Preheated: Our Unique Role in Addressing the Mental Health Effects of Climate Change

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DISCLOSURES

I have ***no*** financial relationships or conflicts of interest to disclose.

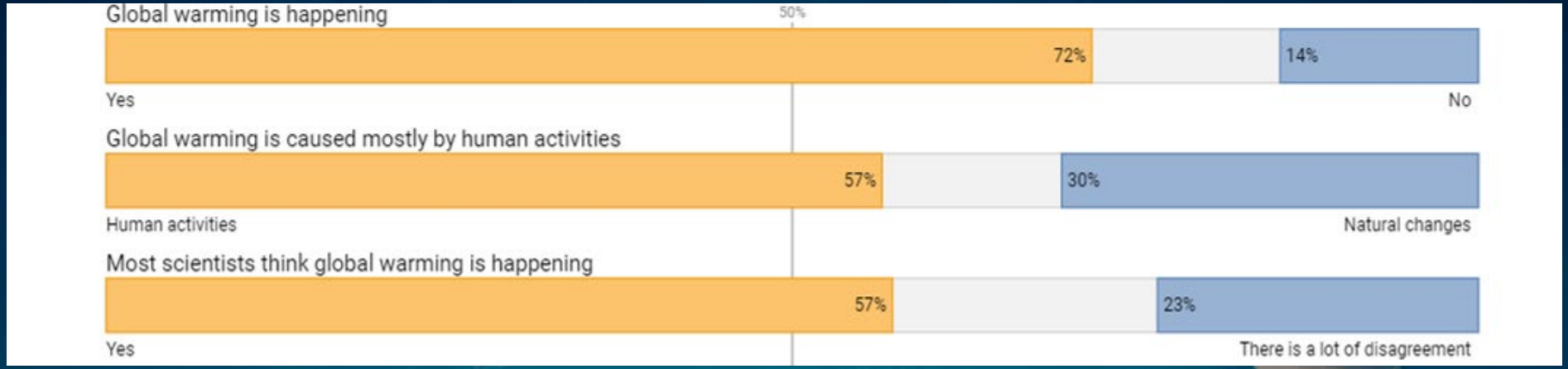
Objectives

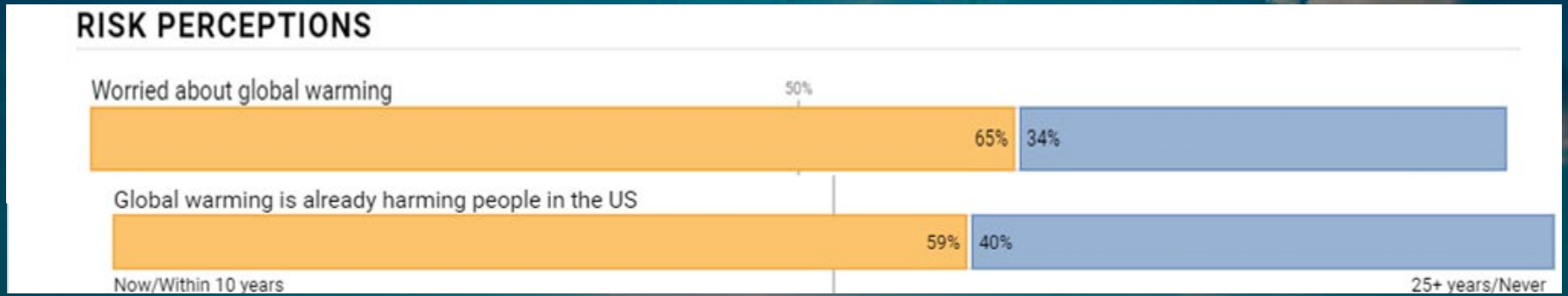
- Understand the environmental effects of human-induced climate change.
- Elucidate the mental health effects of a warming planet, temperature extremes and increased air pollution.
- Take actions as mental health professionals using the CARE acronym in the face of climate change

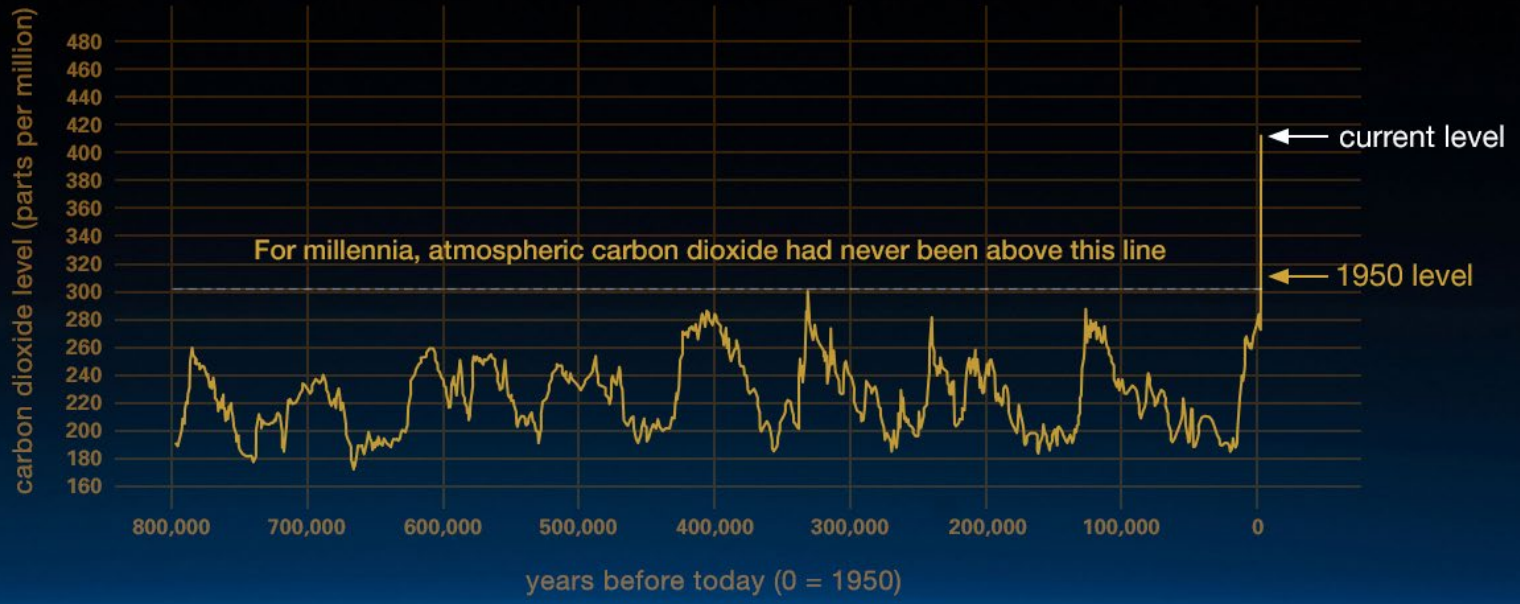
CLIMATE CHANGE BACKGROUND

Introduction to Mentimenter polling

YCCC 2021 U.S. public opinion survey





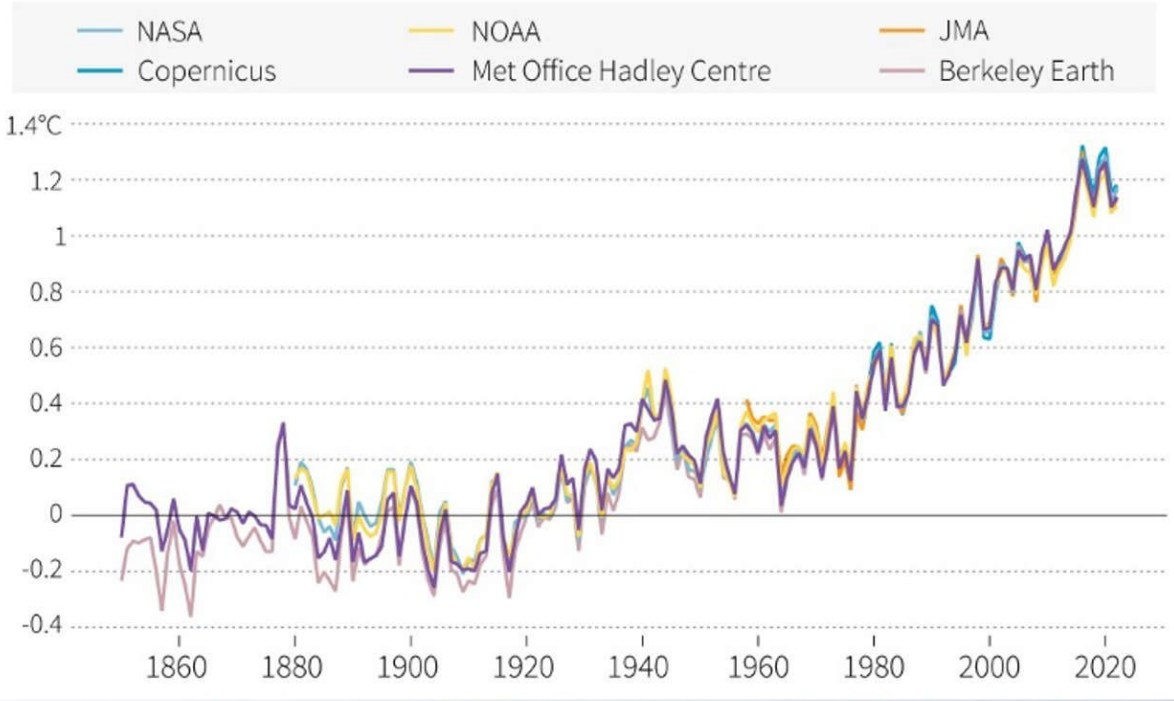

carbon dioxide level (parts per million)
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
For millennia, atmospheric carbon dioxide had never been above this line
current level
1950 level
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
years before today (0 = 1950)

RISING TEMPERATURES

COP27

The years 2015 to 2022 are on track to be the eight warmest on record globally

Temperature anomalies compared to pre-industrial levels (1850-1900)



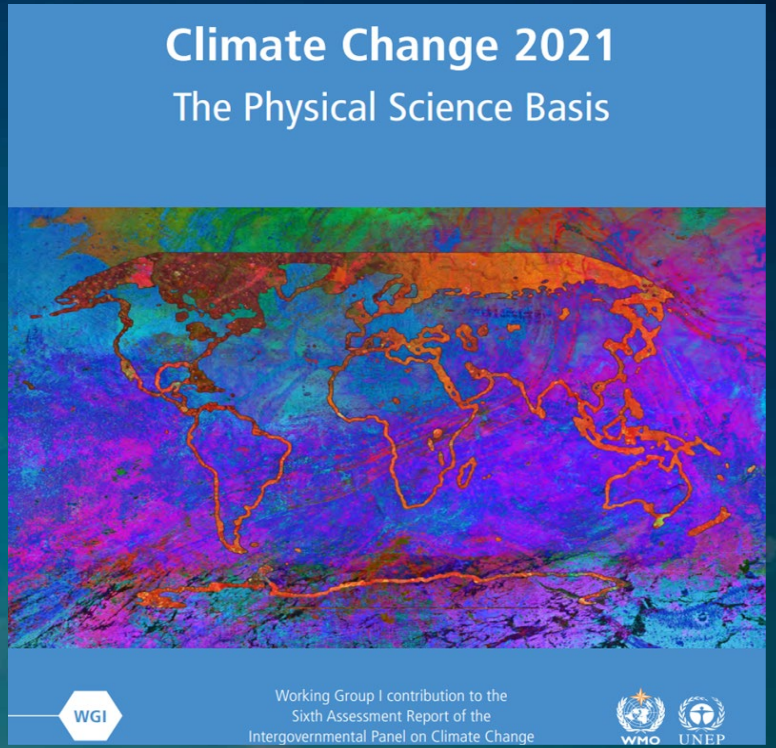
Source: World Meteorological Organization

AFP

Unequivocal

"It is unequivocal that human influence has warmed the atmosphere, ocean and land."

The best estimate of total post-industrial, human-caused temperature increase is 1.1 °C (from 1850–1900 to 2010–2019).

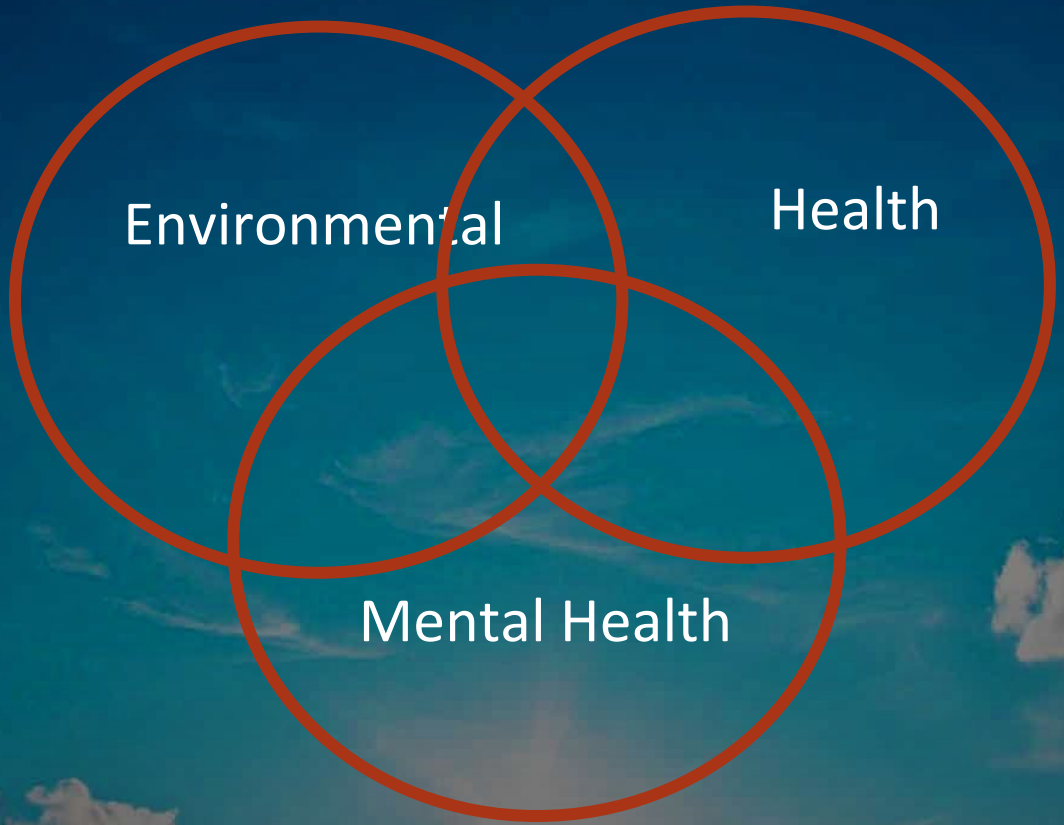


Extremes

Human-induced climate change is already affecting many weather and climate extremes …such as heatwaves, heavy precipitation, droughts, and tropical cyclones…

Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO2) and other greenhouse gas emissions occur in the coming decades

Effects of Warming Temperatures



Public Health model

Affordable Housing

Employment opportunities

Community violence

Child Abuse rates

Pandemics

Air pollution amounts

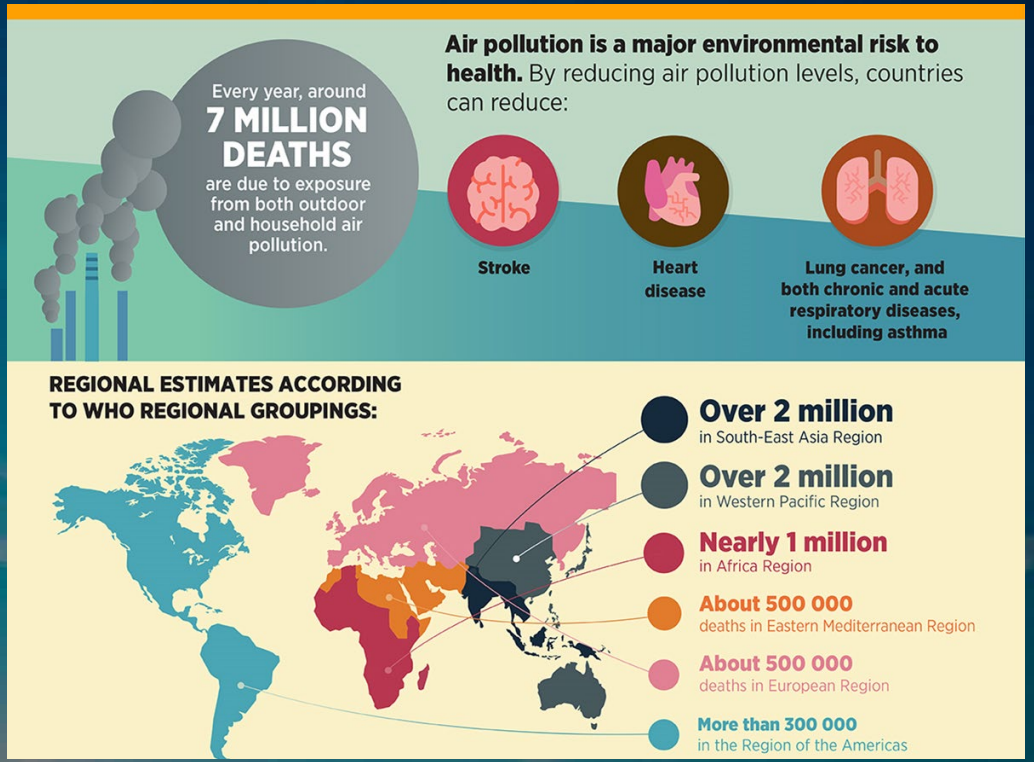
Environmental Impacts – Climate Change

- Heat waves
- Heavy rainfall events
- Droughts
- Wildfires
- Hurricanes
- Floods
  - Sea levels have risen 7-8 inches since 1900.
    By 2100, sea levels are projected to rise 1-8 additional feet.
- Air pollution

AIR POLLUTION MORTALITY

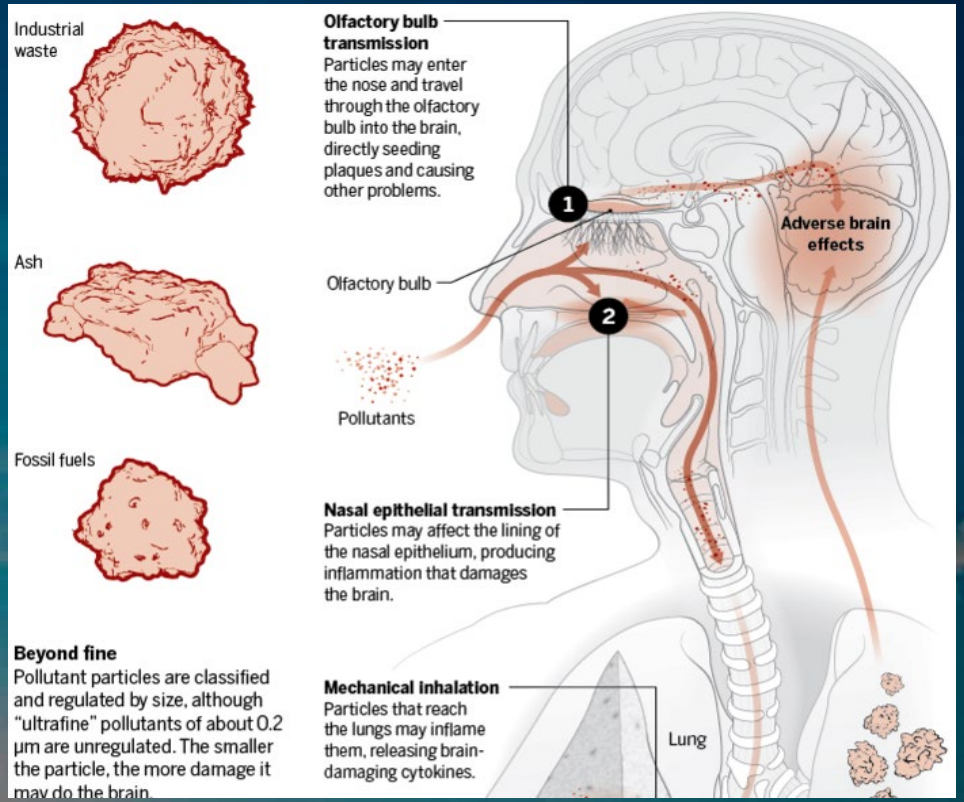
Air pollution is the **greatest cause of lost life in the world**

- 2.9 year average life expectancy lost per person (Leleivald et al. 2020)
- Let's compare:
  - Smoking (1.6 years)
  - Alcohol and Drug use (11 months).



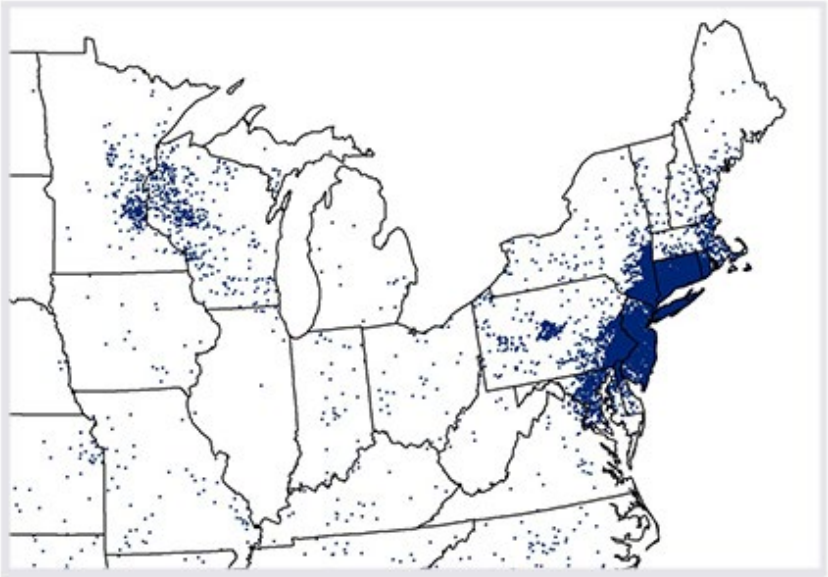
AIR POLLUTION AND NEUROPSYCHIATRIC DISORDERS

- **Autism**
  - 3 meta-analyses
- **Dementia**
  - 2 meta-analyses
- Depression (mixed findings)
- Suicide
- **Stroke**
- Parkinson's

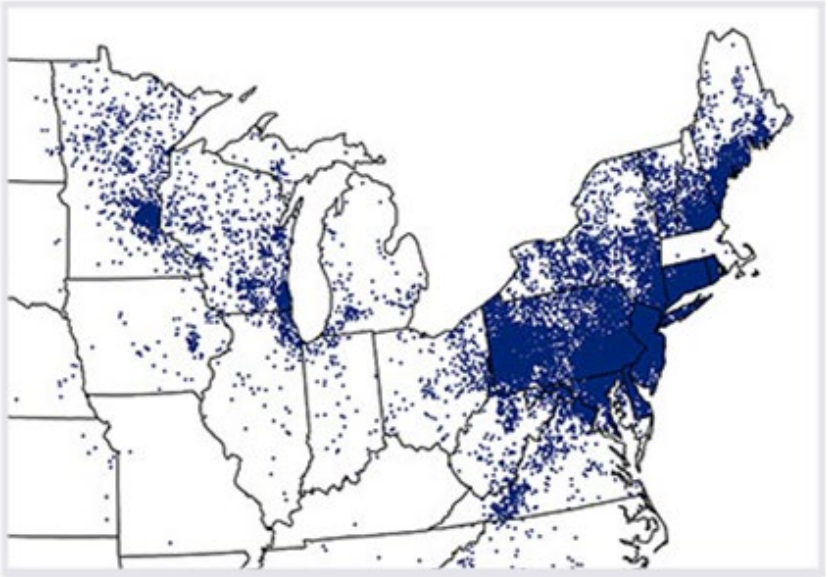


Underwood, E. (2017). The polluted brain.

Lyme Disease spread



1996



2018

Floods and Droughts

Climate change-related water disasters

- Sea level rise
- Flooding
- Hurricanes
- Coastal storms

Droughts

25 million – 1 billion climate-related displaced persons by 2050.

Half Billion Children

- Disruption of education
- Destroyed health infrastructure
- Increased risks of forms of neglect and abuse (including trafficking, child labor)
- Increased child deaths from disease
- Vector-borne diseases
- Malnutrition

Nutritional Deficiencies

Zn	Zinc deficiency	Major depression, impaired immune function & neurodevelopment
Fe	Iron Deficiency Anemia	5.6x rate of bipolar disorder in women 2-3x rates of anxiety, neurodevelopmental delay
Protein	Protein-energy under-nutrition	Liver, kidney, or heart failure Irritability, apathy, impaired cognition & consciousness Mild intellectual disability

Food Safety, Distribution, Nutrition

Health Impacts

- Heat related illness and deaths
- Acute and chronic cardiovascular and respiratory disease
- Injuries, GI disease, drowning
- Lyme disease, Zika virus, West Nile virus
- Algae toxins, Vibrio bacteria, diarrheal illnesses
- Salmonella infections, GI infections

	Climate Driver	Exposure	Health Outcome	Impact
Extreme Heat	More frequent, severe, prolonged heat events	Elevated temperatures	Heat-related death and illness	Rising temperatures will lead to an increase in heat-related deaths and illnesses.
Outdoor Air Quality	Increasing temperatures and changing precipitation patterns	Worsened air quality (ozone, particulate matter, and higher pollen counts)	Premature death, acute and chronic cardiovascular and respiratory illnesses	Rising temperatures and wildfires and decreasing precipitation will lead to increases in ozone and particulate matter, elevating the risks of cardiovascular and respiratory illnesses and death.
Flooding	Rising sea level and more frequent or intense extreme precipitation, hurricanes, and storm surge events	Contaminated water, debris, and disruptions to essential infrastructure	Drowning, injuries, mental health consequences, gastrointestinal and other illness	Increased coastal and inland flooding exposes populations to a range of negative health impacts before, during, and after events.
Vector-Borne Infection (Lyme Disease)	Changes in temperature extremes and seasonal weather patterns	Earlier and geographically expanded tick activity	Lyme disease	Ticks will show earlier seasonal activity and a generally northward range expansion, increasing risk of human exposure to Lyme disease-causing bacteria.
Water-Related Infection (*Vibrio vulnificus*)	Rising sea surface temperature, changes in precipitation and runoff affecting coastal salinity	Recreational water or shellfish contaminated with *Vibrio vulnificus*	*Vibrio vulnificus* induced diarrhea & intestinal illness, wound and bloodstream infections, death	Increases in water temperatures will alter timing and location of *Vibrio vulnificus* growth, increasing exposure and risk of waterborne illness.
Food-Related Infection (*Salmonella*)	Increases in temperature, humidity, and season length	Increased growth of pathogens, seasonal shifts in incidence of *Salmonella* exposure	*Salmonella* infection, gastrointestinal outbreaks	Rising temperatures increase *Salmonella* prevalence in food; longer seasons and warming winters increase risk of exposure and infection.

CASE PRESENTATION

Case:

A 54 year-old male farmer presents with depression, citing financial stress from drought-related crop failure and emotional upset from the sale of several prized animals and decline of his lands.

- MMSE is 24/30
- Laboratory work-up reveals creatinine 1.8 and MCV 103.

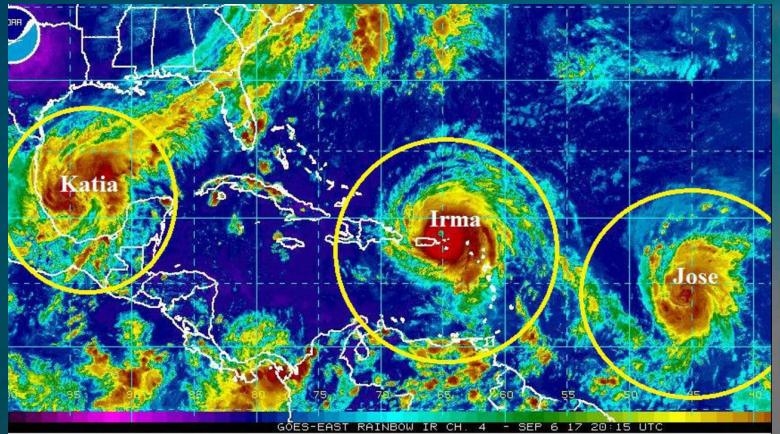
He is prescribed sertraline, but then develops seizures, stops the medication abruptly, and subsequently completes suicide in the midst of worsening heat and dust impacts on his crops later that summer.

Poll: What mental health effects might climate change have?

- Free response

The most affected

Disasters, Trauma

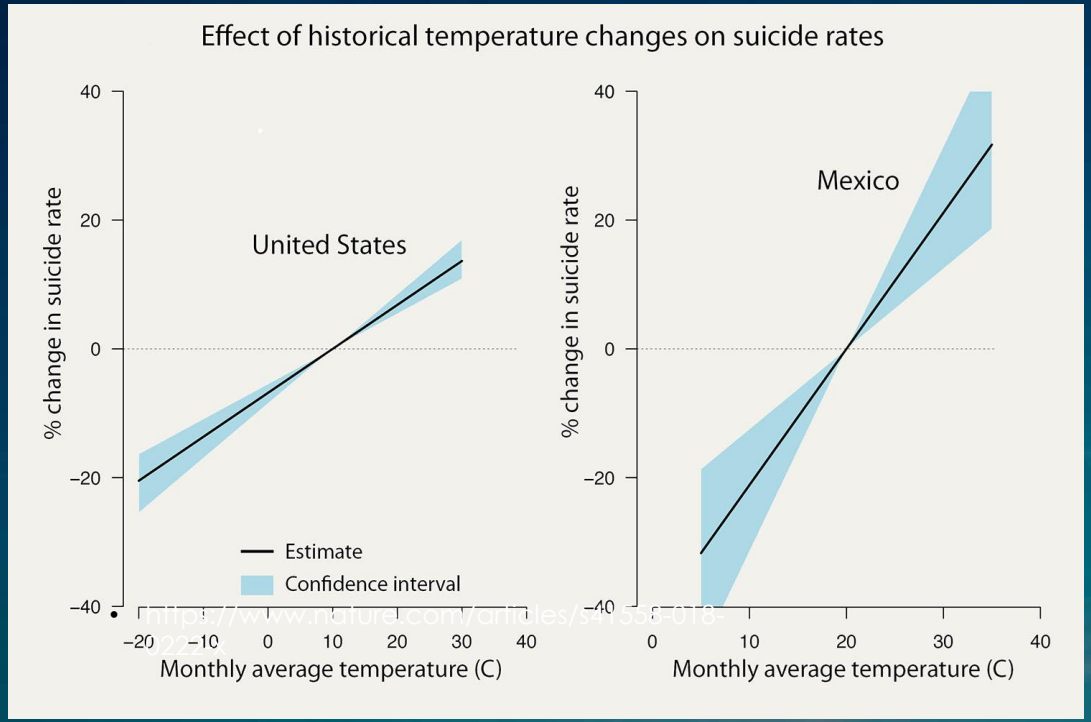


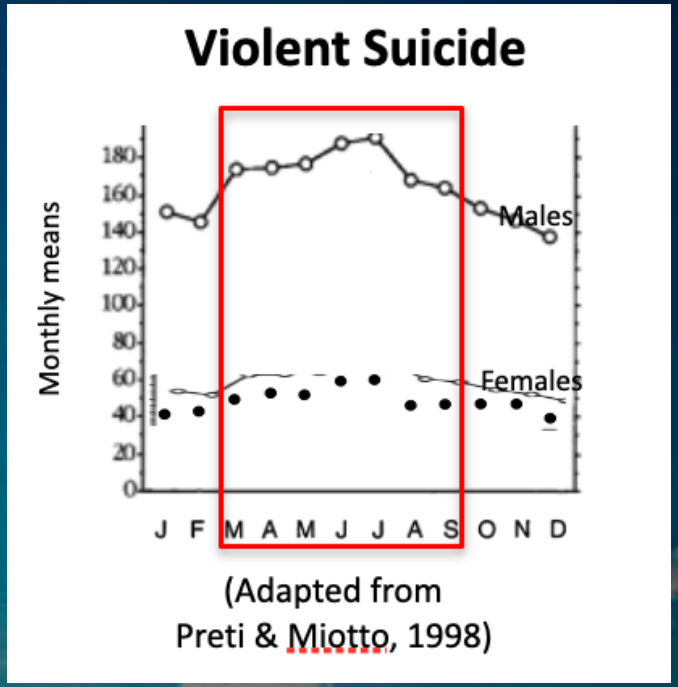
Hurricane Katrina

- 1/6 affected individuals met the diagnostic criteria for PTSD
- Suicide and suicidal ideation more than doubled
- 49% developed an anxiety or mood disorder

(Kessler et al., 2008; Lowe, Manove, & Rhodes, 2013)

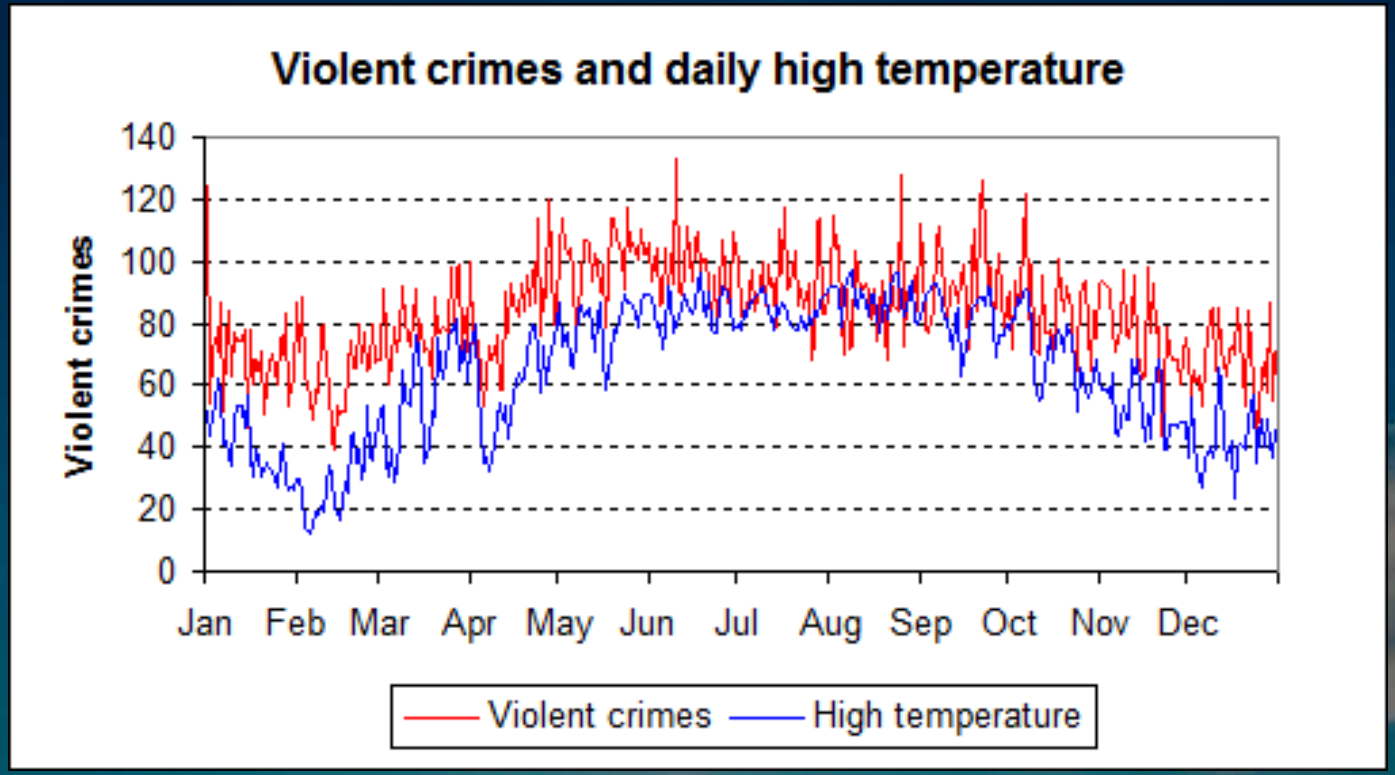
Suicide and Heat





Suicide increase correlates with temperature increase and summer months

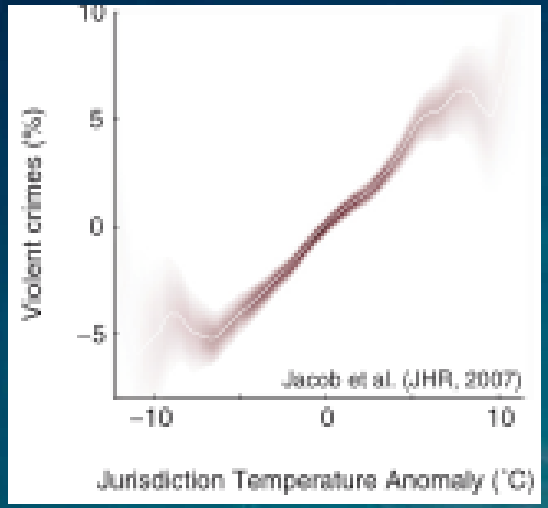
Heat raises tempers



Columbus, Ohio: Jan through December 2007, James Allan Fox, NEUniv

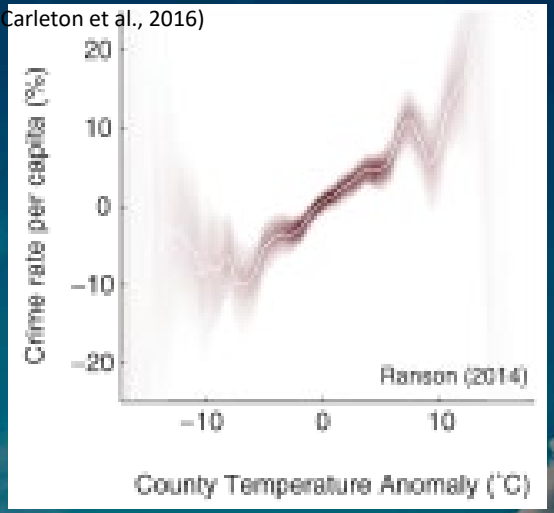
Violence and Heat

Violent Crime



Rape

(Carleton et al., 2016)



Violence rates increase of 3.9% interpersonal and 13.6% intergroup violence per standard deviation increase in temperature (same with std deviation decrease in precipitation) (Hsiang et al. 2013)

More interpersonal and group violence

- True in Chicago, Sub-Saharan Africa, Asia, Latin America
- Supporting evidence from multiple fields.
  (archaeology, criminology, economics, geography, history, political science and psychology)
- Psychology: heat increases arousal, hostile thoughts, decreases self-regulation, attention, cognitive function
- Scarcity: lower crop yields, resources lead to social strife

Burke, Hsiang & Miguel, 2014 *Nature Climate Change* **4**, 234–235(2014). Metanalysis of more than 60 studies. High confidence finding: true in all 27 quantitative studies.


CLIMATE CHANGE DISTRESS

Uncertainty

- About the future environment
- Changing, less predictable weather patterns
- Increased likelihood of extreme weather and natural disasters
- Among youth and young adults
- Or concern about possible future harm to one’s children

ECO-Anxiety

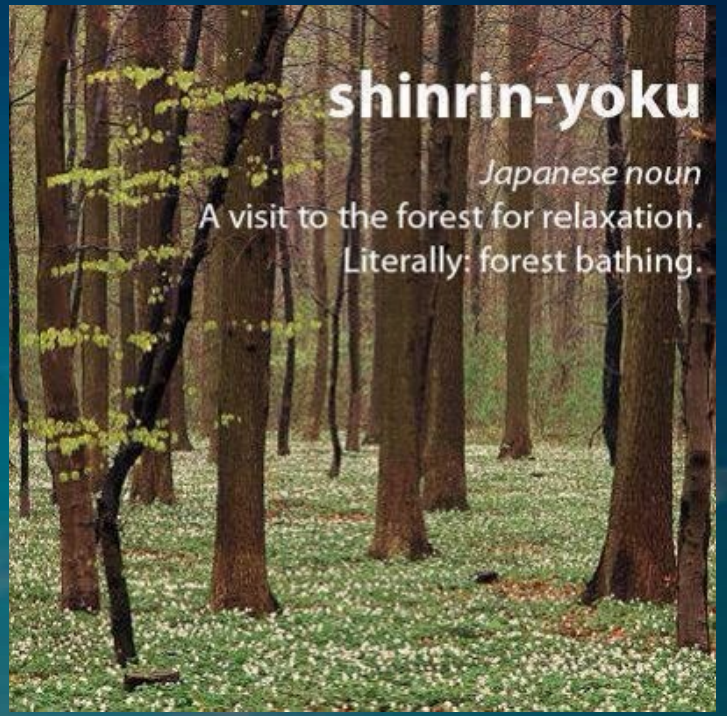
- Anxiety about:
  - Climate change
  - Ecosystem destruction
  - Species loss
  - Complexity of ecological problems
  - Feeling overwhelmed, distress, and dread about environmental problems

Solastalgia

- Loss of place, loss of home
- The geographical place is still there…
- Yet it no longer holds the solace that it once did.
- It no longer has the same meaning.

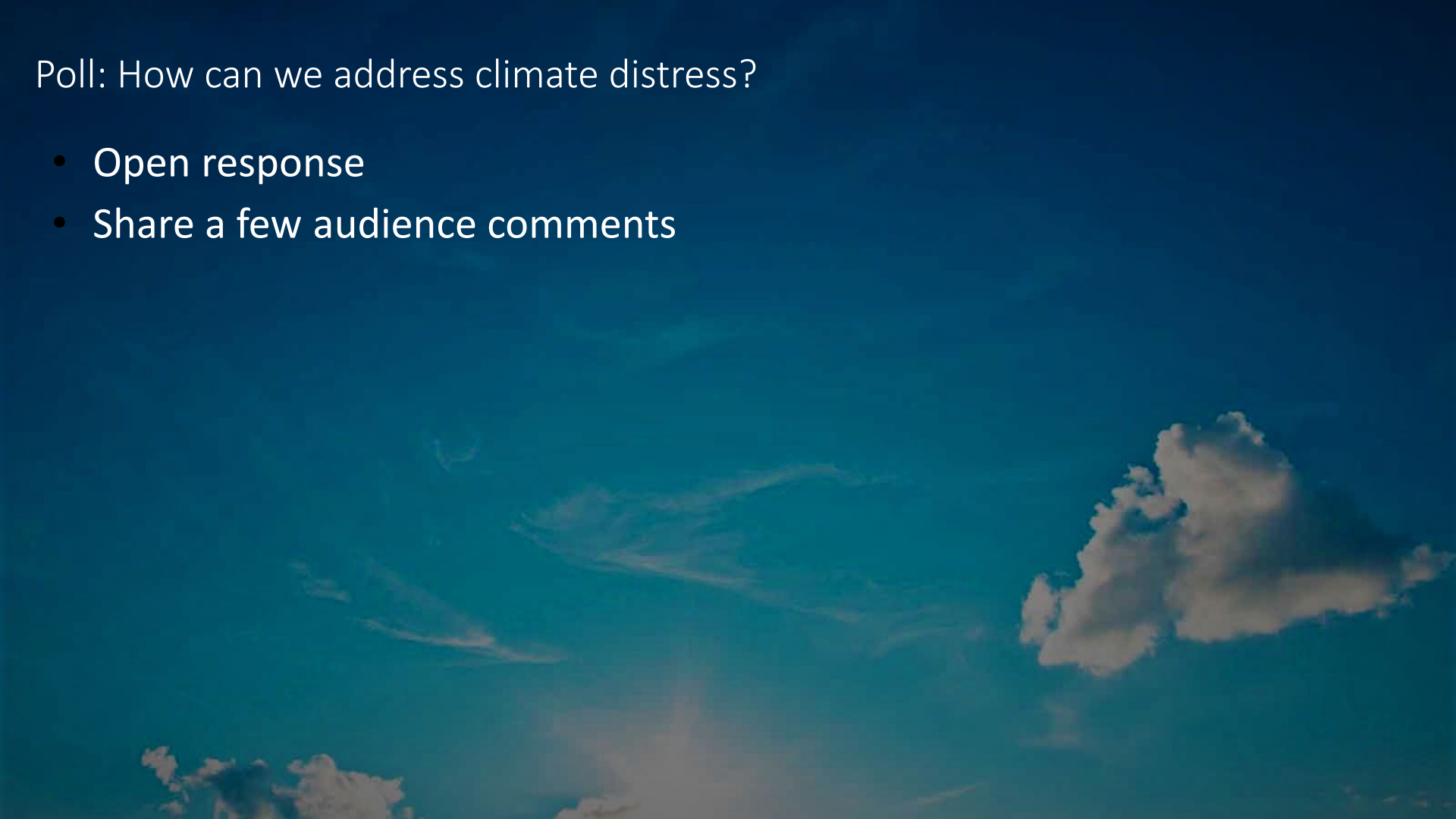
Our Experience of Nature

- The natural world is a coping mechanism
- Outdoor exercise has many health benefits
- What happens when:
  - Becomes hotter, more unpleasant outside?
  - Weather becomes a source of stress?



Poll: How can we address climate distress?

- Open response
- Share a few audience comments



So what can we do?

	Preventive	Adaptive
Individually		
Collectively **As MH professionals**		

MH role: Combat psychological distance

- Denial, Avoidance, Misinformation
- “It doesn’t affect me.”
- Even when it does
- Turn anxiety into hope and action.

Carelton, 2017: 59,000 farmer suicides in India over 30 years attributed to climate change

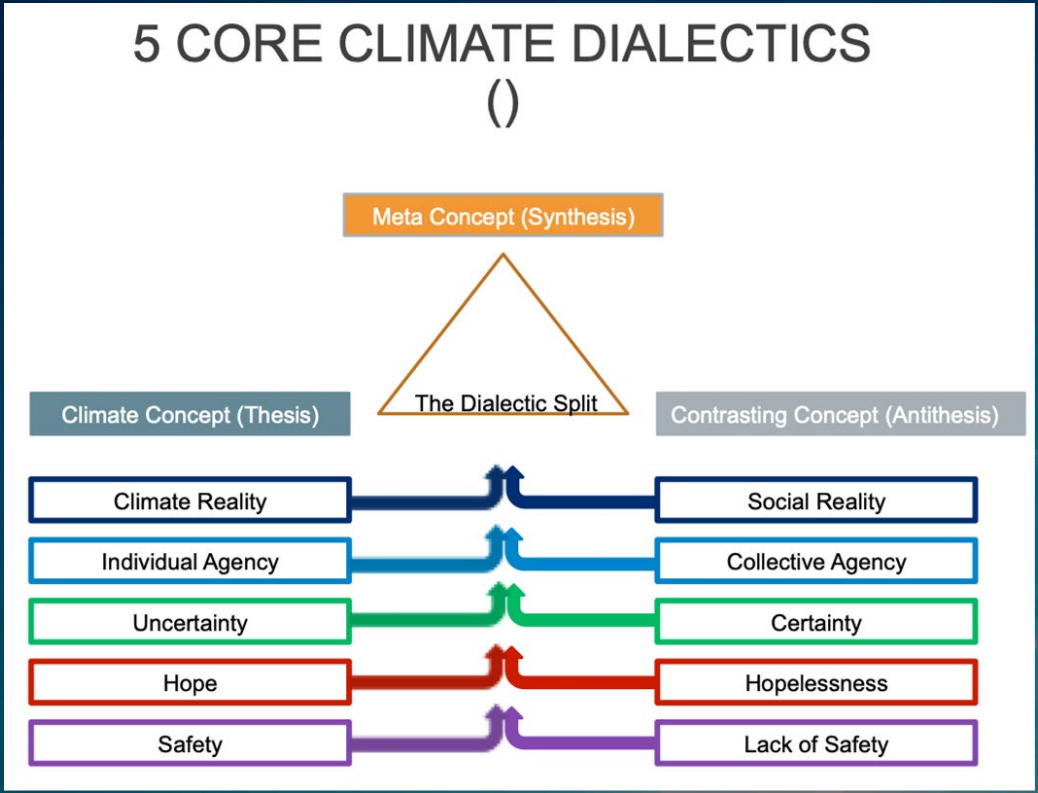
CA_2RE Actions

- Clinical
- Administrative
- Advocacy
- Research
- Education

Coverdale et al., 2018

Climate psychotherapy

- Validate reality-based fear
- Transform rather than lessen anxiety
- Encouraging Active Hope
- Emphasize a secure and caregiving attachment to the natural world
- Acknowledge climate change dialectics



Lewis, Haase & Trope, 2020

Affective: The imperative to hope when it is impossible to be hopeful

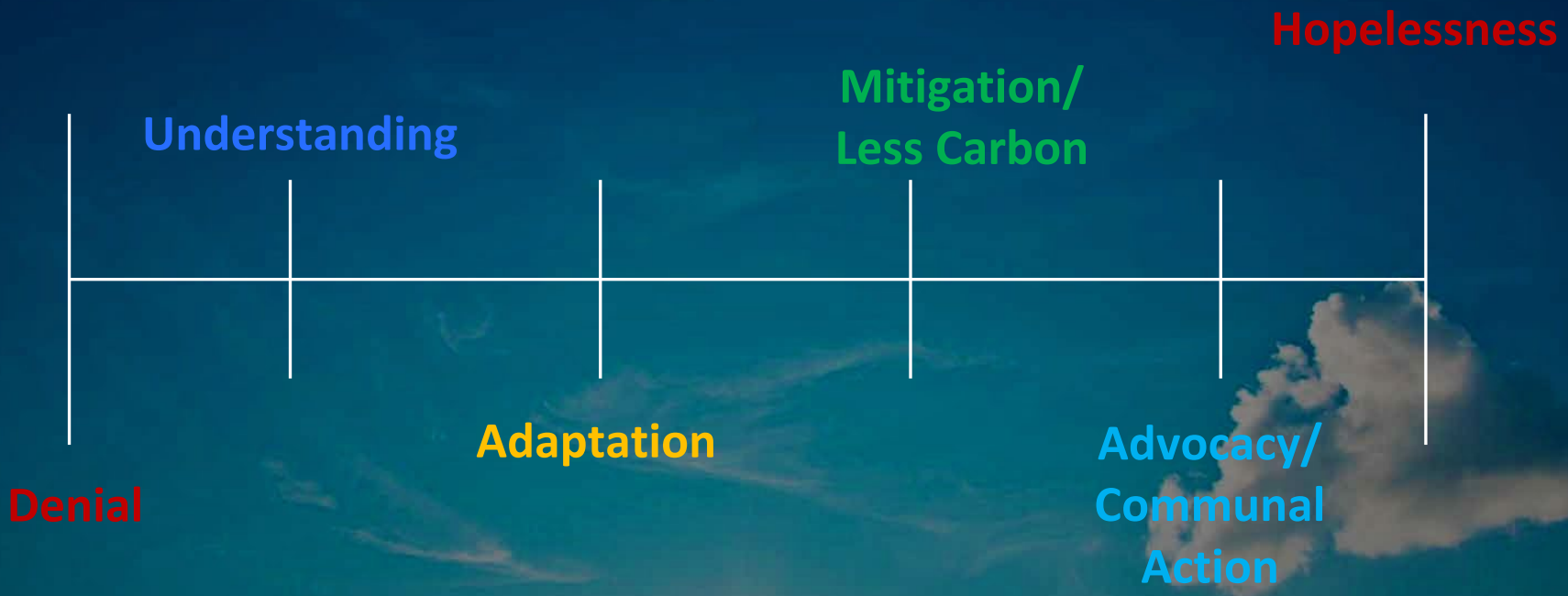
Cognitive: The imperative to think when the future is unknowable and unimaginable

Drive: The need to find empowerment through personal action when you are powerless

Attachment: The need to maintain a mutually caregiving attachment to an increasingly dangerous world

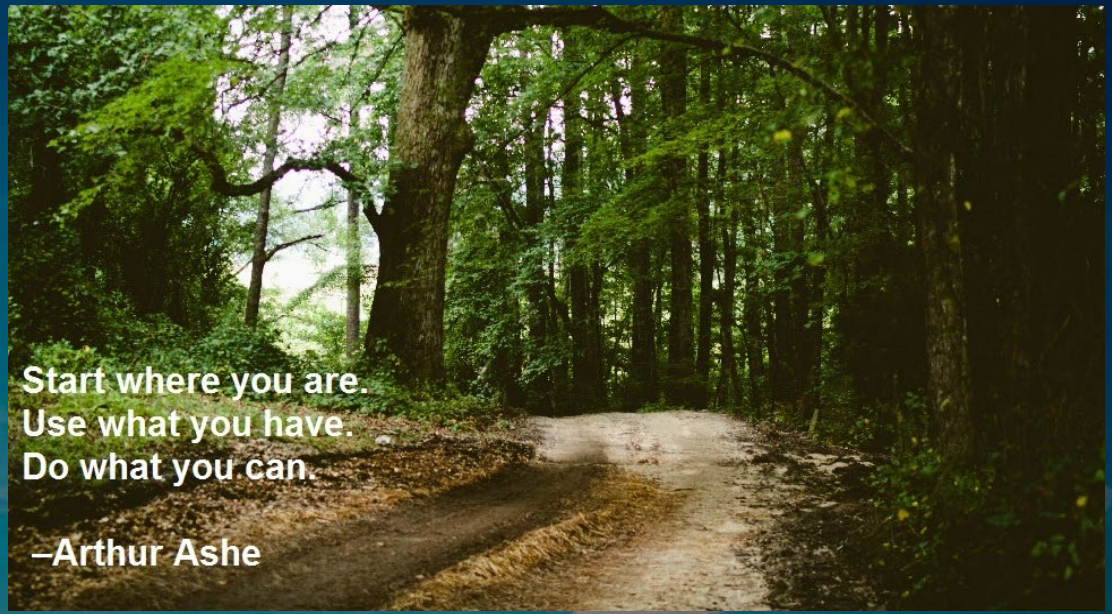
Self: The struggle for a reality-based ego when the self now must encompass an unknowable chaotic future and sluggish social reality response

Climate anxiety reactions



Administrative

- Use less carbon at your institutions.
- Prepare for acute weather and climate disasters.
- Encourage fossil fuel divestment



Advocacy

- Join the Global Consortium on Climate and Health.
- Support climate action as a physician.
- Encourage fossil fuel divestment & less carbon use at your institutions.
- Model lessened carbon use: air travel, food waste.

Advocate: Political, not Partisan Action

- Use your position as a health professional to unite
- Congress has the bipartisan Climate Solutions Caucus
- In our economic interests: $350 billion dollars was spent on disaster relief this decade, not including the tragedies this year (GAO)

Glasgow Climate Pact - 2021

- Goal: warming limited to 1.5° C or less.
- Goal: 45% reduction of carbon emissions by 2030
- Accelerated decarbonization targets for countries
- Phase-down coal and phase-out fossil fuel subsidies.
- $100 billion dollar pledge for climate efforts in developing countries.
- Framework and rules for a global carbon market

- Current Climate Summit: November 6-18, 2022, Sharm el-Sheikh, Egypt

Research Needs

- Eco-anxiety.
- Add to DSM: climate psychological states.
- Prolonged, global disaster states.
- Climate mitigation practices
- Public health responses

Educational Actions

- Join the Climate Psychiatry Alliance

  https://www.climatepsychiatry.org/
- Teach others in training and at your facilities through classes and professional presentations.
- Continue Tele-psychiatry and virtual conferences.
- Incorporate climate effects into health professional training curricula.

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