climate Smart Community, and also shows how the programs are working together.

Our interaction – so, the Department of Health also works very closely with both the Climate Smart Community Program and the Greener, Cleaner Community Programs though our participation on a Climate Smart Community Advisory Group, which has representatives from DOH, as well as NYSERDA, the Department of State and all these other agencies that have an interest in building resilient communities.

We also participate in an Interagency Adaptation Work Group, which, again, has representation from all of these other agencies. And through that, we bring a health perspective into deliberations, and we try
to, you know, specific items in the Climate Smart Community Pledge, at least some of them reflect adaptations that will protect public health.

**Moderator:** I think it’s great that there is so many different organizations and communities that are involved in trying to do the work so it’s not just the local health departments. So, there’s some models that can be followed that are already in existence. Now, is there guidance – is there anything in the Prevention Agenda regarding climate change?

**Dr. Nathan Graber:** Yeah, there is Rachel. And actually the Prevention Agenda is sort of like our blueprint for our local and state public health actions, to address, you know – to address climate change. There are several areas of the Prevention Agenda where relevant environmental health issues are mentioned. So, there’s water quality, there’s air quality, but, you know, what is most important is under Built Environment. There is actually a goal that includes climate change. So we actually have to address – you know, it actually says specifically, sustainability and adaptation to climate change – so, improving design and maintenance of the built environment.

What’s important here is like, we refer back to Jan’s talk, is that if we can develop, you know, design communities in a way that makes them resilient to the impacts of climate change, we have sort of the co-benefits of making communities more, you know, amenable to sort of an active community and active lifestyles and healthier lifestyles in general, but we could also have an impact on their response to some of these extreme weather events as well as the climate change in general.

**Moderator:** So, let’s talk a little bit about surveillance. And, you mentioned earlier that all of this is work we’re already doing. So, surveillance is certainly something the Department of Health and local health departments have been actively doing. What role does surveillance play?

**Dr. Nathan Graber:** Surveillance is an extremely core function. I think it’s really important that we all understand surveillance but also surveillance needs here. So, just a general framework, so surveillance informs interventions. And, when we look at climate change, are we doing surveillance that’s necessary to understand who is most at risk, and where the most risk individuals are. And what interventions are likely to be effective. So, surveillance as a core – and when you use that information to then inform the public health interventions – and then from there, you evaluate those public health interventions and feedback into your surveillance. So it’s – some of the surveillance – talking about different kinds of surveillance, one time let’s take a look at what – what information we need to know in order to design those interventions. Others are sort of ongoing interventions to see how well things – ongoing surveillance to see how well things are going.

**Moderator:** So, what about syndromic surveillance? Can you talk about that?

**Dr. Nathan Graber:** Sure. So, you know, I’m going to, you know, refer to some sort of specific New York City-specific issues. I came from New York City. I’ve recently transplanted here to the State Health Department, so I apologize if this New York City-centric but it’s what I’m most familiar with.
So, in New York City, they have a syndromic surveillance system set up for extreme heat events. And during that time, they’re monitoring emergency department visits and EMS calls and when you take a look at the chart that’s – that they put out with the syndromic surveillance, you’ll see that – you know, the heat index and emergency medical service calls, the model for that, the emergency medical calls, they follow each other pretty well. So, when it gets hot, more people start suffering from heat-related illness. And it’s kind of like what we expect, you know, for that particular temperature.

**Moderator:** Right.

**Dr. Nathan Graber:** But, it demonstrates sort of during the emergency response for that extreme heat event need to – to continue with the intervention, such as opening of cooling centers, checking on the vulnerable, ensuring that people are using and getting the correct messages out there, make sure people using interventions that are most important.

**Moderator:** And is there syndromic surveillance related to hypothermia and cold issues as well?

**Dr. Nathan Graber:** That’s right. And we’re talking about heat and floods today, so I think this tells an interesting story. So hypothermia, although we expect that the winters to get warmer and not to have as many – as much snowfall in New York State, one of the things that’s important is that we may be seeing more severe winter storms.

So, back when I was at the city, we had a fellow there who took on an interesting project, to take a look at whether you can design a similar system for syndromic surveillance for hypothermia, so for cold-related illness that you have for hypothermia. And, she demonstrated that the model, you know, for the syndromic surveillance matched pretty well with hospital discharge data. And that’s really great to know. And what happened was, is that after Sandy, they were able to – to implement this syndromic surveillance – because they have this model already developed, they were able to implement this syndromic surveillance right after Hurricane Sandy, which was an unusual event because it was a late-season hurricane that was then followed by some extreme cold.

**Moderator:** So, that’s sort of an example of – a current example of how this syndromic surveillance is being used to mitigate some of the effects of climate change.

**Dr. Nathan Graber:** That’s right, because it was able to inform some sort of a response – get the messaging out there that, look, you know, there are – there is an increase in hypothermia. People were impacted by the storm, you know, and now they’re being impacted by the cold that follows.

**Moderator:** Now, what about data regarding heat illness that could be used to inform interventions?

**Dr. Nathan Graber:** Right. So here is another look at surveillance – this is sort of a retrospective kind of look at what has happened during extreme heat events in the past. So, if you look at this chart, sort of on the far left, what we have are emergency department visits for heat-related illness. And if you take a look, where were people exposed? They were exposed, you know, outside of their home and other places. So, are we seeing – are these the workers? Are these the athletes? Are these people out on the street who are being exposed to heat and getting sick?
So, the intervention for them are very different than if we look at the right side of this, which are the people who died during from heat stroke, during extreme weather, extreme heat events. And these are people who are mostly exposed in their home. And those are different individuals. Those are people who have underlying risk factors, either being older age or having underlying chronic diseases that put them at risk for dying. And, so the interventions are very different.

**Moderator:** So, certainly the heat and heat-related illness is a problem. Now, can you talk about a problem where surveillance data has been used to change policy?

**Dr. Nathan Graber:** Right. So here’s another New York City example.

**Moderator:** Sure.

**Dr. Nathan Graber:** So folks—epidemiologists at the New York City Department of Health took a look at retrospective excess mortality and took a look at how that’s associated with temperature and heat index – particularly the heat index. The heat index is a measure of a combination of temperature and humidity. And that actually has a bigger impact on health outcomes than just temperature alone.

So, they took a look at that, and the National Weather Service at that time was issuing advisories at a threshold where, you know, that was equivalent to – it was higher but equivalent to the health outcomes you see at a lower threshold. So, initially it was a heat index equal to 100 for one day. It turns out it had the same sort of health impact as having a heat index for 95 or greater for two days. And because of that, the National Weather Service changed the threshold for issuing an advisory, lowered it, specifically for New York City, based on local health outcome data, and that also triggered a change in the city’s emergency heat response. Now, do we have – do we need to do that for other locations? Do we see that same relationship in other places? That’s what surveillance data can tell us.

**Moderator:** Well, I think that’s – you have apologized for it being a New York City example, but I think it’s a great example so it’s relevant for everyone. Now, are there resources available where people can find more information about some of these effects of extreme weather?

**Dr. Nathan Graber:** That’s right. I mean, here at the State Health Department, we have a lot of educational materials available. And, I think what’s important about the educational material is that it contains actionable items – things that people can do to protect themselves, to be safe and healthy during exposure to weather conditions. And – and, what’s important is we have this information, and I think we always have to, you know, figure out, is it – is it geared towards the populations in sort of local areas? We have to take a look at - one responsibility is with local public health professionals is to say, is this information reaching them? Are they absorbing it? And is it getting them to understand that those vulnerable populations – are they understanding they are at risk for adverse health outcomes?

**Moderator:** Now, certainly, there has been a lot of resources developed, research done. What areas would you say we still need to do more research on?

**Dr. Nathan Graber:** Right. So, there is a lot we still need to know. There is always a lot we still need to know. I think we have enough to begin, you know, to continue our work on developing effective
interventions, but I think there is a lot still we should know more about. And one is sort of the relationships between climate and weather factors and health and understanding sort of more subtleties of those relationships. That’s really important for us to know, to understand more about risk factors, as well as understand about what we should expect to see in the future. And understand who we should be reaching. And then who are those that are most at risk. So getting those risk factors sort of identified. And then, of course, evaluating our interventions to see that they’re effective.

Moderator: Now, what about on the education and surveillance efforts? What areas would you say we need more effort there?

Dr. Nathan Graber: So, we already have a lot of effort. So, you know, I don’t want to dismiss. I think, you know, one thing that’s very important and everybody understands, is that we are already doing a lot of this work. We’re not in unfamiliar territory. We’re talking about familiar things. Surveillance is familiar to us. And so, what may be important is sort of locally targeted surveillance and epidemiology to understand, you know, these risk factors and different areas. And then in terms of sort of outreach and education, once again, I’m going to mention this again – are those messages, you know, penetrating the right populations? Are the people who are most at risk self-identifying? Are the people who come in contact with them – the stakeholders – are they identifying they’re in touch with those people who are at risk? And so they can act appropriately to sort of help them adapt to, you know, changing climate.

Moderator: So, there is going to be a list of – we need to do more research here; we need to do more outreach here. But, there is good news on this information as well, right?

Dr. Nathan Graber: That’s right. I think one – what’s really important to understand and I started off my talk with this, is that, you know – there is already acceptance that, you know, we’ve reached that point where the weather has changed, and the climate is changing over – and we have retrospective data to show that and we have projections that are fairly good to demonstrate that it’s going to continue going forward. And, I think we have general acceptance that there are public health outcomes associated with those changes in climate in a lot of different areas. And the good news is, is that the research is following it. So, if we take a look at what you get on a PubMed search for weather, climate and health, you know, that number has been increasing rapidly in recent years.

Moderator: Excellent. Now, I know some examples of leading research on climate change and health is being done right here in New York State. We met here with Shao Lin to learn about some of the cutting-edge work that she has conducted on this topic. And, we’ll have an opportunity now to hear what she has to say.

Shao Lin: So, my name is Shao Lin and I am the Section Chief for Epidemiologic Studies and Evaluation in the Center for Environmental Health. And also, I am the Research Director for the Bureau for Occupational and Environmental Epidemiology. So currently, as a principal investigator, I’m leading three climate-health project grants by the federal government. The first one is funded by CDC so which is working on the climate change and variability. The second project is funded by NIH and is looking at climate change and vulnerability in pregnant women. The third project is funded by NYSERDA – it just
started this year – and it’s looking at population vulnerability to climate change in New York State and planning the different adaptation strategies.

So, we look at some of the biological processes to understand health outcomes such as renal disease, birth defects, and also the waterborne and foodborne disease and Lyme Disease too. So these are four types of diseases have been rarely studied in previous studies. So also, it’s not common in the literature. The first thing we do find is that renal disease is related to extreme heat. Also – very interesting – we do find different types of renal disease have different patterns – it has different climate factors and response patterns. So the concept behind it is humans do not respond to weather factors individually. Instead, they respond to the whole climate system. So which factors would be more representative, more realistic representation of the climate exposure. So for this reason, that is why we look at the whole multiple weather factors simultaneously.

So, I think the first thing we do see is the geographic variation for the climate factors and health response relationship. So which adaptation strategies should be different by different areas because the heat threshold is different by different areas. And also, the local community characteristics and local climate is different. We tried to – based on our data – we used and we tried to establish a new climate health tracking system by incorporating our health and climate data into the ongoing NYS Environmental Public Health Tracking System (EPHT). We also created what we call a research corner in the Environmental Public Health Tracking System. By using putting all our published papers and using maps and charts or some other some other statistics that are more easy to access, more visible in the research corner. To put in the public portal for the Environmental Public Health Tracking System.

We do not just work by ourselves. We also sit on multiple national climate group called the National Climate Workgroup. We also helped them to create some of the climate indicators. So, we also share our findings with other states – and of course we learn from other states too. So, by working on the national level and with other states we also try to publish whitepapers for the US Congress we got in the climate change and health. So, we think that by using this way we can learn from each other and can also improve our skill in the public health research.

**Moderator:** So, certainly there is a lot of great work being done – great research. Now, as we work to prepare for future climate impacts on health, what are some of the priority areas you think we should be focusing on?

**Dr. Nathan Graber:** Right. I think we have to think about how we select priorities in public health. You know, we should – of course be focusing on the things that are having the greatest impact now or potential for impact on public health now. So, let’s take a look at those.

In New York State, we know it’s getting hotter. We know that we have seen increase in precipitation, and related to that – the extreme weather events that have been associated, such as the heat wave we are experiencing, the floods that we saw pretty recently and over the last couple of years, and also the increase that’s associated with extreme heat events like air pollution, and bad – poor air quality days. And then, of course, with those events, power outages and those health risks, associated with power outages, as well as the spread of vector-borne disease, and I keep listing them, right? Because they’re
sort of a complete risk because of things changing with the changing climate in terms of public health concerns.

But, the ones that I mentioned above, they feed directly back into like what should we be focusing on in terms of surveillance and I spoke a lot about surveillance because I think it’s really important we have good data that demonstrates what the health risks are and how that is going to inform those interventions – and some of them fall to Emergency Preparedness and Response for those extreme weather events. Others fall, you know, to sort of local health department responses that are collaborations with stakeholders, which is extremely important. So, we have these partnerships and collaborations that help us to not only penetrate into the communities that we think are going to be most impacted, but also broaden our ability to adapt to climate change, because of the effectiveness of interventions, get institutionalized and part of communities and part of our daily life.

And then, of course, we have to take a look at those interventions, evaluate to ensure that those interventions are effective. And I think, you know, sort of going – going forward, I think we have of course a lot of work to do.

**Moderator:** Sure.

**Dr. Nathan Graber:** And I think we’re doing a lot of that work.

**Moderator:** Absolutely. And I think you have talked about great examples of work being done. And one of the questions we have actually from the audience is – are there online resources that a citizen might be able to access about climate change or responses to severe weather issues?

**Dr. Nathan Graber:** Right. So, I think that’s a great question. There is a lot of stuff online – anybody who Google’s anything is going to get results, right? So, if you take a look at our website, the New York State Department of Health website, we have a tremendous amount of information – both education and outreach information but then Shao Lin mentioned in her talk the information that’s available on the Environmental Public Health Tracking Portal which has indicators for climate change that’s available to the public and anybody can work with. And then Jan talked about the different programs that are, you know, headed up by the Department of Environmental Conservation – Climate Smart Communities – and that has information online that’s available to the public. And, of course, the Emergency Management Agency, both at the state and local level have information on preparing and responding to climate-related extreme weather events.

**Moderator:** Great.

**Dr. Nathan Graber:** So, I think there is a lot of information out there. And I highly recommend that people review it.

**Moderator:** Take a look?

**Dr. Nathan Graber:** Absolutely.
Moderator: So, I think we have time for just one more question. And a great question. What are the different adaptation strategies for rural versus urban areas? It’s a big question to answer when we have about a minute left. But, if you could just address it briefly even.

Dr. Nathan Graber: Yeah. So I think there are big differences. We do talk a lot about urban areas, because that’s what I’m most familiar with. But, there are some major differences. If we think about cooling centers in an urban environment, there are a lot of resources, you know, for – for people to get to those cooling centers during heat waves, because they’re a short walk or can take public transportation. But, when you are in a rural area, that is going to be different accessibility and I think that’s one area of research going forward is understanding that. And Shao Lin may have mentioned it during her talk as an area looking forward – going forward. So, it’s a different adaptation strategy.

And one thing that is sort of common, and I think, you know – I think there are sort of common principles across the board. One thing we have to think about, when it comes to most events but also sort of the general change, people like to stay at home. I think the concept of sheltering in place versus going to evacuation centers, I think we have to understand why people, you know, choose not to go to evacuation centers – why they chooses to shelter, you know? And then, what the health risks are associated with shelter in place and how to make that sort of safer choice – risk reduction, you know, in those scenarios.

Moderator: Sure.

Dr. Nathan Graber: Where people choose to do shelter in place.

Moderator: Well, Nathan, that’s all we have time for today. But thank you for the information you have shared with us. I think this has been a really informative talk for our viewers.

Dr. Nathan Graber: Thank you.

Moderator: And thank you very much for joining us today. Please remember to fill out your evaluations online. Your feedback is always helpful to the development of our programs and continuing education credits are available. To obtain Nurse Continuing Education Hours, CME or CHES credits, learners must visit www.phlive.org and complete the evaluation and post-test for today’s offering. Additional information on upcoming broadcasts and relevant public health topics can also be found on our Facebook page. Don’t forget to ‘like us’ on Facebook to stay up to date. As a reminder, you can also download the companion guide to this broadcast on our website, phlive.org. The companion guide will provide you with learning activities to help further your knowledge and understanding of the topics covered in today’s program. This webcast will be available on demand on our website within two weeks and DVDs of any of our public health live broadcasts can be ordered from our website as well. Please join us for our next broadcast on August 15th as we discuss Teens & Taboo: A Look at Prevalence and Prevention of Sexually Transmitted Infections. I’m Rachel Breidster and thank you for joining us on Public Health Live!