

# The Impact of Climate Change

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Regional Convenings  
January 2023



# OBJECTIVES



LIVE WELL  
SAN DIEGO

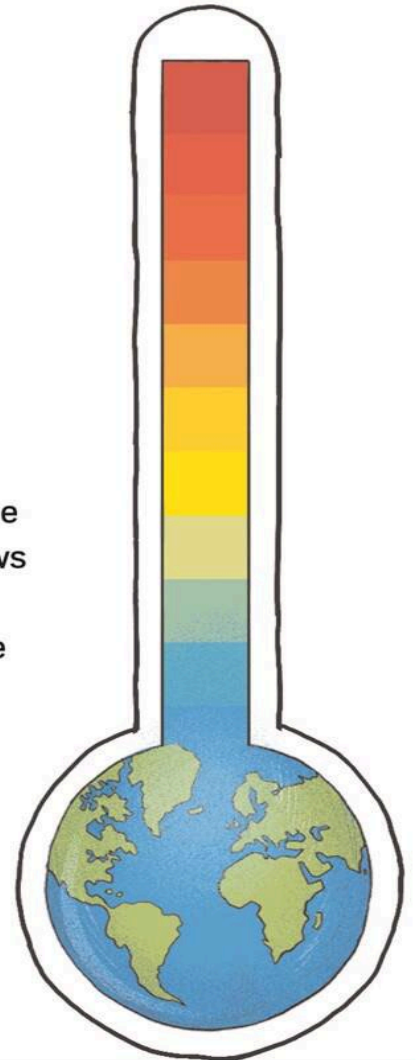
1. Regarding climate change: What is the problem from a public health perspective? Who is at risk?
2. The impacts of extreme weather and climate change: **heat, wildfires & air quality, and vector-borne disease.**

## CLIMATE CODE RED

The Intergovernmental Panel on Climate Change's (IPCC) new report, the latest health check of the Earth's climate, has some grim news — that human activities have been driving up the planet's temperature

**April 2022:** Mitigation of Climate Change

**Feb 2022:** Impacts, Adaptation and Vulnerabilities



Source: IPCC Reports on Climate Change ([conservation.org](https://www.conservation.org))



# 1. WHAT IS THE PROBLEM FROM A PUBLIC HEALTH PERSPECTIVE? WHO IS AT RISK?

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# BOTTOM LINE: EXTREME WEATHER AND CLIMATE CHANGE IS BAD FOR PEOPLE



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SAN DIEGO



“The climate crisis is a health crisis: the same unsustainable choices that are killing our planet are killing people.”

—*Dr. Tedros Adhanom Ghebreyesus*  
*Director General,*  
*World Health Organization*



“Climate change is one of the most serious public health threats facing our nation. Yet few Americans are aware of the very real consequences of climate change on the health of our communities, our families and our children.”

—*Georges Benjamin, M.D.,*  
*Executive Director,*  
*American Public Health Association*



## U.S. CALL TO ACTION ON CLIMATE, HEALTH, AND EQUITY: A POLICY ACTION AGENDA

2019

The undersigned organizations and individuals call on government, business, and civil society leaders, elected officials, and candidates for office to recognize climate change as a health emergency and to work across government agencies and with communities and businesses to prioritize action on this Climate, Health and Equity Policy Action Agenda.

[Home](#)[Download Full Policy Agenda](#)[View the signers](#)[Sign for your Organization](#)[Sign as Individual](#)[More Resources](#)

Or: [Download a Summary of the Policy Action Agenda](#)

# SUMMARY: WHAT IS THE PROBLEM?



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## From SAFEGUARDING CALIFORNIA: Implementation Action Plans - Public Health Sector Plan

“The most immediate and concerning impacts for vulnerable populations continue to be extreme **heat** and **air quality** (i.e., wildfire smoke, ozone, particulate matter, criteria air pollutants, and allergens), as well as intermittent years of **extreme precipitation**, such as El Niño years that can cause coastal and riverine flooding, and extreme prolonged **drought**. Combinations of climate hazards can occur simultaneously, synergistically, cumulatively, or in sequence, such as landscapes denuded by wildfire later having landslides in wet seasons.”

Source: [Public Health Sector Plan.pdf \(ca.gov\)](#), Page 150.



# WHO IS AT RISK?



**LIVE WELL**  
SAN DIEGO



# IDENTIFYING RISK AND SUSCEPTIBILITY: SAN DIEGO COUNTY



## Vulnerability Assessment Domains and Indicators

Higher risk  
vulnerabilities for San  
Diego County relative  
to other regions



**Environmental Exposures Domain**

**Population Sensitivity Domain**

**Adaptive Capacity Domain**

<u>Indicator</u>	<u>Page</u>
Heat	21
Air Quality	23
Drought	27
Wildfires	29
Sea Level Rise	31
Children	34
Elderly	36
Poverty	38
Education	40
Race and Ethnicity	42
Outdoor Workers	44
Vehicle Ownership	46
Linguistic Isolation	48
Physical Disability	50
Mental Disability	52
Health Insurance	54
Violent Crimes	56
Air Conditioning	59
Tree Canopy	60
Impervious Surfaces	62
Public Transit Access	64

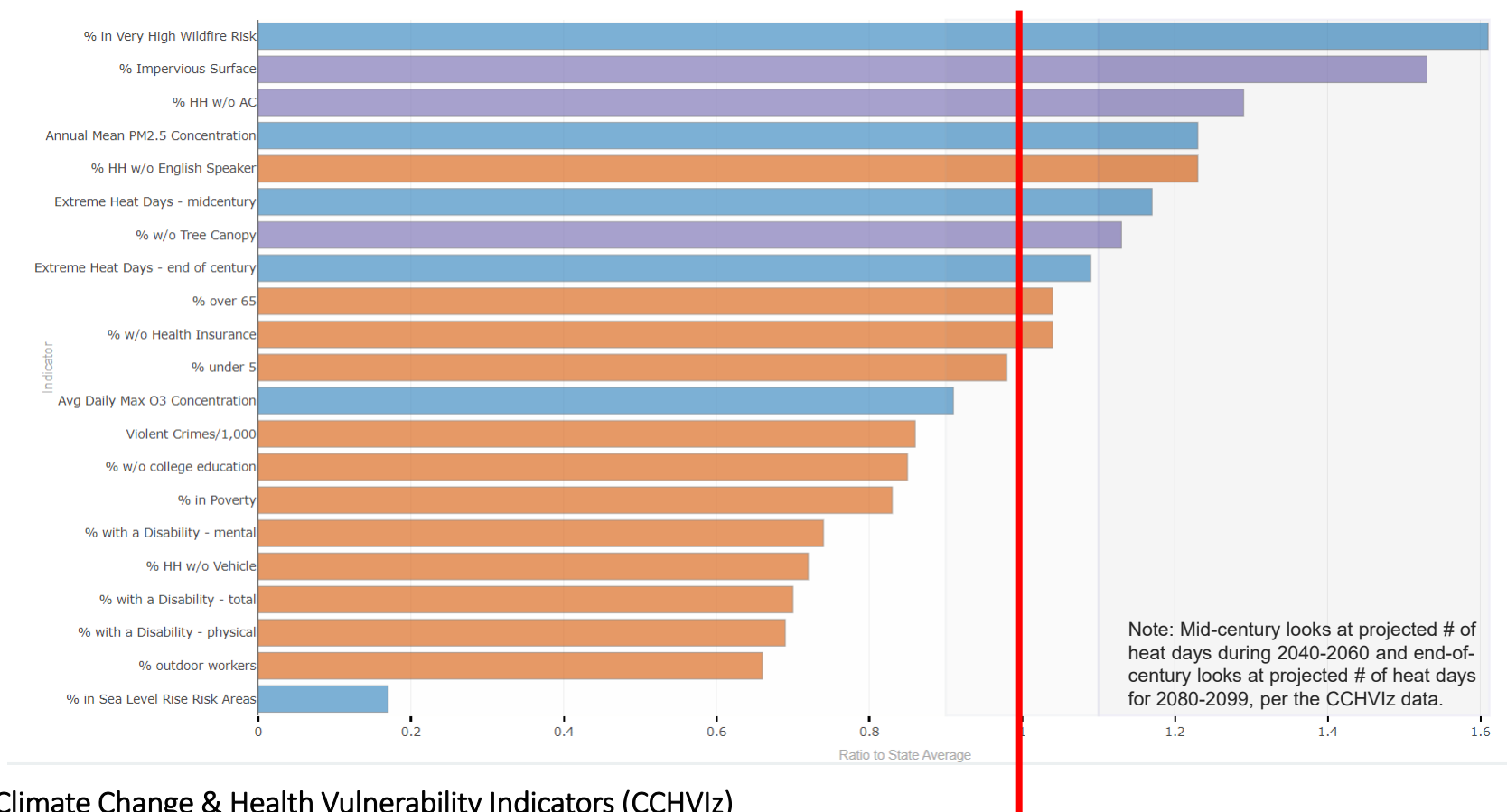




# IDENTIFYING RISK AND SUSCEPTIBILITY SAN DIEGO COUNTY DATA



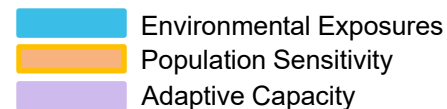
## 2022 Assessment



Climate Change & Health Vulnerability Indicators (CCHViz)

Red line indicates state average

Source: Climate Change and Health Equity Section -- CalBRACE Project.





## 2. THE IMPACTS OF EXTREME WEATHER AND CLIMATE CHANGE: HEAT, WILDFIRES & AIR QUALITY, AND VECTOR-BORNE DISEASE

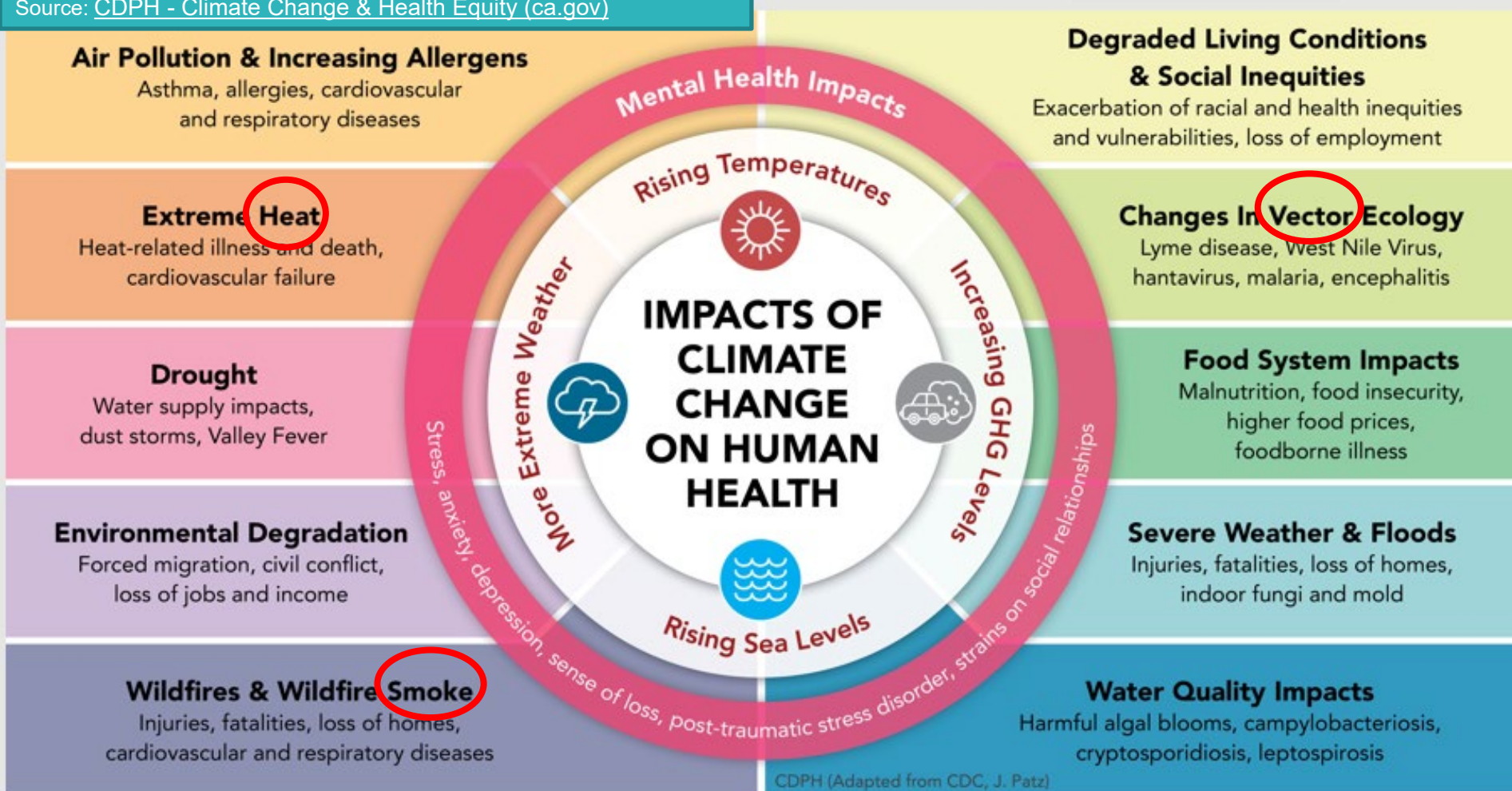
# WHAT IS THE PROBLEM?



CalEPA OEHHHA Report:

*Indicators of Climate Change in California*

Source: [CDPH - Climate Change & Health Equity \(ca.gov\)](https://www.cdph.ca/Programs/CID/DCDC/Pages/ClimateChange/ClimateChangeHealthEquity.aspx)



*Impact of Climate Change on Human Health (Adapted from CDC, J. Patz).*



# EXCESSIVE HEAT

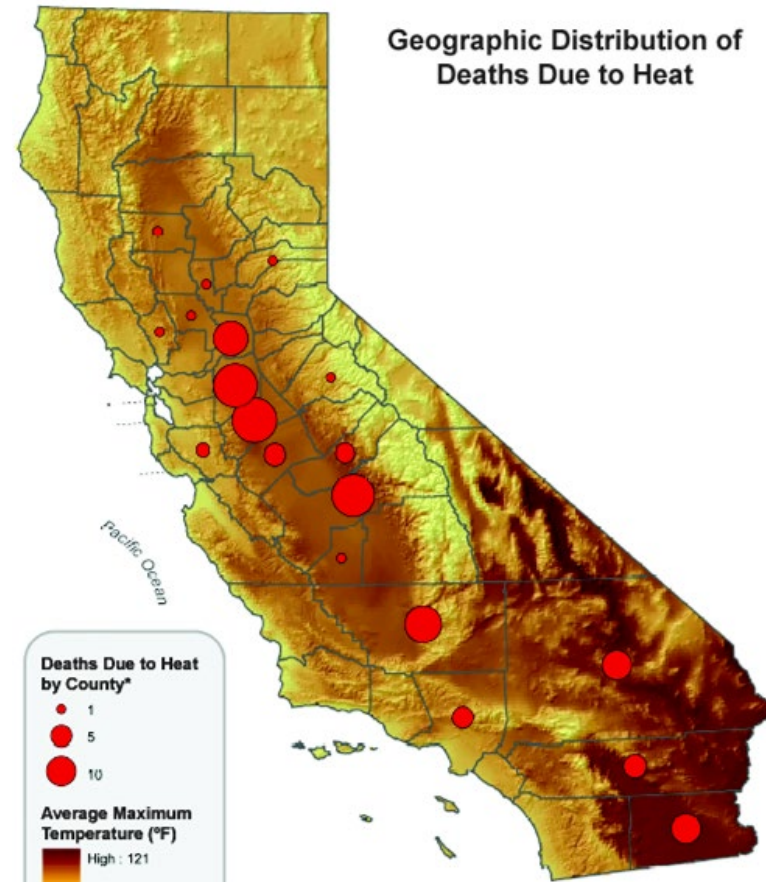


# NATURE OF HEAT WAVES ARE CHANGING IN CALIFORNIA



LIVE WELL  
SAN DIEGO

- During the July 2006 Heat Wave:
  - Unprecedented deadly event in California
    - 147 died specifically from hyperthermia
    - 450-600+ died in a few days
    - All other deaths were due to exacerbation of chronic conditions
  - 16,000 excess hospitalizations



- California heat wave activity is increasing. Specifically, humid, **nighttime-accentuated** heat waves are on the rise.

Gershunov, A., D. Cayan and S. Iacobellis, 2009: The great 2006 heat wave over California and Nevada: Signal of an increasing trend. *Journal of Climate*, 22, 6181–6203.



# HEAT ALERTS TRENDS, 2012 - 2022



Year	# of Heat Alerts Issued
2012	3
2013	4
2014	4
2015	10
2016	10
2017	11
2018	12
2019	15
2020	20
2021	16
2022*	7
<b>Total</b>	<b>112</b>

Source: NOAA, National Weather Service, San Diego. Includes Heat Advisories and Excessive Heat Warnings issued for one or more areas annually.

## TYPES OF ALERTS DETERMINE PHASES OF THE HEAT RESPONSE PLAN

- Heat Advisory
- Excessive Heat Alert
- Excessive Heat Warning

PHASE I \* PHASE II \* PHASE III

[Consumer Version Excessive Heat Response Plan \(sandiegocounty.gov\)](https://sandiegocounty.gov/consumer-version-excessive-heat-response-plan)

# DIRECT IMPACTS OF HEAT

In California,  
Heat-related hospitalizations,  
2000-2020: 13,042

Heat-related ED visits, 2005-2020:  
77,259

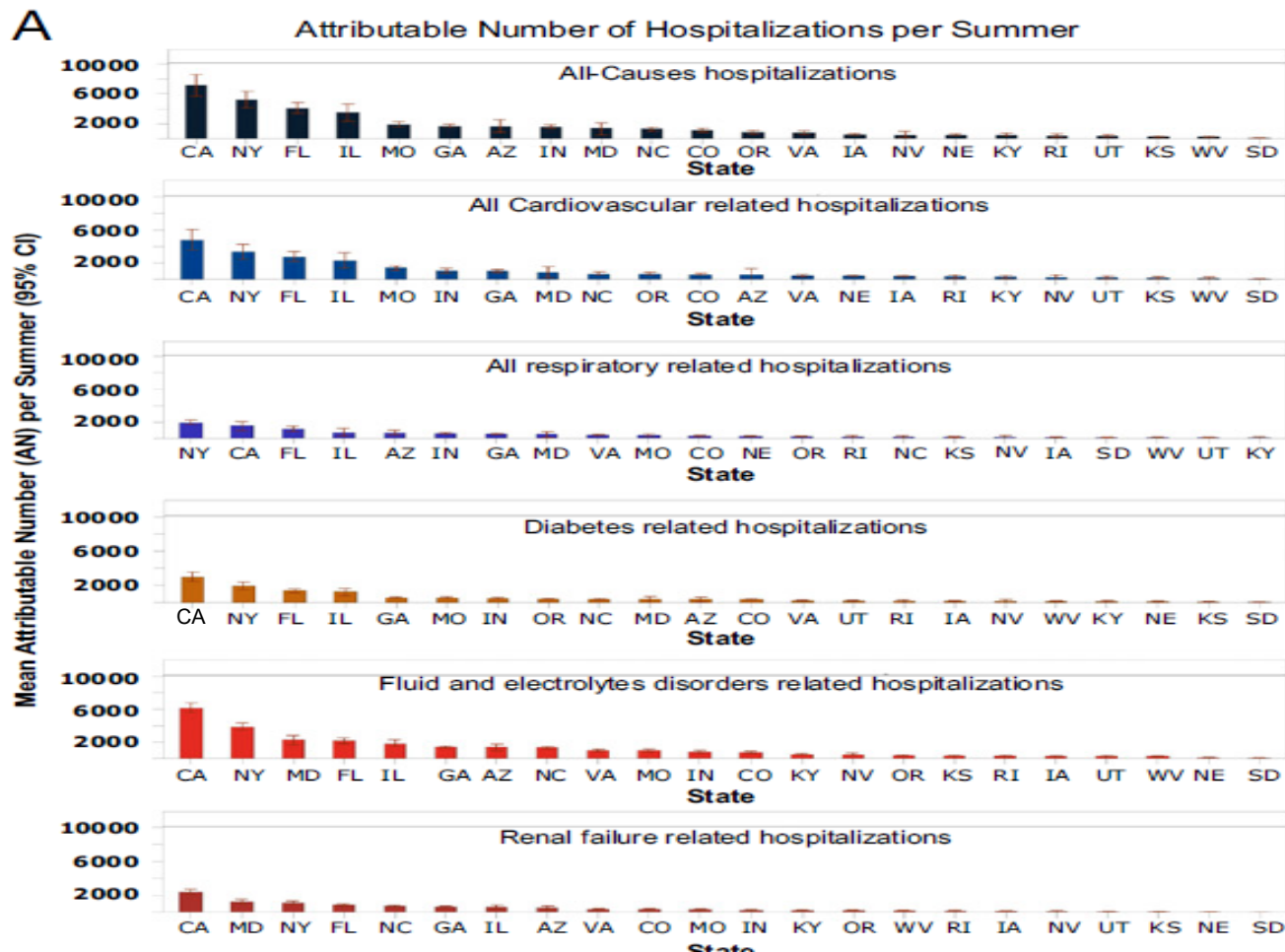
Ref. <https://trackingcalifornia.org/heat-related-illness/heat-related-illness-summary-tables>

	SYMPTOMS		TREATMENT
HEAT CRAMPS	<ul style="list-style-type: none"> <li>• Heavy sweating</li> <li>• Painful muscle cramps or spasms</li> </ul>		<ul style="list-style-type: none"> <li>• Stop activity for a few hours.</li> <li>• Move to a cooler location.</li> <li>• Drink water, clear juice, or a sports beverage.</li> <li>• Seek medical attention if cramps do not subside within one hour.</li> </ul>
HEAT EXHAUSTION	<ul style="list-style-type: none"> <li>• Heavy sweating</li> <li>• Weakness</li> <li>• Fatigue</li> <li>• Headache</li> <li>• Dizziness</li> <li>• Nausea or vomiting</li> <li>• Fainting</li> <li>• Irritability</li> <li>• Thirst</li> <li>• Decreased urine output</li> </ul>		<ul style="list-style-type: none"> <li>• Move to an air-conditioned environment.</li> <li>• Lie down.</li> <li>• Loosen clothing or change into lightweight clothing.</li> <li>• Sip cool, non-alcoholic beverages.</li> <li>• Take a cool shower or bath, or apply cool, wet cloths to as much of the body as possible.</li> <li>• Seek medical attention if symptoms worsen or last longer than one hour, or if the victim has heart problems or high blood pressure.</li> </ul>
HEAT STROKE	<ul style="list-style-type: none"> <li>• Very high body temperature</li> <li>• Altered mental state</li> <li>• Throbbing headache</li> <li>• Confusion</li> <li>• Nausea</li> <li>• Dizziness</li> <li>• Hot, dry skin or profuse sweating</li> <li>• Unconsciousness</li> </ul>		<ul style="list-style-type: none"> <li>• Call 911 immediately and follow the operator's directions—<b>this is a medical emergency.</b></li> <li>• Reduce the person's body temperature with whatever methods you can: wrap the person in cool cloths, immerse them in a cool bath, or spray them with cool hose water.</li> <li>• After administering cooling methods, move the person to a cooler place.</li> <li>• Do NOT give liquids.</li> <li>• If there is uncontrollable muscle twitching, keep the victim safe, but do not place any objects in his or her mouth.</li> <li>• If there is vomiting, turn the victim on his or her side to keep the airway open.</li> </ul>

Source: CDC, 2012<sup>8</sup>

# Assessment of extreme heat and hospitalizations to inform early warning systems

Ambarish Vaidyanathan<sup>a,1</sup>, Shubhayu Saha<sup>a</sup>, Ana M. Vicedo-Cabrera<sup>b</sup>, Antonio Gasparri<sup>b</sup>, Nabill Abdurehman<sup>c</sup>, Richard Jordan<sup>d</sup>, Michelle Hawkins<sup>e</sup>, Jeremy Hess<sup>f</sup>, and Anne Elixhauser<sup>g</sup>



**California is  
where most of the  
burden occurs**

**Mostly CVD  
hospitalizations**





# WILDFIRES AND AIR QUALITY



UNDERSTANDING  
— THE CHANGING —

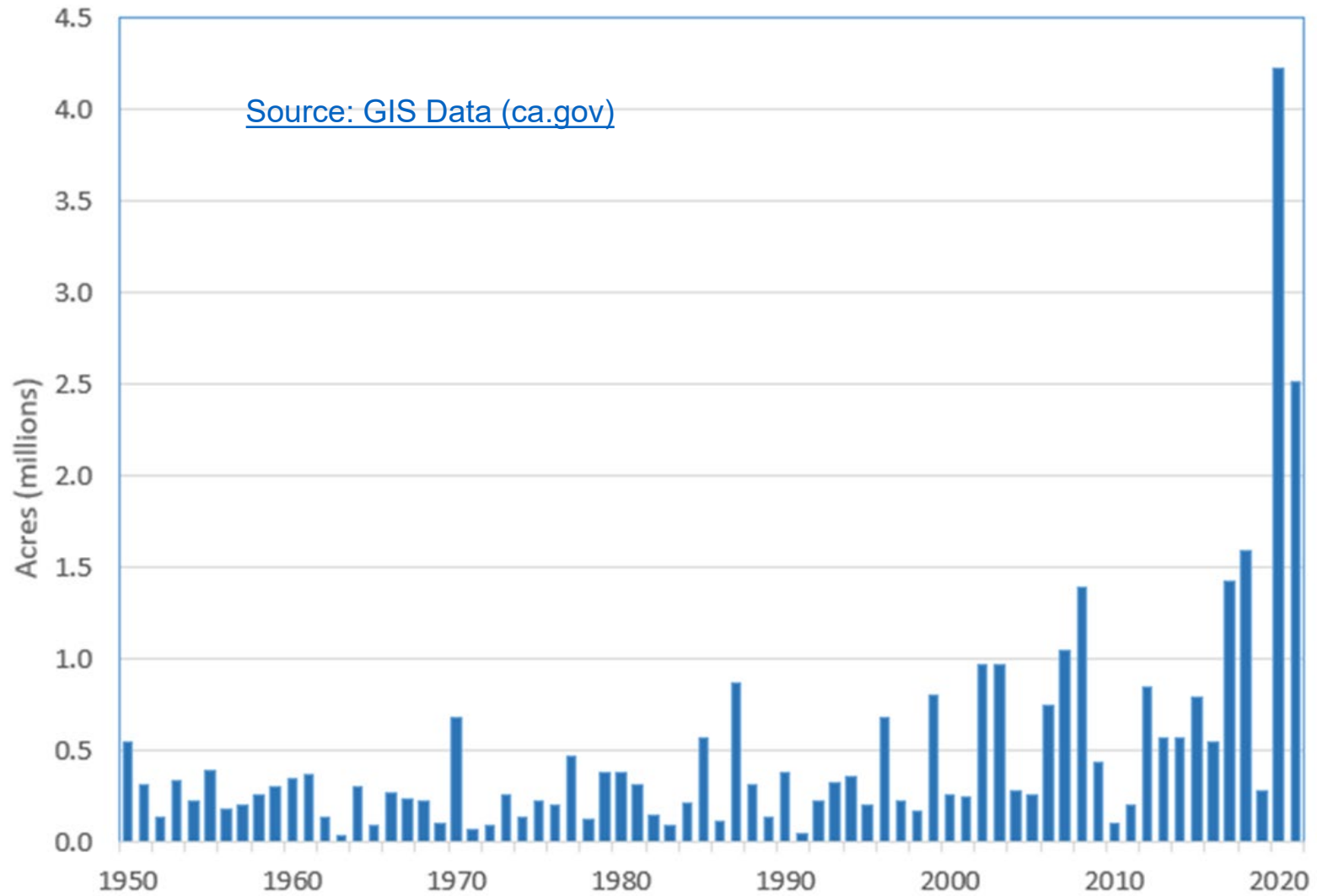
# California Fire Season





# ACRES BURNED IN CALIFORNIA 1950-2021

[Source: GIS Data \(ca.gov\)](#)

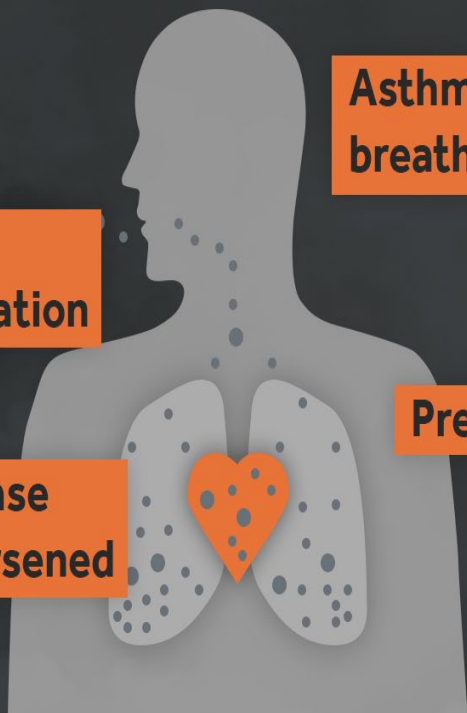


# CALIFORNIA WILDFIRE RISK AND HARMS TO HEALTH



## WILDFIRE POLLUTION HARMS HEALTH

### Fine particle (PM<sub>2.5</sub>) effects



Eye, lung,  
throat irritation

Asthma attacks,  
breathing problems

Heart disease  
effects worsened

Premature death

CLIMATE  CENTRAL

## California Wildfire

### RISK FACTORS



#### DROUGHT

The drier it is, the better it burns.



#### WIND

Winds fan flames & carry sparks.



#### HUMAN ACTIVITY

Negligence can lead to wildfires.

**WESTERN  
FIRE CHIEFS  
ASSOCIATION**

# WHAT IS SAN DIEGO'S AIR QUALITY RATING?



## Live Well San Diego Indicator #7: Physical Environment: Air Quality

Physical environment: **air quality is measured as the ratio of days that air quality is rated unhealthy**. Air pollution affects more people than any other pollutant. Lower levels of air pollution in a region correlate with better respiratory and cardiovascular health of the population. In San Diego County, the air quality was rated poorly **on 4.4% of days in 2021 (total of 16 days for the year). This decreased from 9.6% of days in 2018.**

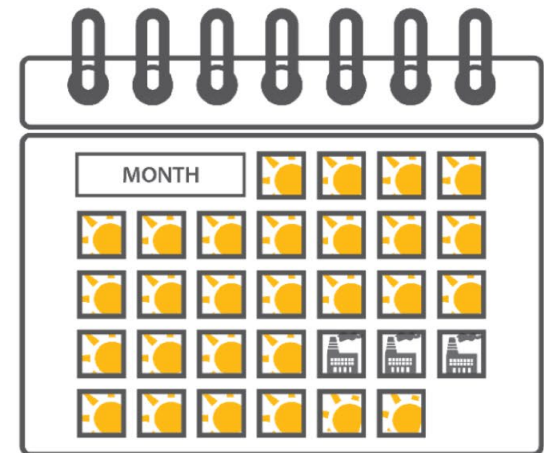


COMMUNITY

## PHYSICAL ENVIRONMENT: 9.6%

Percent of Days that Air Quality was Rated as Unhealthy for Sensitive Populations. Reflecting most recent data available (2018).

**3** OUT OF **31** DAYS  
IN THE MONTH  
AIR QUALITY IS RATED POORLY





# VECTOR-BORNE DISEASES



# VECTORBORNE ILLNESS

WONDER IF THE  
MILD WINTER WILL  
HAVE MUCH OF AN  
EFFECT ON MOSQUITOES  
THIS YEAR?

[A National Public Health Framework  
for the Prevention and Control of  
Vector-Borne Diseases in Humans  
\(cdc.gov\)](#)

## THE PROBLEM

Americans are at an increasing risk of vector-borne diseases, and the United States is not adequately prepared to respond to these threats. ←





# THREAT OF VECTOR-BORNE DISEASES



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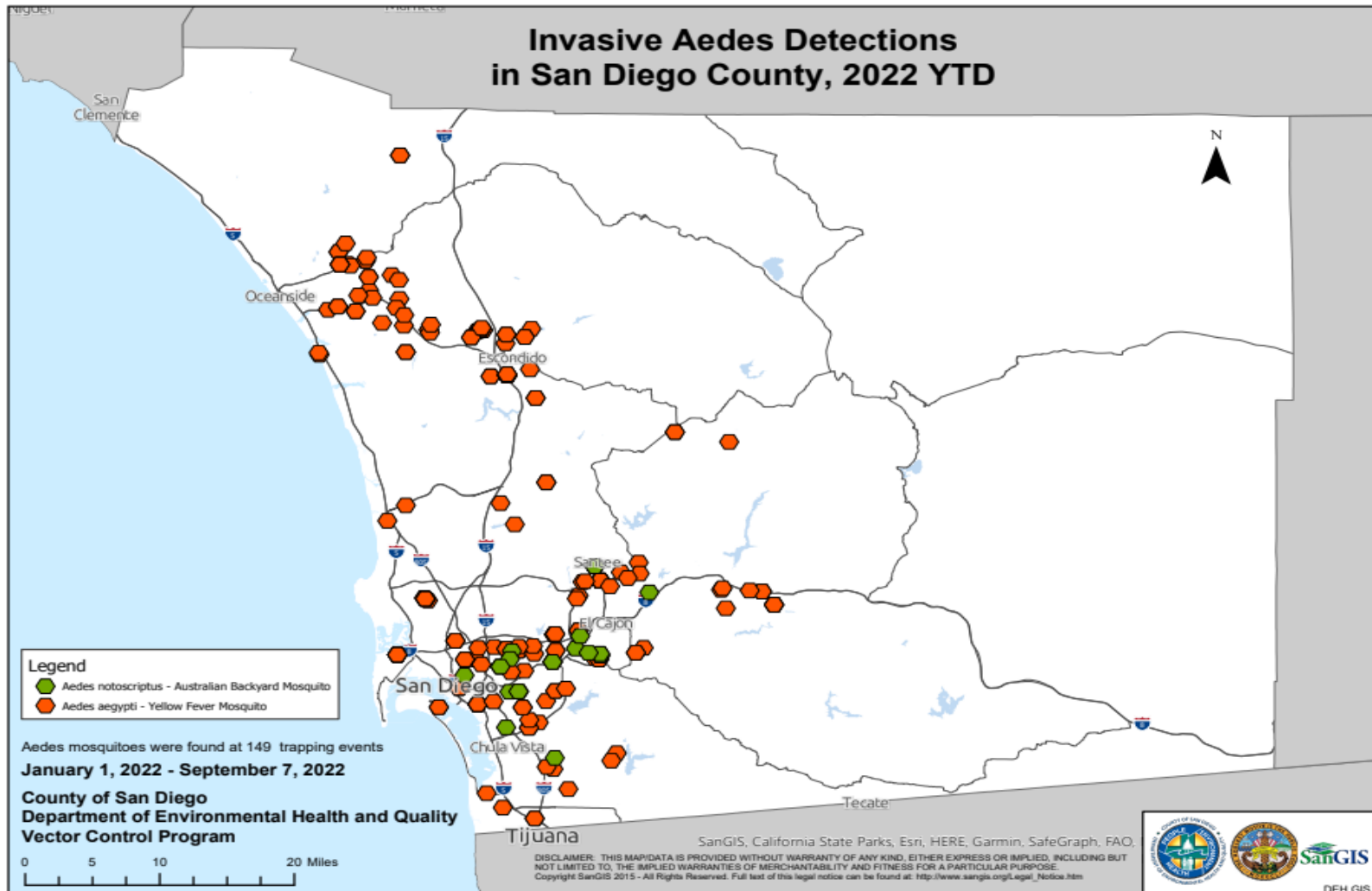
- Anaplasmosis/Ehrlichiosis
  - Babesiosis
  - Chikungunya
  - Dengue
  - Hantavirus Infections
  - Leptospirosis
  - Lyme Disease
  - Malaria
  - Plague, human or animal
  - Psittacosis
  - Q Fever
  - Rabies
  - Relapsing Fever
  - Rickettsial Infection
    - *Including Typhus and Typhus-like illnesses*
  - Rocky Mountain Spotted Fever
  - Tularemia, human or animal
  - West Nile Virus
  - Yellow Fever
  - **Zika Virus Disease**
- 
- Listed here are vectorborne and zoonotic diseases or infections that are reportable in San Diego County, including Zika Virus that became reportable in 2016.
  - With climate change vector “seasons” lengthen; mosquitoes can complete developmental cycles more quickly, and persist for longer periods.

- Since 2014, 3 new species of invasive mosquitoes have invaded San Diego County and are here to stay.



- *Aedes aegypti* (2014)
- *Aedes albopictus* (since 2015)
- *Aedes notoscriptus* (since 2018)

# DETECTIONS OF AEDES MOSQUITOES IN SAN DIEGO COUNTY



# Thank You!

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