Presented by Dr. Ponette-Gonzalez and Evan Klansnic 11/19/2025

Planning for Extreme Heat and Air Quality Hazards

Guest Speaker

I'm Evan Klansnic, an undergraduate at the University of Utah studying sociology, with an interest in urban and environmental planning.

- I am very interested in how cities accommodate their residents.
- I helped with Alex's environmental planning research last summer by collecting field data.
- I am currently in a project to identify ways cities intervene and give guidance in extreme heat and air quality emergencies.
- I've played piano for 12 years, and have a cat named Sage.

What is a Heat Action Plan?

According to the U.S. Center of Disease and Prevention, a heat "response" plan:

1. Is a coordinated plan that describes and organizes activities to prevent heat-related morbidity and mortality
2. Focuses on emergency response or includes information on long-term adaptation
3. Covers a broad geographic scope (such as a state or large county) or a smaller area (an individual city, school, or neighborhood).
4. Activates in response to temperature information (such as from the National Weather Service)

[1] Centers for Disease Control and Prevention. (2020). *Heat response plans: Summary of evidence and strategies for collaboration and implementation.* U.S. Department of Health and Human Services, CDC.

Components of a Heat Action Plan

HEAT IMPACTS

- ❑ Describes how extreme heat affects people, infrastructure, and services in the area

PLAN ACTIVATION

- ❑ Triggers specific heat actions when certain temperatures, heat index values, or durations are reached

VULNERABLE GROUPS

- ❑ Identifies who is most vulnerable and where heat risk is concentrated in the jurisdiction

COMMUNITY CONTEXT

- ❑ Captures local housing, language, transport, social, or cultural factors that shape heat risk and response

INTERVENTIONS

- ❑ Lists what agencies and partners do before, during, and after heat events to reduce health impacts

AGENCY ROLES

- ❑ Assigns responsibilities and coordinates communication across agencies, partners, and stakeholders

EVALUATION

- ❑ Tracks what worked and revises the heat plan based on data and after-action reviews.

[1] Centers for Disease Control and Prevention. (2020). *Heat response plans: Summary of evidence and strategies for collaboration and implementation.* U.S. Department of Health and Human Services, CDC.

What is an Air Quality Action Plan?

"Air Quality Action Plan" can mean very different things depending on the jurisdiction. Let's look at a few examples:

1. Seattle and King County define their "wildfire smoke" response plan as the anticipated actions the department may take before and during a wildfire smoke event to protect community health and limit health disparities.
2. Salt Lake City defines their Air Quality Action Plan as an initiative to encourage City employees to telecommute or modify their commutes during days when air quality is deteriorating or considered unhealthy.
3. San Diego County define their regional air quality strategy as a comprehensive air pollution control strategy including all feasible measures to reduce emissions (and PM as a co-benefit)

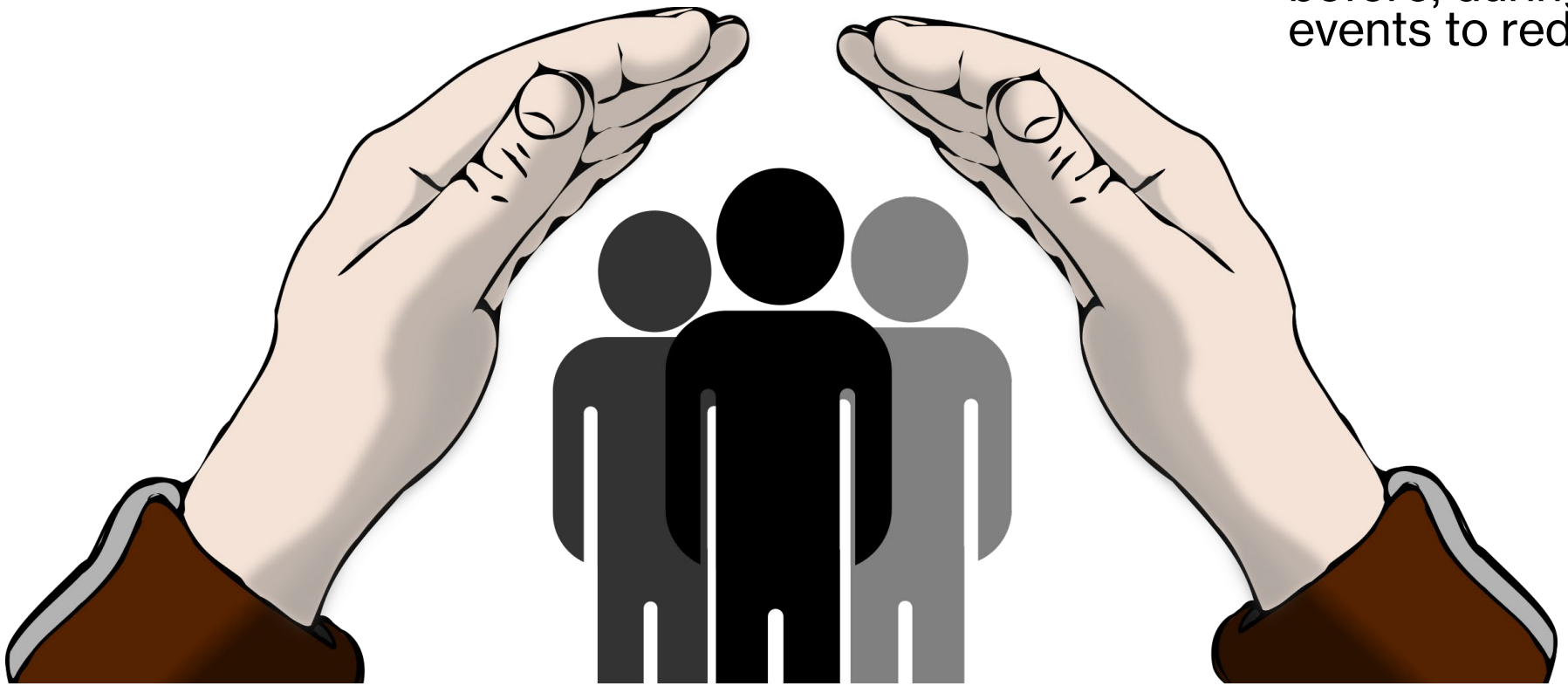
[1] Public Health – Seattle & King County. (2024). *Wildfire smoke response plan* (Version 3.0). [2] Salt Lake City Corporation. (2021). *Salt Lake City Corporation's workforce Air Quality Action Plan*. Sustainability Department. [3] San Diego County Air Pollution Control District. (2022). *2022 Regional Air Quality Strategy (RAQS): 2022 revision of the Regional Air Quality Strategy.*

Interventions

If you could build a heat or air quality action plan, what interventions would you provide for people to protect them from extreme heat and air quality hazards within your city?

As a reminder, interventions are:

what agencies and partners do before, during, and after heat/AQ events to reduce health impacts.



The ideas are endless.

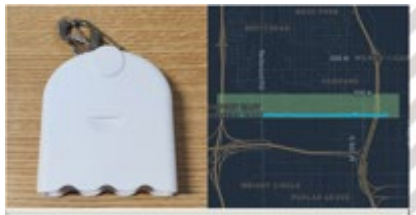
Videos

- [King County developing its first Extreme Heat Mitigation Strategy]
- [Shipping containers turned into downtown Phoenix cooling centers - YouTube]

Does That Little Strip by the Curb Help Me Cool Down?

Many heat action plans highlight urban greening, but maintaining trees is expensive. A cheaper idea is to change the *park strip* surface (the narrow strip between sidewalk and street) and hope it cools pedestrians.

- ❑ Location: 3.25 km segment of W North Temple in SLC, UT
- ❑ Park strips classified into several material types (grass, gravel, bare, etc..)
- ❑ 6 afternoon walks (4-6 pm) in June with wearable sensors logging heat index/GPS location every 2/1 second(s)
- ❑ Each measurement matched to park strip type and with/without tree canopy (NLCD)

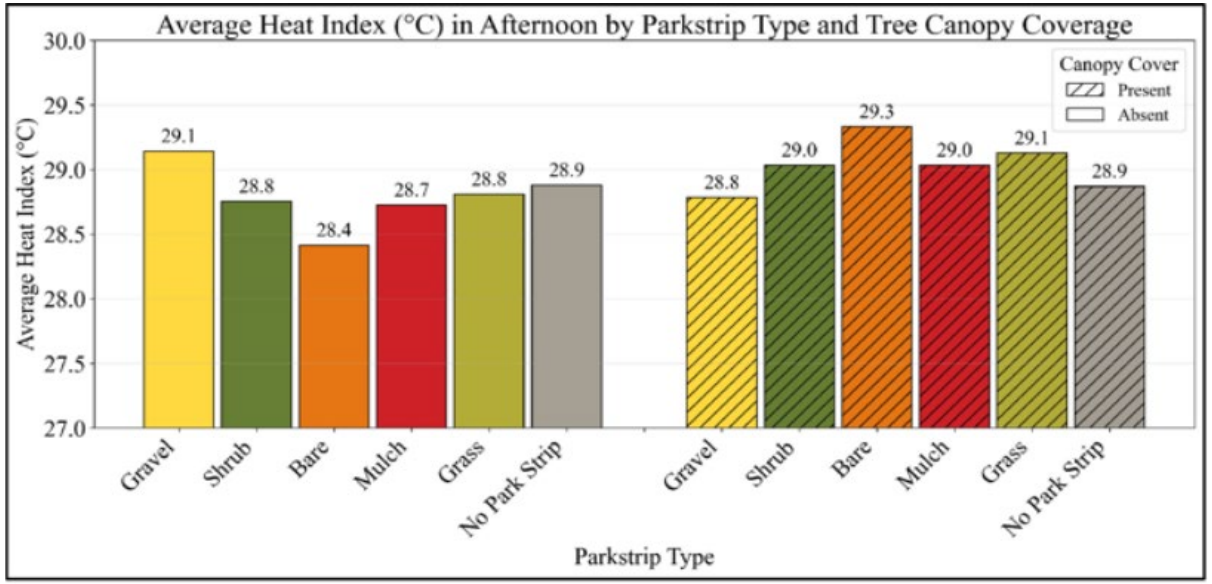


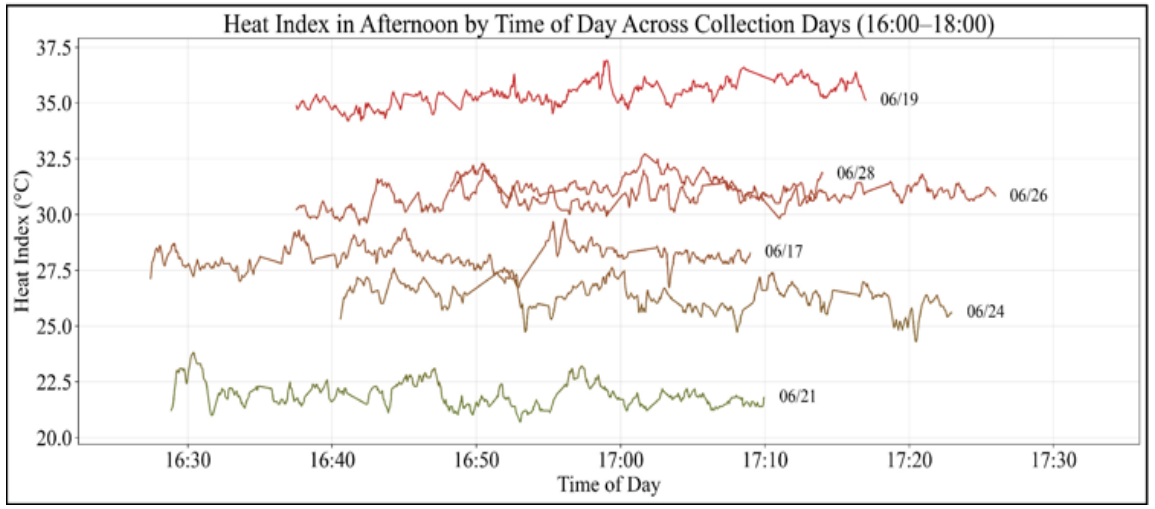
The Airbeam 3 measures particulate matter concentrations and has built in GPS.

The Kestrel Drop D3FW primarily measures temperature and humidity.

Material Impacts on Heat Index Are Too Small to Detect

Walking beside park strip materials with and without tree canopy produced very small differences in pedestrian heat index, while heat varied widely due to outside factors.





- ❑ Across 4,920 measurements, the average HI was within 28.4-29.3 °C
- ❑ Within each 2-hour walk, HI varied ~2.7-3.3 °C along the route, three times any material/shade difference.
- ❑ A two-way ANOVA showed no significant effects.
- ❑ Factors such as weather, strip size, and urban form may have masked readings.
- ❑ Fixed sensors would be better to isolate each materials affect on ambient HI.

Three Interventions: Targeted Alerts, Behavior Guidance and Urban Greening

This project aims to:

- ❑ Examine how large Western U.S. cities try to protect residents from extreme heat and PM2.5 using targeted alerts/risk messaging, behavior change guidance, and urban greening strategies
- ❑ Compare what different cities are doing, and turn those findings into concrete, realistic recommendations that Salt Lake City can use in its own plans

What we have done so far:

- ❑ Built heat and PM2.5 exposure profiles for the largest city in each Western state
- ❑ Used a programmable Google search to collect hundreds to identify hundreds of city plans, annexes, SOPs, and public guidance documents, finding 104 documents within our scope
- ❑ Built a draft codebook to analyze “features” of each document as an initial collection of data