One Sheet

Heatwaves: Heat Survivability

July 2021 Prepared by Rev. Richenda Fairhurst
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Human heat and temperature livability:

Humans evolved in a climate 'niche' with limited temperature variation. Heat and humidity even a few degrees over what our bodies are acclimated to can cause injury or death. A 2020 report, The Future of the Human Climate Niche includes this graphic of the areas on Earth that will become uninhabitable due to climate change starting now through 2070.

Wake-up events

1995 Heatwave in Chicago: 106°F with a heat index of 125°F. 739 people died and thousands were treated in emergency rooms & by first responders. (Chicago Magazine, first hand accounts.)

2003 Heatwave in Europe: In the 2003 summer heatwave in Europe, 50-70,000 people died.

2021 Heatwave in the Pacific Northwest: US Oregon and Washington temps obliterated all-time records at up to 45°F higher than normal and buckled roadways, melted cables, and lifted siding from homes and businesses. A record high for all of Canada was 121°F in Lytton, British Columbia. The high temps fed wildfires, and the town of Lytton burned to the ground. Wildlife were also affected, including an estimated billion seashore animals cooked alive.

Heat now & to come: Heat extremes are here decades earlier than climate models predicted (NOAA). With the atmosphere now trapping almost twice as much heat than in 2005. **By 2100:** If we fail to reduce our greenhouse gas emissions, "by 2100 the heat-related death toll could rise above 100,000 a year in the U.S. Elsewhere the threat is far greater: In India, for example, the death toll could reach 1.5 million." (National Geographic)

Human heat tolerances:

Both heat and humidity effect the ability of the human body to cool itself. In hot conditions, cooling through sweat evaporation is the last natural human line of defense.

Temp in the SHADE	**General affect on people in high risk groups** (Chart info gleaned from https://www.weather.gov/jetstream/hi)
130°F or higher	Heat/Sunstroke HIGHLY LIKELY with continued exposure
105°F - 130°F	Sunstroke, heat cramps, or heat exhaustion LIKELY, and heatstroke POSSIBLE with prolonged exposure or physical activity.
90°F - 105°F	Sunstroke, heat cramps, or heat exhaustion POSSIBLE with prolonged exposure and/or physical activity.
80°F - 90°F	Fatigue POSSBLE with prolonged exposure and/or physical activity.

Additionally:

- Temps above are listed for SHADE. **Add up to 15°F if the person is in the sun.**
- After the air temperature reaches 95°F, the body requires sweat evaporation to cool down. High humidity will impede evaporation in these conditions.

- Wind can provide evaporation, but **a hot, dry wind is hazardous** because it **adds** heat to the body.
- Humidity levels near and over 100% impedes cooling by evaporation. This can lead to the 'wet bulb' effect.
- Wet bulb temperatures at or above 95°F are not survivable even by healthy people for more than a few hours.
- Internal body temperature at 104°F - 107°F affects internal organs and requires emergency treatment to prevent coma and death.
- Higher temperatures are linked to "a greater incidence of premature, underweight, and stillborn babies, and heat exhaustion affects mood, behavior, and mental health. Hotter weather makes people more violent, across income levels. It lowers children's test scores and shrinks productivity." (National Geographic)

Wet & Dry Bulb Temperature – What?

- **Bulb**: The 'bulb' is the little bit (bulb) of mercury at the bottom of your thermometer.
- **Dry Bulb temperature:** A measure showing just the heat of the air surrounding the thermometer. Most of the time when people refer to air temperature, the measurement is a 'dry bulb' temp. Think of a thermometer on your patio, it measures just the air temperature, not the moisture or humidity.
- **Wet Bulb temperature:** How hot the air/environment is when the effect of water and evaporation are included in the bulb measurement. This measurement is done by adding wet cloth and opportunity for evaporation to the bulb.

Cooling Centers

Many churches, cities, and other organizations open cooling shelters when heat waves occur. Unfortunately, current shelter strategies are underfunded and may not reach those most in need. Climate Change is Killing Americans. Health Departments aren't Equipped to Respond

Implementation and Strategies, CDC Climate Health Publication PDF 'The Use of Cooling Centers to Reduce Heat Related Illness: Summary of Evidence and Strategies for Implementation." Incorporates information from experts in Arizona, Chicago, New York as well as from NOAA. Also includes resource links.

"LA Suffered Deadly Heat, Yet Chairs Stood Empty at its Cooling Centers." Los Angeles Times, September 2020. When the well-intended offer cooling centers without the necessary resources to meet the challenges that include an understanding of the true needs in their communities, such as limits to access, trauma in targeted populations, health and mental health issues, prior poor experiences with and in shelters.

Social Infrastructure is not just about 'cooling centers.' It is a movement to create and shape public spaces for civic interconnectivity that encourages neighborly and even lifesaving interaction. With few exceptions, our public spaces all require people to spend money. We can reshape public spaces to help us adapt to climate change and improve our shared life together. Eric Klinenberg studied the 1995 Chicago heatwave. His latest book is Palaces for the People.