



Preparing for Extreme Heat in New York State June 2017 Public Health Live

TRANSCRIPT

Moderator: Hello and welcome to "Public Health Live." The Third Thursday Breakfast Broadcast. I'm Rachel Breidster and I'll be your moderator today. Before we get started, I would like to ask that you please fill out your online evaluation at the end of the webcast. Continuing education credits are available after you take our short post-test and your feedback is helpful in planning future programs. I also want to let you know that the planners and presenters of Public Health Live do not have any financial arrangements or affiliations with any commercial entities whose products, research or services may be discussed during in this activity and no commercial funding has been accepted for this activity. As for today's program, we will be taking your questions throughout the hour by phone at 1-518-402-0330 or via e-mail at: phlive.ny@gmail.com.

Today's program is entitled, "Preparing for Extreme Heat in New York State," and our guests today are Neil Muscatiello and Asante Shipp Hilts, both with the New York State Department of Health. Thank you for joining us.

Good morning.

Asante: Good morning. Thank you for having us.

Neil: Morning, pleasure to be here.

Moderator: Neil, to get us started today, can you just review objectives for today's show?

Neil: Sure. Today we're going to be talking about trends in warming temperatures in New York State as well as the nation. We'll be going over some of the health effects of extreme heat. We'll be talking about some of the work we have been doing to identify vulnerable populations in New York State. And then we'll be talking some about some initiatives that we are working on at the Department of Health to address extreme heat.

Moderator: Excellent. Now, we hear terms all the time like weather and climate, and apparent increases in extreme temperature, extreme weather, have been noted by many folks. Could you start us off by helping us to understand the difference between weather and climate? Because I think that's a source of confusion for people.

Neil: Sure. So weather has to do with the conditions in the atmosphere at a given point in time. What's our temperature today? Is it raining? Is it windy? That can change from moment to moment. Climate has more to do with long-term average weather patterns for particular geographic location over a number of decades. When we are talking about climate change, we are thinking about systematic changes at a particular location in the atmospheric conditions.

Moderator: Now a term I think a lot of people are familiar with is the Greenhouse Effect. Can you talk to us about what do we mean by the Greenhouse Effect and how it is that related to this topic of climate change?

Neil: Sure. The Greenhouse Effect has to do with the ability of greenhouse gases to trap heat in the atmosphere. We've listed four primary greenhouse gases on the slide that you can see here. So when these greenhouse gases are released into the atmosphere, they kind of create a blanket and trap the heat down towards earth. That leads to a warming climate.

Moderator: Could you tell us more about how greenhouse gases have actually been changing?

Neil: Sure, so over the past 2,000 years or so, for the most part, we've had fairly stable concentrations of greenhouse gases. If you look at the slide on the screen here, we're showing concentrations of three of the primary greenhouse gases. You can see, as I said, the trends are pretty stable until about 150 years ago. That coincides to when we started to industrialize and release these gases into the air. So you can see the concentrations increase exponentially in the last 150 years or so.

Moderator: Looking at that graph, there is certainly a dramatic shift to increasing there. So, how does the change in greenhouse gases and that increase, how does that increase the risk of extreme heat?

Neil: Obviously this is a very complex issue and experts have put a lot of time into trying to understand this relationship. But essentially, the graph we're showing here is depicting CO₂ concentrations in the black line, as well as average global temperatures from the period of time starting about 1880 to current. So, the average temperature over that time is shown by the horizontal line. The individual blue and red bars are yearly global temperatures. And so, as you can see, there is year to year variation in the temperatures, but over the whole time period, we see a kind of a warming trend with the warmest years being in our most recent past. These warmest years, this changing pattern in temperature corresponds to increasing greenhouse gas concentrations.

Moderator: Well, thank you for that explanation. Now is the risk of increased heat – is the same risk occurring across the entire country?

Neil: No. In fact, you see some variation in the average change that's occurred over time. If you look at the past 100 years or so, which is what this map is showing, you'll see that there is variation, and that variation's not the same across the country. Some areas have even experienced a slight cooling trend, if you look at the Southeast but overall as indicated by the RED coloring on the map, most of the United States, the Northeast, including New York, has experienced some warming.

Moderator: So the numbers you are showing, the picture you are showing, certainly provide a compelling picture to look at. I wonder, are there any differences in the estimates about how bad we can expect that these changes are temperatures are going to become?

Neil: Sure. And again, this is work that's been done by a lot of climatologists, experts in that field. Essentially what we see, depending upon steps we take now to change what we're emitting in terms of greenhouse gases that will drive how much temperature change we can expect to have. This map is showing projected temperature changes comparing the beginning of this century to what we might expect at the end of the century for two different scenarios. On the left you'll see projected changes under a scenario where we take steps now to decrease the concentrations of greenhouse gases that we're emitting, and on the right, you can see projected changes in a scenario where we kind of continue to emit greenhouse gases at current concentrations. But some of the steps we take now to decrease greenhouse gas emissions will drive the magnitude of the change.

Moderator: We hear about warming trends and you're talking about those hot days getting hotter. One of the terms we hear is Extreme Heat. I wonder if you can talk to our audience more, talk to me more, about what that means?

Neil: That's a good question. There is no real single definition of Extreme Heat, but generally when you think about Extreme Heat, we're thinking about unusually hot or humid weather. It could be specific to a particular location - in Phoenix, Arizona, right now, they're predicting temperatures over 100 for the next several days. In New York, as you can see on this slide here, the thresholds at which we make heat advisories and heat warnings and heat waves are different. So, if we get temperatures around 100 for a couple hours, that's enough to issue a heat warning. These are the thresholds used by the National Weather Service and New York State. And I also point out that New York City has done some work to re-evaluate the thresholds that the National Weather Service has used and they've revised theirs a bit. That's something that we're doing in the future, too. But in terms of extreme heat, what we're concerned about is, as the climate warms, we're going to have more of these periods of time where we have hotter weather of longer duration. The graphic you can see on the map now is kind of illustrating that. What we have done is taken some data from a project that we've

collaborated on with NASA and we're looking at any time a temperature in a county of New York State rises above 90 degrees, we call that a county day. So this graphic is depicting a sum of county days above 90 degrees Fahrenheit for five-year chunks of time. As you can see, as we have gone from 1980 to about 2012, we see an increasing trend in those number of county days above 90 degrees. I'll point out, for the last category, we had data through 2012 when we did this analysis. So that's only three years of data, but it already suggests that for that period of time, we have more than we have seen in the past 20 or 30 years.

Moderator: Certainly, this is all giving a lot of cause for concern. Now can you talk to us - if we're talking about weather, talking about climate, extreme heat - how does all this relate to public health?

Neil: Sure. So again, going back to this idea of the Greenhouse Effect, it is trapping heat in the atmosphere. We expect that we're going to have warming of our climate and that we have more extreme heat events where the temperature kind of on the hottest of the hot days is going to continue to increase. This has direct impacts on health. So our interest is in trying to understand that and take steps now to increase awareness and provide information to the public so that we can kind of try to mitigate the potential impacts on health.

Moderator: Excellent. Thank you. Now, Asante, welcome to the show - thank you again for joining us. Could you get us started on the discussion of extreme heat and related health effects?

Asante: Sure. So extreme heat can actually cause several symptoms like heat stroke, heat exhaustion, heat edema, heat cramps, just to name a few. I'll give a little bit of detail about each one of those. For example, heat cramps are caused by a loss of salt from heavy sweating and those heat cramps can then lead to heat exhaustion which is caused by dehydration. These can all progress to heat stroke. Heat stroke really is the most serious of those three because it can cause shock, brain damage, organ failure, and even death. There is a much longer list of the health risks that are associated with rising temperatures, and I won't have time to go over all of them today, but I do just want to just point out that higher temperatures and extreme heat can really worsen symptoms of many chronic diseases that people may already be living with. So heat can increase the risk of many diseases that are related to contaminated food, related to water or vectors that carry disease like mosquitos and ticks.

Moderator: So certainly, in addition to just being concerned generally, we have a valid concern from a public health perspective. Neil, can you talk to us about what particular age groups might be most impacted or at greater risk by these heat effects?

Neil: Sure. So we've looked at these data for summer months. We generally look at May

through September, when we know the temperatures is going to be hottest. We've looked at hospitalization and emergency department data and split that out by age groups. You can see on this graphic, each section of the graph is showing heat, stress, hospitalization and emergency department admission rates for the time period 2008 – 2012, for the months May through September. Going left to right, you're seeing the youngest to the oldest rates. So what is evident in those figures is that for each of the age groups, you see this peak in hospitalization and emergency department visits in July. That's kind of what we would expect because July tends to be the warmest month in New York. But what's also very clear from the graphic is that, as you get older, we tend to see a higher rate of hospitalizations in emergency department visits. So above 65 is where we see our highest rates.

Moderator: Now, what about looking at New York State as a whole? Are there certain areas of the state that are more impacted by these heat effects?

Neil: Sure. So when you take that same data, May through September, and we are looking at 2008 to 2012, we've calculated rates by county. What you can see here is that it tends to be the counties where we have our greatest urban population – so, New York City, out in Buffalo and Erie County, Rochester in Monroe County where we see the highest rates.

Moderator: How does heat stress on the hottest days compare to heat stress on cooler days of the year?

Neil: Sure. So again, I mentioned that we had looked at some NASA satellite temperature data. This is part of a project to kind of answer that question, what's the relationship between temperature and health. And so this graphic is showing how heat stress changes according to temperature. What we see is on days where the temperature is warmer, you see more hospitalizations and emergency department visits. You see about a 15% increase for each degree Fahrenheit in summer temperature. We've also looked at this a little bit for some other diseases as well. We started to look at how renal disease is impacted. We've seen some results there and hope to also in the future look to cardiovascular and respiratory data.

Moderator: You certainly provide a pretty compelling picture here, both with the information you've shared here and visual presentation. I wonder if you can start talking to us now about what's being done to really prepare us for these health risks that we are facing.

Neil: The Department of Health has been fortunate to receive funding from the Centers for Disease Control and Prevention (CDC) to look at climate and health. We've been funded since about 2010 for funding as part of the Climate Ready States and Cities Initiative (CRSCI). As principle investigator for the project, I oversee the

implementation of goals and objectives of this grant for our department. Primarily what we're trying to do here is forecast climate impacts and assess vulnerabilities. We want to project the disease burden in a changing climate, identify public health interventions that we can implement to hopefully mitigate the impact of changing climate on public health. And then kind of form an adaptation plan that can guide those interventions. And then, over time, kind of refine the steps we're taking to intervene and improve the quality of those interventions.

Moderator: Excellent. I think one of the things that we've seen on this show throughout the years is how successful the New York State Department of Health has been in collaborating and forming partnerships to accomplish some of their objectives. I wonder if you can tell us about how the health department has been leveraging resources through partnerships or other projects and groups to help work on this effort.

Neil: Sure. So, of course, assessing the impacts of climate on health doesn't occur in a box, so starting within the Department of Health, we have partnered with a lot of programs ourselves to try to figure out how we can work together on these issues. But we've also worked with external partners at the local, state and federal levels, to try to integrate our activities. I mentioned we're getting funding from CDC to help do these activities. We've partnered with the National Weather Service to kind of evaluate the thresholds at which heat warnings are issued. We've been funded by NASA, as I mentioned, to do some work to look at the relationship between temperature and health. In terms of state agencies, we're working with DEC. They have a Climate-Smart Communities Program which I'll be talking about a little later. They've been great partners in trying to integrate our activities together. I won't go through the whole list, but we've had a lot of good collaborations, and certainly that's a key to our success.

Moderator: Absolutely. Thank you. Now, Asante, I understand that you coordinate the state health department's BRACE activities. Talk to us about what BRACE is and describe some of the activities you are involved in.

Asante: Yes. And Neil has done a great job of giving an overview of what those BRACE steps are. More specifically what we do in New York State is we identify who those vulnerable populations are that might be at a really increased risk for heat-related illnesses. We also want to monitor the trends in heat-related illnesses across New York State, and we want to provide information to assist the public in making health-related choices and then we want to incorporate emergency preparedness planning in to our climate-specific activities.

Moderator: Now, you mentioned emergency preparedness planning as one of the activities that the health department has undertaken. Can you speak a little bit more about that?

Asante: Absolutely. So our New York State health department has a robust public health emergency preparedness and response capacity. Of course we are not first responders, but we do plan and prepare to mitigate the public health impacts of emergencies.

Moderator: Sure.

Asante: So our partners at the Office of Health Emergency Preparedness collaborate with us to help guide us in our preparedness efforts.

Moderator: Excellent. Now let's hear from the Director of the Office of Emergency Preparedness, Mike Primeau, about the work of his office in addressing extreme heat events.

Mike Primeau: So, when we go in to emergency response activities, we have developed a plan that is called our Incident Management System, or IMS. All IMS does is function around the incident command functions around the department's statutory responsibilities. That's the easiest way to think about it. As most people know, DOH is very broad in its responsibilities. We're responsible for not only environmental aspects, but also the laboratory, communicable disease, immunizations, family health. So Incident Management System basically brings all those subject matter experts in all those areas in a coordinated fashion to develop plans. Now I'm not talking about a written plan per se, but actually the plans to respond to the incident at bay that's going on right now. So New York Responds is a web-based data system that is used by each county in their emergency operations center to provide situational updates to State Office of Emergency Management. It is also the vehicle in which they provide requests. So in any emergency, one of the basic rules of emergency management is that the locals will respond first. Once all their resources have been expired or getting close to, they would request up to the state for certain things. Similar to what we just talked about, if it was cots or bio water or generators, it goes up through the New York Responds system to the state OEM. They would look into their stockpiles and provide that resource. They'd also tap into other state agencies if that the resource existed there, then they'd provide it that way. And in a really bad emergency, if we were out of state assets, we would request up to the federal government. So before New York Responds came on deck couple years ago, cities and counties would be on different systems that didn't always talk to each other. Now they're all on the same system. They all have a common view or what in the business of emergency management we call a common operating picture so everyone understands where they're at and allows the state to look at resources and to see where there's gaps being identified. So if something was happening in the Southern Tier, they could move assets from the Northern Tier, if there was the need for that. So it absolutely does

that. Now it does not talk to the federal government, but it allows the state to go through the federal systems and to consolidate New York's request into one. So in that way it is a much improved system with common operating system for everyone to view and get the same picture at the same time, as best we can.

If heat is to rise to the point where you need to do all those things we just talked about, which in many counties it does, especially in the southern part of our state, I would say just concentrate on those plans. Talk to your partners. Do a good training program. Do an exercise that tests the plan so you can identify the gaps. And then, go from there. Next thing I would tell them to do, if you have identified resources that you would need for a heat situation, is to go ahead and resource those. Find a resource where you can either stockpile equipment, or buy equipment and stockpile it. Or at the very least, get educated and know what the State has and what they don't have so you can plan how you're going to either provide those resources or know how much time you have to live before you can get those resources.

Moderator: So, I would imagine that everyone is at least somewhat vulnerable to heat, but I wonder if you could explain, Asante, why it is so important that we do assessments and assess vulnerability.

Asante: Sure. Assessing vulnerability is important because people who are more vulnerable may experience a greater severity of impact from the heat compared to others. And people who are more vulnerable may be less able to engage in behaviors that would minimize their exposures. And they also may be less able to recover from extreme heat events.

Moderator: So then who are we talking about? Who are these populations who are more vulnerable to extreme heat?

Asante: Well, the reality is that everyone's vulnerable to extreme heat. Everyone's vulnerable to heat illness. In fact, about 6,200 Americans are hospitalized each summer due to excessive heat. That's pretty shocking. So of course, some individual characteristics will make certain people more vulnerable than others, like for example, suffering from an existing chronic disease, or your age - as Neil talked about, being older puts you at high risk. Being obese, or alcohol use, or living in an area that might be socioeconomically deprived. All of those things will increase your risk. For example, most groups -- the group that's most affected is the elderly population. Currently we know that hospital admissions related to heat for persons over 65 years is about 15 times greater than those who are 17 years and younger. So their risk is much higher. There are some other community factors that might contribute to vulnerability, and those include being socially isolated because you are alone. Having a lack of mobility. A lack of access to air conditioned environments. What your housing characteristics are,

like living in an urban heat island. And really, an urban heat island is something that occurs when temperatures rise because of buildings and roads and other infrastructure that might make the area impermeable and very dry. So those are some things that would increase someone's risk.

Moderator: Thank you. Now, Neil, Asante just mentioned and sort of explained those urban heat islands. I imagine that's a term that's newer for some of our audience members. Could tell us a little bit more about that?

Neil: Sure. As Asante alluded to, an urban heat island is an effect that occurs because these built-up areas tend to hold heat and they maybe have decreased air flow. So they tend to be warmer. There tends to be more impervious surfaces, less green space, so, as I said, they build up heat and tend not to be able to release that heat, especially at night, as well. As this graphic suggests, the temperature could be several degrees warmer in an urban area compared to a surrounding suburban or rural area.

Moderator: Can you also explain how socioeconomic factors affect vulnerability?

Neil: Sure. Socioeconomic factors have been studied in public health for a number of health outcomes. As it relates to extreme heat, we're generally looking at vulnerabilities associated with inability to access resources necessary to keep cool. So, people may not be able to afford air conditioning or get to a spot where they can get cooler. They may have higher levels of pre-existing conditions which predispose them to the effects of heat. There also may be more contextual factors, such as fear of going outside due to living in a high crime area that may influence people's decisions about being able to get out and find a spot to get cool.

Moderator: Sure. Now, I understand that your staff has done work to identify areas in New York State with populations who are most vulnerable to heat and heat effects. Could you tell us about some of those efforts?

Neil: Sure. So we were lucky enough to get a grant from NYSERTA to answer some of these questions. What we were interested in doing was identifying community level factors that represent the kind of population vulnerabilities to heat and use that information to come up with a heat vulnerability index that we could use to help us identify areas where we might want to focus resources related to preventing extreme heat-related illnesses. So, essentially, what we did was selected variables that had been associated with heat related illness in previous studies that had been done. We identified variables from existing data sources, the Census, and the USGS National Landcover Database. And we pulled this information together and conducted an analysis to identify components that represent different types of vulnerabilities. Then we mapped that.

Moderator: And can you discuss for us some of the findings that you uncovered in your assessment of heat vulnerability?

Neil: Sure, So in this analysis we identified four components that we considered to represent kind of the vulnerability in New York State. That's what you're seeing on the map here. Starting in the top left and going clockwise, these are Census-tracked based maps. They tend to show the areas where population or land use characteristics representing each of the ten components tend to occur. Again, top left represents language vulnerabilities which relates to people's inability to access resources in a native language that could play a role in vulnerability. Moving to the right, socioeconomic vulnerability, which I talked about a little bit a while ago, is a known vulnerability that we identified and that relates to lack of access to resources that might help in cooling or preventing heat-related illness. The third on the bottom right represents vulnerability associated with age. We've already looked at some graphics showing the risk related with age. Then on the bottom left, environmental urban vulnerabilities. Those are the kind of vulnerabilities we are thinking about when we refer to something like the heat island effect being warmer in cities, predisposing certain people to the effects of heat.

Moderator: Certainly, I think it is really helpful to see them broken out in those different components so we can look at the risk factors. I wonder, can you put the different factors together to create a picture of overall vulnerability in New York State to extreme heat?

Neil: Sure. And in fact, that's what we did to come up with our overall heat vulnerability map. That's what you're seeing here. You could see that vulnerability does vary across the state, with areas that are dark on this map representing higher vulnerability and lighter areas representing lower vulnerabilities. A couple points I want to make is, if you recognize that you live in one of these areas of high vulnerability, it doesn't mean that you specifically are at risk. It just suggests that there may be populations living in that area who are vulnerable. Areas with the same color, mean that they have the same or similar heat vulnerability index score - it is important to note may be different vulnerabilities going back to the maps we showed on the previous slide. So it is important to note that when interpreting the map, the overall HVI score, as we call it, may be driven by different combinations of the comorbidities. Lastly, some of the areas that are most visibly prominent on that map are actually areas where you may see a smaller population. So there are some areas in the Catskills and Adirondack region that stand out because they're large Census tracks with fairly low populations. But it is actually the cities which don't show up as well on this map because they tend to be smaller Census tracks with higher populations that have the highest vulnerability. So what we hope to do from here is kind of take this information and make it available to people, ideally get it into the hands of people at the local level who can use it in their public health planning efforts. This is something we've worked

with the DEC, the New York State Department of Environmental Conservation Climate Smart Communities Program, on. They've developed a Certification Manual which communities in New York State can use to actually be certified Climate-Smart Communities. One of the aspects of that is doing a vulnerability assessment. So we are working with them to figure out whether or not we can integrate some of this work into some of that certification process. We also hope to take these heat vulnerability index scores, and then look at these with temperature data and health outcome data to kind of get a better understanding of vulnerability when we consider those factors as well.

Moderator: Excellent. Thank you so much. So we recently visited with staff at the New York City Department of Health and Mental Hygiene to learn about their comprehensive city-wide approach to heat vulnerability. Let's take a look.

Kathryn Lane: well, we know from investigating heat-related deaths in New York City that the majority of heat stroke deaths here happened in un-air conditioned homes where temperatures can be much hotter indoors than outdoors in the absence of air conditioning. Air conditioning is really the most effective prevention measure to prevent heat illness and death. And, unfortunately, when it is very hot outside, fans alone will not provide enough cooling. We also know that people who are most at risk for severe illness or death often don't own air conditioning or can't afford to use it, and have some other risk factor that puts them at a higher vulnerability. They may be older than 65. They may have some kind of physical or chronic health condition like cardiovascular disease or respiratory condition, a renal condition or obesity. They may have a mental health condition such as schizophrenia, or a cognitive condition like dementia. They may use alcohol or drugs heavily. Or they may take a certain type of medication that may impair their body's ability to keep a normal temperature. We've also looked at neighborhood level risk factors for heat illness and death. We know that, unfortunately, poor communities of color that bear the greatest burden of the health impacts from heat. We worked with researchers at Columbia University's Mailman School of Public Health to look at neighborhood level factors that influence the risk of mortality during extreme heat. And that study found that poor communities of color were more at risk, as were communities where the local surface temperature was higher and there was less green space.

Munerah Ahmed: We conducted focus groups and surveys to get a better idea of how people perceive heat and how it can impact health, and also to see what type of behaviors people take during extreme heat events. We found that most people don't see heat as a factor that could impact health. It's seen more as something that's an inconvenience. But we also found out that people who we know are at risk tend to stay at home, even when they don't have air conditioning. About 50% of respondents who are at risk -- or who we would

consider to be at risk – stayed home when they didn't have access to air conditioning. The heat vulnerability index helps us to identify how vulnerability to heat changes according to where you live, according to neighborhood differences. That heat vulnerability index is being used by us to target health interventions and really the at-risk neighborhoods. It is also being used by our external sister agencies to help target interventions related to heat resiliency. The average summer temperatures in New York City are rising, and with climate change, they are expected to continue to rise. We are working with our sister agencies and other stakeholders to develop interventions now to prepare for current risk and for future health risk so that way we can protect our most at-risk New Yorkers.

Kizzy Charles-Guzman: The mayor's office uses a science-based approach to address climate impact to mitigate the effects on extreme heat. We coordinate the New York City Panel on Climate Change which is an independent body of scientists and experts that advises the city on climate risks and develops local level projections in climate science. They are projecting average summer temperatures in the city are rising and are projected to increase by almost six degrees Fahrenheit by 2050, and almost 9 degrees Fahrenheit by the 2080s. Our office uses this projection, this climate data, as well as the city's heat vulnerability index as our guidance as we develop and implement our strategies to keep our state safe and healthy. Still, there is work to be done, and through One NYC, the Mayor's Office of Recovery and Resiliency is leading this effort. We are launching a comprehensive heat resiliency program aimed at reducing heat related health impacts by lowering temperatures in heat vulnerable neighborhoods, strengthening social networks and improving quality of life for all New Yorkers. This program expands the city's current efforts and adds new initiatives. For more information on the city's heat mitigation and adaptation program, visit www.nyc.gov.

Moderator: Neil, you discussed some of the work that you've been doing to identify areas with people who are more vulnerable to extreme heat. I wonder if you can talk to us about what you are doing to help people prepare, regardless of their vulnerability level, to help people prepare for, and adapt to, potentially more extreme heat events in the future.

Neil: Sure. One area that we've been doing some work recently on is with cooling centers. Cooling centers are places where people can go to get cool during periods of extreme heat. This is one thing we're trying to do to increase people's awareness about extreme heat and potentially reduce or prevent heat related illnesses from happening. We still need people to hydrate and think about how much time they're going to spend outside on a really hot day. Maybe think about working in early hours or in the afternoon when the temperature drops a little bit. But cooling centers is another aspect

of our planning. We want to be able to tell people where they can go if they need to cool off. A lot of counties are doing this type of planning already. Some have formally set up cooling centers when it is hot, and some are a little bit more informal. As you can see on the slide, a cooling center can be one of any number of types of places. But it's especially important that vulnerable groups know where these locations are so they can seek a cool spot if they need to on a very hot day.

Moderator: Absolutely. Can you talk a bit more about what specifically is being done in New York State on cooling centers?

Neil: Sure. We've partnered with local health departments and local emergency managers to identify locations that they hope to establish as cooling centers, if needed, at some point during the summer. We're doing some work now to develop an interactive map that we could put online that people could go to and find out a location nearest to them and get directions to that location if they so choose. We're also -- we've also done some work to evaluate accessibility of cooling centers, looking at urban/rural differences and how close populations tend to be located in reference to their nearest cooling center, as well as trying to understand how well vulnerable populations can access cooling centers using public transportation.

Moderator: Sure. Now, given that cooling centers seem to be a fairly important component of preparing for these emergency heat events, are there any reasons why a cooling center wouldn't be used during a heat emergency?

Neil: Yes. Accessibility is obviously a big one which I just talked about and some of our partners in other states have done a little bit more work on this but they have found some interesting results based on some of the work that they have done. In some cases, people don't recognize their vulnerabilities. They may not want to leave home, or kind of have an anxiety about going to a spot that they're not used to going.

Moderator: Sure.

Neil: And as I mentioned, they may not be able to afford or have an accessible cooling center.

Moderator: Well, it certainly sounds like an important thing for us to be addressing. Now, let's take a look at the approach that Rochester has developed to address extreme heat events.

John Picone: So I think most risk for people in the city of Rochester are obviously the elderly, as well as the very young. Not everybody has the resources to have air conditioning in their house or to have a pool in their backyard, so the city of Rochester is providing these opportunities for people to cool off in extreme heat.

So we have six spray parks and three water features throughout the city of Rochester. They run from 10:00 a.m. to 8:00 p.m. Every day. They run by activation. Each of the features has a little push button that the kids can push. Once they push it, it is on a timer system, and then they'll have to reactivate it for it to come back on. That way we're not wasting too much water. I think it would be a great opportunity for other cities to model Rochester's Cool Sweep Program. There are some great opportunities for people to provide heat relief for their citizens in their cities and towns. It does take a great cooperation amongst different departments, but it's been running for ten years and it's very successful. The feedback has been very positive. I think in Rochester, in general, when people hear about Cool Sweeps being called, all the TV broadcasts and radio broadcasts have been supportive. They let everybody know when we do the release. It gets that word out to everybody and I think it's been very receptive from all the citizens of Rochester. Some of the lessons to learn, you want to make sure they're gated off at some water parks. You obviously want a crew that's making sure that they're clean, glass-free, that they're near maybe a facility that can really monitor that water park or spray park. Those are lessons that we've learned along the way. Currently there is plans for an additional water park. We try to locate them throughout the city of Rochester. The next one will be on Campbell Street. The mayor has made it a focus of making sure each area has a water park and the opportunity to stay cool in the summertime. The project just started a couple weeks ago. It will be completed in December and in 2018, summer, we'll have a new water park over at the Campbell street playground

Moderator: There's so much really important information you guys have been sharing and what's going on. I would imagine communication and education of this information is a really large component of what we're talking about. Can you talk to us about what the health department is doing in that area?

Asante: Sure. One of the greatest resources that we developed only a few years ago is our New York State Health Department Climate and Health Webpage. This is an excellent resource for public health practitioners, other community members who want to get information about extreme heat, resources that are available to them. Neil talked earlier about cooling centers. On this climate and health webpage there is a link so that you can access where those cooling centers are located in your area. There is tons of other resources on that page as well.

Moderator: Can you talk to us about what kind of materials are available to educate the public about extreme heat?

Asante: Absolutely. One of the resources that we're finalizing right now is a pamphlet on the use of fans. We're all familiar with how to use fans during the summer, but we want to emphasize that sometimes it can be tempting for someone to use a fan in an

extreme heat event when there's no other air conditioning available. But, unfortunately, in some circumstances, blowing around very hot air is actually dangerous, which can happen with the use of a fan. It has been documented already that when temperatures are hotter than 95 degrees, you can actually cause more risk by using a fan than using another source of air conditioning. So temperatures are very hot, the fan, as I said, just blows around a lot of hot air. And this is risky, especially for some of the high-risk groups that we talked about earlier, like the elderly, babies, people who have other existing health conditions. So the other health information that you can get about how to keep yourself cool and to be safe include a pamphlet that's called, "Keeping Your Cool During Summer Heat," that's accessible on the webpage, as well as an "Excessive Heat Events Guidebook." Both of those are on our Climate and Health webpage – so that you need to stay cool and find the cooling center nearest you.

Moderator: Earlier today we talked about the CDC BRACE framework. You mentioned CDC funds 18 states and cities, including New York State and New York City, to utilize that BRACE framework to plan for health programs and climate change. Are there any summaries available of the New York State Department of Health's work that they've done on this BRACE initiative?

Asante: Yes. We're actually please do have completed a "Climate and Health Profile Report" that was done in 2015. That report provides a really good summary in nine chapters about what we're doing in New York State to prepare for extreme heat and other changing aspects of our climate. It has some chapters about who those vulnerable populations are and what we can do to help them prepare for extreme heat events. It also talks about some of the collaborations that Neil discussed earlier and what we're doing to plan in the future for how to address extreme heat.

Moderator: Excellent. Could you describe specifically what's on the state health department's webpage that's related to extreme heat?

Asante: Sure. In addition to our Climate and Health webpage, we also have an Extreme Heat webpage, and that's specifically [related] to our topic today. We've been actively updating this Extreme Heat page. If you look on the screen, you can see that we have a capture – you can't see all the details because it is pretty small – but the link is there and it provides a lot of useful information about what you can do to keep kids out of hot cars, to protect workers from heat illness. We provide some extreme heat planning tools for caregivers of the elderly or people or people who are caring for a loved one so that you can be best prepared in an extreme heat event.

Moderator: Excellent. Thank you so much. Now, Neil, you've talked about a number of publications and web pages where people can find information to help them prepare for extreme heat. What other resources are available?

Neil: Sure. So one of the other things we are trying to do is make data available to people who might be interested in using it to help in their planning. The BRACE program is partnered with our Environmental Public Health Tracking Program which is another CDC grant which has provided funding to enhance environmental health surveillance capacity in the state. So we've made some indicator data available for heat stress so far. We're hoping to add some temperature and precipitation data that would be downloadable by people who go to the website, the department of health website, and used in some of the work they're doing. Eventually, we hope to make the heat vulnerability index data available as well, but probably before that, we'll have county-specific reports that users can download and read. I mentioned we're doing some work with cooling centers already. We're also starting to look a little bit more at how precipitation, extreme precipitation, can affect health.

Moderator: Thank you. Now, Asante, I imagine that the New York State Department of Health already has some programs established to help vulnerable populations, as we've discussed. Can you discuss how you are planning to expand those programs?

Asante: We tried to leverage resources we have within our New York State Health Department by identifying contacts of the programs that already are working with some of those high-risk vulnerable populations that we want to address. We work with them to try to identify what programs they have and what opportunities they currently have for outreach so that we can combine some of our climate messaging with the messaging they're already providing to those populations. So this slide provides a list of some of current programs we're working with. We call those our internal stakeholders. We are looking forward to have some of their helpful educational materials, add some of our climate messaging to the already vulnerable populations they're already serving.

Moderator: Excellent. It sounds like there is really a lot to learn regarding extreme heat and climate. Where can people go to get more education on this really broad subject?

Asante: We actually prioritized the workforce development for people and having the education available to them to learn more about this topic, so we work closely with our New York state Learning Management System, which we call the LMS. The LMS now has a climate and health course category which is great because it allows users to browse for climate and health courses specifically. Right now we have 12 climate and health-specific courses, and we're working to increase that number. We are in process of developing a course on extreme heat for public health professionals. The LMS is really a great resource and courses are free and available to anyone who has the Internet.

Moderator: Excellent. And do you partner or collaborate with any other advanced systems or any other systems for advanced training opportunities?

Asante: Yes, we've actually been fortunate enough to work in our Office of Public

Health Practice with our workforce development group specifically on collaborating with them on distance learning initiatives. Some of those initiatives include the development of our Climate and Health 101 course, and that's through our Great Lakes Public Health Training Collaboratives. We also have a four-part series on climate and health through the Public Health Training Center. Again, those are available online and they're free to anyone who's interested in taking the courses.

Moderator: Excellent. Thank you so much. Now, Neil, to begin wrapping up the program, I imagine that other areas of the country which are already hotter than New York state might have some lessons that they've learned that could be valuable to our audience. Could you briefly summarize a few of those lessons learned for us?

Neil: Sure. So I mentioned earlier that areas of Arizona and the Southwest are expected to have some extreme temperatures this week. They've done a lot of work in planning for these types of events. Arizona - Phoenix, Arizona in particular - has done quite a bit of work to assess usage of cooling centers and try to better understand where the heat related deaths are occurring. So this slide summarizes some of the lessons learned from their work. I won't go through it all in detail but the slides will be available later. I think there is some good information there.

Moderator: Excellent. Thank you. Asante, are there any key take-home messages that you would like to leave everyone with in preparation for extreme heat in New York?

Asante: Sure. I think overall, and looking at the big picture, as I said earlier, everyone is vulnerable to extreme heat and heat illness. As the climate is changing in New York, it is becoming hotter. So that's why extreme heat is important to us. The steps we take now will absolutely impact the magnitude of future warming and the occurrence of extreme heat here in New York State. Extreme heat can cause heat stress, it can cause dehydration, and it can even cause death, so this is something we do want to focus on. Our Climate Ready States and Cities Initiative provides great resources for public health professionals, that includes our Climate and Health webpage that we've explored earlier, as well as our Learning Management System. We really want people to know they can take advantage of these resources.

Moderator: Excellent. Thank you both so much. We have a few moments to take some questions that have come in from our audience. We will start off - our first question that we have here is for Neil. It says, it seems as though the current federal budget doesn't plan to fund climate change education and other efforts. Could you tell us how that will affect states and cities like New York?

Neil: Sure. So we don't have a final federal budget for upcoming years, but it is correct that the current president's proposed budget cancels out climate and health related work. We're fortunate in New York State that we're taking a lot of steps proactively to

try to adapt to climate change and extreme heat. Those efforts will go on to some extent. But programs like BRACE – the Climate-Ready States and Cities Initiative, does help New Yorkers, as we have talked about in this presentation today. We think it is a valuable program. It helps to bring a lot of the work that's going on within DOH and other agencies together to help us understand impacts on health. So we hope that funding will eventually come through for us. But as I said, New York State is still taking a proactive approach.

Moderator: All right. The next question that has come in says, Governor Cuomo's office seems to be actively involved in climate issues. Could either of you tell us more about this?

Neil: Yes. I mean, coming off the announcement that federal funds might be cut, Governor Cuomo still committed New York to trying to attain the goals of the Paris Agreement. They just announced that Rochester was recently named the most – the most recently named Certified Climate-Smart Community. So congratulations to Rochester. We're really happy about that. I think at all levels of government, we're still, as I said, previously, we're still kind of committed to doing our part here to, in New York state, to mitigate and adapt to the impacts of changing climate.

Moderator: We have another question that's come in for Asante. Could you please go over BRACE again? What does it stand for and who set the guidelines?

Asante: Sure. We are a BRACE state. We receive money from the CDC, Centers for Disease Control and Prevention, for BRACE. BRACE stands for Building Resistance Against Climate Effects. Building Resilience Against Climate Effects is a framework that we implement in New York State and is a five-step framework. It allows us to forecast what the disease burden will be. It allows us to identify who the vulnerable populations are in New York State, what interventions need to be put into place so we can mitigate the impacts of climate change on those vulnerable populations. It allows us to identify what interventions will be most effective with those populations. And then we can spend some time evaluating the implementation of those interventions. And the guidelines for BRACE are set by the CDC. That's what we follow. And we've been able to work through most of that framework here since we've been funded from the CDC for our BRACE implementation.

Moderator: Excellent. Thank you so much. You mention that chronic diseases are linked to extreme heat. Can you expand on what you mean by that?

Neil: Sure. Aside from the direct effect of heat on health, we also expect the warming climate will also have an influence on air pollution. There's different pathways by which heat is going to work to affect health. We are starting to look at the effects of temperatures on respiratory conditions and cardiovascular outcomes. We'll have hose

results in the future. We've also started to look at renal disease and have seen that there does tend to be an increase in hospitalizations in emergency departments for renal disease associated with increasing temperature as well.

Moderator: Thank you. Another question we have is that a lot of the diseases we worry about in New York -- I was actually just thinking this as you were answering -- a lot of the diseases we worry about in New York are spread by vectors like ticks for Lyme disease and mosquitos for West Nile Virus. Tell us how extreme heat and climate change will affect our risk for those diseases.

Asante: Sure, I can answer that. So our temperature is increasing and our climate is warming. That's going to have an impact on the vectors we have in New York State like ticks and mosquitos. As our temperature continues to warm and increase, we will see that have an impact on the life cycle of some of those vectors. We'll see that they are living a little bit longer, or if we have some erratic temperatures in the winter and temperatures are warmer, we might see that life cycle of those vectors change. They might be more apparent or they might stick around longer in the summer months, or appear earlier in the fall season. So those warmer temperatures can speed up the life cycle of those diseases. We'll also see that in certain parts of the country where it is too hot, some of those vectors won't be able to survive. So depending on where you live will determine the changes in what we see in those vectors.

Moderator: Excellent. Thank you so much. Do we have time for another question here? Some people are concerned about worsening water quality, particularly from harmful algae blooms. Can this be related to climate change and extreme heat?

Neil: So harmful algae blooms are another condition that we expect may be influenced by extreme heat. There's other drivers of harmful algae blooms. But we're talking about blue-green algae, creating -- building up to -- in high levels in lakes and streams, primarily lakes and -- excuse me -- saltwater bodies. So our oceans and our fresh water bodies. But in heightened -- some of these blue-green algae can release toxins that can cause health effects. We've seen it in animals that have gone into water that's been experiencing a blue-green algae and have had toxic effects. The recommendations is that if you see water that kind of has a paint-like appearance, a green paint-like appearance, to stay out of it. But we are doing more work in looking at that.

Moderator: All right. We're out of time for today, so I want to thank you both so much for all of the information you've shared. I think this is tremendously useful, not just for the public health community but the community at large. So thank you so much.

Neil/Asante: Thank you for having us.

Moderator: 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 program and continuing education credits are available for today's program. To obtain those continuing education hours – CNE, CME and CHES credits, learners must visit www.phy.org and complete an evaluation and post test for today's offering. This webcast will be available on demand on our website within two weeks of today's show.

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I'm Rachel Breidster. Thanks for joining us on "Public Health Live!"