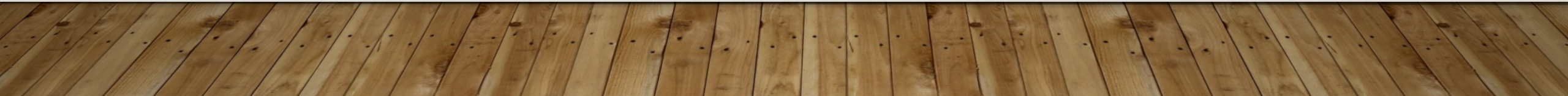


CLIMATE CHANGE AND COVID-19

TOM BECKER

NORTHWEST PORTLAND AREA INDIAN HEALTH BOARD



GAME PLAN FOR TODAY

- Highlight an article in NEJM on climate events and COVID-19 (Salas et al, Climate crises and Covid-19, NEJM July 17, 2020)
- Answer question/s about last week's presentation

FACE SHIELDS AND AEROSOLS

- Simulated cough in lab setting
- Simulated inhalation in lab setting
- Varied droplet sizes
- Influenza virus-based aerosol (not SARS)
- Measured protective effect/lack thereof at different times

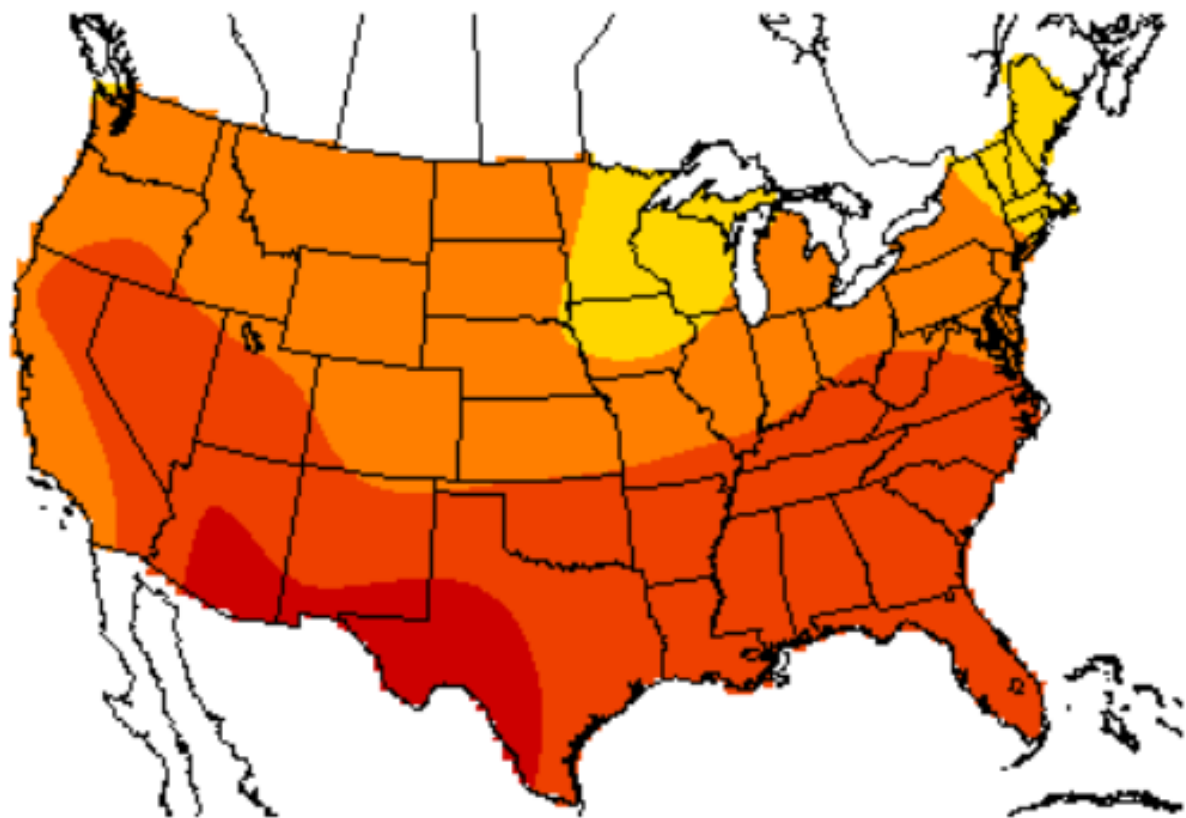
Healthcare workers are exposed to potentially infectious airborne particles while providing routine care to coughing patients. However, much is not understood about the behavior of these aerosols and the risks they pose. We used a coughing patient simulator and a breathing worker simulator to investigate the exposure of healthcare workers to cough aerosol droplets, and to examine the efficacy of face shields in reducing this exposure. Our results showed that 0.9% of the initial burst of aerosol from a cough can be inhaled by a worker 46 cm (18 inches) from the patient. During testing of an influenza-laden cough aerosol with a volume median diameter (VMD) of 8.5 μm , wearing a face shield reduced the inhalational exposure of the worker by 96% in the period immediately after a cough. The face shield also reduced the surface contamination of a respirator by 97%. When a smaller cough aerosol was used (VMD = 3.4 μm), the face shield was less effective, blocking only 68% of the cough and 76% of the surface contamination. In the period from 1 to 30 minutes after a cough, during which the aerosol had dispersed throughout the room and larger particles had settled, the face shield reduced aerosol inhalation by only 23%. Increasing the distance between the patient and worker to 183 cm (72 inches) reduced the exposure to influenza that occurred immediately after a cough by 92%. Our results show that healthcare workers can inhale infectious airborne particles while treating a coughing patient. Face shields can substantially reduce the short-term exposure of healthcare workers to large infectious aerosol particles, but smaller particles can remain airborne longer and flow around the face shield more easily to be inhaled. Thus, face shields provide a useful adjunct to respiratory protection for workers caring for patients with respiratory infections. However, they cannot be used as a substitute for respiratory protection when it is needed.

TAKE HOME MESSAGES

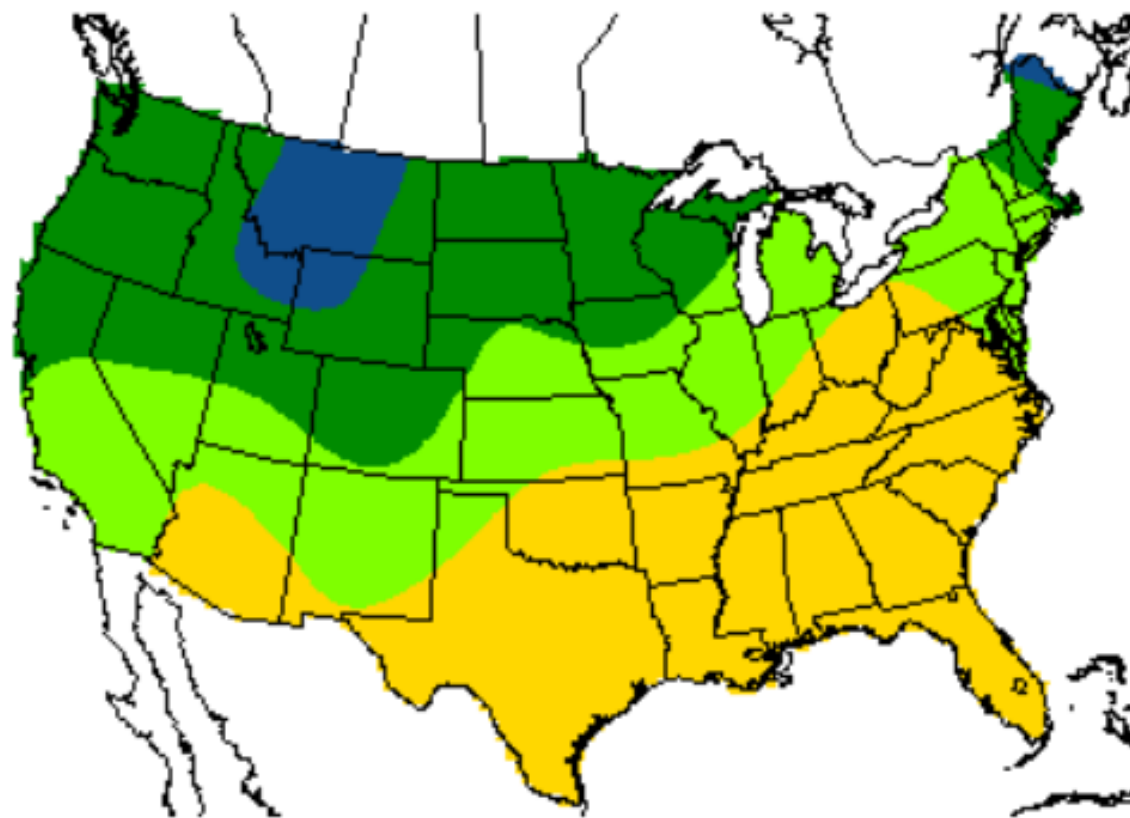
- To minimize the transmission of SARS- CoV-2 during extreme weather events in the US... sheltering, population evacuation, and related strategies will need to be modified
- In long term, we need to see prioritization of federal and state funding to address the overlapping challenges of climate change and COVID-19 epidemic

INTRODUCTION

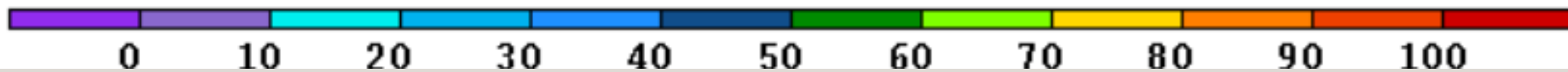
- Al Roker says it is hot out there! Including in Indian country
- Tropical storm arrived June 7th
- Record temperatures in southern US
- Wildfires in the West
- Meanwhile, climbing COVID cases in many states
- Unclear if federal or other agencies are preparing for the dual challenge of weather-related disasters and COVID

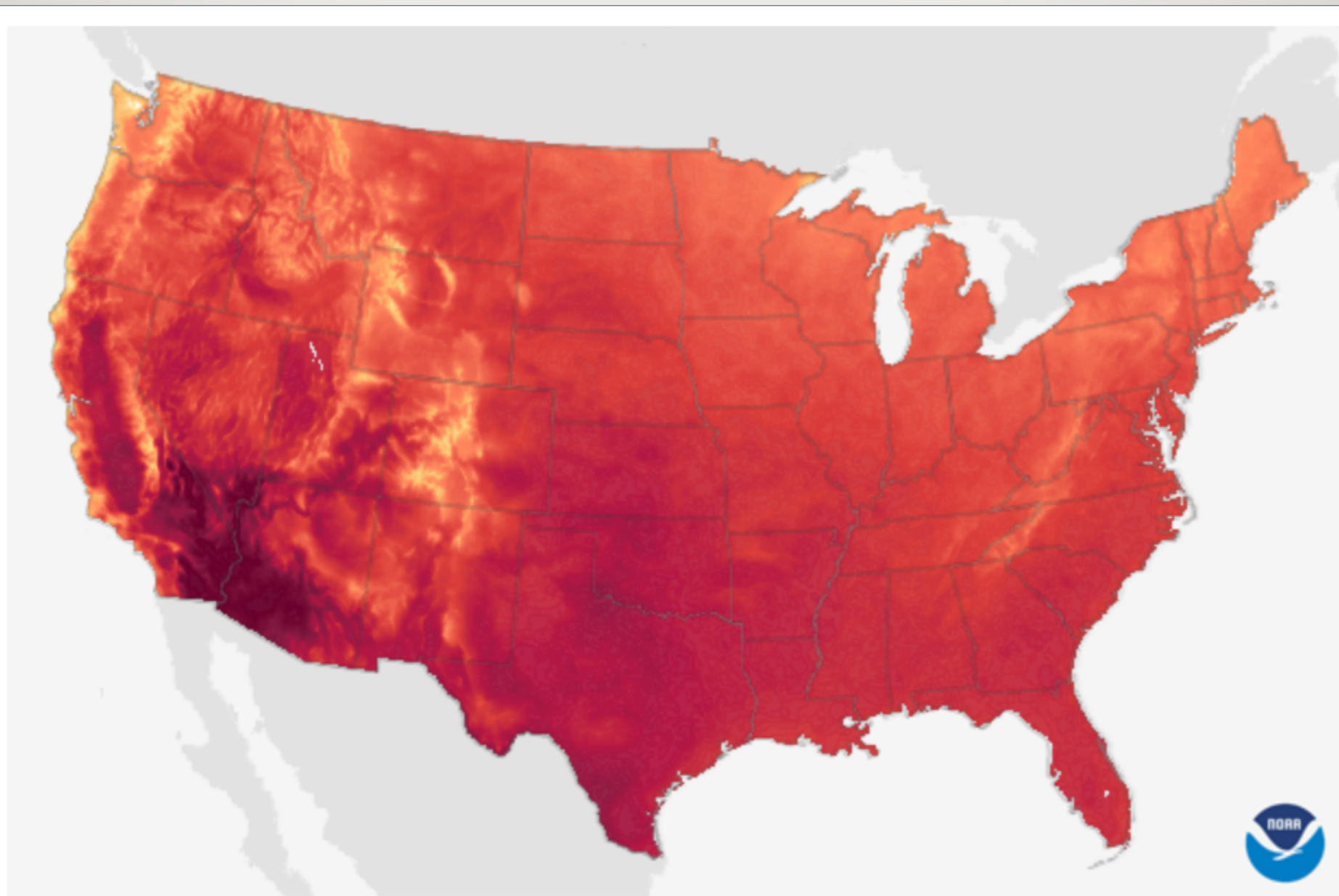


Maximum Temperature



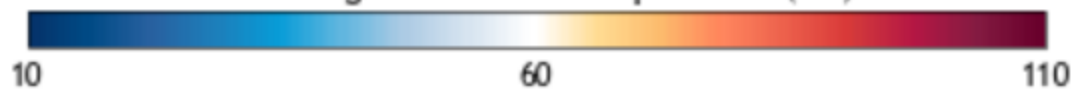
Minimum Temperature





July 2020-2029
High emissions
(RCP 8.5)

Average maximum temperature (°F)



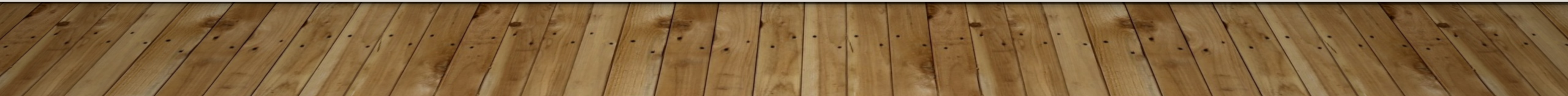
Climate.gov
Data: LOCA

WEATHER AND EFFECTS

- 2020 may be the hottest year ever recorded
- Rapid increase of COVID-19 in very hot states
- Wearing face masks in high heat can be very uncomfortable
- Cooling centers (with AC) can become more crowded than ever before
- Recall 2018 evacuation orders for 1 million people in US

WEATHER AND EFFECTS

- High heat and air pollution may negatively effect pulmonary function...increasing COVID-19 risk in people with pre-existing conditions
- Heat wave or other climate events (hurricane, tornado, flooding, wildfires) can bring an excess number of people to hospitals that already see COVID-19 patients (increasing transmission risk)
- Disruption of services related to a climate event (blackouts, impassible roads, downed communication systems) further threaten health and health care...for COVID-19 and everything else
- These issues are not limited to the US...India and Nepal recently experienced displacement of 4 million people related to floods



Short-Term Strategies for Managing Climate-Related Extreme Events during the Covid-19 Pandemic.

Extreme events (e.g., hurricanes, wildfires): evacuation and sheltering

Communicate clearly to the public that the Covid-19 pandemic does not change the imperative to evacuate, given the substantial risks of remaining in place during extreme climate-driven hazards.

Use existing community pandemic-communication channels to disseminate critical information.

Increase the number of available shelter sites, with lower occupancy per site, more separated spaces within sites, and more space per shelter resident (e.g., using smaller “noncongregate shelters,” hotels).

Use standard shelter-registration information (name, contact phone number) for all persons entering, to facilitate contact tracing in case Covid-19 is diagnosed in persons who used the shelter.

Implement shelter protocols for infection control, including daily symptom checks, isolation of symptomatic persons, mandatory wearing of face masks, ample supplies of hand sanitizer, hand-washing stations, and meals provided in disposable containers.

Adapt guidance for minimizing Covid-19 viral transmission in mass care settings for use with in-home sheltering — because many evacuees shelter with family and friends.

Extreme heat: remaining at home and cooling locations

Provide electricity subsidies and extend moratoriums to prevent electricity and water shutoffs for people with pandemic-related unemployment and economic hardships to allow them to remain in their homes.

Ensure effective alternatives to minimize heat exposure if designated cooling centers or popular indoor, air-conditioned venues are closed.

Ensure that cooling centers follow guidelines similar to best-practice guidelines noted above.

Minimize transmission risks by limiting occupancy and providing or requiring masks and hand sanitizer in air-conditioned venues open to the public, such as malls or movie theaters.

Use phone text messages, as used for pandemic communication, for heat-health notifications.

SOME FIXES

- Expand telemedicine services/capabilities for provision of care/psyc support/advice during overlaps of extreme events
- Expand paramedic services for at-risk people in communities
- Decrease fossil fuel dependence, decrease air pollution, decrease greenhouse gas emissions (that take a greater toll on the same populations at higher risk for SARS-CoV-2)
- Consider environmental modifications...parks, white roofs on buildings, green design
- Shore up community outreach programs for most vulnerable people

HOW DOES THIS AFFECT US IN INDIAN COUNTRY?

- Your clinic/hospital/practice/tribe may be part of the larger emergency preparedness community
- If you are at the planning table already, you can plead the case for special preparations for your patient population (culturally-tailored community education about safety and SARS-CoV-2 transmission)
- If you are not represented in emergency preparedness plans and the overlap of climate disasters and COVID, perhaps you can insert yourself or a representative

REFERENCES

- **Climate Change & COVID 19**

- Shultz JM, Kossin JP, Hertelendy AJ, et al. Mitigating the twin threats of climate-driven Atlantic hurricanes and COVID-19 transmission [published online ahead of print, 2020 Jul 14]. *Disaster Med Public Health Prep.* 2020;1-30. doi:10.1017/dmp.2020.243
- ***this one talks mostly about hurricanes but this could apply to forest fires etc (evacuating homes in fire-prone areas****

- **Climate Change & Emerging Pathogens**

- Tong S, Ebi K. Preventing and mitigating health risks of climate change. *Environ Res.* 2019;174:9-13. doi:10.1016/j.envres.2019.04.012

- **Climate Change & Infectious Disease**

- Zinsstag J, Crump L, Schelling E, et al. Climate change and One Health. *FEMS Microbiol Lett.* 2018;365(11):fny085. doi:10.1093/femsle/fny085.