ISEE Talk:

15 slides

1. seconds each
2. Hi everyone, I’m Heather, and I’m a PhD student at Columbia in the Environmental Health program. I’ll be presenting some work I did with my supervisor Joan Casey, and these lovely co-authors. This study is part of a larger research program where we’re trying to characterize the effects of climate-related exposures in potentially vulnerable populations so that we can inform climate resilience policy!
3. In this study, we looked at the association between two different exposures to wildfire and frequency of health care visits in older adults who use electricity-dependent medical equipment and who are insured by Kaiser Permanente Southern California.
4. This map here is of the seven counties that made up our study area, in which wildfires are becoming increasingly common, and there’s a big fire season now every year.
5. Why electricity dependent medical equipment? Electricity dependent medical equipment is things like oxygen concentrators, electric beds, and at-home ventilators. We thought that people who rent this equipment might be particularly vulnerable to cardiovascular and respiratory health effects from wildfire smoke, and to stress from having to evacuate from a fire, because if you use this equipment you’re usually using it to manage cardiovascular or respiratory illness. This indicates some level of disability. Older adults who use electricity-dependent medical equipment might also be less able to evacuate because they need electricity to power their equipment.
6. We wanted to draw attention to this population because as we plan for climate-related disasters, it’s essential that we consider who is most vulnerable to these disasters, and plan accordingly so that no one is left behind, ideally, by our disaster response.
7. To look at the association between wildfire exposure and healthcare utilization by these people, we measured wildfire exposure in two ways. First, we looked at wildfire smoke PM2.5 concentrations. As many of you probably know, there are a lot of studies looking at wildfire PM2.5 exposure and that show a relationship between PM2.5 and cardiorespiratory disease exacerbation. This is well-established. We used satellite-image based models combined with ground measurements to estimate wildfire PM2. 5 exposure by ZCTA for each participant.
8. But, we also wanted to describe and quantify direct exposure to wildfire – if a wildfire is burning near your house and you have to evacuate, what does that mean? To do this, we got wildfire evacuation boundary data from news sites and the Los Angeles Fire Department archive for two big Fires in the study area – the Getty Fire and Woolsey Fire. We digitized the maps of the evacuation zones in QGIS and identified ZCTAs and then people who were evacuated from their residences.
9. We used negative binomial regression models to look at the relationship between each of these two exposures and daily ZCTA-level counts of 5 types of health care visits – outpatient visits for all causes, inpatient visits for all causes, and emergency visits for all causes, and then inpatient visits for cardiorespiratory disease, and emergency visits for cardiorespiratory diseases. We singled out cardiorespiratory related visits because previous literature suggests there will be PM 2.5 effects related to these outcomes, and we think our population here might be at an elevated risk of these cardiovascular disease exacerbations to begin with.
10. We controlled for daily temperature, long-term seasonal trends not caused by the exposure, daily non-wildfire PM 2.5, and ZCTA-level SES variables in both of our models. We tested for both immediate and lagged effects of wildfire PM2.5 exposure on all types of healthcare utilization, and we tested the immediate effect of evacuation exposure on all types healthcare utilization.
11. We found associations between wildfire PM 2.5 exposure and increased frequency of outpatient visits, and all other types of visits by people who use electricity-dependent medical equipment. We also found associations between evacuation exposure and decreased outpatient visits, and increased inpatient admissions for cardiorespiratory disease for only the Woolsey Fire out of the two fires we examined.
12. Despite the fact that we used a sample of everyone insured by Kaiser in Southern California, we still might have been underpowered to detect these associations. Additionally the Getty Fire was a much smaller fire than the Woolsey, and might have had fewer effects on health overall.
13. It would have been ideal to do some subgroup analyses, but unfortunately we didn’t have the data for that. We’re also limited by the fact that we’re only looking at hospital visits made in the Kaiser Permanente system, and during disasters, people insured by Kaiser might have gone somewhere else.
14. Still, these findings suggest that older adults who use electricity-dependent medical equipment may be experiencing health effects of wildfire smoke exposure and seeking care for them, and at the same time, that wildfire evacuation might interrupt routine care.
15. This population is vulnerable to wildfire smoke and evacuation, and we should both learn more about how to support this population, and include this population when planning disaster response.