

# The Impact of Rising Temperatures on Health

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Neighborhoods and Health Lab

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# Objectives

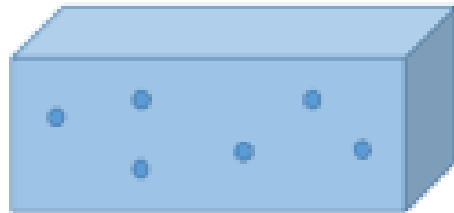
- Learn how heat exposure impacts health and why heat exposure is a public health crisis
- Understand factors that increase the risk associated with heat exposure
- Identify communities that are disproportionately impacted by heat



# What is Heat?

- Heat is a form of energy that is transferred between a person and the environment.
- Temperature is not heat but is used to measure the amount of heat in the environment or in the body.

**Temperature:**  
How "hot" or  
"cold" an object is.

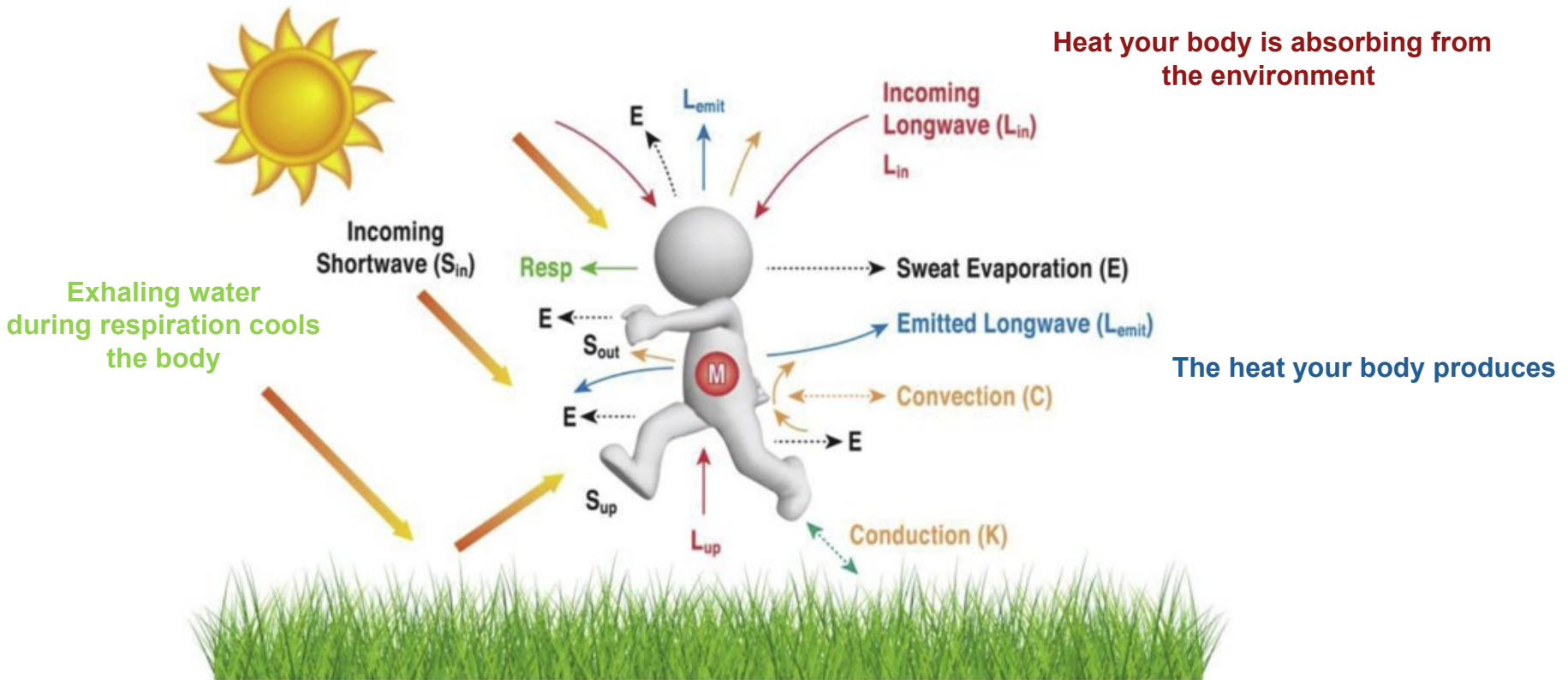


**Heat:** is transferred to  
the object. (ex. stove  
heats pan).



# How is Heat Exchanged?

## OUTDOOR HEAT EXCHANGE

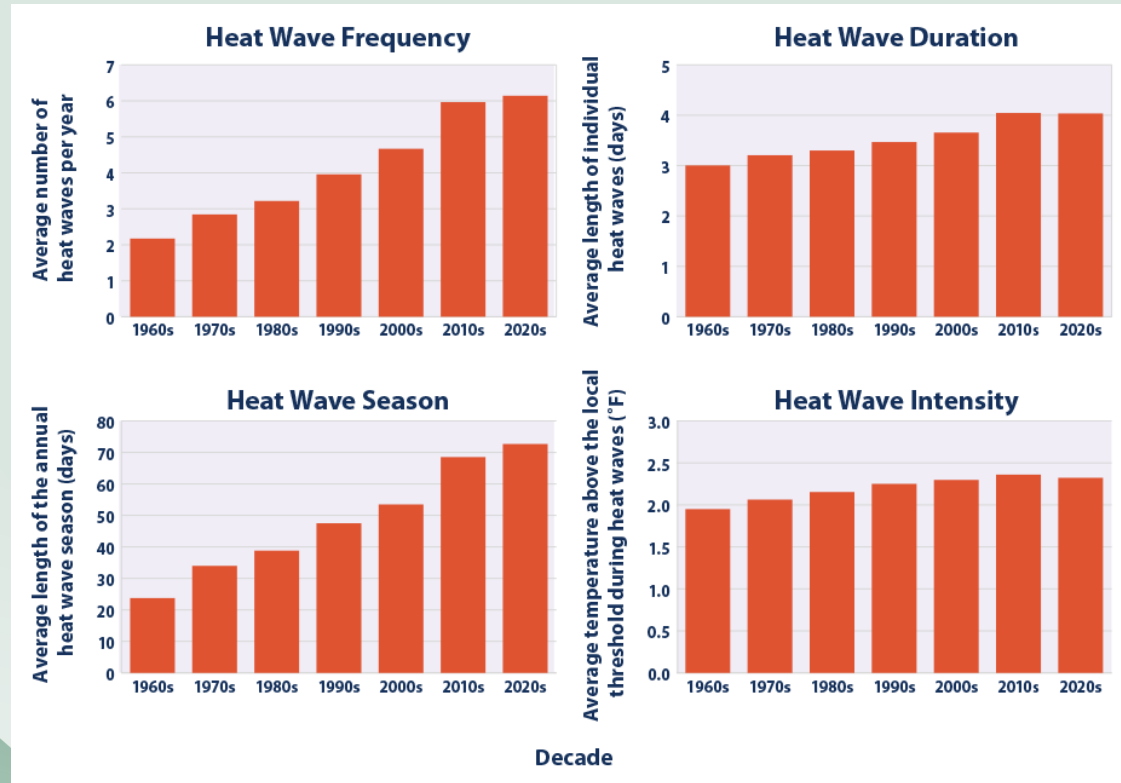


Source: McGregor and Vanos 2018



# Acute Heat Exposure

- Heatwaves are commonly defined as temperatures that are greater than the 95<sup>th</sup> percentile for 2 or more days.
- Over the last 40 years there has been a sixfold increase in the number heatwaves

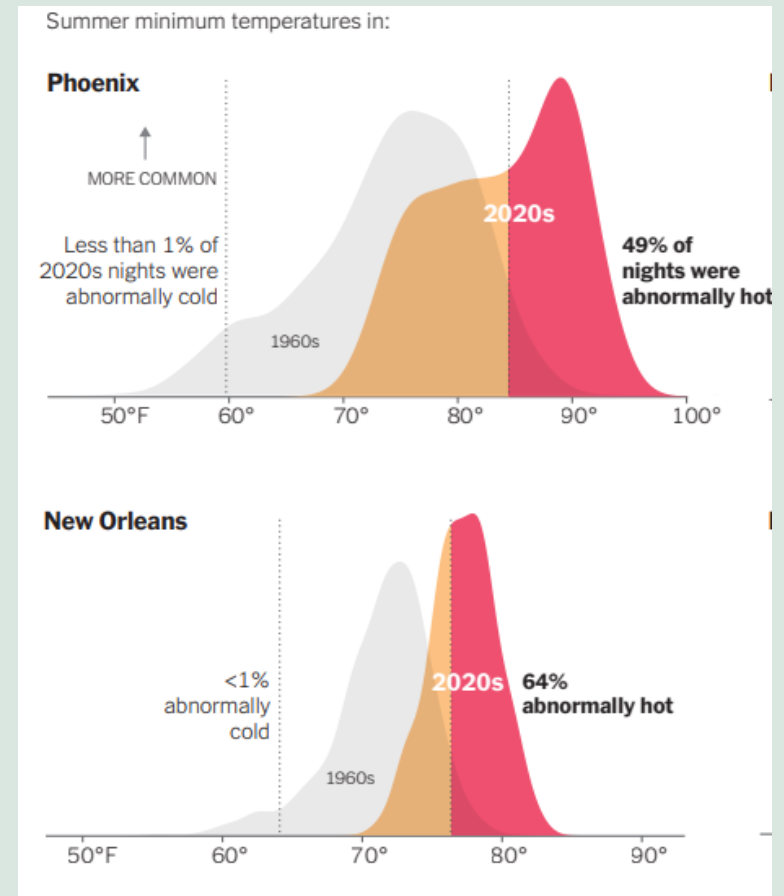
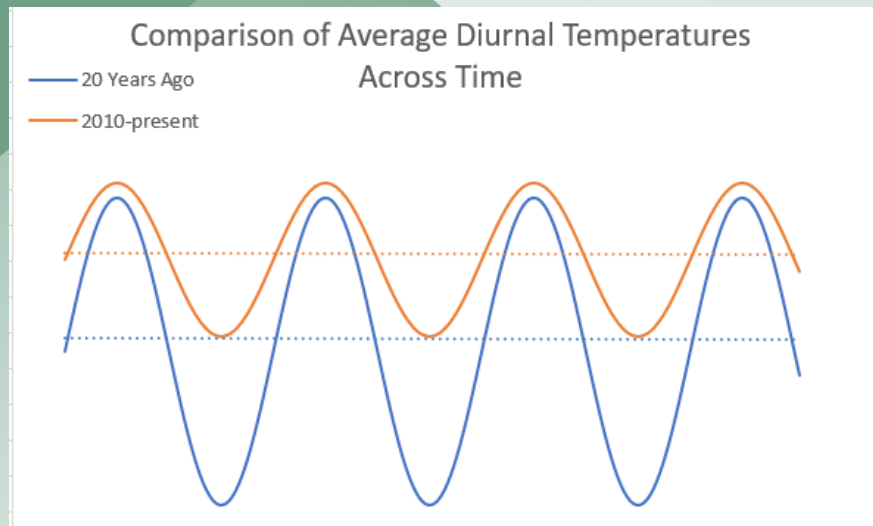


Source: EPA 2022



# Chronic Heat Exposure

- Chronic heat exposure is exposure to warm temperatures for prolonged periods
- Nighttime temperatures are rising more rapidly than daytime temperatures.



Source: New York Times 2022



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# How Heat Affects the Body

- Thermal homeostasis: the body's core temperature needs to be between 98° and 100° F for the heart, lungs and kidney to be functioning properly.
- When ambient temperatures are hotter, the body must work harder to cool itself and maintain thermal homeostasis.
- This can lead to:
  - Heat stress/illness
  - Strain on the respiratory, cardiovascular and renal systems that can result in death and permanent disability.
- Heat stroke begins at body temperatures of 103° F or higher.
- At body temperatures of 105.8° F proteins in our body begin to denature; this process cannot be reversed.



# Health Effects of Heat Exposure

Heat exposure can result in and exacerbate:

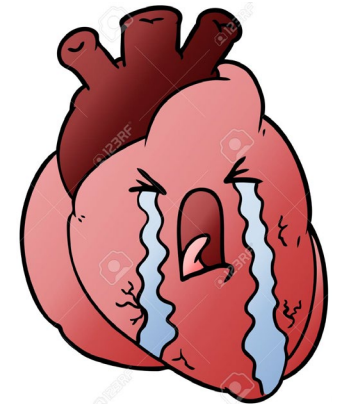
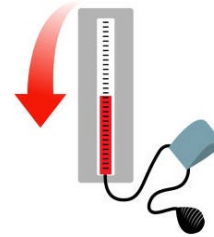
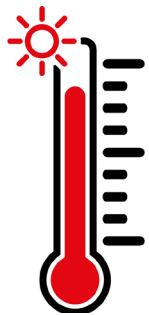
- Cardiovascular disease
- Renal disease
- Respiratory diseases and illness (e.g. asthma)
- Diseases of the nervous system
- Violent behaviors
- Mental and behavioral disorders
- Mood changes
- Stroke
- High blood pressure
- Reduced sleep quality
- Heat cramps
- Fainting
- Heat exhaustion
- Heat stroke
- Heat edema (swelling in hands and feet)
- Pregnancy complications
- Diabetes
- Kidney stones
- Suicidal ideation
- Deaths by suicide



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# Effect of Heat on the Cardiovascular System



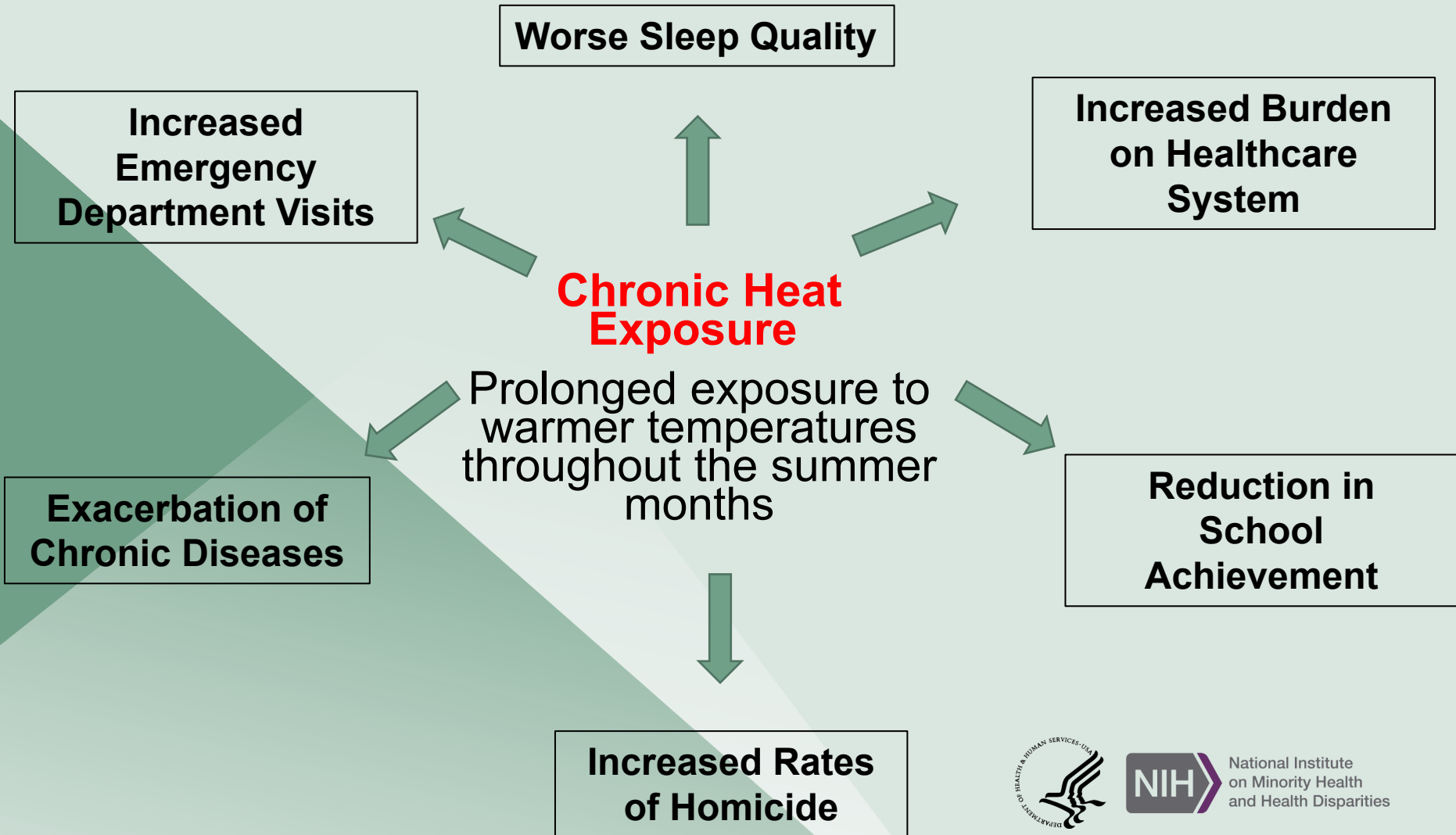
Rising temps cause our blood vessels to dilate to try and cool the body down

This causes a drop in blood pressure

The heart compensates by pumping harder and faster, causing strain on the heart, which can result in conditions like heart failure



# Health Impacts of Chronic Heat Exposure



# Why is Heat Exposure Increasing?

## Urban Heat Islands

- Urban cities are significantly hotter than surrounding areas
- Cities replace natural landscapes with buildings and roads that absorb and trap heat
- Increased nighttime temperatures
- Lower income neighborhoods to have hotter temperatures



Source: EPA 2012

## Climate Change

- Rising temperatures everywhere
- Increased frequency of heat waves
- Longer, hotter summers
- Warmer nights
- Effects worse in northern regions, which are not equipped to deal with hot temperatures



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# What Groups Are More Susceptible to Heat Exposure?

People with chronic medical conditions (e.g., hypertension and diabetes)



Less responsive to temperature changes; taking meds that worsen effects of heat exposure; and these conditions are risk factors in heat related illness

Racial and Ethnic minority populations



Greater environmental risk; Higher prevalence of chronic conditions like diabetes, obesity, stroke and heart disease

Low-income populations



Less access to healthcare and have higher risk of chronic disease; Greater environmental risk

Elderly and young people



Their bodies have less effective mechanisms for cooling



# Lower Income and Racial and Ethnic Minority Populations are Disproportionately Impacted by Heat

- The rate of emergency room visits for heat-related illness increased by 35% on average from 2005 to 2015 for all ethnicities.
  - 27% increase for Whites
  - 67% increase for African Americans
  - 53% increase for Asian Americans
  - 63% increase for Hispanics



# The Consequences of Living in a Warmer Climate

19.9% of all households reported that they kept their home at a temperature that felt unsafe or unhealthy, at least one month in the last year.

Of those households:

- **20.4%** were households with children
- **25.5%** were households of color
- **25.3%** were moderate-income households
- **32.1%** were low-income households



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# The Consequences of Living in a Warmer Climate

30.9% of all households reported that they reduced or forewent expenses for basic household necessities, such as medicine or food, in order to pay an energy bill, at least one month in the last year.

Of those households:

- **38.7%** were households with children.
- **42.4%** were households of color
- **39.7%** were moderate income houses
- **51.9%** were low-income households



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# To Summarize

- Heat exposure is frequently not recognized as a problem or health concern.
- When heat exposure is discussed, it is often in terms of heat waves, which leaves the negative impacts of chronic heat exposure largely unrecognized.
- Temperatures are rising and exposure to heat will only get worse.
- Heat exposure disproportionately affects people with chronic medical conditions, low income, elderly and young people, and racial/ethnic minorities.
- LIHEAP and other energy assistance programs are a critical tool to address this public health crisis, specifically in populations that are most vulnerable to heat.





# Questions?



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# Discussion Prompts

- What are your perspectives on the narrative of heat protective measures from the welfare and policy sector?
- Given that there is literature that supports the effects of heat on health, what are your perspectives on who (healthcare or welfare sectors) should take on the responsibility of addressing this issue? Or should it be a joint effort?



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