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The Surprising Effects of Wildfire Smoke on the Skin

Dr. Keller:

Over the past several years, there's been an uptick in the number of wildfires occurring in the United States, exposing thousands to a variety of respiratory and cardiovascular health threats. But could wildfires also affect the skin?

Welcome to *DermConsult* on Reach MD. I'm Dr. Matthew Keller and joining me to discuss her recent study on this topic is senior author, Dr. Maria Wei, a dermatologist and melanoma specialist at the University of California San Francisco. Dr. Wei, thanks for being here today.

Dr. Wei:

Thank you very much. My pleasure.

Dr. Keller:

So, to start off, Dr. Wei, can you tell us what inspired you to look into the effects of wildfires on the skin?

Dr. Wei:

Yes, I'm very interested in how the environment interacts with the skin. The skin's the largest organ of the body and its primary function is to act as a barrier. It's a physical barrier, it's an immunological barrier, and it's a temperature barrier. I've studied melanoma for a number of years now, and that's a skin disorder that comes through the interaction between the skin ultraviolet radiation from the sun, and an individual's genetics. In the case of wildfires, as you mentioned, here in northern California we've been experiencing an increase in the number and intensity of wildfires. In 2018, when the Camp Fire started, I was in my office in San Francisco here which is 175 miles away from the source of the fire, and ash was falling from the sky like snow, and smoke was covering the skies. And as I was looking out my office window, I wondered at that time how the smoke and ash might affect the skin, and just during that week of the fire, I had a student come in who was very interested in his first sentence was, "I'm interested in studying the environment and the skin." So that was Raj Fadadu, he's the first author on the paper, and that's how the project got off the ground.

Dr. Keller:

It's interesting how serendipity and sort of how things come together in scientific research. But what about wildfires make them so dangerous for the skin?

Dr. Wei:

Well, first, air pollution generated by wildfires has a very wide reach. I was sitting 175 miles, in my office, away from the source of the fire, and yet the smoke was dense, and ash was falling. Last year, pollutants from fires on the West Coast could be detected on the East Coast and over the Midwest as well. Second, depending on what's burned, the composition of fires is very complex. For example, the Camp Fire burned down not just foliage, but also the town of Paradise, so that many of the pollutants that resulted were from burning household items, such as plastics, metals, and created very toxic fumes. Third, the increasing intensity of fires means that the density of pollutants in the air is greater and that is pushing the skin past its limits. And then lastly, there are cells in the skin that have receptors that can bind certain pollutants in the air and actually actively internalize them, to cause inflammation and itch.

Dr. Keller:

One of the things I found most interesting about your study was that so many of the patients in the research were patients who did not carry a diagnosis of eczematous dermatitis. Can you explain to us why you think that was?

Dr. Wei:

Yeah that's exactly right. We found that during the time of the fire, 90 percent of the folks that came in with itch did not have a diagnosis

of eczema or atopic dermatitis. And that means that supposedly their skin barrier is normal, and yet they were getting irritation and possibly some inflammation from the components that were airborne, due to the wildfire. And that's a bit worrying because that really shows that the air pollution that was generated 175 miles away is affecting folks with normal skin. And our findings are probably much less than it would be if you looked at folks that lived closer to the fire, with immediate proximity and that's something that we're gonna look at in the future.

Dr. Keller:

For those of you just tuning in, you're listening to *DermConsult* on ReachMD. I'm Dr. Matthew Keller, and today I'm speaking with Dr. Maria Wei about her recent study exploring the potential link between wildfire smoke and skin disease. So, Dr. Wei, how do wildfires differ from a typical campfire or fireplace? Should we recommend our atopic kids not go camping?

Dr. Wei:

Well, wildfires are significantly different from a typical campfire or fireplace fire, in that wildfires are very intensely burning. They're much hotter and unpredictable. They can burn items such as homes, as I had mentioned before, and create air pollution in greater quantity than a typical campfire or fireplace with a greater density of pollutants and so they have a very different quality from campfires or fireplace fires. I think that kids with atopic dermatitis or eczema can safely go camping and just be mindful of not standing in the plume of campfire smoke, which can shift with the wind, and also the contact is so brief if they happen to walk through the plume. It's not an issue. Wildfire pollution, it's usually present for a number of weeks. For example, the Camp Fire in 2018, the one that we studied in our paper, the air pollution in San Francisco, 175 miles away, lasted for two weeks and the level of pollution was greater than tenfold over baseline. So quite different from the exposure that you'd get at a campfire.

Dr. Keller:

Thank you so much for that. So, what recommendations would you have for people during wildfires? Should they stay inside? Use emollient if outdoors?

Dr. Wei:

Yes, there are some pretty simple strategies that you can use to protect yourself. One of them, of course, is staying inside, and wildfires don't just affect the skin, they can affect the lungs, the cardiovascular system and actually the neurological system as well. So, staying inside is a very good strategy, but of course, if the fire is prolonged and you have to go about your business you can apply emollients because that provides an additional barrier. If you have normal skin it is additive to your normal skin barrier, and if you have eczema or atopic dermatitis, it sort of replaces and gives you a normal barrier in times when you don't have a normal barrier. You can wear long sleeves and long pants, just to cover your skin as well.

Dr. Keller:

So, before we wrap up, Dr. Wei, did you find or are you looking into any other skin conditions that may be affected by wildfires?

Dr. Wei:

Yeah, great question. We definitely are. We're interested to see how generalizable our results are. First of all, the Camp Fire was unique in the sense that it unfortunately burned down an entire town, so the pollutants there were very complex. A so-called "ordinary" wildfire would not have that complex mixture, so we're interested to see if other wildfires have this effect. And we're also interested to see if other skin disorders would be vulnerable to the effects of wildfires as well.

Dr. Keller:

Well, that's a great way to round out our discussion, and I want to thank Dr. Maria Wei for sharing her intriguing research with us today. Dr. Wei, it was great having you on the program.

Dr. Wei:

It was fun being here. Thanks so much for having me.

Dr. Keller:

For ReachMD, I'm Dr. Matthew Keller. To access this episode and others from *DermConsult*, visit ReachMD.com/DermConsult, where you can Be Part of the Knowledge. Thanks for listening.