

## ***Environmental Health Chat* Podcast Transcript: Climate Change, Air Pollution, and Children's Health**

**[Theme music]**

**Ashley Ahearn (Narrator):** You're listening to Environmental Health Chat – a show from the National Institute of Environmental Health Sciences that explores the connections between our health and our world.

I'm Ashley Ahearn.

**[Music fades out]**

**AA:** Dr. Kari Nadeau puts in long days. She's a practicing physician, a professor at Stanford University, the director of the Sean N. Parker Center for Allergy and Asthma Research. And, mom to five kids.

Through her work, Dr. Nadeau is connecting the dots between climate change, air pollution, and effects on children's health.

Climate change is contributing to more frequent extreme weather events, like hurricanes and flooding, as well as drought and wildfire. And the risk to human health is growing, Dr. Nadeau says. Increased air pollutants from climate change can also worsen many existing illnesses and conditions.

Dr. Nadeau recently co-authored a review paper with Dr. Frederica Perera in the New England Journal of Medicine that explores these connections with a focus on what pediatricians can do to better protect their patients.

**KN:** I think there are people in the medical community that maybe 10 years ago didn't know if climate change was going to be a reality that they would have to face as professionals, but it's knocking on our door every day almost, we're dealing with patients that are suffering from health-related illnesses that are associated with climate change.

**AA:** And those health-related illnesses are particularly problematic for children. Dr. Nadeau says 80% of children on the planet are exposed to air pollution levels that are unsafe.

**KN: 2:03** Children have a much higher metabolism than the average adult, so they take in a lot more air per day than an adult does.

**AA:** Kids also tend to spend more time outdoors – which means they can have higher exposures to polluted or smokey air from wildfires.

**KN:** They also have developing organs, so their lungs are developing, for example. So, they're at much higher risk for being affected by air pollution or climate change compared to an adult who already has fully developed lungs.

**AA:** There's also a mental health burden that can hit especially hard for kids. Young people today are experiencing what's called climate change anxiety as they learn about how the global climate is changing and how that will affect many of them directly now, and in the years ahead.

**KN:** And because of food insecurity, displacement, post-traumatic stress disorder from wildfires, flooding, extreme weather events, they affect kids for a long time and have a durable effect on their memories for the rest of their life. And so, children are at much more risk for having effects on mental health issues compared to adults.

**AA:** Children of color and those who grow up in economically disadvantaged communities are more likely to live near toxic waste sites and breathe polluted air. They and their families are also less able to adapt or respond to climate emergencies.

**KN:** And unfortunately, a lot of people of color and underserved populations live in areas that are highly dense, like in cities. And so, there's heat islands, they can have a higher chance of having extreme heat events. And then finally, people that are impoverished don't have as good access to health care and so that's going to affect how they can adapt to climate change. So, for all these reasons, children in vulnerable communities that are under-resourced really are hit hard.

**AA:** As a doctor who specializes in allergies and asthma, Dr. Nadeau is concerned about climate change from rising CO2 levels and the extra pollution it creates, and how that affects children's health.

**KN:** People need to understand that the health effects of air pollution alone are very disastrous to children and oftentimes irreversible because they can induce asthma for someone's lifetime, for example, and that asthma could even be worsened with climate change. For example, with heat stress your asthma can get worsened; with stress your asthma can get worsened; with allergens being increased around the world due to climate change and warming as plants grow and they're emitting more pollen that can make your asthma worse.

**AA:** But Dr. Nadeau doesn't dwell on the bad news when it comes to climate change and health. In fact, the review paper she recently co-authored, did quite the opposite.

**KN:** I am a cautious optimist, I want to make sure that we can talk a lot about the problems of climate change and health, and that can spur us to action. So, what I see is that this article serves as a nexus point by which to act and it's not too late. By doing something now we can improve the lives of not just ourselves, but of the future.

**AA:** For example, Dr. Nadeau points to research by Adar et al. that shows that by simply replacing one fossil-fuel powered school bus with ultra-low sulfur diesel you can reduce asthma marker rates for the children that ride that bus by 30% within a month's time.

**KN:** But when you actually look at the numbers – and this is what I did for the article with Dr. Perera – for every dollar you put into renewable energy and mitigating against climate change, you get a \$13 benefit from overall health benefits, both indirect and direct – saving lives, reducing visits to the emergency room, for example. So that was a surprising piece of data that's now been published.

**AA:** Dr. Nadeau says she'd like to see more research on mitigation and adaptation strategies for climate change: research that focuses on solutions and can provide policy makers the information they need to make change.

**KN:** I'd personally like to see much more research done around when we electrify a city, or when we reduce the fossil fuel emitting cars in California, for example – and that's coming up – or when cities decide to ensure that people take public transportation rather than using cars. How is that affecting childhood asthma rates? Right away those types of studies can be done. So, I call this solutions-facing research. And if we can do more and more solutions-facing research around *policy* that would help, I believe, policy makers so that policy makers can know that their actions had a positive effect. And they can also use it as an iterative process by which to say, oh, wait a minute, we changed this policy and it had this benefit compared to this policy and it didn't have the benefit we thought, right? Then people can make wiser choices as they change policy.

**AA:** Doctors can play a critical role in protecting the public – and helping their patients respond to the health challenges that accompany climate change.

**KN:** I think for all of my discussions, especially being an allergist and an asthma doctor and a pediatrician, I bring this up in any of my conversations. It's very natural, actually – Like “What are your worries? What can we do about this? How do we proactively adapt to it?” Because already as a pediatrician, you're talking about wearing helmets, you're talking about, how to get vaccinated, how to make sure that you live a safer life and you protect your kids from having to live in fear of x, y, or z.

**AA:** Dr. Nadeau remembers one woman – a single mom – who brought her 5 children in for a checkup.

**KN:** ...and she had two children with asthma, she has asthma herself, and she was worried about air pollution and wildfire. So, we talked about that. And then I advised her that getting an air filter at home would be helpful. And of course, she nodded her head. But I could tell that something was worrying her and I said, “Well, you know what's on your mind?” And out of asking those questions, it came to bear that she couldn't afford a filter. And so, I said, “Okay, you know, let's work together to talk to your community council and try to get air filters for free to your community.” And so that's what we did. It took a little time. But that's where, as a doctor, I think we can be educators and helping on a one-to-one basis with patients and families.

**AA:** But there's also change that's needed, more broadly. Dr. Nadeau believes that students of medicine should be taught curriculums that include the health effects of climate change. There should be questions on medical board exams about climate change and health. She says it's time medical practitioners all over the world take the lead on equipping their patients with the knowledge and support they need to keep their families safe.

**KN:** Start drawing up management scenarios as pediatricians to put resources together for families and children, especially vulnerable families, maybe people that don't have English as a primary language. Start to think very deeply into how we can start managing issues around climate change and their effects on health early on, so that we can proactively reduce the risks of climate change to their health, to the extent that they can change behaviors over time. But If you start talking about it as a pediatrician early then you can give the right tools to the family to try to reduce risks of climate change overall to that child in their lifetime.

**AA:** Dr. Nadeau often shares information with her patients from the NIH and NIEHS websites, as well as NIEHS newsletters, downloadable pamphlets, and webinars on climate change and health designed to help the public learn more.

She believes that fighting climate change will take a massive team effort but that it starts with good communication – whether that be between doctors and patients, friends, peers, or policy makers.

**KN:** But also, that as children, as parents, as families, as citizens of this world that we're not using the world. The philosophy should be that we're *stewards* of this world. That my children, when I think about my mindset, I hope they know that we're only on this planet for a very short time, this planet will outlive us for sure. But the key goal is that we take care of it for others – my grandchildren hopefully (laughs), but most importantly, for many other generations to come.

**[Music comes up]**

I'm Ashley Ahearn. Thanks for listening to Environmental Health Chat.