Slide 1:

I studied wildfires in Pueblo, a city in Southern Colorado, where there have been serious wildfires in recent years.

The county it’s part of has higher rates of asthma than the statewide average, so my analysis quantifies the severity of wildfire smoke in Pueblo and examines whether we can connect that to asthma hospitalizations.

Slide 2:

Colorado considers Pueblo a **moderate wildfire risk.**

On this map, **red areas indicate high wildfire risk**, and you can see that while Pueblo isn’t red, it is **close to a lot places that are**, so it can occasionally be affected.

One way to think about the risk is to draw a circle about 100 miles around Pueblo, represented by this circle, in red

Slide 3:

…and check how many acres are burned by fires within that circle, plotted here.

Notice two things: (1) **the average number of acres burning increases after 2000** and (2) the **acreage burned swings wildly from year to year.**

But this chart **treats every acre burned inside of the 100-mile range equally**; you’d expect closer fires to affect Pueblo more.

Slide 4:

To deal with this, I measured smoke intensity in Pueblo **accounting for the distance** between Pueblo and the fire.

Say a fire is **10 miles from Pueblo; if that same fire were 20 miles away, it’s only going to count 1/4** as much in measuring the intensity of smoke people in Pueblo experience.

Slide 5:

Measuring smoke intensity this way **smooths out the spikes** a little bit, because it gives the most weight to fires close to Pueblo.

At this same time, it **still tracks acreage burned close to Pueblo well, which makes sense for a good metric**. Now, we have a way of measuring smoke intensity in the city.

For this to be useful, want to link it to consequences people face due to wildfire smoke.

Slide 6:

People with asthma are at particular risk from wildfire smoke, which can irritate lungs and worsen symptoms.

If my smoke intensity metric is predictive of asthma hospitalizations, this can **help the Pueblo City council think about how to help people with asthma stay healthy** when wildfires hit.

Slide 7:

The CDC has studied something similar.

**They found that in New York, asthma-related ED visits increase 80% on days when wildfires peak.**

I wanted to **test the hypothesis that the same relationship exists in Pueblo**. Unfortunately, my data on wildfires and hospitalizations was **only reliable at yearly level.**

Slide 8:

When I used that yearly data to examine the connection between smoke intensity and asthma hospitalizations in Pueblo**, I did not find the positive relationship I expected.** **Asthma hospitalizations are pretty much declining regardless of yearly wildfire smoke levels.**

But there’s a problem, called **aggregation bias**

Slide 9:

When data values are aggregated from, say, daily to yearly level, **relationships that exist at the daily level can get averaged out**.

**Maybe asthma hospitalizations do spike on *days* with lots of smoke, but not in *years* where many other things happen, like public health interventions that help people with asthma.**

Slide 10:

To better study this problem, the **Pueblo city and county governments can gather more granular data on wildfires *and* hospitalizations**, ideally allowing us to test hypotheses at a daily level.

This can empower Pueblans with asthma when wildfires strike. Thank you.