

# Heat\_Related\_Illness-Ep1-McCauley\_Final

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heat related illness, heat, workers, farm workers, farmworkers, mccauley, studies, symptoms, work, exposure, core body temperature, research, cooling, people, health, field, bandana, roxanna, science, michaela

## SPEAKERS

Michaela Kandzer, Ricky Telg, Phillip Stokes

### **Ricky Telg** 00:04

This is Science by the Slice, a podcast from the University of Florida's Institute of Food and Agricultural Sciences Center for Public Issues Education. In this podcast, experts discuss the science of issues affecting our daily lives revealed the motivations behind the decisions people make, and ultimately provide insight to solutions for our lives.

### **Linda McCauley** 00:33

This intersection of science and health and policy has never been better illustrated than the issue of heat related illness.

### **Phillip Stokes** 00:49

Hey everyone, Phillip Stokes here with Science by the Slice and education coordinator with the PIE Center. This is part one of our two part series about being outside in the heat, and more specifically the heat related illnesses that can happen with overexposure to high temperatures. You just heard from Dr. Linda McCauley one of the guests on today's episode, more about her in just a bit. But in today's episode, our guests discuss heat related illnesses in worker populations. today's conversation can get a little heavy at times. These are people's lives and livelihoods that are being discussed. And some of the content of this episode may be unsettling for some listeners. You'll hear an interview conducted by Michaela Kandzer, communications assistant at the PIE center. She spoke with Dr. Linda McCauley and Dr. Roxana Chicas, both from the Nell Hodgson Woodruff School of Nursing at Emory University. Dr. McCauley is the dean and a professor. And Dr. Chicas is an assistant professor. And they both conduct clinical research in Occupational and Environmental Health. The research they are discussing today is about how he affects human health, what this could mean in a changing climate, and how this impacts worker populations. And one last thing I want to mention, much of the research being discussed in this episode was conducted through a research project with the Southeastern Coastal Center for Agricultural Health and Safety, a partner program of the PIE Center. Through this research project, Dr. McCauley as well as Dr. Chicas were researching heat stress and chronic kidney disease among farmworkers. There are quite a few really significant findings and implications from this research project, which you'll hear them discuss in this episode. And I'll make sure to include different resources

from their research in the show notes. Okay, with that, we'll pick up with Michaela asking Dr. McCauley to explain what heat related illnesses are.

**Michaela Kandzer** 02:44

So I just want to start off with a question about what is heat related illness?

**Linda McCauley** 02:49

That's a great question. It's term that we're using to describe an array of symptoms and health problems that can be associated with exposure to high temperatures. For many, many years, the only heat related health effect that was studied was heatstroke. When a person actually would lose consciousness from working or exercising in rising temperatures. Now, we are beginning to realize there's an array of symptoms. Many times people don't recognize what they are from beginning with more dehydration than we would expect for or want to see in humans to death by heatstroke and heat exposure. And so heat related illnesses kind of lead all inclusive terms for things that you can attribute to heat. And that's really important because if you think about if temperatures are climbing and someone goes to an emergency room with a cardiac event, they're going to record the cause of death as cardiac arrest. Right. But as we become increasingly aware of the effects of climate change, a lot of clinicians and scientists are arguing that, that it needs to be heat related cardiac arrest or heat related illness. That's why it's important. So that if you don't, if you don't name something correctly, you can't count it.

**Michaela Kandzer** 04:28

Yeah, that makes sense. So that causes a big issue for surveillance of the issue. Right? So how are you guys working to help combat that issue?

**Phillip Stokes** 04:36

And this is Dr. Roxana Chicas.

04:39

What we're doing is we've been doing studies with agricultural workers who are perhaps one of the most exposed occupations to heat. And so we've been doing studies to characterize how their body is reacting to being chronically exposed to heat. We knew before that they were suffering from heat related illness, but many of those studies were done, where workers would just self report symptoms here. So it's actually one of the first studies, we measure heat related illness symptoms by measuring core body temperature, where we saw that the workers core body temperature was in fact going over the 38 degree Celsius threshold. And then we also were monitoring like the heat, the ambient heat that they were working in, as well as their dehydration levels or dehydration that they were having. And so our studies are, you know, to bring awareness to what's going on to the body and how it's how climate change and heat is affecting human health. And hopefully use that for some work, work, better working conditions, and also try to push you know, more policies that combat climate change.

**Linda McCauley** 05:57

You know, it's an interesting story about how we got into this type of research. We didn't just decide one day to start studying heat. We were studying female farmworkers who might become pregnant, and

what we knew about hazards in that work environment that could have effects on the pregnancy and the fetus. And we were studying three things. There's been a lot of work done on pesticide exposures and in pregnancies. And so that was one of the things we were looking at. And we were looking at muscular skeletal stress, because it had been a lot of studies on prolonged standing while you're pregnant, and how much exercise vigorous activity you should do while you're pregnant. And we added heat exposure, because we knew that a lot of women had been caution while they were pregnant, like not to run in marathons, and not to overuse hot tubs and spas. And so we had that third area of hazard. And we were doing lots of interviews of farm worker, women, and this was in about 2010 and 11. So 10 years ago, and they just grabbed hold of the heat exposure, because they were already feeling it in Florida, and had never, ever considered that heat exposure could be harmful to their pregnancies. And so that's how we got introduced to heat related illness and knew that the farm worker community really cared about this issue. And then it wasn't just the women. They were like, what about our husbands are our partners, our children who working in agriculture, so it was just the most marvelous example of how, when you work with communities, and you educate them, they can let you know, let the scientific team know what they are really wanting to know more about and worried about.

**Michaela Kandzer** 08:10

Yeah, no, I think that's super awesome. And a really great example, to have, you know, academic research in real life. That's one of my favorite parts, or favorite aspects of this podcast is every time we meet with a researcher, and we get to hear the story of how they got into their research, it's always really cool to like see how that happened and how it wasn't just they woke up one day with this idea it, it was a real need in the community. And they're working really hard to meet that need and to fill that gap in the education. And I just think that's really awesome, and really beautiful. So thank you for sharing that story. So I know that I was chatting with Roxana little bit before the interview, and she was talking about how she's actually done in Apopka and collecting some data right now. So can you kind of talk about that and how, what kind of data you're collecting order to study this larger topic of heat related illness?

08:57

Yeah, so I'm currently in Apopka, Florida. And we're actually doing our final data collection for a longitudinal study, where we have been following a cohort of agricultural workers for about two years and winter and summer. And we are collecting urine and blood samples morning before they go to work and after they end their workday. And we're also bio monitoring them while they're in the workplace. So looking to see how their heart rate their core body temperature, their physical activity, what the temperature is, where they're working at all of that to just kind of get a really good picture and understanding of the ambient temperature they're working in, but also how the body is responding and to see any types of changes from morning to afternoon.

**Michaela Kandzer** 09:45

Really awesome. So what kind of things have you found so far?

**Linda McCauley** 09:48

Well, one thing that we found is that we were able to his follow up a stick with us, right, Roxana they, when you do a longitudinal study, you have to kind of get a commitment from your research participants

to stick with you and come back. And that's a that's a major challenge for a lot of research and particularly challenging with immigrant populations. So our retention rates been really good, right, Roxana?

10:18

Yes, it has been really, really good. And I think that speaks to that our research team, in collaboration with the Farmworkers Sssociation of Florida has made a commitment to really listen to the community what their needs are. And we tailor our studies around their needs, and like their schedule. And so the Farmerworkers Association also does a great job with the outreach they do they do with the farm workers. And so I think it shows a really true commitment by the farm workers to learn more about their health, but they also feel that they are contributing to hopefully improving the working conditions for you know, future farmworkers.

**Linda McCauley** 11:02

Some of the things science wise that we found are an array of symptoms that are considered under the umbrella of heat related illnesses from excessive sweating, of course, we know that they come off the fields, just the clothing is wet from sweating during the day, and then headaches, nausea and vomiting, even stomach cramps. All the things that we classically know, is are associated with too much heat exposure. And it's really interesting that some of these symptoms initially are they're rather vague. And in fact, they overlap a lot with pesticide exposure. Because pesticide exposures can cause headaches, nausea, cramping, and so what we believe is that we've done so much teaching around pesticide exposures and symptoms, we need to really work with the farm workers to help them realize that there's two hazards that work in very mysterious ways and can cause similar symptoms. We also found that a large proportion of the workers show up under hydrated for whatever reasons during the night, they didn't overhydrate their bodies, they didn't drink enough fluids, or maybe they drank fluids that aren't the best to hydrate the body. So they show up for work somewhat dehydrated, which is a compromising situation for them. We also do things that we haven't found the questions that we're still studying, like, we can't seem to understand the risk factors for women versus men. Body weight doesn't seem to be a major predictor you would think your BMI would play, I mean, if you're overweight, running a marathon, I think we kind of think you would overheat faster than someone who was not overweight, we're not finding that is a major risk factor. Nothing is like, clear, obvious, this is the most important risk factor for getting sick in the feilds from heat exposure, which means we have to keep looking at what their susceptibility factors are, that we just don't know yet. And that's why. Roxanna has worked with pre diabetic state and the ability to metabolize glucose. And Could it be playing some interaction with heat exposure? Just don't know.

**Michaela Kandzer** 13:57

Yeah, and that's really fascinating, too. So kind of poses the question like so do all does everyone need to be worried about heat related illnesses, everyone need to be educated about the risks and about the symptoms and about some of the things that can be done to avoid heat related illness? Or what to do if you think someone is experiencing a heat related illness? So what are some of those things that can be done to help prevent heat related illness in the field and just in general?

14:22

Yeah, so for my dissertation, we looked at cooling interventions, and it was a cooling bandana, a cooling and a cooling vest. And then also what would happen if they were both a cooling bandana and a cooling vest. And so we compare that to a control group. And so it was interesting because we found that the bandanas seem to be more protective from workers going over the 38 degree threshold and not so much for the cooling vest. And there's probably several reasons for that. One, you know, the vest was heavy than a cooling bandana that goes around their waist. And it's the it would start to weigh them down as it started to melt. But I think that the cooling bandana is it's, you know, it's giving us signs that, no, we just need to be proactive, and they are, you know, sustainable solutions out there to try to keep workers safe. And we're also right now piloting an electrolyte hydration intervention to see if we know we can number one it will the workers drink electrolyte fluids? How much can they drink? And does that help with the alleviation of heat related on the symptoms and kidney injury? Are they better hydrated with the solutions that we're giving them? So, you know, are they are they suffering less symptoms of heat related illness? So it's exciting times, I'm hoping that we can find some solutions.

**Michaela Kandzer 16:00**

Yeah, I think it's really, I think it's fascinating to see like, how important the work that you guys are doing, you know, you're studying heat related illness, but really, you're working towards worker protection.

**Linda McCauley 16:10**

There's so much research that needs to be done. Right now. There's very few states that have the any regulation for doing things differently for workers when the heat goes up. And think about that for a minute, the rest of public health. When we know where heatwave is coming, we mobilize and open cooling shelters, there's outreach to the elderly, there's people are told to drink more water more water's available, workers are outside workers, particularly are largely ignored. And it's not just with heat. So when we looked in the in the West during the wildfires last summer, where they were opening shelters for people to get away from the smoke, and we knew that the particulate matter in the smoke was hazardous to health. There are so many pictures of farm workers working in densely smoked fields. And so I don't know what it says about our country that somehow workers in particularly immigrant workers are not considered essential and vulnerable. Farm workers working in those fields with dense smoke all around them, harvesting vegetables for people who weren't even aware of where the vegetables they were eating that we came from, and who took that risk of working in that smoke to harvest those crops for them. It's just very disturbing. So there's huge amounts of work well, for biological scientists, social scientists, anthropologist, health policy folks, it's very, it's a very encompassing problem. So there is just, this intersection of science and health. And policy has never been better illustrated than the issue of heat related illness.

18:22

Yeah, I think that, you know, migration, one of the biggest drivers of migration is climate change. And so to you here in the United States, we're seeing those two issues kind of collide, right? immigrants coming here to the United States climate change happening, they are considered essential, but have no very few labor protections. And so I think that, you know, this is, this is the work we're doing is good. And I'm hopeful that more researchers will be interested in trying to look into this area. And I think like Dean McCauley said, like having multidisciplinary people look at this so that we have a better grasp of

what the situation is. And I think that more people will become aware of the harsh working conditions that farmworkers are having immigrants are having, and hopefully we can make some change.

**Michaela Kandzer** 19:17

Yeah, that is super fascinating. So are there like health databases that you guys can pull data from to look and see, you know, about some of these farm workers and the symptoms and stuff that they are experiencing? Or is it all data that you're having to go out and collect in the field yourselves?

**Linda McCauley** 19:33

You know, there's the National Agricultural Worker Survey, which is operated with the Bureau of Labor Statistics. And sometimes they have helped related questions, but it was never designed to be a health survey. And so that's the best randomized survey of the population, but it's not because it's more about it. Labor survey been a health survey, it's certainly not as comprehensive as what we need. And it's never, there's no way to track individuals that you see with research studies to their health record. It's just, it's so fragmented in the United States that we can't do it, the migrant clinician network is actually has a project where they're trying to enroll farm workers in their health surveillance. And no matter where they work in the United States, they are linked with the migrant clinician network, so that that group can begin to survey the work of the population. It's not huge yet, but it's the type of things that we need.

**Michaela Kandzer** 20:53

actually have a few more questions for you guys. So looking at, you know, solutions in the field? What kind of solutions? Do you think that there are? What kind of solutions have you guys been finding that you can share with policymakers or with just people in communities or with farm managers and operators?

**Linda McCauley** 21:10

So you know, this is so simple to protect workers, there's three things that you have to do, you have to give them rest breaks, because they will we know that if they're, if they're, depending on how vigorous the work is, that's a huge risk factor for their core body temperature rising, so you have to give them rest breaks, maybe even mandate how, how much that needs to be, you have to keep them hydrated, they have to have water, and they have to have shade, when they're resting, they, they kind of be able to cool off. And so some farm workers, I mean, some growers actually, when they're resting in these shaded canopies, they have ice for them to put around their neck to try to cool off. But it's really as basic is that work breaks, rest and shade. And water.

22:13

Yeah, you know, there's a simple, just kind of like example, from the BP oil spill that happened many years ago. And when OSHA was there, kind of overseeing the cleanup, and it was so hot, they required it was mandated that the workers take breaks in the shade. And there were not a single report of heat related illness, severe heat related illness in any of the workers. And as soon as OSHA left, and it was no longer, you know, mandated and no oversight, heat related illness symptoms started popping up to the point that it was over 900 cases of heat related illness that was reported. So I think that shows just right there how important for it to be required that they take a break. You know, oftentimes growers and

industry will say, Well, you know, they, they can take a break whenever they want. But, you know, there's a power imbalance. Yeah, there's a power imbalance, right, and they're also paid by the peice. So this is a case where time really is money. And it's not something that they can really do, because they're really working hard just to survive, right. And if we had, like dean McCauley said these three simple things, I think that agricultural workers wouldn't be 35 times at risk for heat related death.

**Michaela Kandzer 23:42**

Yeah, I think that's such a powerful example that you just shared. So yeah, I guess the next task is to get people to do that. Right. So I guess just my last question is, do you guys have any final thoughts that you guys would like to leave behind and share with our listeners today?

**Linda McCauley 23:58**

Just that this climate change is going to get a lot worse, before it gets better. And as Roxanna said, this, you know, these workers who are harvesting our food are essential. They have to work our country depends upon it. There are other outside workers, that it's less essential, you know, landscapers and even some, some roads, say like, there's outside workers who work on very hot roads. You could delay the road repairs, you can't delay feeding people in the United States. And so it's just critically, this whole concept was critical, this concept of an essential worker, and you can't stop them from working and producing food, but we have to protect them. They're not dispensable. And, and there's so much work and the perception that they're all illegal. And they took on this risk when they came to the United States is just harmful because a lot of these workers are not undocumented. A lot of them are here legally on work visas, and so no humans are dispensable.

**Phillip Stokes 25:29**

Once again, that was Michaela Kandzer speaking with Dr. Linda McCauley and Dr. Roxana Chicas. I want to thank both of our guests for being on Science by the Slice. As I mentioned at the beginning, I included different links in the show notes so you can learn more about this topic. There's a recorded webinar by Dr. McCauley an entire resource page on heat stress from the Southeastern Coastal Center for Agricultural Health and Safety, and even a short documentary called facing the sun, which includes actual footage from the research carried out by Dr. McCauley and Dr. Chicas. Next up, we will still be discussing heat and how overexposure can impact our health, but in a different setting, sports and athletics. Now this episode isn't just for athletes. I spoke with Dr. Rebecca Lopez from the University of South Florida, who researches exertional heat illnesses and we talked about how this can impact anyone. Whether you're participating in sports, or doing any other activity outdoors. That episode is available now. I want to thank everyone who works on science by the slice. Michaela Kandzer, Rachel Raybon, Valentina Castano, Sydney Honeycutt, Ricky Telg, Ashley McLeod Morin and Alena Poulan. I'm Phillip Stokes. This is Science by the Slice.