


Climate change, human health and environmental justice: Understanding the road ahead




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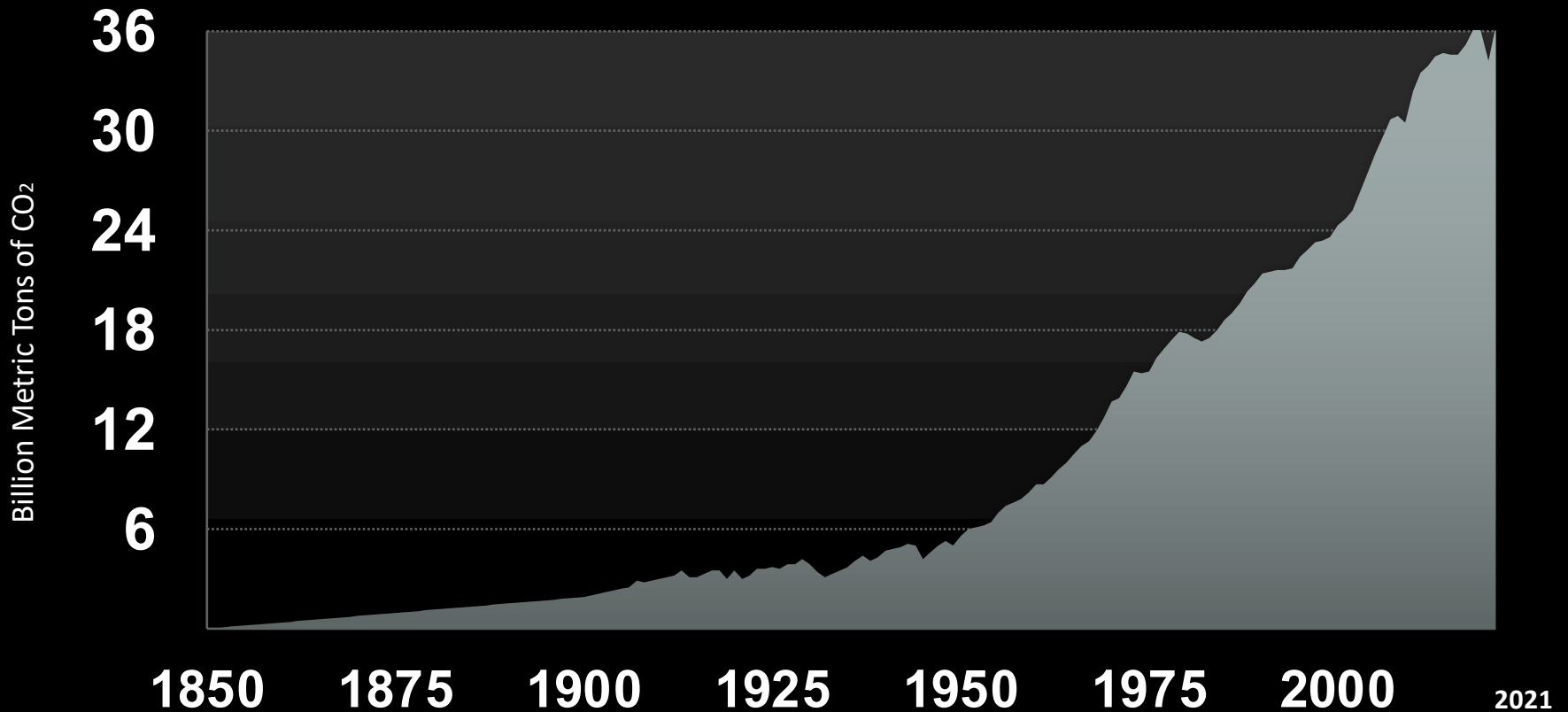
“the single
biggest health
threat facing
humanity.”

WHO, COP26, 2021

- 
- A small green seedling with two leaves is growing out of a crack in the ground. The ground is dry and cracked, symbolizing resilience and hope in the face of environmental challenges.
1. Understand the connection between CC and health and its impact at various life stages
 2. Understand why CC is an environmental justice problem
 3. List 5 interventions you can do in less than a week that will have a positive impact in the climate crisis

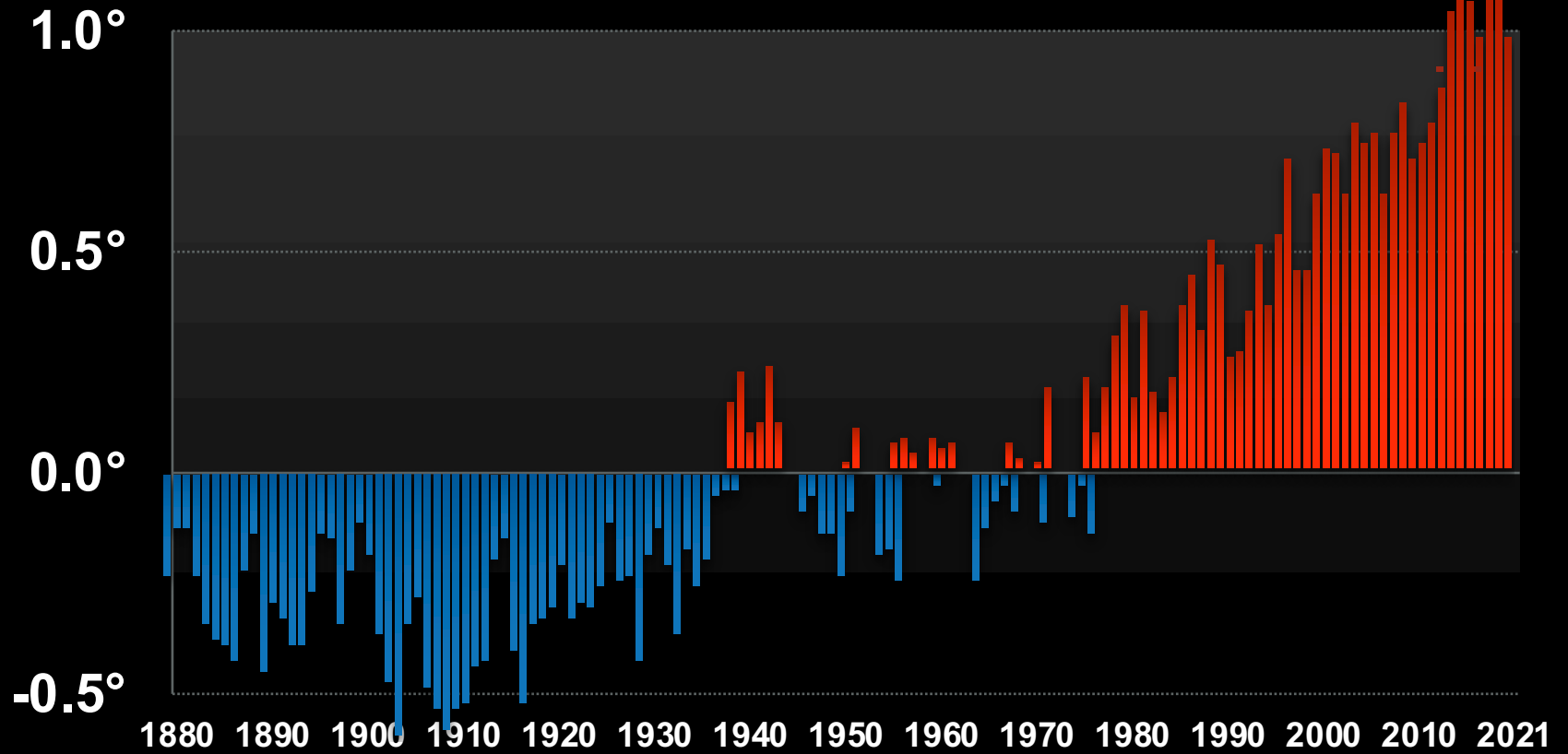


The Largest Source of Global Warming Pollution Is the Burning of Fossil Fuels

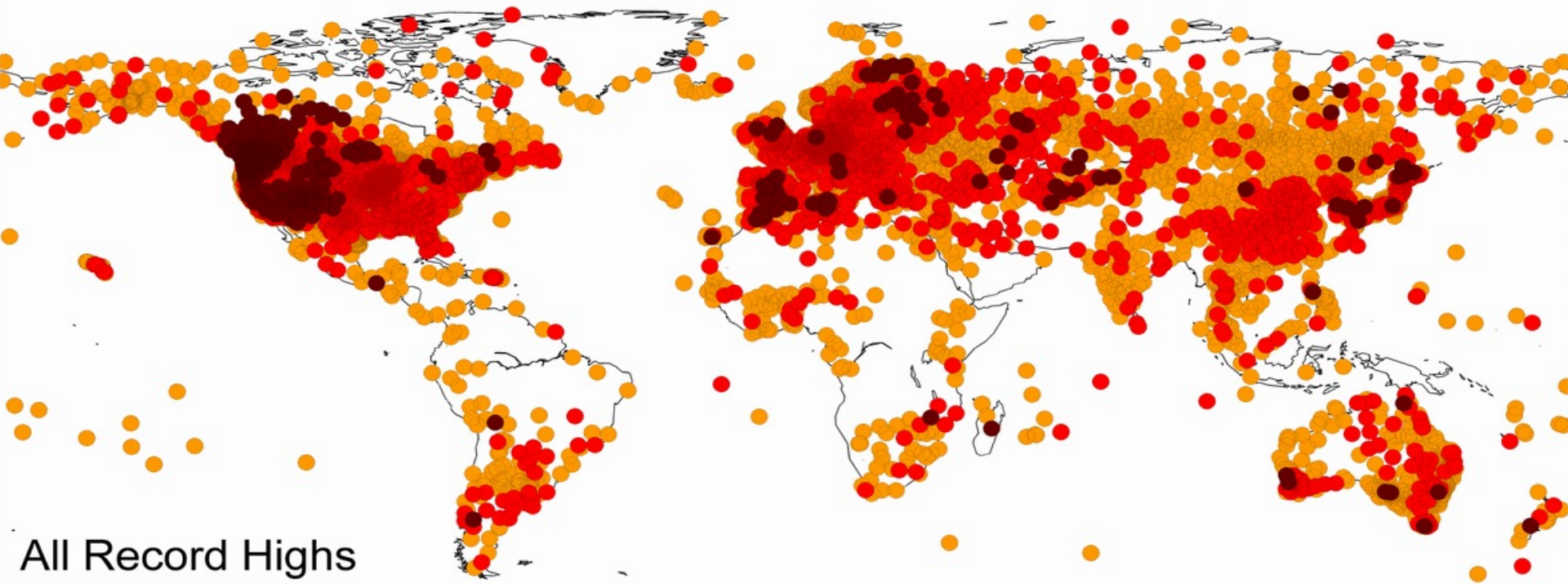


Global Surface Temperature – Departure from Average

- 1880 – 2021



2021 Record High Temperatures



Daily: 79,887

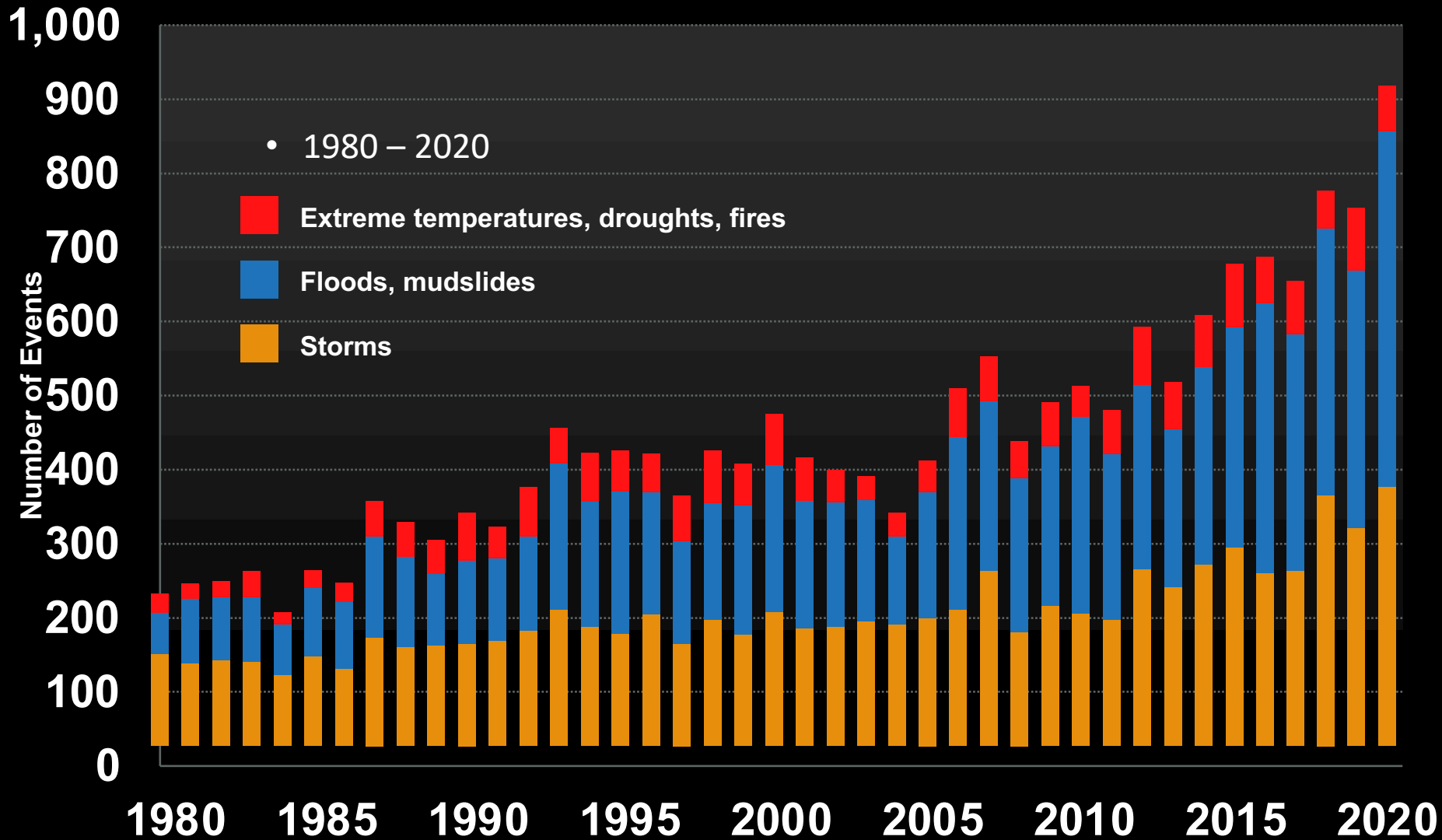


Monthly: 4,308



All-time: 815

Worldwide Extreme Weather Catastrophes



Climate change

Vulnerability

Vulnerability factors

- Demographic factors
- Geographic factors
- Biological factors & health status
- Sociopolitical conditions
- Socioeconomic factors

Exposure pathways

- Extreme weather events
- Heat stress
- Air quality
- Water quality and quantity
- Food security and safety
- Vector distribution & ecology

Health system capacity & resilience

- Leadership & governance
- Health workforce
- Health information systems
- Essential medical products & technologies
- Service delivery
- Financing

Climate-sensitive health risks

Health outcomes



Injury and mortality from extreme weather events



Heat-related illness



Respiratory illness



Water-borne diseases and other water-related health impacts



Zoonoses



Vector-borne diseases



Malnutrition and food-borne diseases



Noncommunicable diseases (NCDs)



Mental and psychosocial health

Health systems & facilities outcomes



Impacts on healthcare facilities



Effects on health systems

Marsh Harbour, Bahamas

- September 4, 2019

Hurricane Dorian was “stalled” over the Bahamas for 40 hours, dropping up to 150 cm (60 inches) of rain.

Hurricane Maria

• September 20, 2017



Hurricane Maria

• Puerto Rico, September, 2017

Total of 4645 excess deaths from September 20 through December 31, 2017.

NEJM 2018



Surface Air Temperatures, July 13, 2022

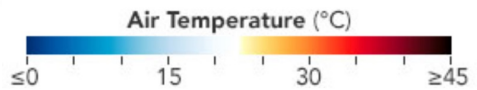
Lieria, Portugal
45° C (113° F)

Tunis, Tunisia
48° C (118° F)

Ahvaz, Iran
46.5° C
(115.7° F)

Shanghai, China
40.9° C
(105.6° F)

Heat records were broken across Europe, Asia, Africa and the Middle East in late June and early July 2022.



Data and map: NASA

Northwestern America

• June 28, 2021

The 2021 Pacific Northwest heat wave was “the most anomalous extreme heat event ever observed on Earth since records began two centuries ago.”

● Lytton, BC, Canada – 46.6° C (115.9° F)

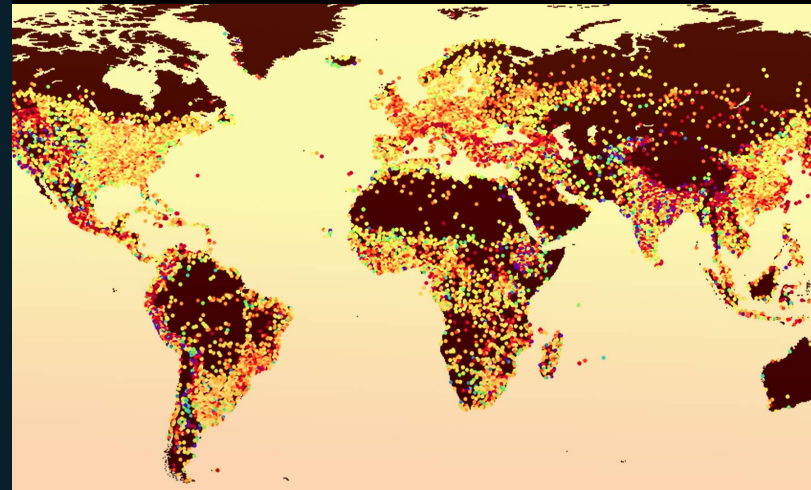
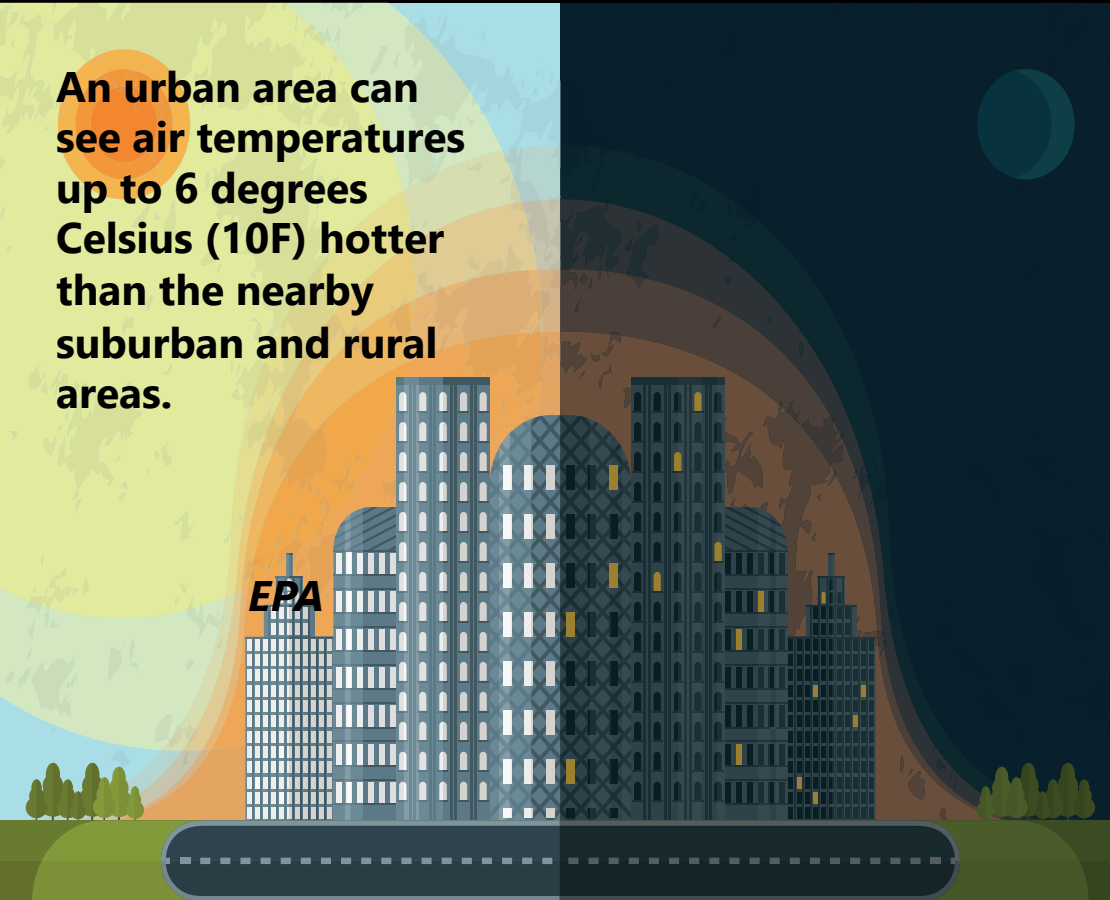
● Seattle, Washington – 42.2° C (108.0° F)

● Portland, Oregon – 46.7° C (116.1° F)

NORTHWEST STILL BAKING IN RECORD HEAT

Urban heat islands will continue to increase

An urban area can see air temperatures up to 6 degrees Celsius (10F) hotter than the nearby suburban and rural areas.



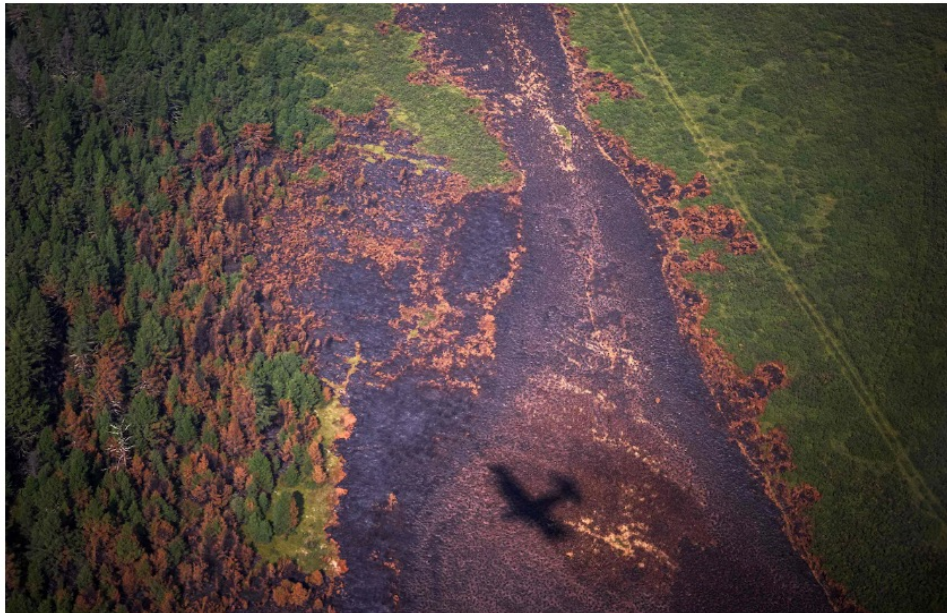
EUROPE

Siberia's wildfires are bigger than all the world's other blazes combined



By Robyn Dixon

August 11, 2021 at 8:08 a.m. EDT



The shadow of an aircraft of the Air Forest Protection Service flying over a burned forest in Siberia's Sakha region on July 27. Russia's coldest region is experiencing major wildfires for a third straight year. (Dimitar Dilkov/AFP/Getty Images)

Yreka, California, USA

• July 31, 2022

The McKinney Fire is California's largest and most deadly fire so far this year.

The April and May 2022 heatwaves in India and Pakistan led to warnings that glacial lakes could burst.

Unfortunately, those predictions came true...

Hunza, Pakistan

• May 7, 2022



Video © Pamir Times (@pamirtimes) via Twitter

Lake Mead, Nevada

• April 17, 2022

Last Full (2000)

52.3 m
(171.6 feet)

The United States' largest reservoir is at its lowest level since it was filled in the 1930s.

Jackson, Kentucky

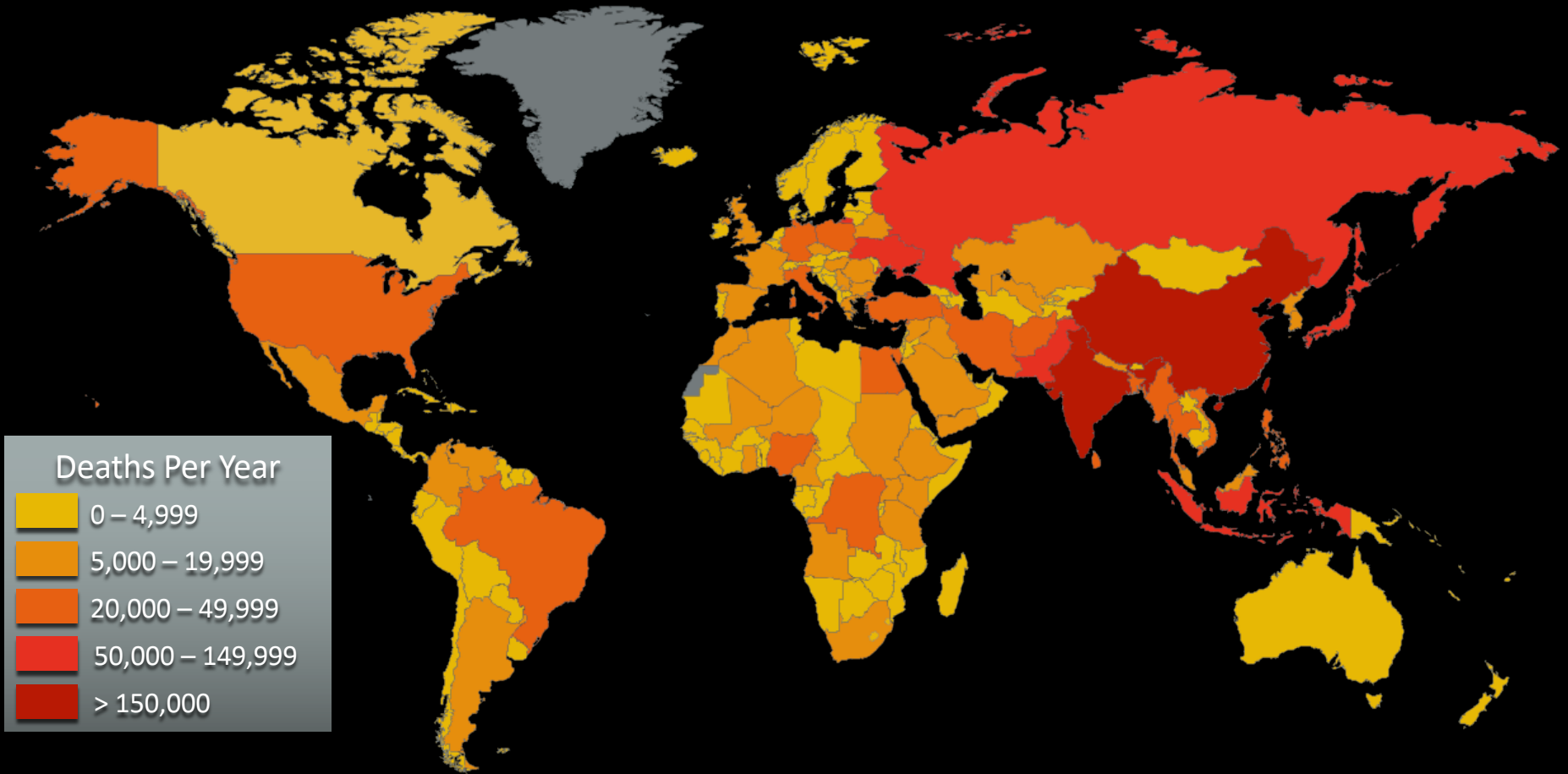
• July 28, 2022

Kentucky was hit by the second 1-in-1,000 year rainfall event on July 27. At least 37 people were killed in the resulting floods.

Photo © 2022 Leandro Lozada/AFP via Getty Images



Deaths Attributable to Ambient Air Pollution



Over 90 %
of children
in the
world are
exposed to
air
pollution

AIR POLLUTION IS A GLOBAL CHILDREN'S HEALTH ISSUE

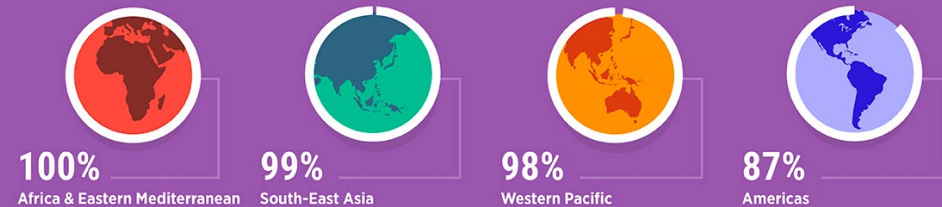
Globally **93%** of all children and **630 million** children under 5 years are exposed to air pollution levels* above the WHO air quality guidelines

*fine particulate matter 2.5 micrometers or less in diameter (PM2.5)



THE BURDEN OF DISEASE FROM POLLUTED AIR IS HEAVIEST IN LOW- AND MIDDLE-INCOME COUNTRIES

Percentage of children under 5 years exposed to PM2.5* levels higher than the WHO air quality guideline are:



98% Low- and middle-income countries

52% High-income countries

CLEAN AIR FOR CHILDREN'S HEALTH

#AirPollution





More than 4 in 10 Americans live in places with unhealthy levels of air pollution.

OVER 137 millions
(PM2.5, O3)



People of color are 3.6 times more likely than white people to live in a county with 3 failing grades.

Comparison of Global Estimated Deaths

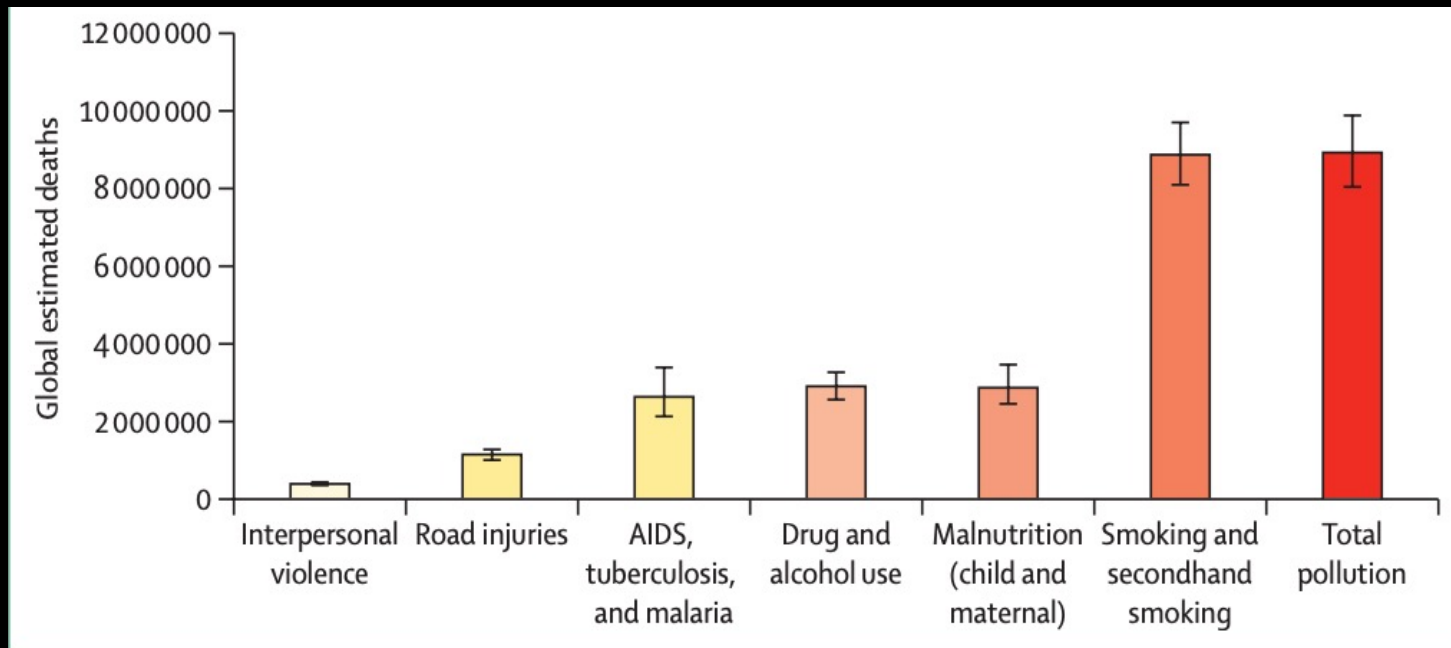



Figure 1: Global estimated deaths by major risk factor or cause

Data from Institute for Health Metrics and Evaluation and Global Burden of Diseases, Injuries, and Risk Factors Study 2019.⁶ Error bars are 95% CI.

Lancet Planet Health 2022; 6: e535–47



1



a frog is put suddenly into boiling water, it will jump out, but if the frog is put in tepid water which is then brought to a boil slowly, it will not perceive the danger and will be cooked to death

Boiling frog

an idiom for the inability of people to react to significant changes that occur gradually

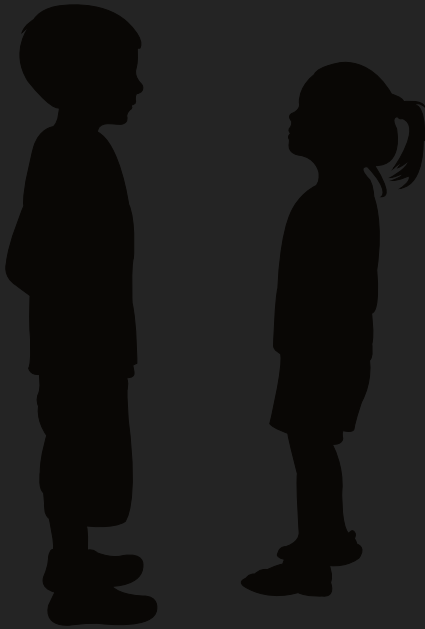
WIKIPEDIA

2



3

CLIMATE
CHANGE
OUTCOMES
AFFECT EVERY
ORGAN SYSTEM



Adverse birth outcomes

Neuro-developmental

Cognitive changes

Congenital heart disease

Brain abnormalities

Malnutrition

Psychiatric conditions

Malignancy

Immunological changes

Metabolic disturbances

Diabetes

Dementia

Allergic rhinitis

4

"Up to now, the polar bear has been the poster child for climate change. We must use every scientifically sound and politically correct mechanism in the book to convince leaders..."





... that humanity really is the most important species endangered by climate change”

**Dr. Margaret Chan
Director-General, WHO**



Air pollution impacts child asthma



Increases in ambient air ozone levels at sub-NAAQS levels:

1. Decreased FVC and FEV1 in AA adolescents with persistent asthma.
2. Decreased response to controller therapies.

Exposure to fine and coarse **PM**
(PM 2.5, PM10)

1. Increased asthma prevalence, ER visits and hospitalizations.

Asthma in Children

Current asthma prevalence percentage, children ages 18 and under, 2018

	Non-Hispanic Black	Non-Hispanic White	Non-Hispanic Black / Non-Hispanic White Ratio
Boys	16.8	5.0	3.4
Girls	11.7	6.2	1.9
Both Sexes	14.3	5.6	2.6



Hospital admissions rate per 100,000 for asthma, children ages 2-17, 2017

Non-Hispanic Black	Non-Hispanic White	Non-Hispanic Black / Non-Hispanic White Ratio
216.5	41.9	5.2

Annals of the American Thoracic Society

Home > Annals of the American Thoracic Society > List of Issues > Just Accepted

Air Quality Index and Emergency Department Visits and Hospitalizations for Childhood Asthma

 Franziska Rosser ; Yueh-Ying Han , Scott D Rothenberger ,  Erick Forno ; Christina Mair , and  Juan C. Celedón ;

Rosser, Han, Rothenberger et al. Ann Am Thorac Soc. 2022