

Podcast Script: Wildfire Smoke 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.

Wildfire season in the west is longer and more intense than ever – as average temperatures increase, snowpack decreases, and overgrown forests burn more intensely. Add to that: more people are living in areas at risk of wildfire.

But even if you haven't lived near a wildfire, the smoke can also be a problem. In recent years, cities across the west have been shrouded in smoke for longer and longer stretches during wildfire season – and with that smoke can come harmful volatile organic chemicals and particulate matter that can make its way into our bodies.

That could be a problem for children's health.

Dr. Stephanie Holm is an environmental pediatrician and co-director of the Western States Pediatric Environmental Health Specialty Unit. These specialty units are made up of networks of scientists and health professionals that provide guidance to doctors and families about environmental health issues.

Dr. Holm specializes in the health effects of wildfire smoke.

Stephanie Holm: So yes, lots of work in that area the last couple of years. It's been a busy couple of years.

AA: Her specialty unit serves California, Nevada, Arizona, Hawaii, the Pacific Islands, and Tribal Nations. And over the past few years, she was hearing loud and clear that parents were worried about wildfire smoke and how it could be harming their kids.

SH: We were getting calls from folks all around our region trying to figure out what to do for kids when there were these big wildfire smoke events.

AA: But her research is also personal. Dr. Holm lives in the San Francisco Bay area, which has experienced dangerous levels of air pollution from fires in recent years.

SH: I have a seven-year-old daughter. And we've had quite a number of very bad smoke events in the last few years. She has not yet had a school year in which she did not have smoke days, where school was just cancelled because of smoke, which is something very different than when I was growing up.

AA: So, Dr. Holm wants to help us all get ready for wildfire season, and protect our kids the best we can.

We'll get to some helpful tips for parents in a bit, but first, let's take a look at why kids are more vulnerable to wildfire smoke – and what exposure could mean in terms of health outcomes.

Dr. Holm says kids are more vulnerable than adults for three key reasons.

Reason number one: Kids are smaller, but they breathe more, so they're getting a higher dose of pollution through their airways proportional to their body size.

SH: If you think about breathing in a toxin compared to your ability to deal with that, they're getting a much higher burden of whatever they're breathing in, compared to people who are older than they are.

AA: Reason number two: Kids bodies are changing more rapidly than adults are as they grow and develop. These periods make their bodies more vulnerable to the effects of toxins.

SH: If you have exposures that disrupt growth, that can have very different consequences than an exposure that happens to an adult who is a more static system – adults don't change as much as kids change.

AA: Some long-range research out of the University of Southern California found that kids who were exposed to higher levels of air pollution showed lower lung function and growth, which can lead to other problems, like asthma and pulmonary disease later in life.

And reason number three that kids are more vulnerable to wildfire smoke:

SH: Kids tend to run and play outside more than adults do, which on the whole is a really good thing, right? We want kids running and playing. But it means that if you have an outdoor air pollutant exposure, that they're also probably going to get more of that exposure than the adult is.

AA: When kids are exposed to wildfire smoke Dr. Holm says you see an uptick in the more predictable symptoms – wheezing, runny nose, scratchy throat. But some emerging research is raising alarms about other potential health outcomes.

SH: Children who are exposed to wildfire smoke in utero – and this is based on just a couple of studies but enough to make me concerned – that there are higher rates of preterm birth, so kids being born earlier and smaller than you would expect for their age related to wildfire smoke exposure anytime during pregnancy.

AA: More broadly, when kids are exposed to high levels of particulate matter – such as from industrial air pollution, which shares some characteristics with wildfire smoke – research has found associations with a wide variety of other health effects.

SH: That includes things like metabolic effects, so changes in weight and blood pressure and BMI. Things like neurocognitive effects, both changes in IQ and cognition, and also some changes in behavioral disorders, like ADHD and those kinds of things. Particulate matter is also a known carcinogen, meaning that long term lifetime exposure can increase the risk of cancers later on life.

AA: Dr. Holm says there's much more research to be done on wildfire smoke exposure and health outcomes in kids, but there are lots of things parents can do to minimize exposure.

First, make the air in your home as clean as possible. If you have a central air conditioning system, Dr. Holm says get MERV (M-E-R-V) 13 filters.

SH: MERV stands for minimum efficiency rating value. And those are the filters that will capture most of the particles down to some pretty small particles. And you can really keep your indoor air pretty clean using MERV 13 filters, especially if you make sure that you have extras on hand so you can change them as they get dirty.

AA: If you don't have central AC, Dr. Holm says you can buy air cleaners, but suggested the mechanical kind that push air through a filter, rather than the electronic ones that ionize the particles.

Or, there's the DIY approach which many people have taken:

SH: If you take a box fan, a basic 20-inch box fan, and buy a MERV 13 filter, and just secure it to the front of the box fan and just by pushing air through that filter you can get pretty good filtration as well.

AA: But Dr. Holm cautions not to leave those box fan set-ups unattended since they weren't meant to run with filters attached to them and there could be a fire risk.

Smoke severity can change throughout the course of the day, so Dr. Holm says to keep an eye on it and when the wind shifts and it lifts, that's a great time to get kids outside for some activity – and to air out the house if you can.

Face masks are another option – though there are some specifics to think about there, too, Dr. Holm says. Those cloth masks that help keep COVID-19 droplets away aren't effective for smoke.

SH: Better in terms of filtration for wildfire smoke would be medical or surgical face masks. So, the kind of mask that you would wear at a clinic, if they're handing out the disposable face masks.

AA: Fit is key, and those surgical pleated masks don't always fit snugly. The best mask for smoke is a respirator mask – the N95 variety or better.

SH: The bottom line there is that can a kid get some protection from wearing a surgical or medical type mask or a N95 respirator? Yes. Is it enough that you should feel safe having your kid do their normal activities? No. I like to always think of it as having a clean indoor space is the first priority and paying attention to when you go outdoors. But if you have a reason that you need to go outdoors –like it's time to take your kid to school, school starts at 8:00 you have to go outdoors now – putting a mask on them for that period where they have to be outdoors may give you some protection and may give them some protection.

AA: But if you approach the problem of wildfire smoke exposure from the community level, Dr. Holm says improving air filtration in schools and other public places where kids gather is a cost-effective step to help a broader swathe of the population.

SH: That's really important because a lot of schools will talk about that during wildfire smoke events, they might want to shut down. They say our air quality is bad, we're going to shut down. All that does is it exacerbates the underlying inequities, because you've sent kids home to homes, some of which have good air quality, and some of which won't.

AA: Policies that reduce greenhouse gas emissions and promote better forest management will also help the broader problem of climate change related wildfires, says Dr. Holm. And tackling that big picture issue is important, because the lives of our kids depend on it – and so does their mental health.

Living in an area that is destroyed by wildfire can have immediate and long-term traumatic effects on kids. Some research from Fort McMurray in Alberta, Canada found symptoms of depression and PTSD in kids who were evacuated due to wildfire.

Kids thrive on routine and repetition, Dr. Holm says, and a wildfire robs them of that. Avoiding smoke exposure can also trigger changes and limitations in a child's life that can add another layer of stress to whatever they are already facing.

SH: And so I think it's really important for communities to be extra aware that kids that are already dealing with the highest number of stressors and burdens, are those who are going to be really at risk for mental health issues following wildfire smoke events.

AA: There are several good resources Dr. Holm recommended that parents check out. The National Child Traumatic Stress Center has released a storybook about kids evacuating from a fire called "Trinka and Sam and the Big Fire." It's also available in Spanish. There's also an app called "Help Kids Cope" for parents navigating natural disasters like wildfire.

Dr. Holm and her colleagues at the Western States Pediatric Environmental Health Specialty Unit have developed a continuing education series for health professionals called A Story of Health. There are different chapters on how environmental exposures can affect people's health.

SH: We have been just developing this year a wildfire smoke chapter that has a narrative of a story, and intermixed with the story is a bunch of scientific information to really connect it to this child – a little girl named Sophia – a fictional character. And so you can sort of think through how this wildfire smoke event affects Sofia's life and what the different health components are that should be considered.

That chapter was released in the summer of 2021. You can find it at the Environmental Health Chat website.

[Music comes up]

I'm Ashley Ahearn. Thanks for listening – and stay safe this summer.