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
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

- 1980 – 2020

- Extreme temperatures, droughts, fires
- Floods, mudslides
- Storms

Data: 2017 Munich Re, Geo Risks Research, NatCatSERVICE. As of 2021.
Hurricane Dorian was “stalled” over the Bahamas for 40 hours, dropping up to 150 cm (60 inches) of rain.
Hurricane Maria
• September 20, 2017

Source: 2017 NASA
Hurricane Maria

• Puerto Rico, September, 2017

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

NEJM 2018
Heat records were broken across Europe, Asia, Africa and the Middle East in late June and early July 2022.
The 2021 Pacific Northwest heat wave was “the most anomalous extreme heat event ever observed on Earth since records began two centuries ago.”

- Portland, Oregon – 46.7°C (116.1°F)
- Seattle, Washington – 42.2°C (108.0°F)
- Lytton, BC, Canada – 46.6°C (115.9°F)

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

Urban heat islands will continue to increase
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 Dilkoff/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...
Lake Mead, Nevada

• April 17, 2022

The United States’ largest reservoir is at its lowest level since it was filled in the 1930s.
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.
Deaths Attributable to Ambient Air Pollution

Deaths Per Year
- 0 – 4,999
- 5,000 – 19,999
- 20,000 – 49,999
- 50,000 – 149,999
- > 150,000

Data: World Health Organization, 2016
Over 90% of children in the world are exposed to air pollution.
More than 4 in 10 Americans live in places with unhealthy levels of air pollution.

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

OVER 137 millions (PM2.5, O3)
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. Error bars are 95% CI.

*Lancet Planet Health 2022; 6: e535–47*
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

Wikipedia
Adverse birth outcomes
- Neuro-developmental
cognitive changes
- Congenital heart disease
- Brain abnormalities
- Malnutrition

Psychiatric conditions
- Malignancy
- Immunological changes
- Metabolic disturbances
- Diabetes
- Dementia
- Allergic rhinitis
"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.

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## Asthma in Children

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

<table>
<thead>
<tr>
<th></th>
<th>Non-Hispanic Black</th>
<th>Non-Hispanic White</th>
<th>Non-Hispanic Black / Non-Hispanic White Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>16.8</td>
<td>5.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Girls</td>
<td>11.7</td>
<td>6.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Both Sexes</td>
<td>14.3</td>
<td>5.6</td>
<td>2.6</td>
</tr>
</tbody>
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### Hospital admissions rate per 100,000 for asthma, children ages 2-17, 2017

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<tbody>
<tr>
<td>216.5</td>
<td>41.9</td>
<td>5.2</td>
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https://minorityhealth.hhs.gov
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;