COCA Conference Call
Heat Waves and Climate Change: A Public Health Perspective
George Luber, MA, PhD
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Coordinator: All participants standing by our conference call is about to begin. I want to thank you for joining today's COCA teleconference. Following our presentation today there will be a formal question and answer session.

At that time if you wish to ask a question please press star 1, until that time all lines will be in a listen only fashion. At the request of the company today this conference call is being recorded.

Should you have any objections you may disconnect at this time. Now I introduce your host for the call today Ms. Alycia Downs, ma'am you may begin.

Alycia Downs: Thank you very much and we'd like to welcome everyone to today's COCA conference call entitled Heat Waves and Climate Change: A Public Health Perspective.

Today we are honored to have Dr. Luber present. Dr. George Luber is an epidemiologist at the National Center for Environmental Health at the Centers for Disease Control and Prevention.

He earned his PhD from the University of Georgia and has served as an Epidemic Intelligence Service officer at CDC. His research interests includes the epidemiology of harmful algal blooms and the health affects of climate change.

Most recently his work has focused on the epidemiology and prevention of heat related illness and death, the development of municipal health heat response plans and application of remote sensing techniques to modeling vulnerability to heat stress in urban environments.

So right now I'll turn it over to Dr. Luber.

George Luber: Thanks Alycia. It's a pleasure to be on this call today and thanks everybody for calling in. You guys have impeccable timing because as of this morning NOAH's Web site lists of heat warnings excessive heat warnings and heat advisories in much of the west and including parts of the east, D.C. and Philly are under heat advisories so this seems like a perfect opportunity to highlight this risk.

And today I'll talk about several dimensions of extreme heat exposure including what we know about the epidemiology of heat waves and at-risk populations as well as what we can expect in the future with the added pressure of climate change.

I will be advancing slides, I'll be letting folks know when to move the slide presentation forward and there are a few moments within the presentation where I have some animation so I will let everyone know when to advance the slides.

So please advance to the first slide, presentation outline, and just to orient everybody to this talk I'm going to begin this presentation with a discussion of the current state of knowledge about the epidemiology of heat waves and this will be followed by a discussion of the potential impacts of climate change on extreme heat exposure.

And finally I'd like to conclude with an overview of some of CDC's current activities within this area. Next slide. Heat waves are not new phenomenon. They have been quietly killing the most vulnerable residents of our cities for centuries.

In the United States, exposure to extreme heat is responsible for more death annually than hurricanes, lightening, tornados, floods and earthquakes combined.

Over a five period from 1999 to 2003 there were a total of 3,442 reported heat related deaths when annual average of 688 but despite the lethality of heat and heat waves there's still a lack of public recognition of the hazard of extreme heat exposure.

Part of the problem lies in the fact that heat waves are silent killers, natural disasters that don't leave a trail of destruction in their wake. Like other natural disasters they are sporadic phenomena but unlike hurricanes, which leave lasting reminders of the devastation, memories of heat waves disappear once cool weather arrives.

From a public health view point another major obstacle lies in the fact that the true impact of heat waves is largely under estimated because many heat related deaths are unreported or unrecognized as heat related.

Bodies found days after a heat wave, with no core temperature to record, often are not coded on death certificates as heat related. Furthermore increases in hospital visits and death due to cardiovascular and respiratory diseases have been documented during heat waves suggesting that heat exacerbates these conditions as well.

And the inability or failure to attribute these increases in mortality to the heat wave event has been a persistent challenge. But at some fundamental level each heat related death represents a failure of the public health and social welfare system.

But despite these obstacles it's our position that each and every heat related death is preventable. Next slide. Not surprisingly most of the public health attention to the health affects of extreme heat has focused on morbidity and mortality associated with heat waves.

The epidemiologic investigation following the St. Louis heat wave of July 1980 was one of the first to highlight the magnitude of mortality associated with heat waves, as all cause mortality increased by 57% from the previous year.

A heat wave investigation following the 1993 Philadelphia heat wave demonstrated that much of the excess mortality during heat waves is from cardiovascular death, illuminating the need to broaden the classification and attributions of heat related deaths to include other causes of mortality in addition to heat stroke.

The 1995 heat wave in Chicago is responsible for greater than 700 excess deaths over 11 days resulted in a revision of the definition and classification of heat related deaths by the National Association of Medical Examiners leading to a more accurate quantification of excess mortality associated with these events.

And perhaps most importantly this event prompted collaboration with CDC in the development of a city wide heat response plan aimed at preventing deaths of this magnitude from occurring again. Next Slide.

Another important finding to emerge from the 1995 Chicago heat wave investigation was the relation between peak temperature, heat index and mortality.

This graph shows maximum temperature, heat index, and the number of heat related deaths during the 1995 heat wave. Please note the two lag between maximum temperature and death.

This finding has important implications for it suggests that medical examiners surveillance or an emergency department surveillance should not be used a trigger for the activation of a public health response including the provision of emergency cooling shelters.

Instead a response must be activated when a heat wave is forecast not after illnesses or deaths are reported. Perhaps the most startling reminder of the potential – I'm sorry next slide please – perhaps the most startling reminder of the potential lethality of heat waves was the August 2003 European heat wave which was responsible for over 34,000 deaths across Europe and more than 14,000 in France alone.

A combination of several factors were responsible for the high death rate including a general lack of appreciation of the lethality of heat waves as evident by the fact that many healthcare professionals who were on annual summer holiday in August were not recalled to duty by the Ministry of Health.

Tragically many of the victims of this heat wave in France were the elderly under supervised medical care in nursing homes most of which were not equipped with air conditioning or other means of cooling.

Even cold baths, an inconvenient but effective option, were not able to be used for cooling because of the high ratio of residents to showers. It would have taken days to give all the residents a single turn ruling out this option. Next slide please.

These investigations along with others have highlighted some of the most important risk factors for hypothermia and heat related death including age, the elderly and very young are most vulnerable because they're not able to thermo regulate efficiently because of their higher sweating thresholds, thus increasing the risks of life threatening and consequences when their body temperatures rise.

Those with underlying medical conditions such as cardio vascular and respiratory disease, obesity and even mental illness are at increased risk and poverty represents the combined risk of reduced health status and access to protective measures such as air conditioning.

Advance the slide. An increased risk is not limited to individual factors but also include features of the built environment that accentuate the health risks of heat waves including access to transportation, medical care and cooling centers, as well as crime necessitating keeping windows and doors closed for safety reasons.

In addition housing type in the urban heat island affect have a marked affect on risks for hypothermia. Next slide please. Another important epidemiologic insight gained from long term analysis of temperature and mortality is that cities have a temperature at which mortality is lowest.

Mortality rates rise as temperatures rise outside of this comfort zone. This figure shows the U shape relation between temperature and mortality for 11 U.S. cities.

The trough represents the comfort zone, this deeper right side of the arm shows the mortality increases at hot temperatures and the shallower left side arm of each line shows the increase with colder temperatures.

What's most important about this analysis is that the temperature mortality relation varies greatly by latitude and climatic zone. In general, northern cities are more vulnerable to high temperatures and southern cities to low temperatures.

Understanding the city specific relation between temperature and mortality is critical for developing appropriate public health responses. Next slide. While urban areas of the United States are currently challenged by the high morbidity and mortality of heat waves, a larger challenge is looming.

The inner governmental panel on climate change, the leading international scientific body of the effects of climate change, predicts an increase in the duration, intensity and frequency of heat waves in the coming century.

The fact that the IPCC, a body known for their highly conservative predictions of the impact of climate change, estimates this outcome with a very high confidence underscores the certainty that this will become a major public health problem this century. Next Slide.

An indication of the magnitude of the impact climate change will have on temperatures is illustrated in this slide. These maps show the projected increase in average daily July heat index which is a measure which combines heat and humidity for the coming century relative to the present.

The largest increases in temperatures are found in the south eastern United States with a Canadian model projects increases of more than 25 degrees Fahrenheit.

And for example a July day in Atlanta that now reaches a heat index of 105 would reach a heat index of 115 in the right hand Hadley model and 130 degrees in the Canadian model. Next slide.

Adding to the climate change driven increases in temperature are the added effects of the urban built environment in fact cities and climate are coevolving in a manner that will certainly amplify both the effect of heat waves as well as the vulnerability of urban populations to heat related death.

For example more than half of the planet now lives in cities, up from 30% only 50 years ago. Urban areas are gaining an estimated 67 million people per year, about 1.3 million people every week.

By 2030 approximately 60% of the projected global population of 8.3 billion will live in cities. Additionally there is a projected increase of 100 million more persons greater than 65 years of age by the year 2100.

This population increase will be accompanied with rapid urbanization which is quickly transitioning communities from native vegetation to

an engineered infrastructure that increases thermal storage capacity resulting in significant change in the urban climate compared to adjacent rural regions, which is known as the urban heat island affect.

Next slide please. The urban heat island can be a powerful force in local climate as illustrated by the urban heat island diagram on the upper right.

The combined effect of the high thermal mass provided by concrete and black top roads and a lower ventilation ability of the urban canyons created by tall buildings serve to extend the temperature increases created by climate change.

Now advance the slide. In real terms relative to the surrounding rural areas urban heat islands can add anywhere from seven to 12 degrees Fahrenheit to the urban heat load.

More importantly the urban heat islands serves to absorb heat during the day time and radiated out at night raising the night time minimum temperatures which have been epidemiologically linked with excess mortality.

This satellite thermal image of night time surface temperature in Phoenix on the lower left hand of the slide visibly illustrates this effect. Next slide please.

In a study looking at the degree to which climate can vary within the urban heat island Harland and colleagues at Arizona State University compared eight neighborhoods within Phoenix to look for differences in exposure to heat stress.

They quantified and compared neighborhood ecological characteristics such as land cover, vegetation type, settlement density as well as sociodemographic characteristics such as age, income, education and availability of resources to cope with heat such as air conditioning and swimming pools.

They found statistically significant differences in temperatures between the study neighborhoods during the entire summer which increased during a heat wave period.

High settlement density typified by apartment buildings, sparse vegetation and having no open green space in the neighborhood were significantly correlated with higher temperatures and thermal comfort index.

Lower socioeconomic and ethnic minority groups represented in this map by the Black Canyon freeway neighborhood were more likely to live in warmer neighborhoods with not only greater exposure to heat stress but in an environment that lacked resources to cope with it.

In comparison the upscale historic Anglo Phoenix neighborhood which has lush landscaped properties, ample green spaces and a high percentage of houses with air conditioning and pools experience significantly less heat exposure.

If we compare average summer time mean maximum temperatures for the two groups we notice that the historic Anglo neighborhood is about seven degrees cooler on average. Advance the slide.

But these differences are amplified during the critical times such as heat waves when the difference jumps to 14 degrees Fahrenheit, please advance the slide again.

In sum people in warm neighborhoods were more vulnerable to heat exposure because they had not only greater exposure to heat and had also fewer social and material resources to cope with it. Next slide.

To respond to the multiple threats posed by heat waves the urban environment and climate change, CDC has focused prevention efforts on developing tools that local emergency planners and decision makers can use to prepare for and respond to heat waves.

Two specific activities that I will highlight today include the creation of a guidance document for the development of heat response plans and the development of a methodology for mapping urban vulnerability to the effects of heat waves. Next slide please.

One critical lesson of previous investigations has been that excess mortality from heat waves can be prevented through the identification of relevant risk factors for a given locale and the development of written city specific heat response plans.

Following this, CDC in collaboration with colleagues at EPA, NOAH, and FEMA have participated in the development of an excessive heat events guide book which provides a comprehensive set of guiding principals and a menu of options for cities and localities to use in the development of heat response plans.

These plans clearly define specific roles and responsibilities of government and non-governmental organizations during heat waves.

They identify local populations at increased high risks for heat related illness and death and determine which strategies will be used to reach them during heat emergencies.

Heat response plans also include specific criteria for activation and deactivation of the plan and measures for periodic evaluation. Next slide.

A second activity focused on adapting to the challenges of climate changes and heat waves centers on a collaboration between CDC and the National Center of Excellence on Urban Climate and Energy at Arizona State University.

This project goal is to develop a research methodology that provides local and regional governments a new set of tools for prevention of an emergency response planning for acute and chronic urban climate impacts. Next slide.

This approach attempts to understand the influence of the built environment characteristics such as land use, housing stock, and engineered materials on the spacial distribution of heat related illness episodes as quantified by EMS and fire department dispatch data.

This map of Phoenix, Arizona shows the location of heat related incidents for 2001 through 2005. Next slide. This heat incident data can then be overlaid with other layers of known risk factors to predict which neighborhoods are more likely to experience heat related morbidity and mortality during heat waves.

This will allow local emergency response personnel to not only focus resources during these events but to also tailor prevention and health communication messages to specific ethnic or demographic groups.

Prior to areas for the provisioning of heat you have energy assistance in air conditioning can also be identified for this approach. Next slide. Colleagues at King's College London are producing similar composite vulnerability maps which display a graduated sensitivity to heat stress index by district.

This composite variable considers factors such as age, housing type, population density and poverty but does not factor in the influence of the heat island effect through the use of satellite thermal imagery as was shown in the previous work.

And we hope that future evaluations of these mapping techniques show that they are effective in predicting the location of deaths from heat waves and can prevent high mortality events like the one witnessed in Europe in 2003. Next slide.

To conclude it's become clear that the excessive temperatures brought about by climate change and enhanced by factors of the built environment cannot be prevented but the high morbidity and mortality associated with these events can be.

Public health can and should play an active role in the development of adaptation measures such as city specific heat response plans. And finally we should insure that the development of these plans are guided by the best evidenced based data generated by epidemiologic studies and ecological models on the relation between hazard and health outcomes. Thank you.

Alycia Downs: Thank you Dr. Luber that was an incredibly timely presentation and now, Jennifer, if we could go ahead and open it up for questions and answers.

Coordinator: We will now begin the Q and A session if you'd like to ask a question at this time please press star 1 on your telephone. After pressing star 1 you may be prompted to record your first and last name for pronunciation purposes only.

Should you wish to cancel or withdraw the question you may also press star 2. Once again please press star 1 now for any questions or comments and let's allow a moment for any questions to register.

Once again that is star 1 for questions or comments and I do show our first question, you may go ahead sir.

Question: Yes good afternoon. Very interesting presentation. I have two questions, could you comment on the appropriateness of distributing fans in communities during heat waves and then also does the CDC have model epi tool kits that would help local health departments track mortality and morbidity due to heat. Thank you.

George Luber: Okay great. Could you repeat the second part of that question was do we have model…

Question cont'd: Do you have model surveillance forms for mortality and morbidity that could be used during heat waves?

George Luber: Okay I'll start with your first question and that is on the impact of fans. The problem with fans is that when they are used in

environments that don't – when they are used to cool people by blowing air over them in hot environments indoors they've been shown to actually work against the cooling effect, actually working like a convection oven.

Unless they are used to bring cooler air from outside to inside or to blow hot air outside they can be quite dangerous. Many heat wave investigations show operating fans in rooms with no open windows and actually, you know, it actually can become quite deadly.

We discourage the use of fans during heat waves. We know many fire departments and local response groups try to hand out fans during heat waves but when they're used they typically go into low income houses which often are in a part of town that high crime people don't like to leave their windows open at night.

So we find that it actually can be quite dangerous. The second part of your question about epi forms no we do not conduct routine surveillance for EDs during heat waves.

We're usually not asked to do so and we always work upon invitation of the local health department and but we tend not to rely upon surveillance for this type of response because that needs to happen way ahead of the heat wave.

Once the heat wave is forecast that's when the responses should be initiated and people need to be – high risk populations need to be identified and moved to cooling shelters.

If we wait for the – for bodies to pile up or for folks to be admitted to the ER we think we're already behind the curve on the heat wave.

Coordinator: Thank you. Once again for further questions or comments please press star 1 on your phone. Also to cancel you may press star 2. Our next one in queue comes from the Orange County Fire Authority.

Question: Howdy, thanks so much. The State of California has set a few threshold levels in a state wide plan and therefore our counties are working on the same sort of thing.

We set ones in the threshold and then they changed and are a reiteration of this plan just for recently. I'm wondering whether there is any, you know, evidence based and scientific background that might guide us on thresholds. That when it comes to predicted heat index indices or either day time highs or night time highs that correlate with excess mortality or with other indicators of heat stress within a population.

George Luber: The approach that seems to work best is a city specific approach. The relation between heat index and mortality for, you know, that there was a graph that showed that relation.

It varies so greatly between different locations and as a function of the demographic profiles of the city as well as the ecological characteristics, land cover and including the types of meterologic conditions that the city experiences.

For example heat waves earlier in the summer tend to be more deadly than the ones late in the summer. There is a measure of physiologic adaptation on the individual level to heat exposures so if we have a very, very hot series of days in June we expect more death than in the same meterologic conditions in July.

My point is is that there – we encourage cities to explore the relation between temperature and heat index more appropriately and mortality based upon historic records and not based upon a generic model for the country.

Because it's not going to be applicable especially to Orange County's experience with that is going to be quite a difference than Boston and we do not promote the use of a generic model for that relation.

Question cont'd: Very good thank you.

George Luber: And my guess with California is that their recent experience last summer has prompted them to look, I know some epidemiologist there are doing very fine work looking at that relation for different parts of California, and that would probably be the best model to work on is looking at the previous five, ten years of data and, you know, when those – what are those triggers point should be.

Question cont'd: Yeah they were looking at prospect and irrespectively at some of our computer dispatch data and trying to find call types that correlate with meteorological characteristics.

George Luber: Right.

Question cont'd: Yeah our county alone, from the coast to inland with large differences in heat index and therefore for us.

George Luber: And it's important to have a as well defined a trigger point as possible because the triggering these warnings with little effect can serve to backfire where people don't take them seriously.

Question cont'd: Indeed.

Coordinator: Thank you. Our next question in queue comes from the New York City Department of Health.

George Luber: Hi.

Question: Hey George. So given that the relationship between temperature and mortality seems to extend down to temperatures that are more sort of usual summertime temperature let's say.

And given that if people are in an air conditioned environment presumably they're not going to be impacted by the ambient temperature.

Are you folks looking the cost effectiveness and strategies for rather than the emergency response getting people to a cooler environment actually targeting populations and providing air conditioning and utility bill subsidies so that people will use them looking at that as a strategy.

George Luber: We haven't started looking at that as a strategy but I have – I gave a presentation recently at the – there was a low income energy assistance program conference and there are – there's a lot of opportunities for collaborating with programs aimed at providing assistance to low income housing with not only identifying risk groups but, you know, providing them a link with services that I'm certain would be cost effective, you know, developing large scale emergency response for these type events especially if they're going to increase in severity and

frequency it might be more cost effective to hand out air conditioning units I absolutely agree.

And I think that is hopefully where we'll be headed I think is a lot of opportunities for learning from those risk groups and from the programs that address those groups as far as outreach, targeting those people, to actually getting to them.

And so our biggest challenge with heat wave is not identifying risk factors but it's actually getting people to realize that they are at risk and getting them to change their behavior, getting them to realize that heat can kill, and they need to get to an emergency cooling shelter.

And if we can team up with programs that have experience in reaching these populations I think we'll have a better chance of preventing death.

Question cont'd: Thanks.

Coordinator: Thank you. Our next question in queue comes from the California Department of Health.

Question: Hi, I have one question. I was wondering George if you could comment on the issue of air pollution and how that might play a role in heat death especially with ozone levels projected to increase with global warming.

We're also concerned in California about vulnerable areas that would be in higher elevations in parts of the state and how ozone levels are typically higher with higher elevations and those would also typically be cooler areas where people wouldn't be acclimated to the heat.

So I was just wondering if you could briefly comment on that George.

George Luber: Sure and I have not done much work in this area. I know that there's a great amount of interest especially with the Europeans in the synergistic effect of heat waves in ozone because high temperatures encourage a formation of ozone.

We definitely have a link an epidemiologic link with respiratory distress and heat waves as well as cardiovascular deaths they're very interconnected.

I don't think we can extricate one from the other. The Europeans I think if I'm – this is off the top of my head so I might have to go back into my papers but I believe the Europeans, the French, found a connection between high ozone levels and mortality during their event.

But the Italians did not I believe. There's still much work that needs to be done to clarify that effect but from a first glance it looks like certainly heat waves exacerbate an ozone formation and extend the risks to those with respiratory disease.

The high altitude question I'm not familiar you probably know more about ozone formation and how it affects you said it affects those at higher altitudes more?

Question cont'd: Well no I just thought those were the areas where you might typically see some higher ozone level.

George Luber: The higher altitudes within the city?

Question cont'd: Or, you know, while there are certain areas where the ozone has migrated to from city pollution.

George Luber: And so meaning a heat wave would produce ozone that would drift into areas where they're not exposed to much ozone?

Question cont'd: Well no we typically have higher ozone levels but since they were up at higher, you know, higher elevations that typically would be cooler so they wouldn't, you know, so when a heat wave did hit those areas not used to heat you'd have both, you know, a double impact of both, you know, higher ozone and, you know, a population that's vulnerable since they're not acclimated.

George Luber: Absolutely and one thing we know is that those populations that don't experience heat stress normally are most vulnerable to death and you can imagine that adding the extra stress of high ozone would increase that risk dramatically.

I don't know of studies that have looked at that but I think that that is where much of the epidemiology on heat waves is going.

Question cont'd: Thank you.

Coordinator: Thank you. Once again for questions or comments please press star 1. If you wish to cancel you may press star 2.

Question: Hello. I'm wondering about CDC's thoughts or work on looking at actually preventing some of the long term effects of climate change through prevention whether it's by promoting. I know that CDC has a healthy building or healthy housing program and I was wondering if

you are all thinking at all about green building and trying to support lowering carbon emissions from new buildings or retrofitting.

George Luber: That's a great question and that's one that has a lot of sympathy here. There are – we have a climate change work group that has recently formed and we're developing a road map if you will of priority areas for CDC's response to climate change.

Now our mandate as an agency is to provide scientific evidence on health hazards and to respond to those and in that sense I believe our colleagues at EPA are better positioned and have probably more credibility with developing recommendations for green buildings and working on the mitigation aspects of climate change.

Many of the folks here are also very interested in that and believe that the benefit of say green buildings or there was less carbon impact have co benefits that impact health in a positive way.

Walking more not only reduces carbon emissions but it increases, you know, personal health. So there's a lot of ways in which creating a healthier community or less carbon emissions in our communities can impact health, air pollution, cardiovascular disease etcetera, obesity, mental health, you name it.

So our approach is to look at the health benefits of say green living if that's what you want to call it but not – and focusing on the adaptive things we need to do to adapt to climate change such as being better prepared for heat wave, being better prepared for extreme weather events, heavy precipitation events, is spreading vector-borne diseases etcetera.

And explore the benefits from a health perspective of combating climate change from the reducing green house emissions but not providing the technical recommendations about how to reduce those that our colleagues at EPA and NOAH and whoever else has a lot more credibility and expertise to do that.

I think there's a lot of selling that we could do with regards to those health benefits of reducing our carbon emissions.

Question cont'd: Thank you.

Coordinator: Thank you. Our next question in queue comes from the Polk County Health Department.

Question: Hi thanks. Just kind of a record keeping question here. We lost track of our slides. I wonder if you could give us a Web address where those slides are posted and then the actual question they wanted to ask was a follow up on the fan question that you mentioned. Is there well written research or resources you could direct us to about that and is there a threshold kind of temperature where fan use really should be cut off?

George Luber: No there is no threshold temperature that I am aware of with regard to the fan use. Perhaps I mean I know there's plenty of expertise on this call. If anybody has a resource that they know of a temperature which fan use becomes counter productive please speak up.

But I'm not aware of any but I am aware that, you know, there are a lot of variation from an individual to individual level with thermal regulatory capacity and age plays a factor and health and also the – its not just temperature when we're talking about ability to – the effect of fans on the cooling property of the individual.

There’s humidity etcetera whether or not we can get some fresh air from outside so there’s going to be a lot of factors that play in that and it’s difficult. We get asked all the time for, you know, what temperature does it become dangerous inside?

And we’re being forced to pick a number and I think we’re going to be picking about 90 degrees but that’s not based upon terribly good data because there’s so much variability, you know, between the young athlete can withstand several days at that temperature but an elderly person with COPD could not last that long and its difficult to make these generalized thresholds especially when we’re dealing with a public that’s not familiar or able to measure something like heat index within their house because they don’t have a relative humidity – a way to measure relative humidity.

So we’re stuck with coming up with a way to simply measure exposure risks such as temperature, you use that in an effective way and get people to change their behavior so its very complicated.

And I don’t think we’re going to come up with something that’s going to be as effective as, you know, some kind of threshold because of that complication.

So to answer your question no but I suspect that somewhere in the 90s for the large majority of the vulnerable population you will start seeing significant health effects.

If it’s above 90 degrees temperature wise and if the relative humidity is also high these fans can be quite deadly.

Alycia Downs: I also just wanted to let everyone know that the slide set is available if you go to our Web site it's at www.bt.cdc.gov/coca.

Coordinator: Thank you. For further questions or comments please press star 1. If you wish to cancel you may press star 2. Our next one in queue comes from the City of Minneapolis Health Department. You may ask your question.

Question: Hi thanks. I'm wondering if there is any guidance available to help with the determination on whether to continue large public events such as outdoor events or golf tournaments or special events that the municipality might be having. Thanks.

George Luber: Sure I think our – the warnings that we put out are applicable to a general I'm sorry we don't put out warnings. NOAH puts out the warning. We encourage cities to develop their own response plans that are guided by NOAH's forecast for heat waves.

And they determine which kind of media outlets or which populations to alert and that includes those that are engaged in any outdoor activity especially if it's sunny and hot.

And there is – we do not provide thresholds or do an analysis that suggests thresholds for a specific city or large events like that. I think the city is in the best position to understand the risk associated with, you know, say like a concert outdoor concert or what not.

And those advisories should include warnings to people that will be outside during those types of events so an event of heat wave warning or heat advisory should not only include messages to the elderly but

also to athletes, construction workers, as well as those gathering for large outdoor events.

You know, stay hydrated, use plenty of sunscreen, light loose fitting clothing, and if you are at any specific risk to avoid those types of activities but that, you know, is an important component of that heat advisory that it should be a general public warning about this extreme heat and avoid the exposure and stay indoors. And that would cover large outdoor events as well at risk population.

Coordinator: Thank you. Our next question or comment comes from the Iowa Department of Public Health. I think she's cancelled her question and the next one in queue comes from the California Department of Public Health. You may ask your question sir.

Question: Yeah hi this is Dr. Harrison and I want to thank you very much. It's an excellent presentation. In 2006 we became the first state in the country to pass a standard for work related heat illness.

It requires employers to provide water, shade, rest and a minimum amount of breaks and I have been reading a lot of the material and I think that workers are sometimes an overlooked vulnerable population.

George Luber: Absolutely.

Question cont'd: For example in the 2006 guidance documents from the EPA of the excessive heat amends guidebook outdoor activities are mentioned in the context of the general community and are listed under behavioral choices.

And so I would encourage you and the folks at the NCAH as you are developing further guidance or agenda for research and epidemiology on heat related illness to specify that occupational groups are a specific vulnerable population and to if you can put those in a somewhat separate category because that will help other states develop specific guidelines and/or standards for worker population.

For example the State of Washington is in the middle of their regulatory process for a very similar standard that we have in California and my colleagues in Washington tell me that there's a tremendous amount of employer opposition to setting that regulation.

So anything I think we can see from the CDC and NCEH that would emphasize that workers are also vulnerable and their science and good guidance on what employers ought to do will be extremely helpful.

George Luber: Yes I think we need to do a better job of bring NIOSH into these type of discussions to develop these guidance documents although some of the features of these warnings will be different I think that's a population that's definitely overlooked in general when we look at heat waves.

Arizona had a heat wave in 2003 I believe it was, or '04, no I'm sorry in '04 or '05 where we had quite a few construction worker deaths and, you know, that is a significant risk group that needs to be have some special attention.

Question cont'd: Thank you. I appreciate that.

Coordinator: Thank you and our next question in queue comes from Novella Systems.

Question: Good afternoon. You mentioned that in France in 2003 the shortage of showers for cooling was problematic in one nursing home. Could they have possibly used misting of cool waters combined with fans?

George Luber: Absolutely. I had thought that a just taking sheets and wetting the sheets and putting them over people would help. I think the biggest obstacle is in the French and European experience is the lack of appreciation for the affect of heat.

People when the elderly especially seemed they are worn down over days they're resistance to the heat is generally or gradually erodes and it's a slow process and one that I think is easy to under estimate, you know, how deadly this can be until the second or third day.

You know, we see that lag between temperature and when temperature peaks and when we start seeing deaths after the third day of excessive temperatures or second day people start to failing to cope.

And the French described to me situations in many of the nursing homes where they have rotations through the showers where folks have a schedule that they get there's a shower that will service 50 people.

And so they get every fourth day everybody gets a shower and so they couldn't, you know, put everybody in and, you know, there weren't private bathrooms in many of these nursing homes and that their options for cooling people.

In addition you remember I mentioned it was August a lot of people are on vacation so they were short staffed and there was just too many people to care of to care for and not enough attention early on.

And I think when we get a change in perception of the risks of heat we might start seeing some better adaptations to it. It was interestingly I – one of the first things we were asked when we mentioned that while air conditioning would be protective there was a cultural perception in much of Europe that air conditioning is generally bad for you that exposure to this cold air unnaturally cold air is not healthy.

And, you know, when I asked and I was asked about that by physicians and I said well not that I'm aware of I'm not sure of any – we love it, I'm Florida this is what we can't live without air conditioning its certainly not affecting our health.

But there was a concern for Legionella and that there was a lot of cultural attitudes I think need to be addressed in order to kind of embrace air conditioning which is a good short term adaptation but the long term it enhances – it adds to green house emissions.

But there is – the main problem with the European heat wave initially was the lack of appreciation for the deadly affects of heat. There's much they could have done.

Question cont'd: Thank you.

Coordinator: Thank you. Once again for further questions or comments you may press star 1. If you wish to cancel you may press star 2. Our next one in queue comes from the California Department of Health.

Question: Oh just to follow up on the fan issue. There is some guidelines I think they're in the MMWR report that the conditions of high humidity that were greater 33% and then temperatures that were higher than 90 degrees fans were not recommended to prevent a person from becoming overheated.

Except using a fan that you mentioned George and wetting down the skin.

George Luber: I'm sorry.

Question cont'd: Wetting down the skin with a fan.

George Luber: Which MMWR was that?

Question cont'd: That was a 1995 MMWR.

George Luber: Okay.

Question cont'd: And with temperatures that are above 100 degrees then that's when it's thought that fans might actually contribute to death.

George Luber: That's apparent temperature or the heat index?

Question cont'd: It looks like its apparent temperature of 100 degrees and then combined with humidity when it's over 90 and greater than 33%.

George Luber: Right. It becomes difficult to actually, you now, bring that into play when we were asking folks to be able to measure those parameters when we know they can't.

And I think we err on the side of caution by not encouraging fan use when its hot outside which is a kind of ambiguous statement but or we ask them to use it only to ventilate rooms to bring cool air in or to bring hot air out is erring on the side of caution.

Coordinator: Thank you. To ask further questions that's star 1. Our next question in queue comes from Question cont'd of the California Department of Public Health. You may ask your question.

Question: Interesting presentation.

George Luber: Hello.

Coordinator: Ma'am your line is open if you have a question.

Question cont'd: Hello.

George Luber: I think we got disconnected.

Question cont'd: Hello.

Coordinator: Yes ma'am your line is…

Question cont'd: Am I on?

Coordinator: Yes go ahead with your question please.

Question cont'd: Sir you mentioned in the 1995 Chicago heat wave that heat related death was better defined or redefined by the medical examiners. I was a little curious about that and was it just a matter of giving better

guidance to the examiners so they could code correctly. I'm wondering about how consistent you think…

George Luber: They're very consistent.

Question cont'd: Our reporting is and whether the ICD code currently is adequate in tracking a heat related death.

George Luber: It's still from what I understand a discussion of medical examiners still very much a call that each individual makes about whether or not the National Association set out specific criteria for classification of heat related deaths after '95 which helped.

However those criteria are often difficult to apply in situations where they might not have much evidence as to the circumstances of death. There are temperature of the room etcetera but in addition from what I understand with discussions of medical examiners that there's some reluctance by some to attribute it to heat and while others are more than willing to.

It's I guess their call. One thing we did recently was compare the use of the ICD ten codes I'm sorry nine and ten where we looked at the underlying cause of death versus contributing factors and if we added hypothermia to contributing factor we, you know, whereas the cause of death was cardiovascular disease.

For example we notice that the numbers of death that had heat as an underlying cause or contributing factor increased dramatically and it's probably more reflective of the numbers of death where heat was, you know, the primary cause.

We probably never will be able to get at the point where we have an accurate estimation of the number of deaths or can be able to attribute a death accurately to hypothermia in every case just because of the types of people that it affects.

But I think, you know, Tom has I've had discussions with Tom about this and its probably more useful to look at trends of all cause of mortality associated with temperatures especially when we're trying to look at the effects of heat waves.

And to see how that changes over time or the relation the city specific relation between all cause mortality or excluding injuries and accidents or given locale because of the broad affect of heat on a underlying medical condition.

Question cont'd: Great thank you.

Coordinator: Thank you and at this time, Doctor, I show no further questions in queue.

George Luber: Okay.

Alycia Downs: I just want to thank Dr. Luber for presenting and I think everyone on the call really gained a lot of information and please if you didn't have a chance to ask a question or one pops in your mind later please give us – please send us an email at coca@cdc.gov and we will coordinate with Dr. Luber and try to get your questions answered as soon as possible.

So again we just really wanted to thank you and we appreciate you presenting on this call for us today.

George Luber: Well thanks for the opportunity.

Coordinator: Thank you. That concludes our conference call. Thanks to all for attending and you may now disconnect.

George Luber: Thank you.

Alycia Downs: Thanks.

END