Notes from meeting with Dana about DID study design:

Assumptions of the DID method:

* Parallel trends
* No coincident changes
* No interference
* No anticipation
* Exchangeability
* Correct model specification

What these things mean in our case:

Parallel trends:

* Because we doing group-time ATT, trends need to be parallel on average in pre-treatment times
* Coincident changes and anticipation and interference all kind of tie into this discussion
* No anticipation we kind of get for free with wildfire being the way it is as an unexpected disaster – wouldn’t likely cause hosps the month before
* No coincident changes could cause trends to not be parallel
* The way this could happen is if temperature is higher in treated units than in untreated units (maybe before and during wildfire and the high and dry temps are a cause of wildfire)
  + This could lead to higher hosp before and during treatment due to temp and not in neighboring units
  + Would violate parallel trends and no coincident changes
  + This is a time-varying confounder that might be different on average between treated and untreated units
  + Need to control for this
  + Other possibility is precipitation or severe weather
  + Temp could be systematically higher in treated units

Exchangeability:

* Baked into parallel trends in that once we control for time-varying confounders different between treated and untreated units we get exchangeability.

Relatedly, it’s possible that treated units are not a random sample of units. But we’re estimating the ATT, and so if we wanted to generalize this, we could do transportability to other units but for now we’re getting the ATT in treated units in the US. Might be different/biased compared to the ATE or something/it’s not an estimate of how the exposure would affect the whole population, but it’s something. If they are different would be an example of heterogeneity in treatment effects between units.

Can look at treatment effects 1-3 months after wildfire exposure and have a 2-year washout period. Possible to do sensitivity analysis on length of washout and length of follow-up period.

Reviewers may ask for us to control for educational attainment or something, which doesn’t make sense but is fine to do. Can do this and supplement dump if we need to. Would be a precision variable.

* Need to look for tutorials for the package they use in THE tutorial.

What else?

* Can restrict to control regions that experienced a wildfire at some point if we want to rule out differences in the underlying trends between those groups of places. Shouldn’t affect estimates so let’s check
* Varying follow-up and washout periods is good
* Could we randomly assign fire exposure as a negative control exposure in places that were never exposed? And expect a null result? Or attenuation? I think that would be interesting to try
* Day of week effects, population changes, changes in evacuation and warning procedures, changes in fire size and severity, and other things could affect the effect of wf on hospitalizations but none of these things do so differentially across the treatment timing, so they shouldn’t bias estimates
* Top ten or 15, categories of small medium large, mild moderate severe can do that.
* Are evacuation warnings better? Period-specific
* Could try estimates with only fires that caused mortality or something as well structures burning

Biggest question: parallel trends