

CLIMATE PSYCHIATRY: THE DIVERSE CHALLENGES OF CLIMATE TO MENTAL HEALTH



www.climatepsychiatry.org

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SIX SESSIONS ON CLIMATE HEALTH EMERGENCY

April 28

HEALTH EMERGENCY OF OUR CHANGING CLIMATE: INTRODUCTION AND OVERVIEW

**THOMAS NEWMAN, MD
KRISTINA DAHL, PhD**

May 5

HEAT: A VIEW FROM THE EMERGENCY DEPARTMENT

JEREMY LACOCQUE, DO

May 12

**HOW CLIMATE EFFECTS YOUR SKIN
MARY WILLIAMS, MD**

**CLIMATE CHANGE IN THE ERA OF COVID19
SHERI WEISER, MD**

May 19

SPECIAL RISKS ACROSS THE LIFE SPECTRUM: PANEL

**DANIEL LOWENSTEIN, MD (MODERATOR)
TRACEY WOODRUFF, PhD
POOJA SINGAL, MD
ANNA CHODOS, MD**

May 26

**WILDFIRES AND AIR POLLUTION
JOHN BLAMES, MD**

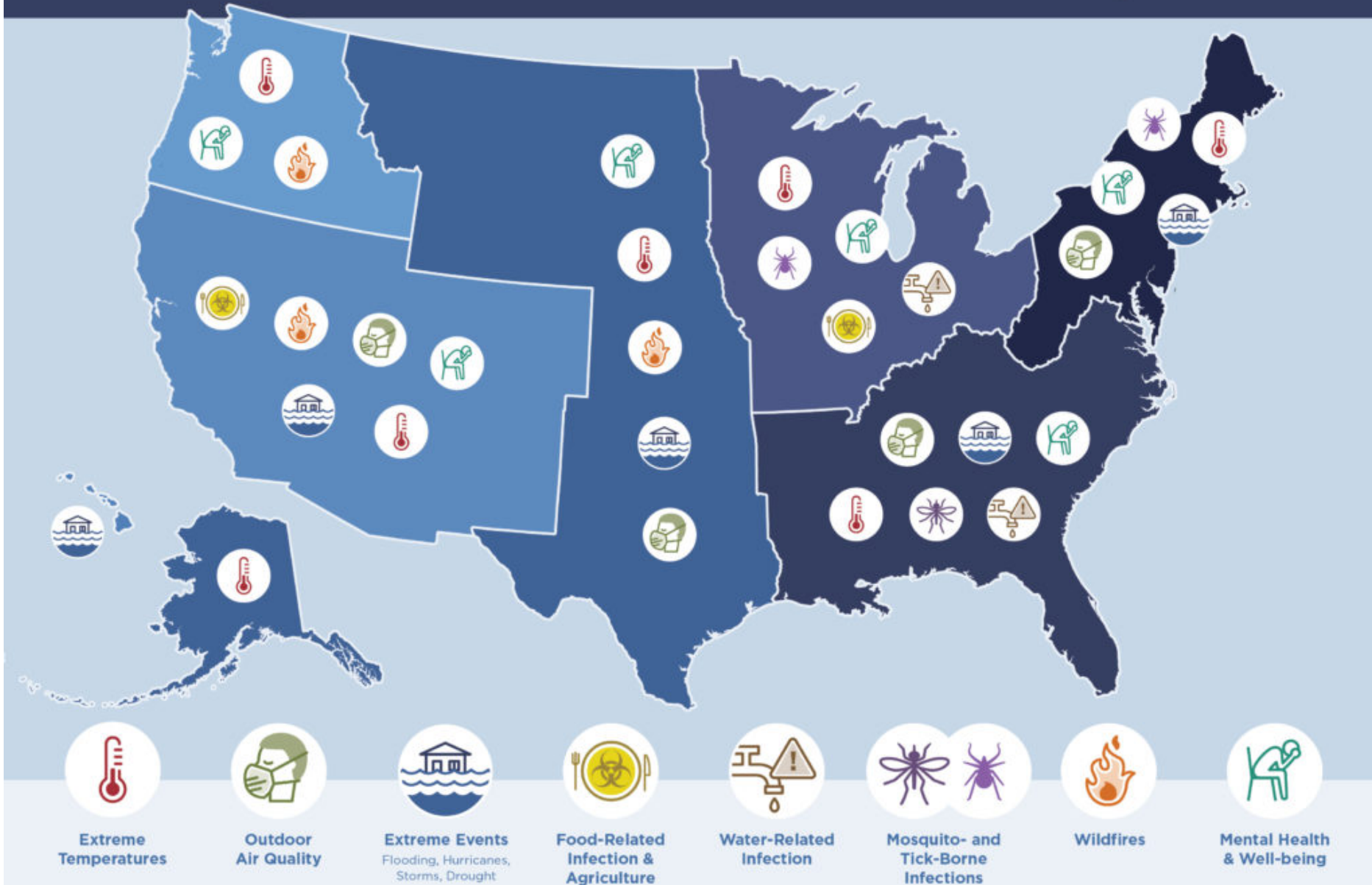
**ALLERGENS AND ALLERGIC DISEASE
KATHERINE GUNDLING, MD**

June 2

DIVERSE CHALLENGES OF CLIMATE TO MENTAL HEALTH

**ROBIN COOPER, MD
ALEX TROPE, MD**

How Our Health is Harmed by Climate Change: Impacts Differ by Geographic Region



SIX COMPONENTS OF CLIMATE PSYCHIATRY

1. Slow Moving Disasters

2. Extreme Heat Effects

3. Acute Climate Disasters

4. Eco-distress Syndromes

5. Vulnerable Populations

6. Engagement & Action

How Does Climate Change Impact Mental Health?

2. Extreme Heat Effects

3. Acute Climate Disasters

4. Eco-distress Syndromes

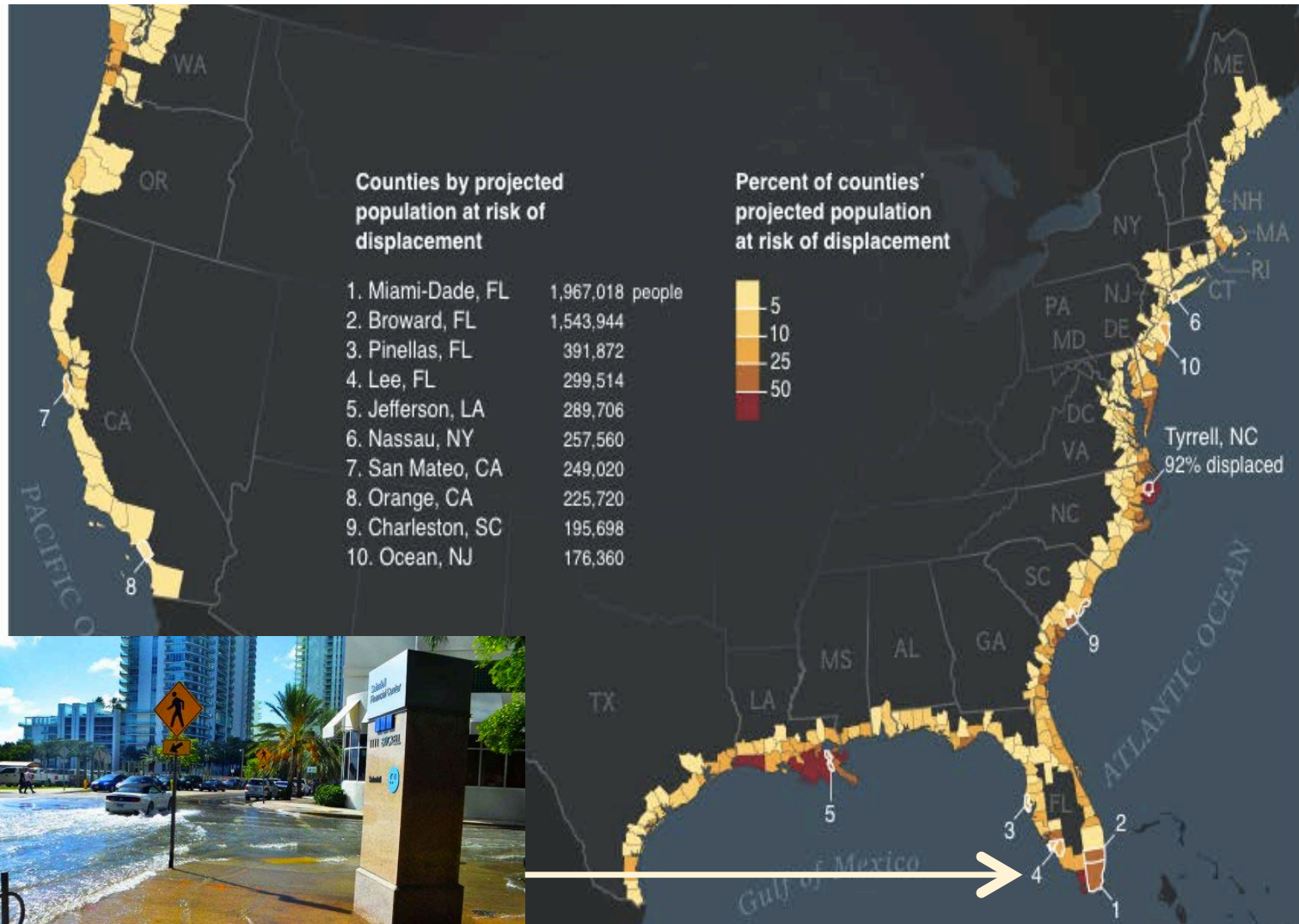
5. Vulnerable Populations

6. Engagement & Action

1. Slow Moving Disasters: Land Loss, Drought, Air Pollution



Permanent Land Loss Sea Level Rise



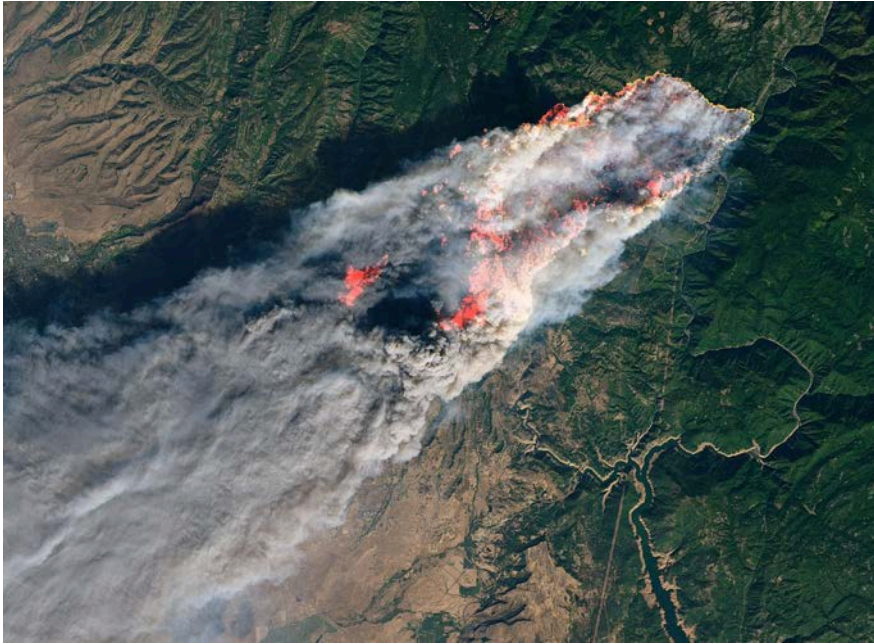
DROUGHTS: SLOW-MOVING DISASTERS AND PRECONDITIONS FOR SUBSEQUENT DISASTER



Psychological Impacts:

- Anxiety, depression, hopelessness when livelihood threatened: esp. among developing world farmers and farmworkers in developed world
- Displacement; forced migration; increased urbanization and inner city poverty
- Political instability
- Solastalgia: psychological distress and grieving from ecological degradation





Paradise, CA and the
2018 Camp Fire

An Ecological Parable

PARADISE CAMP FIRE PRECONDITIONS: DROUGHT



California Drought 2011-2017

- A Slow-Moving Disaster AND a precondition for acute disaster
- Killed 102 million trees from 2011 to 2016
- In 2014, agriculture sector alone lost \$2.2 billion and 17,100 seasonal and part-time jobs
- Lowest Sierra snowpack ever recorded

How Does Climate Change Impact Mental Health?



2. Extreme Heat Effects



3. Acute Climate Disasters

4. Eco-distress Syndromes

5. Vulnerable Populations

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ARIZONA'S EXTREME HEAT
OUTDOOR ITEMS ARE MELTING



FINALLY A CHANCE OF THUNDERSTORMS AND SHOWERS ACROSS SOUTHERN ARIZONA

HEAT: AN ACUTE DISASTER *AND* A PRECONDITION FOR SUBSEQUENT DISASTERS



EXTREME HEAT EFFECTS



MENTAL AND BEHAVIORAL IMPACTS:

- Increases in interpersonal and group violence
- Increases in suicide
- Impaired cognition and concentration
- Impaired sleep
- Psychotropic and other medications impair temperature homeostasis

PHOTO SOURCE: Cityofpasadena.net: 2019
No copyright infringement is intended

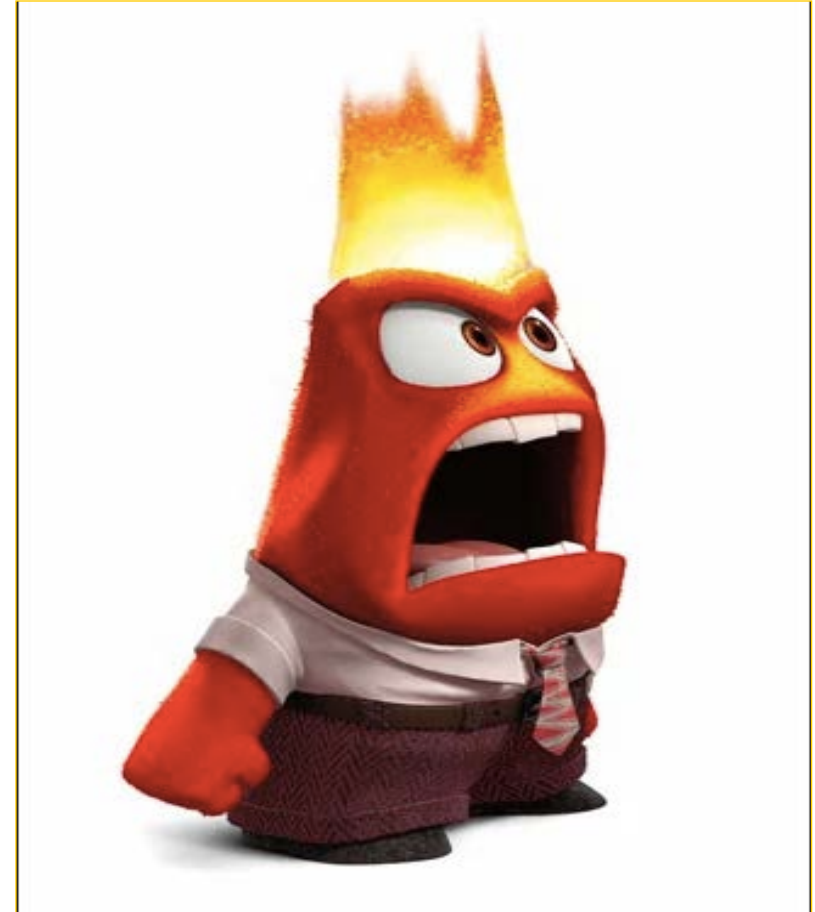
General understanding

“I’m so angry my blood is boiling”

“He’s so hot headed, so hot tempered”

“Keep cool, man. Chill out.”

“Hot under the collar”



Impacts of Extreme Temperatures: Aggression

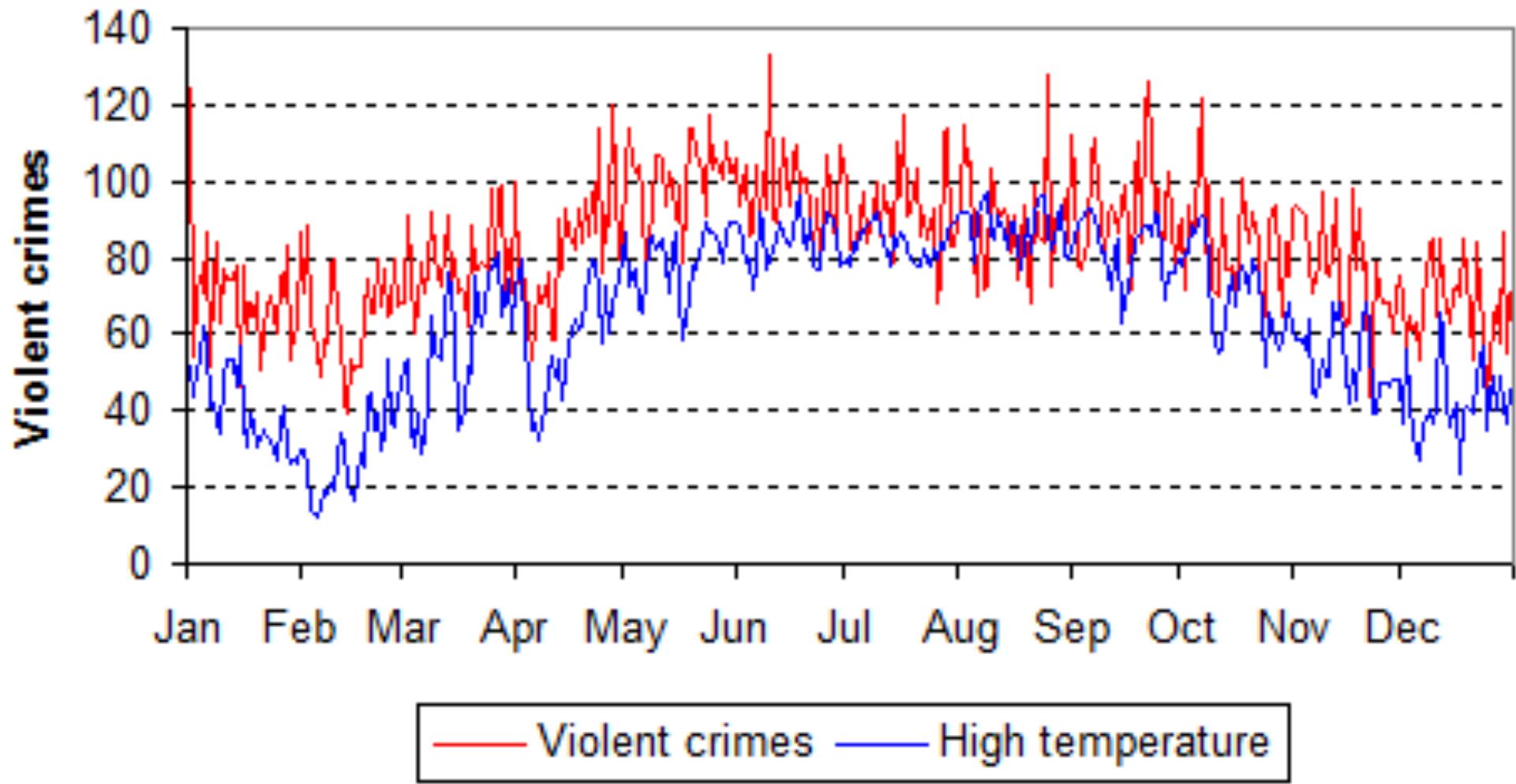


- Increased Incidence violence conflict during extreme heat (Anderson, 2003 Hsiang, et al,2013)
- Children and women vulnerable to increased domestic violence

COVID Connection: domestic violence increases with shelter-in-place orders, similarly with heat waves.

Violent crime

Violent crimes and daily high temperature



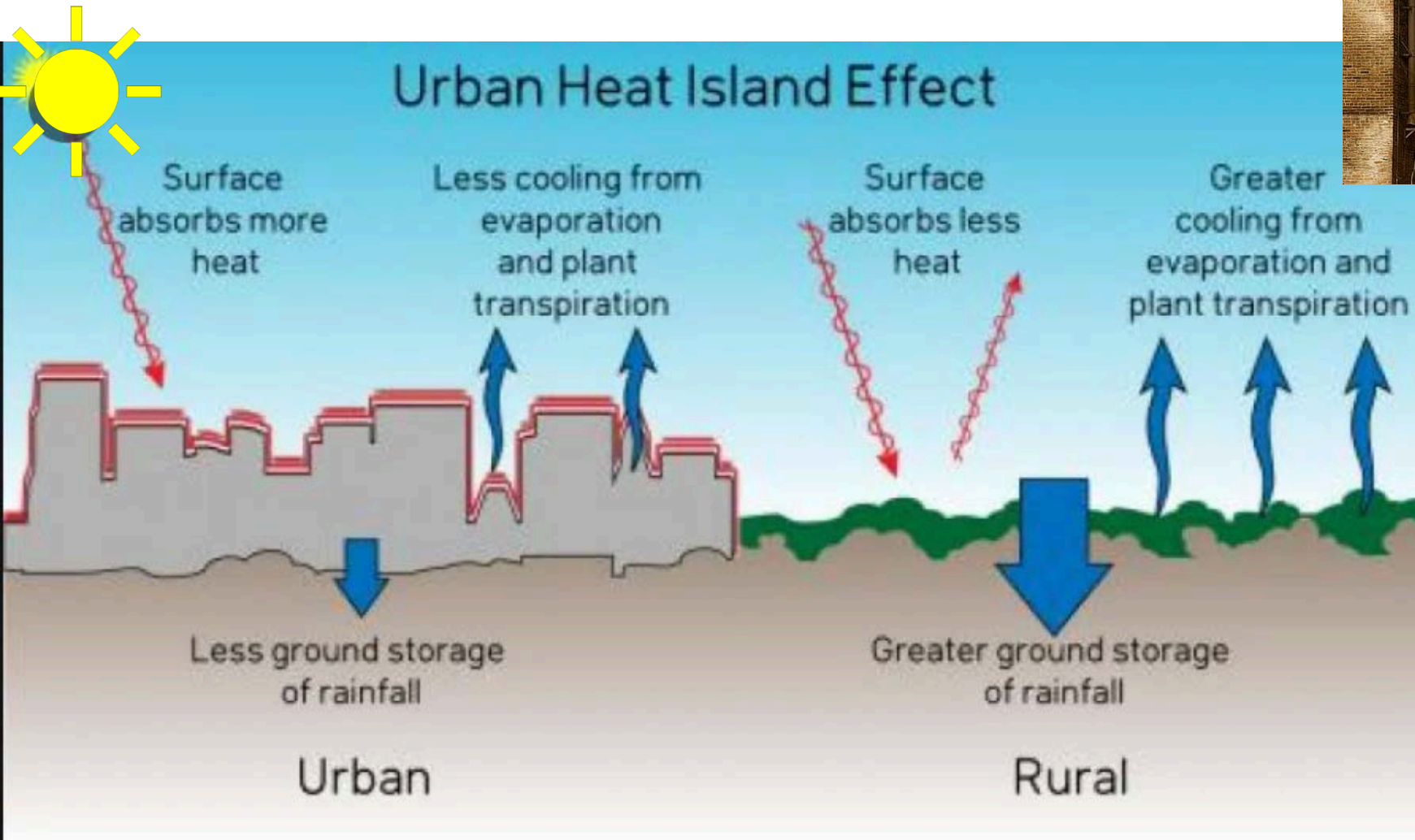
The relationship between hot weather and crime is linear -- as it gets hotter, people get more aggressive

4% between individuals

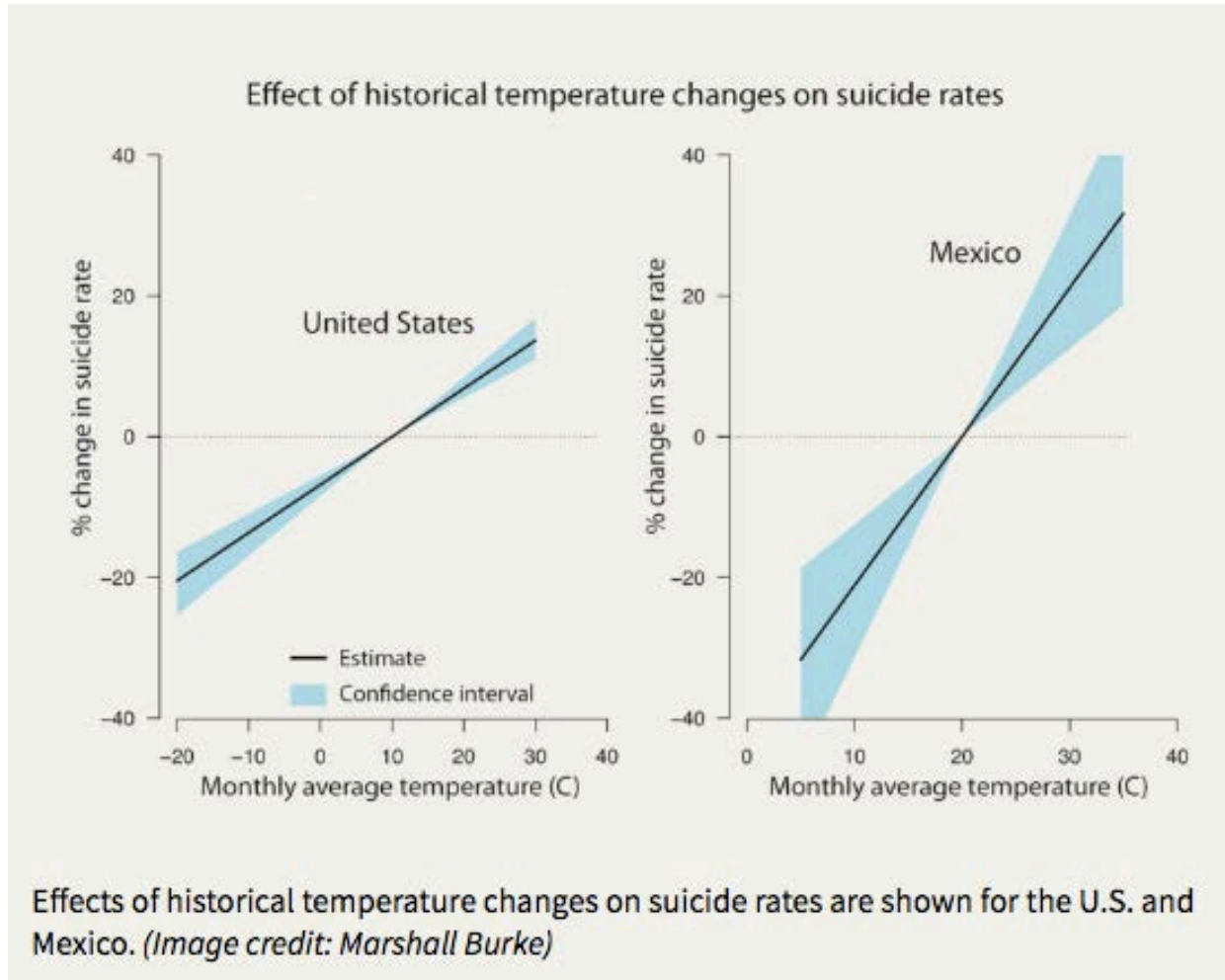
14% between groups



Urban Heat Island Effect: An Inequity Multiplier



SUICIDE INCREASES WITH TEMPERATURE



Increase suicide rates:

- **0.7% in US, 2.1% in Mexico for each 1 degree C over monthly average temp**
- **Projected range of 21,000 more suicides by 2050:**
 - comparable to increase rates due to economic recessions, unemployment, and greater than impact of suicide prevention programs or gun control.**
- **Increases across all socio-economic levels**

Impacts of Extreme Temperatures: Cognition



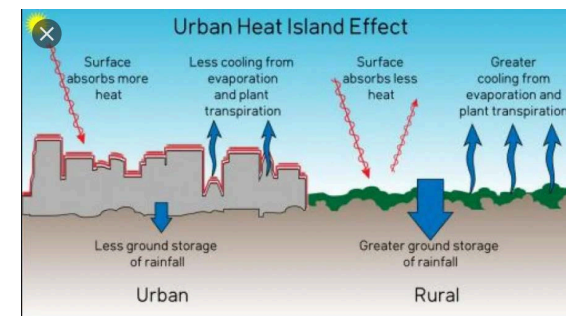
I can't concentrate and I can't make a decision. I keep making mistakes. I forget things. I feel tired and I'm all thumbs.

Heat Exacerbates Insomnia



No copyright infringement intended.

- Disrupts mental and cognitive functioning, executive functioning.
- Exacerbation of psychiatric disorders; esp. high risk for bipolar disorder
- Worse with urban heat island effect



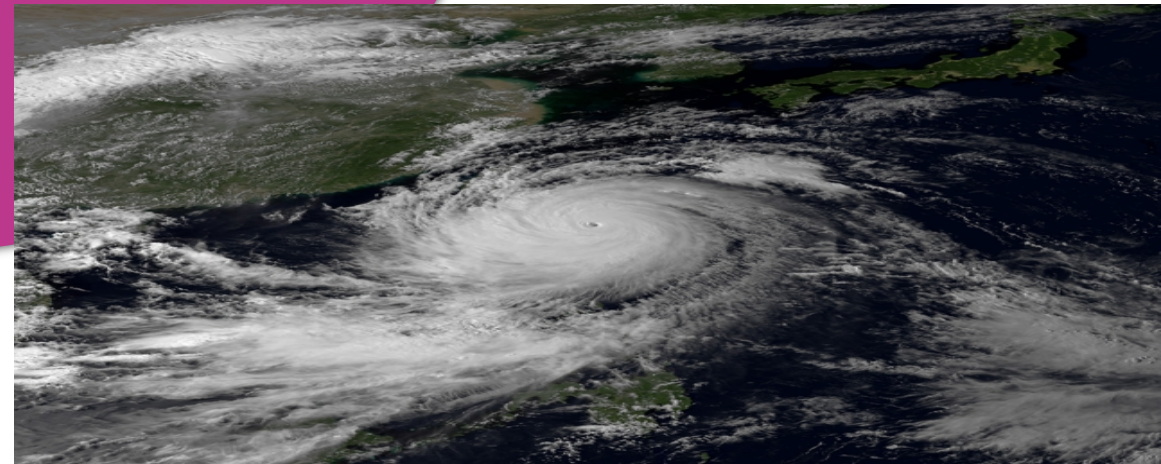
How Does Climate Change Impact Mental Health?

3. Acute Climate Disasters

4. Eco-distress
Syndromes

5. Vulnerable
Populations

6. Engagement &
Action



PARADISE CAMP FIRE: THE ACUTE DISASTER

Camp Fire, November 8th, 2018

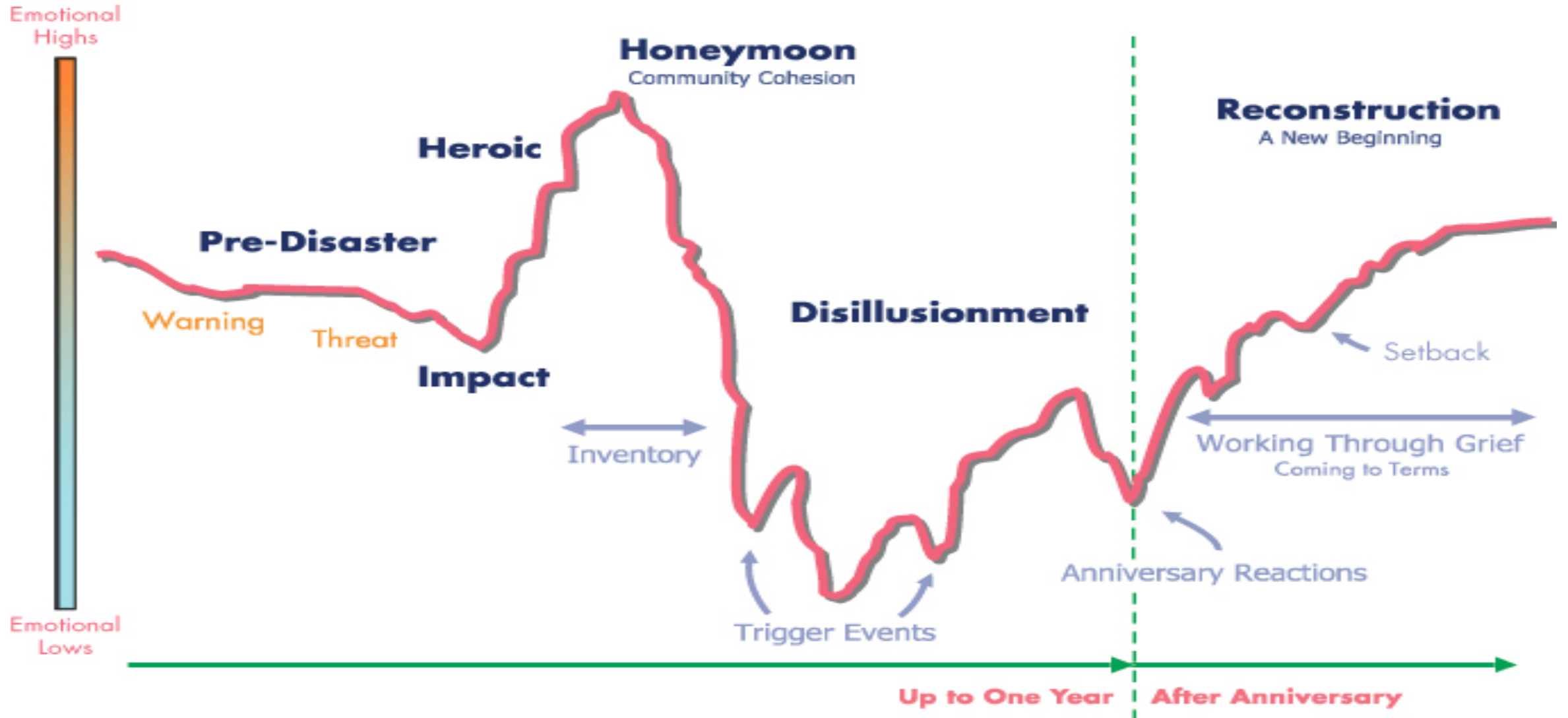
- Acute climate-related disaster
- 85 deaths, 1000 families still displaced as of May 2019, increasing rural homelessness
- 16.5 Billion in total losses, 4 billion of which was uninsured (mostly residents rather than commercial interests)

California Drought 2011-2017

- A Slow-Moving Disaster
- Killed 102 million trees from 2011 to 2016
- In 2014, agriculture sector alone lost \$2.2 billion and 17,100 seasonal and part-time jobs
- Lowest Sierra snowpack ever recorded



Phases of Disasters



ACUTE DISASTERS



Photo Source: Tuolumnefiresafe.org
No copyright infringement is intended

Psychological & Behavioral Responses to Disasters



Ursano, R.J., Fullerton, C.S., Weisaeth, L., Raphael, B. (Eds.). (2007).
Textbook of Disaster Psychiatry. London, UK: Cambridge University Press

DISTANT CARBON POLLUTION: WILDFIRE SMOKE

Camp Fire, November 8th, 2018

- Acute Climate-Related Disaster
- 85 deaths, 1000 families still displaced as of May 2019, increasing rural homelessness
- 16.5 Billion in total losses, 4 billion of which was uninsured (mostly residents rather than commercial interests)

Camp Fire

San Francisco

California Drought 2011-2017

- A Slow-Moving Disaster
- Killed 102 million trees from 2011 to 2016
- In 2014, agriculture sector alone lost \$2.2 billion and 17,100 seasonal and part-time jobs
- Lowest Sierra snowpack ever recorded

Wildfire Smoke November 8th-21st

- Nearly 2 straight weeks of dangerous air quality
- 6 of 10 worst days ever recorded for fine particulate matter, known as PM2.5, occurred during that span. PM2.5 includes inhalable bits of soot, metal and organic compounds

IMPAIRED AIR QUALITY:

- Acute exposure with respiratory distress, asthma
- Vulnerable populations of medically ill, elderly and children
- Children even more restricted outdoor activity
- Increase of anxiety, distress

100 km

AIR POLLUTION PARTICULATE SIZE

How Far Do Particles Travel?

- Coarse particles Up to 6 miles
- Fine particles Up to thousands of miles
- Ultrafine particles Up to 6 miles

Source: EPA

How Big Are Pollution Particles?

(Diameters in micrometers)

Ultrafine

Fine

Coarse

<0.1

0.1-2.5

2.5-10

Strand of human hair

50-70

Single grain of sand

90

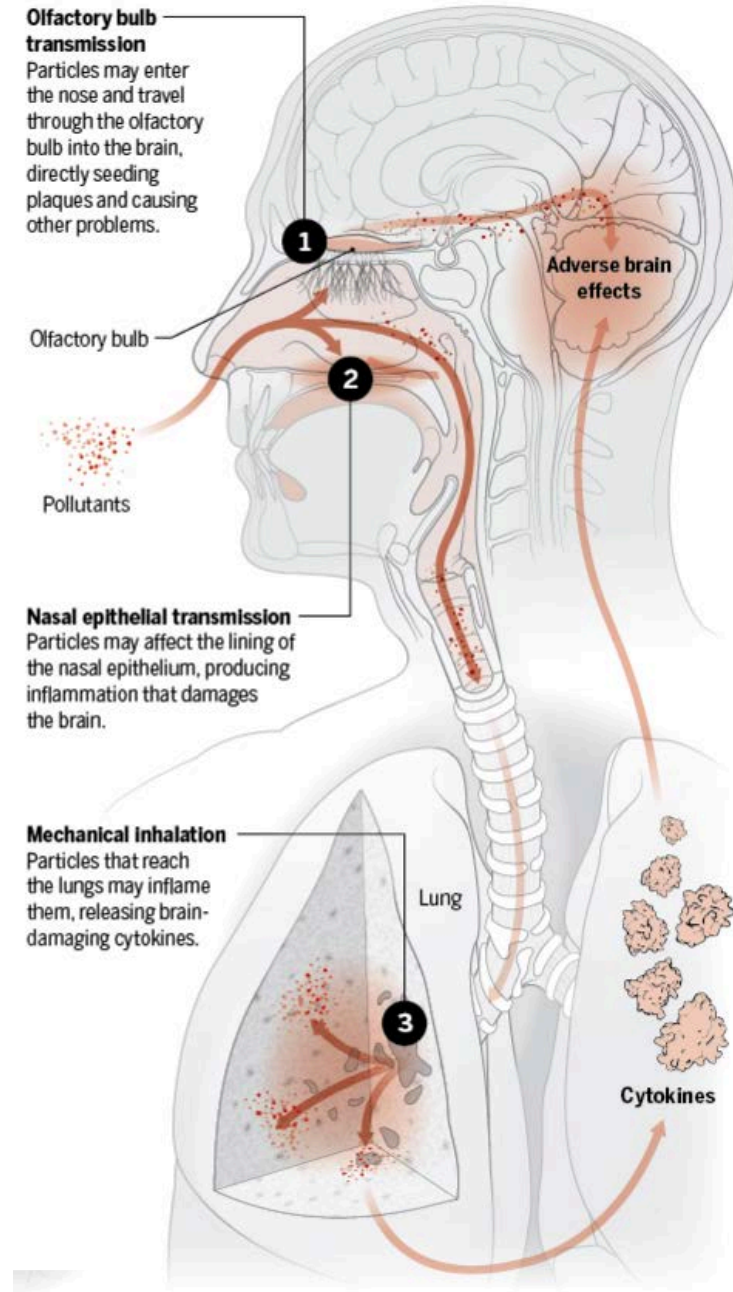
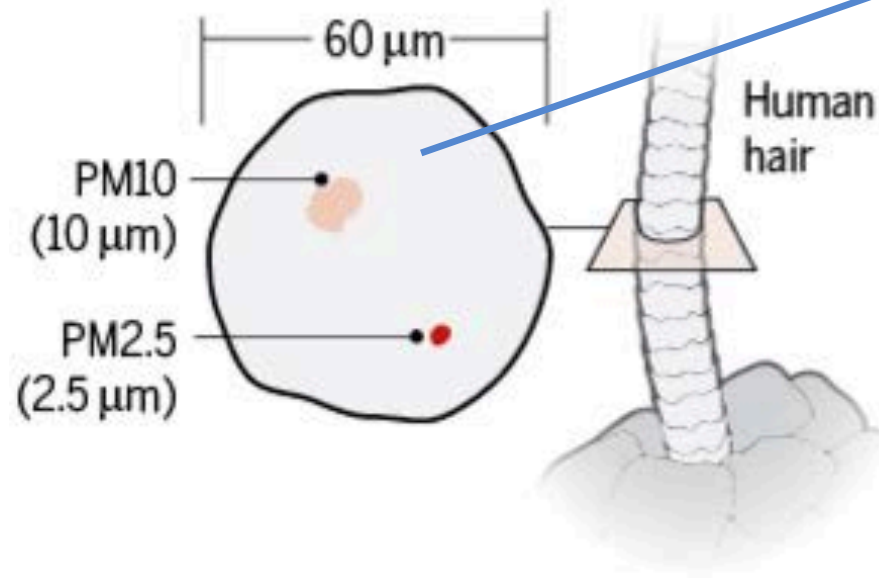
Source: EPA

Mother Jones

CARBON POLLUTION AND NEUROINFLAMMATION

Beyond fine

Pollutant particles are classified and regulated by size, although "ultrafine" pollutants of about $0.2\ \mu\text{m}$ are unregulated. The smaller the particle, the more damage it may do the brain.



“Brain pollution”: links neuropsychiatric health

Small head circumference

Lower IQs

Slower processing speed

Left hemispheric prefrontal white matter disruptions

Smaller brain volumes (right parietal/bitemporal)

ADHD

Autism

MS

Parkinson's

Stroke

ALS

Dementia

Depression *

SLIDE AND MATERIAL CONTRIBUTED BY ELIZABETH HAASE, M D

Perera, F.P. (2017). 'Multiple Threats to Child Health from Fossil Fuel Combustion: Impacts of Air Pollution and Climate Change', *Environmental Health Perspectives*. 125(3), pp. 141-148.

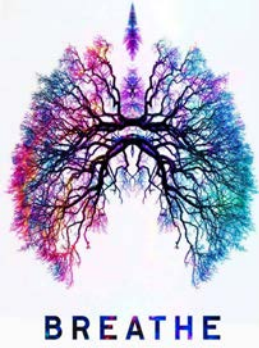
POST-DISASTER RESPONSES

An aerial photograph showing a landscape heavily affected by a wildfire. The terrain is a mix of dark, charred earth and patches of remaining vegetation. A red-bordered text box is overlaid on the left side of the image. In the background, the San Francisco Bay Area is visible, with labels for 'San Fr' and 'Valley'.

Post Camp Fire- Nov. 2019

- Biggest Wildfire disaster in Ca. History: 85 deaths, \$16.5 billion in total losses
- Over 19,000 buildings destroyed; primarily homes
- Homelessness; 1,000 families homeless 6 months later
- Displacement: Population drops from 26, 000 to 3,000 one year later

- Grief responses due to losses (death, homes, property, pets, financial stability, community)
- Exacerbation of mental illness, substance abuse
- New onset depression, anxiety syndromes esp. **PTSD** (late occurring, unrelenting), **survivor guilt**
- Displacement: “**Climate Refugees**”, Community fragmentation, isolation
- Vulnerable groups: children, elderly and low income greatest impact
- Challenges to health care delivery system



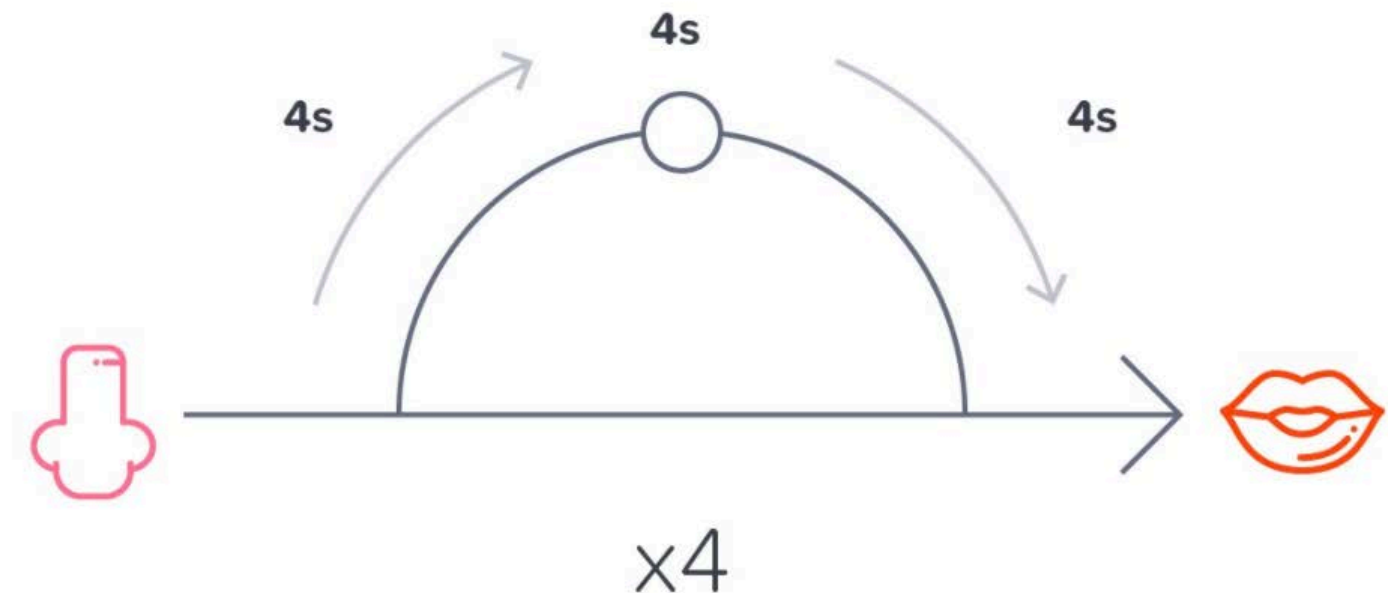
Half-Way Point: Let's Take A Box Breath

Sit comfortably with your back straight

Follow these steps:

1. Breathe in through your nose filling up your belly for 4 seconds
2. Hold for 4 seconds
3. Exhale through your mouth for 4 seconds
4. Hold for 4 seconds, repeat from 1

Box breathing



How Does Climate Change Impact Mental Health?



4. Eco-Distress Syndromes

5. Vulnerable Populations

6. Engagement & Action



ECO-DISTRESS SYNDROMES



Americans are worried:

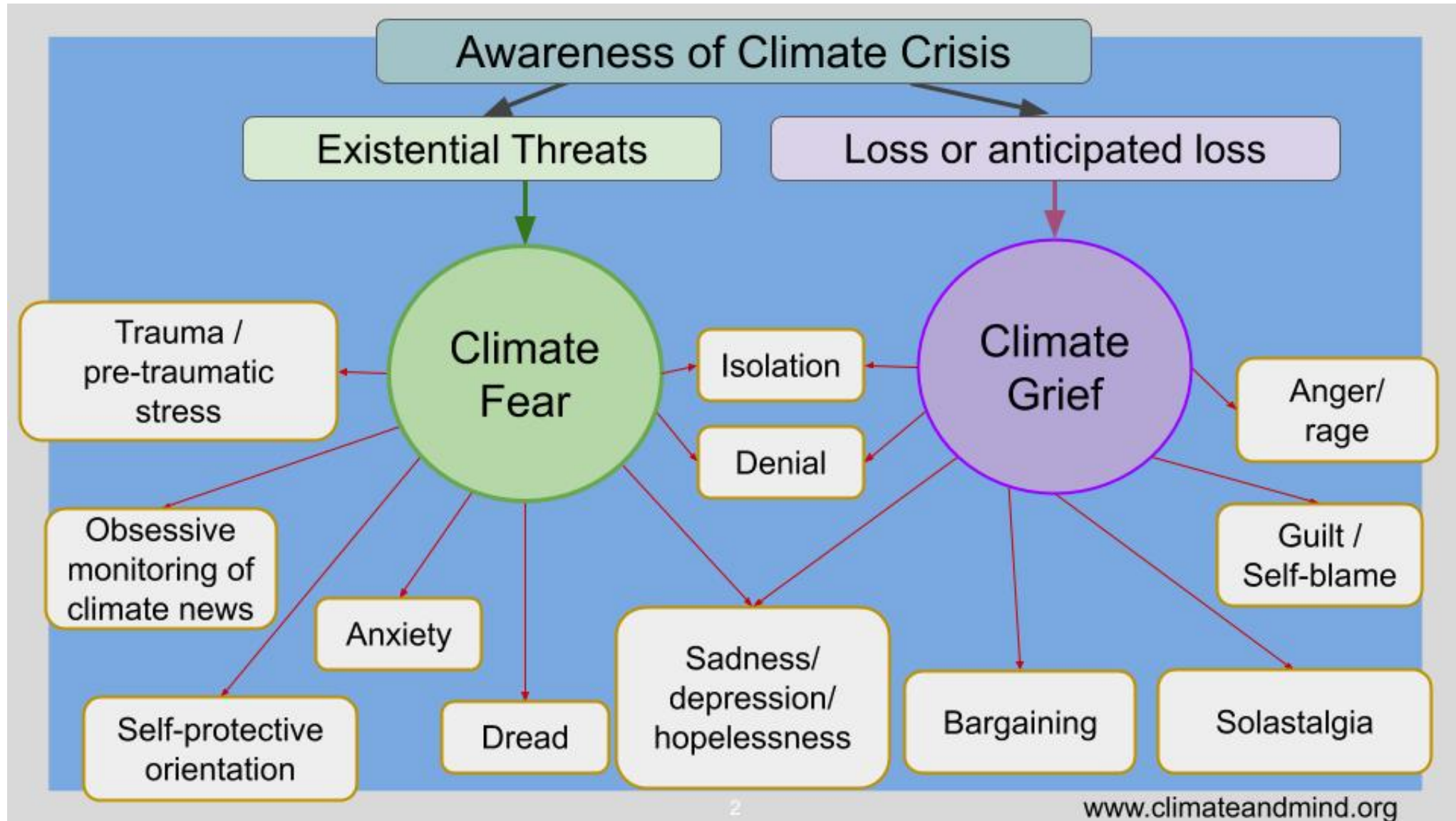
- 69% climate change is happening
- 55% is human caused
- 62% “Somewhat Worried”
- 20% “Very Worried”

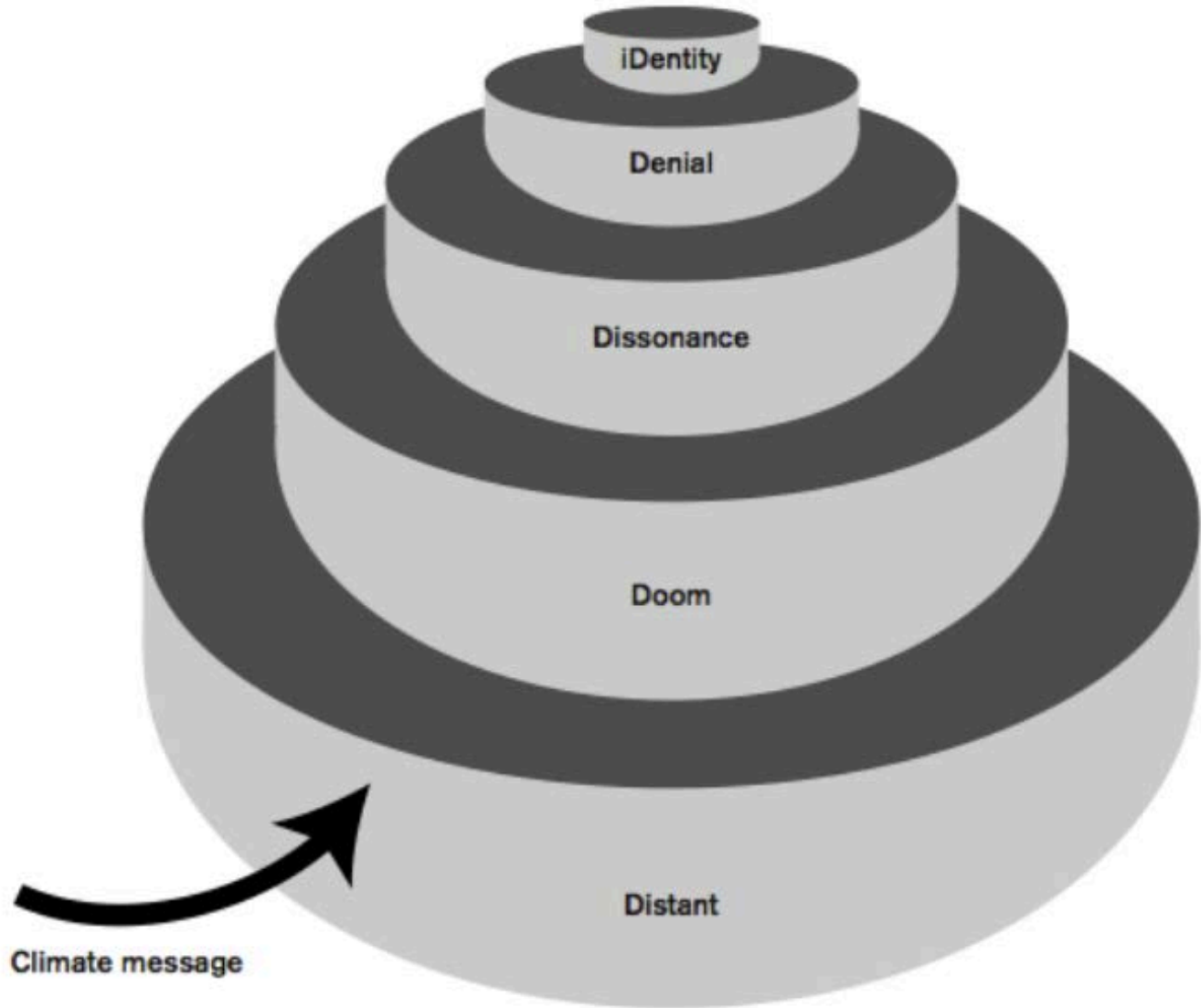
Yale Center for Climate Communications, 2019

PSYCHOLOGICAL RESPONSES TO CHANGING ENVIRONMENT:

- Wide range of emotional reactions; sadness, anger, anxiety, hopelessness
- New syndromes: Climate grief, climate anxiety/distress,
 - SOLASTALGIA: psychological distress and grieving from ecological degradation
- Psychological defenses/responses : Denial, disavowal: result of paralysis and avoidance of solutions, apathy, indifference vs. heroism, engagement
- Mother Nature’s calming properties

ECO-DISTRESS SYNDROMES





What We Think About



When We Try Not To Think About

Global Warming

Toward a NEW PSYCHOLOGY of Climate Action

Per Espen Stoknes

Foreword by Jorgen Randers



Solastalgia

Existential distress from environmental degradation occurring in one's familiar home landscape .
[Albrecht et al 2007]

“Homesickness when you're still at home.”

-Glenn Albrecht

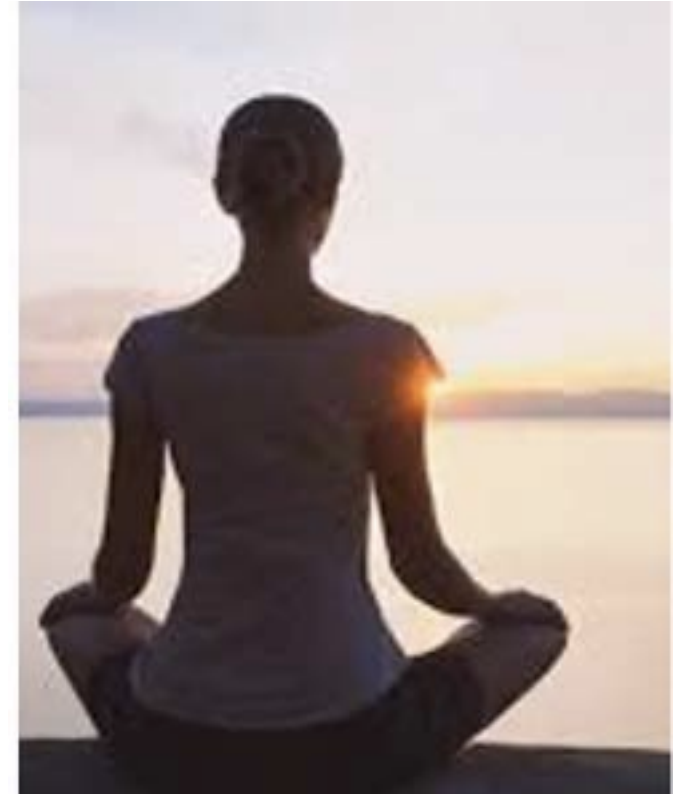
Combination of Latin word solacium for **comfort** and Greek word algia for **pain**.

MANAGING ECO-DISTRESS REQUIRES SIMILAR SKILLS TO COVID DISTRESS

- ◆ REST
- ◆ RESTORE
- ◆ ROUTINES
- ◆ RELAXATION
- ◆ RECREATION
- ◆ RELATIONSHIPS

=

STRESS RESILIENCY



How Does Climate Change Impact Mental Health?



5. Vulnerable Populations



6. Engagement & Action

Determinants of Vulnerability

EXPOSURE

Exposure is contact between a person and one or more biological, psychosocial, chemical, or physical stressors, including stressors affected by climate change.

SENSITIVITY

Sensitivity is the degree to which people or communities are affected, either adversely or beneficially, by climate variability or change.

ADAPTIVE CAPACITY

Adaptive capacity is the ability of communities, institutions, or people to adjust to potential hazards, to take advantage of opportunities, or to respond to consequences.



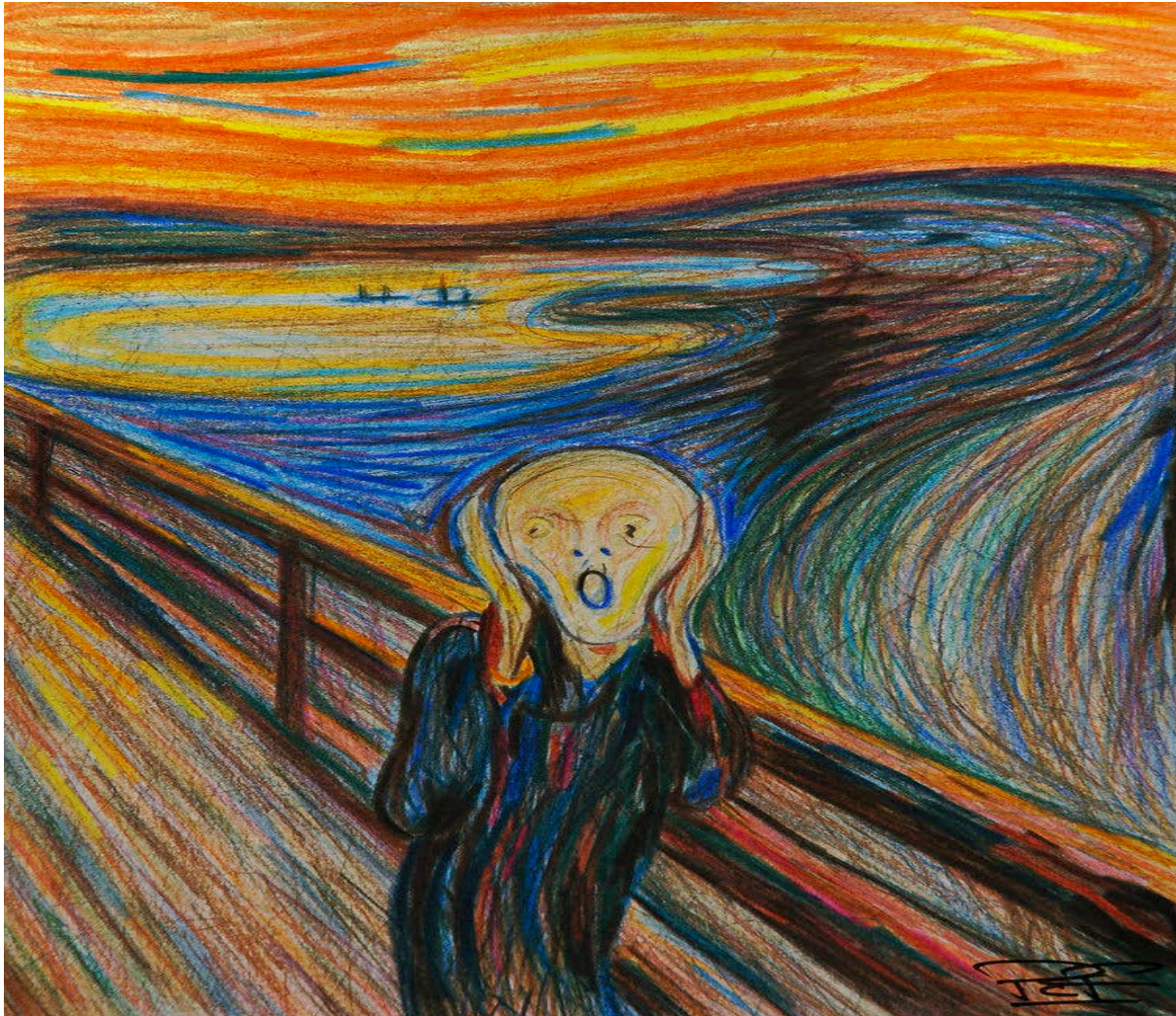
VULNERABILITY of Human Health to Climate Change



HEALTH IMPACTS

Injury, acute and chronic illness (including mental health and stress-related illness), developmental issues, and death

Severe Mental Illness (SMI) Particularly Vulnerable to Heat Events



- Increase in ED visits and hospitalizations during heat waves for psychiatric patients vs. non-psychiatric population
(Wang, et al, 2014)
- TRIPLE risk of deaths due to heat stroke for mentally ill
(Bouchama, et al, 2007)

Medications That Affect Thermoregulation



- Almost ALL psychotropic medications except benzodiazepines)
- Anticholinergic/Antiparkinson medications or (e.g. Artane, Cogentin)
- Amphetamines (e.g. Dexedrine, Adderall)
- Beta-blockers
- Lithium
- Serotonergic agents (antidepressants, etc)

Heat and Humidity Can Also Compromise Medication Quality, Effectiveness and Lead to Dosing Confusion



THE FINAL COMPONENT

6. Engagement and Action



“Hope is a sense that the future is not yet written, that what we do will help to write it.” Rebecca Solnit

THIS CAN NOT BE OUR RESPONSE



The Antidote to Anxiety is Action

**Individual and Family
Responsibility and Action**



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graph TD; A[Individual and Family Responsibility and Action] --> B[Communities and Institutions]; B --> C[Political Advocacy]
```

**Communities and
Institutions**

Political Advocacy

The Antidote to Anxiety is Action

Individual and Family Responsibility and Action

- **Consumer-based Action:**
 - Diets**
 - Divestment**
 - Decreased Fossil Fuel-Based Travel**
 - Increase Building Efficiency**
- **COVID-19 connection: with severe curtailment of personal lifestyles globally, still only 6% emissions reduction this year**

The Antidote to Anxiety is Action

- **Eco-restoration: Join projects/
renewal projects**
- **Renewable energy: Support
citizen- controlled energy/grid
reform**
- **Home Institutions: Work where
you have leverage**
- **Speak Out & Write: Use Your
Voice**

Communities and Institutions



Finally, Don't Agonize, Organize!

Whatever you do, don't do it alone, JOIN others in your community

Our biggest impact will be seen when we can work toward political change

➤ **EXPAND THE VOTE:**

Work with groups that address mobilizing voters;

Work with groups that address safe access to polls and efforts for early vote by mail projects

➤ **ELECTION PROCESS:**

Show up at town halls, Ask questions

➤ **KEEP ELECTED OFFICIALS ACCOUNTABLE:**

Join with groups that advocate and meet with elected officials

➤ **ADVOCATE FOR LOCAL, STATE AND NATIONAL POLICIES**

Join with groups that influence policies

THERE ARE SO MANY GROUPS

Political Advocacy

ACTIONS/WHAT TO DO: A CLIMATE VOLUNTEER GUIDE

<http://tiny.ucsf.edu/ClimateResources>

ACTIONS/WHAT TO DO:

The world is in your hands:



According to [Naomi Klein](#), there is upwards of a Million organizations, developing locally and organically, rising up like Earth's immune system, which are all working issues of Environmental and Climate Justice

INDIVIDUAL ACTIONS:

VOTE FOR CANDIDATES THAT SUPPORT ENVIRONMENTAL JUSTICE

- Decrease Food Waste
 - Creating Compost from food scraps
- Eating less red meat (especially less cows), and source from locally and sustainably grown animals when you do eat meat.
- Support farmers who use environmentally friendly practices, regenerative farming and buy local if you are able to
- Divest from Fossil Fuels/Reinvest
- Decrease driving; increase active transportation when able to
 - Walk, bike, public transportation
- Re-using more materials, buying more second-hand goods
- If buying a new car, buying a hybrid or electric
- Installing energy efficient utilities - solar, wind, etc.
- Call, write and text your political leaders to communicate your views
- Write to local newspapers: submit letters to editors, opinion pieces

ACTIONS:

Participate in access to polls in your community
Work with local legislators. Make voice known
Use your voice:
 Become speaker and take message to others in your network, community
 ✓ Al Gore's Climate Reality Project
 Write to local papers with letters to editor, opinion pieces
 Citizen led restoration projects of local eco-zones, planting ecologically appropriate fauna
 Friends of Urban Forest
Support locally controlled energy systems
Work with institutions where you have leverage;
 Promote Divestment of fossil fuel investments/Reinvestment in Green
 Advocate for sustainable practices
Work with local groups working on changing building codes/zoning for sustainable building and community/urban design
Support active transportation:
 SF Bike Coalition

AND PUBLIC ADVOCACY:

What you do, don't do it alone, JOIN others in community
 Impact will be seen when we can work toward political change.

Work with groups that address mobilizing voters: Environmental Voter Project, League of Women Voters, Sierra Club, etc, etc
 Work with groups that address safe access to polls; early vote by mail

PROCESS:

Show up at town halls, Ask questions; make points in SIMPLE quick manner with already scheduled meetings

GET OFFICIALS ACCOUNTABLE:

Work with groups that advocate and meet with elected officials
 Indivisible groups (Stand Up SF), Citizen's Climate Lobby

FOR LOCAL, STATE AND NATIONAL POLICIES.

<http://www.momtastic.com/webecoist/2008/09/24/25-environmental-agencies-and->

copy.com/top-environmental-groups-you-should-know/

ORGANIZATIONS: CITIZEN AND ACTIVIST ENGAGEMENT

Groups focus on Election Protection/Increase voter turnout:

Climate Action Network
 Environmental Voter Project

Groups focus on Climate/Environment:

Climate Lobby
 Green New Deal
 Green Rebellion
 Green Movement
 Green Action Network
 Power and Light

Justice Alliance
 Mobilization
 Participation Forum
 Climate Action
 For the Future
 US Environmental Network
 Clean Air Force
 Out Front
 Green's Trust
 Climate Action
 Earth and Justice Network

PS:

Society Consortium on Climate and Health
 Institute for Social Responsibility
 Alliance of Nurses for Healthy Environment
 Free Without Harm
 Food and Health Alliance
 Professionals for a Healthy Environment
 Psychiatry Alliance
 Psychology Alliance NA and UK
 Public Climate Change and Health
 Health Now!

CA

EE:

SUPPORT 'BIG GREEN':

Top 10 environmental groups with major funding and able to do a lot of lobbying for policy changes

- Defenders of Wildlife
- Environmental Defense Fund 79% expenses goes to
- Greenpeace
- National Audubon Society
- National Wildlife Federation
- Natural Resources Defense Council 83.6% expenses goes to
- The Nature Conservancy 71.2% expenses
- Sierra Club 88.5% expenses
- The Wilderness Society
- World Wildlife Fund

NEXT TIER:

- American Rivers 75% expenses goes to
- Center for Biological Diversity
- ~~Earth First!~~
- Friends of the Earth
- League of Conservation Voters
- National Wildlife Fund
- National Geographic Society
- Trust for the Public Land 84% expenses goes to
- Union of Concerned Scientists

*<https://www.outsideonline.com/2144781/6-best-environmental-groups-to-donate-better-world>

AVAILABLE IN THE ZOOM CHAT BOX RIGHT NOW AND ALSO AVAILABLE AT WEBSITE ABOVE

THE SIX COMPONENTS OF CLIMATE PSYCHIATRY

climate
psychiatry
alliance



www.climatepsychiatry.org

<http://tiny.ucsf.edu/ClimateResources>

Robin Cooper, MD

Alex Trope, MD

Appreciation to members of our Climate Psychiatry Alliance
for many of the slides and materials

BACKUP SLIDES

SIX COMPONENTS OF CLIMATE PSYCHIATRY

1. Slow Moving Disasters

- Drought
- Land Loss and Dislocation
- Air Pollution
- Biodiversity Loss (6th Great Extinction event)
- Plastics and Toxics
- Agricultural Collapse

2. Extreme Heat Effects

- Increases in interpersonal, group and intimate partner violence
- Increases in suicide
- Common psychotropics affect thermoregulation, heat has direct impacts on cognition

3. Acute Climate Disasters

- Psychological + Behavioral Responses to Disaster
- Early and Later-Onset Spikes in PTSD and Substance Use Disorder
- First Responders' Mental Health

4. Eco-distress Syndromes

- Evolving psychological constructs such as climate grief, climate anxiety, solastalgia, pre-traumatic stress, denial and disavowal
- Nature's Mental Health Benefits
- Psychotherapeutic Responses for Climate Distress

5. Vulnerable Populations

- People with severe mental illness at highest risk
- Elderly or chronically ill
- Pregnant and post-partum women
- Children
- Underserved and minority populations

6. Engagement & Action

- Clinical: Study, prevent, treat health impacts, green health systems; disaster preparedness and response.
- Advocacy: Influence health, energy, environmental policy
- Research: Investigate mental health and climate
- Education: Professional and public education, trainee curriculum development.

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Climate Psychiatry Alliance website: <https://www.climatepsychiatry.org/>

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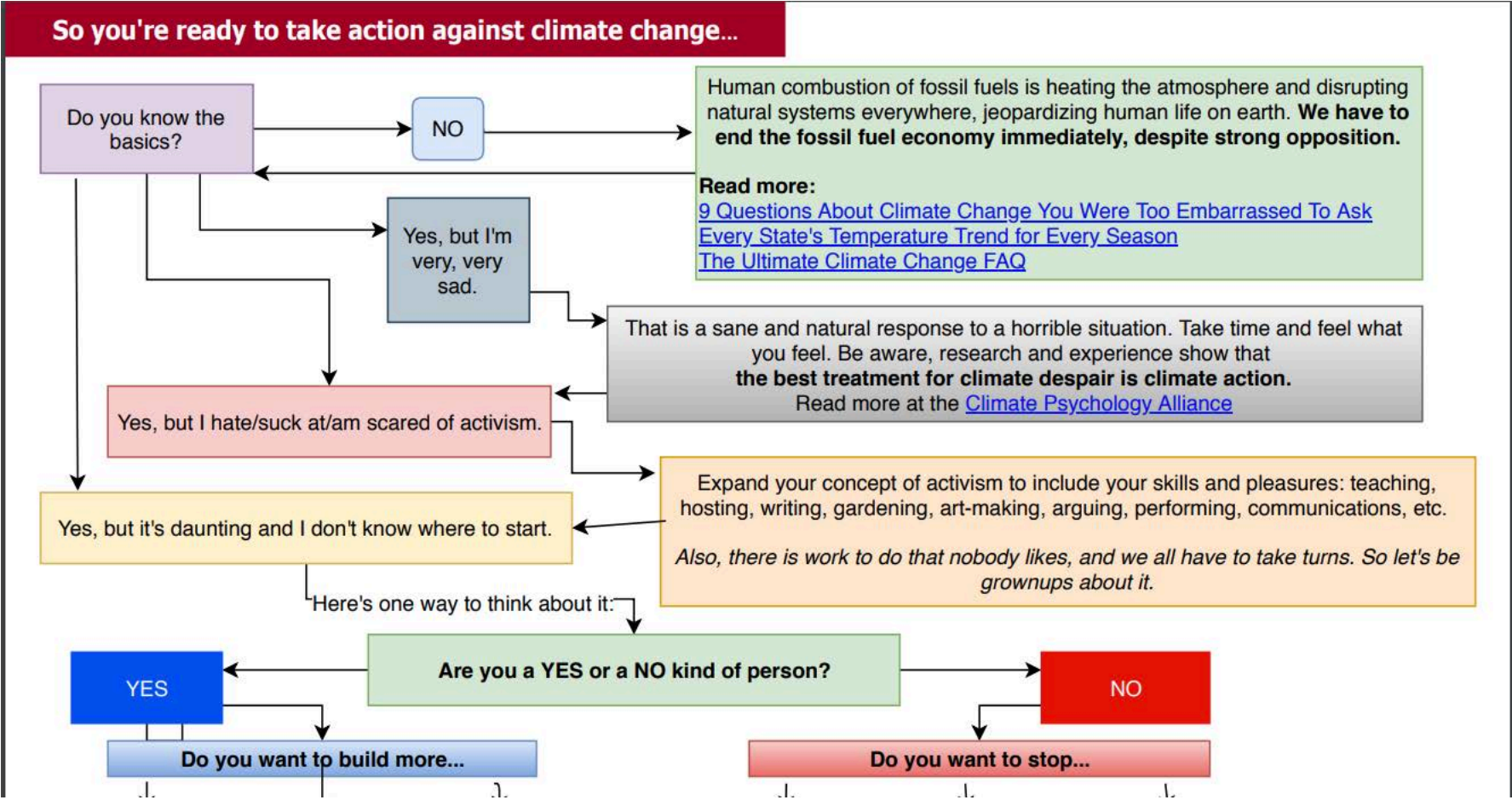
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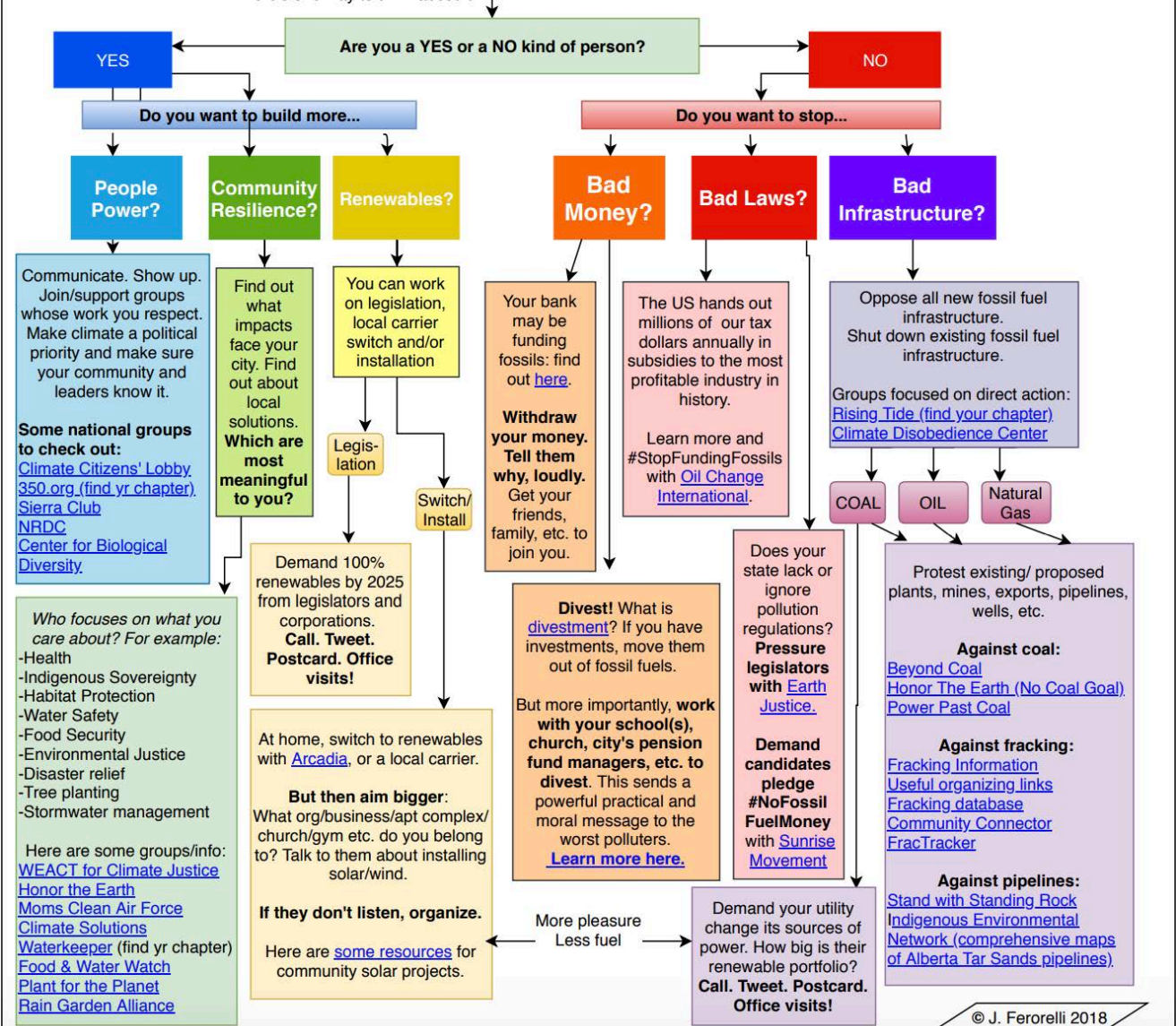


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COVID-19 and Air Pollution: Impacts Across Lifespan

Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study(Updated April 24, 2020)

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Background: United States government scientists estimate that COVID-19 may kill tens of thousands of Americans. Many of the pre-existing conditions that increase the risk of death in those with COVID-19 are the same diseases that are affected by long-term exposure to air pollution. We investigated whether long-term average exposure to fine particulate matter (PM2.5) is associated with an increased risk of COVID-19 death in the United States.

Design: A nationwide, cross-sectional study using county-level data.

Data sources: COVID-19 death counts were collected for more than 3,000 counties in the United States (representing 98% of the population) up to April 22, 2020 from Johns Hopkins University, Center for Systems Science and Engineering Coronavirus Resource Center.

Methods: We fit negative binomial mixed models using county-level COVID-19 deaths as the outcome and county-level long-term average of PM2.5 as the exposure. In the main analysis, we adjusted by 20 potential confounding factors including population size, age distribution, population density, time since the beginning of the outbreak, time since state's issuance of stay-at-home orders, hospital beds, number of individuals tested, weather, and socioeconomic and behavioral variables such as obesity and smoking. We included a random intercept by state to account for potential correlation in counties within the same state. We conducted more than 68 additional sensitivity analyses.

SLIDE AND MATERIAL CONTRIBUTED BY ELIZABETH HAASE, M.D.

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