Climate Psychiatry Wrap Up: Symptoms and Minnesota Public Health

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Highlights of the Day

- A healthy farm is nothing without a healthy farm family - mental health in agriculture – Ted Matthews
- It's Go Time: Envisioning a Radical Clinical Psychiatry –Carson Brown, MD
- Flash Talks - Linzie Wildenauer; Jeremiah Atkinson, MD; Mete Ercis, MD Facilitator Sheila Specker MD, DFAPA
- Nature Based Therapy – MB Lardizabal, DO, DFAPA, Alex Marie PsyD, LP
- An internist discusses health and equity impacts of extreme heat with a dash of appeal to physician advocacy – VL Surapaneni, MD, MPH
- Indigenous Planetary Health – Nicole Redvers, ND, MPH

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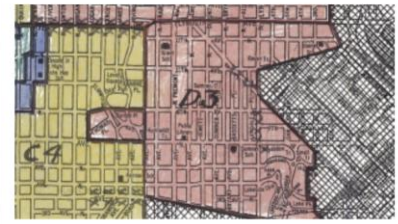
Minnesota Climate Issues:

https://climate.state.mn.us/local-impacts

Older Minnesotans are in danger from extreme heat

Recreation, tourism threatened by winter warming



Disproportionate heat risks for communities of color

Minnesota is getting warmer and wetter

Farmers face new challenges for crops, livestock

Mega-rains overwhelm rivers, roads, and budgets

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What To Do: #1, Heal Thyself: Reducing the Carbon Footprint of Our Practices:

- Telepsychiatry
- Reduce office and hospital space
- Reduce Prescribing - avoid polypharmacy, smaller prescriptions, reduce unnecessary medications
- Reduce food waste, unnecessary supplies and anesthetic gases in affiliated institutions
- Green conference and residency match travel practices

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#2: System Prep: Making a Healthcare Resilience Checklist:

1. Make a list of the kinds of threats likely in your region and how much it will change (NRI)
2. Reassess every 5 years
3. Each unit or type of care should do its own specialized assessment
4. Future risk assessment should be built into current risks
5. Engage community partners (EMT, LE) and meteorologists
6. Assessment should include vulnerabilities due to local and greater infrastructure vulnerability and resources
7. Access to supplies and pharmaceuticals
8. Setting up alerts and surveillance eg for heat, air pollution
9. Providing for surge capacity
10. Infrastructure readiness: heating, water, electric, machinery, structural stability, computer vulnerability
11. Emergency management staff and trainings for how you would respond to each type of emergency, particularly informing and
12. Evacuation capacity
13. Prevention through patient education and screenings
14. Developing an adequate and accessible knowledge base for accessing disaster funding
15. Developing clean energy and clean air policies

https://greenhealthcare.ca/wp-content/uploads/2020/07/1-CCGHC-HealthCareFacilityResiliencyChecklist.pdf

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#3: Beth's Suggestions for System Prep:

1. **Has the community planned for the increase in violence, suicide and death that accompanies increased heat?**
2. **Have the needs of those with mental illness for more support, transportation, help with medications, and their potential responses been included in planning?**
3. **Has the clinic prepared mechanisms to educate patients about climate effects on their health and connect to patients in climate emergencies?**
4. **Have the community and clinic provided forums for processing community change to more sustainable ways of doing things?**
5. **Has the community and community provided training in emotional resilience?**
6. **Has the community provided adequate contact with the natural world for its residents?**
7. **Is the community considering mental health co-benefits in choosing its climate initiatives?**
8. **Has the clinic trained its therapists in climate anxiety techniques?**
9. **Has the clinic provided support for young people with climate distress?**

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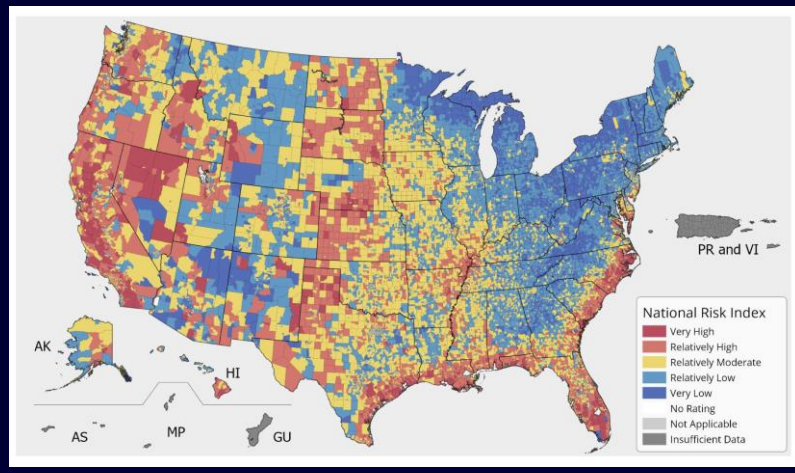
Assessing the Climate Impacts on Your System: The National Risk Index



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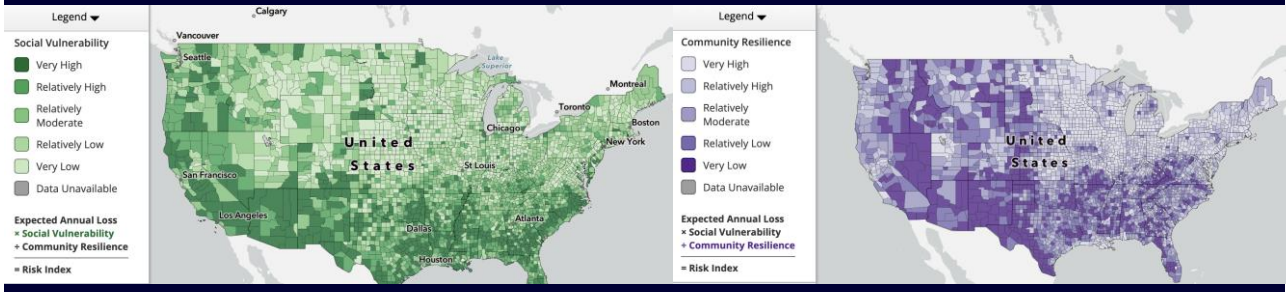
The National Risk Index map for social vulnerability and community resilience



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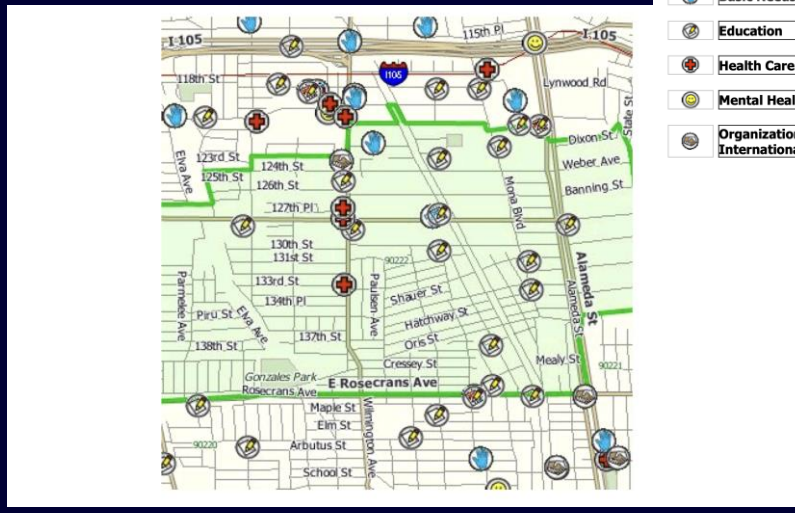
Mapping your community assets:



Site Legend

- Basic Needs
- Education
- Health Care
- Mental Health Care and Counseling
- Organizational / Community / International Services

https://healthpolicy.ucla.edu/programs/health-data/trainings/documents/tw_cba20.pdf

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Types of Community Assets: Anything that improves community life

- The strengths and abilities of individuals
- Physical structures like churches, libraries, and rec centers
- Private, public, and non-profit organizations
- Social service agencies
- Disaster response agencies
- Government agencies
- Military agencies
- Natural assets
- Providers of food, medications, and other basics

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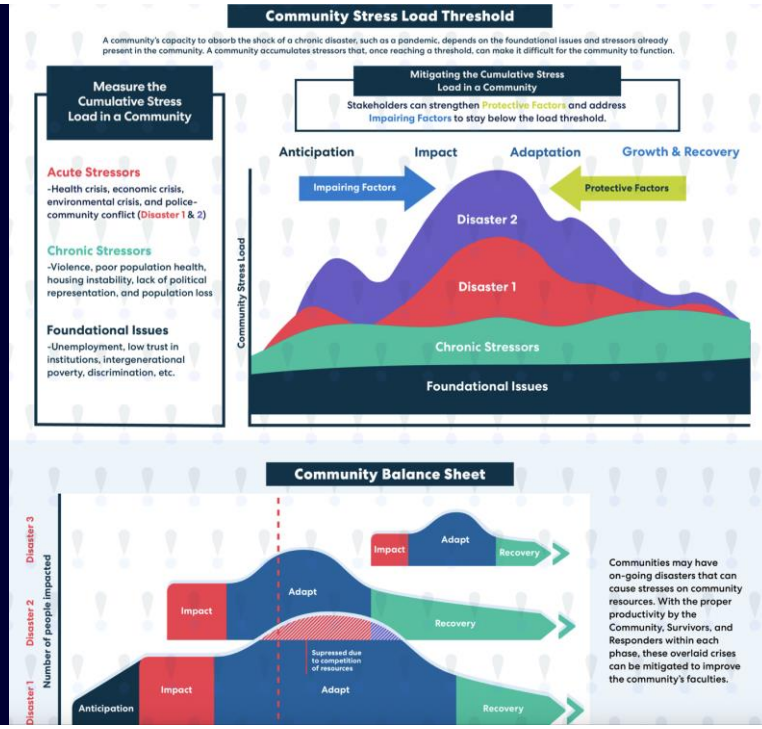
Community Stress Load Threshold
A community's capacity to absorb the shock of a chronic disaster, such as a pandemic, depends on the foundational issues and stressors already present in the community. A community accumulates stressors that, once reaching a threshold, can make it difficult for the community to function.
Measure the Cumulative Stress Load in a Community
Acute Stressors
-Health crisis, economic crisis, environmental crisis, and police-community conflict (Disaster 1 & 2)
Chronic Stressors
-Violence, poor population health, housing instability, lack of political representation, and population loss
Foundational Issues
-Unemployment, low trust in institutions, intergenerational poverty, discrimination, etc.
Mitigating the Cumulative Stress Load in a Community
Stakeholders can strengthen Protective Factors and address Impairing Factors to stay below the load threshold.
Anticipation
Impact
Adaptation
Growth & Recovery
Impairing Factors
Protective Factors
Disaster 2
Disaster 1
Chronic Stressors
Foundational Issues
Community Stress Load
Community Balance Sheet
Disaster 3
Disaster 2
Disaster 1
Number of people impacted
Anticipation
Impact
Adapt
Recovery
Supressed due to competition of resources
Communities may have on-going disasters that can cause stresses on community resources. With the proper productivity by the Community, Survivors, and Responders within each phase, these overlaid crises can be mitigated to improve the community's faculties.

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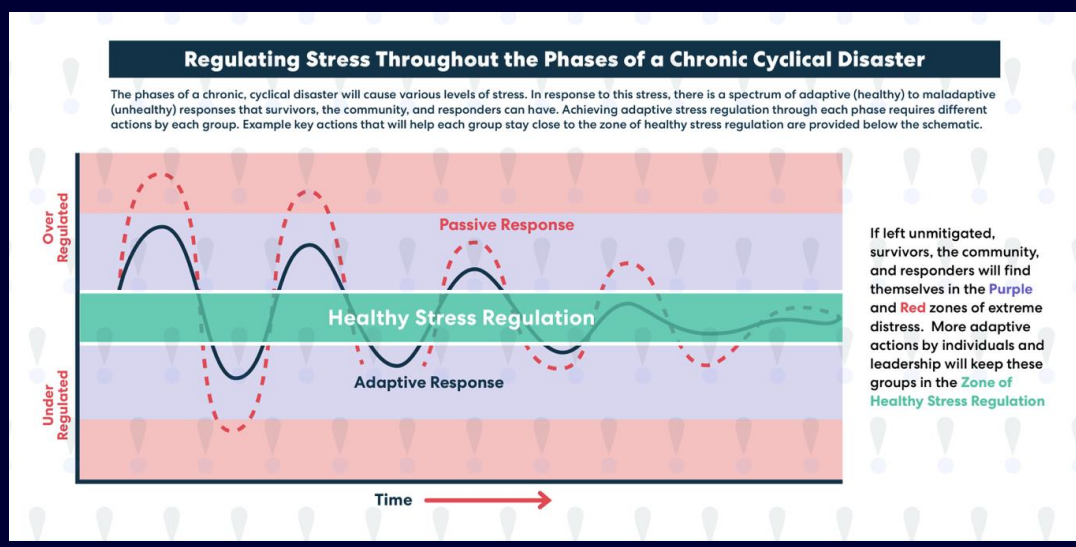
Regulating Stress Throughout the Phases of a Chronic Cyclical Disaster
The phases of a chronic, cyclical disaster will cause various levels of stress. In response to this stress, there is a spectrum of adaptive (healthy) to maladaptive (unhealthy) responses that survivors, the community, and responders can have. Achieving adaptive stress regulation through each phase requires different actions by each group. Example key actions that will help each group stay close to the zone of healthy stress regulation are provided below the schematic.
Over Regulated
Passive Response
Healthy Stress Regulation
Adaptive Response
Under Regulated
Time
If left unmitigated, survivors, the community, and responders will find themselves in the Purple and Red zones of extreme distress. More adaptive actions by individuals and leadership will keep these groups in the Zone of Healthy Stress Regulation

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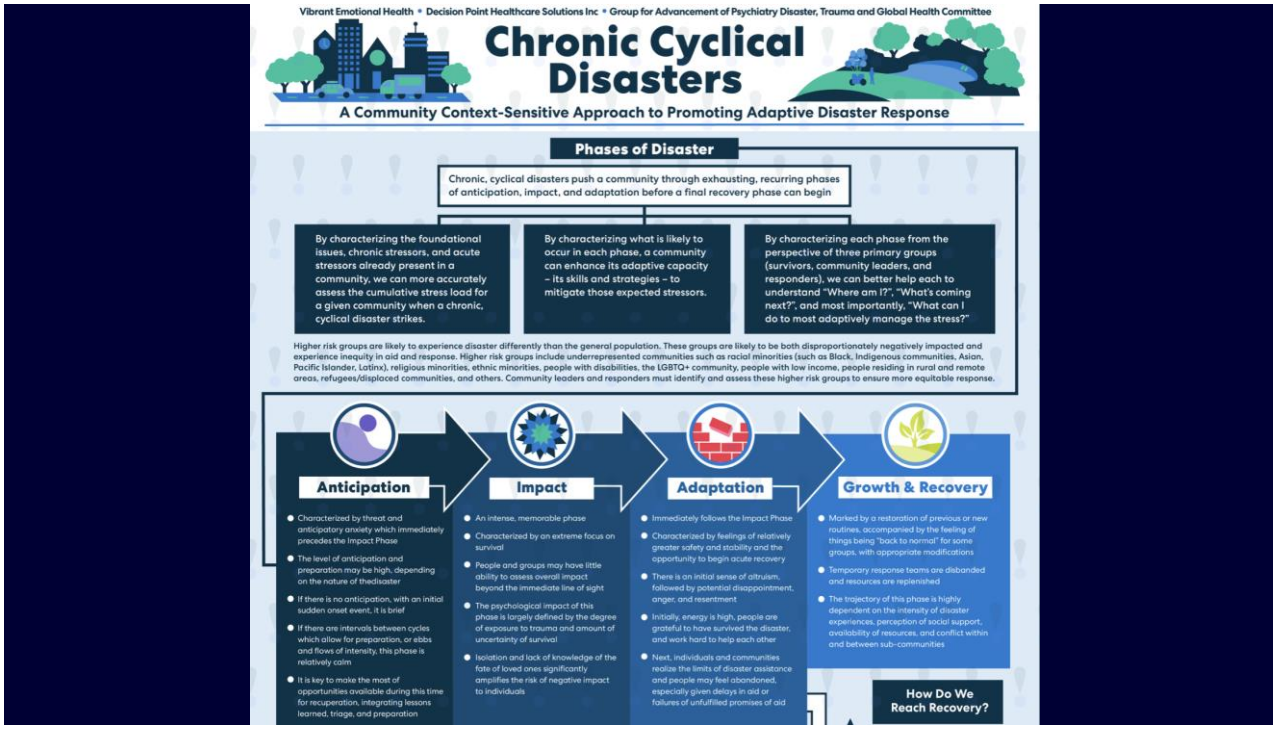
Vibrant Emotional Health • Decision Point Healthcare Solutions Inc • Group for Advancement of Psychiatry Disaster, Trauma and Global Health Committee
Chronic Cyclical Disasters
A Community Context-Sensitive Approach to Promoting Adaptive Disaster Response
Phases of Disaster
Chronic, cyclical disasters push a community through exhausting, recurring phases of anticipation, impact, and adaptation before a final recovery phase can begin
By characterizing the foundational issues, chronic stressors, and acute stressors already present in a community, we can more accurately assess the cumulative stress load for a given community when a chronic, cyclical disaster strikes.
By characterizing what is likely to occur in each phase, a community can enhance its adaptive capacity – its skills and strategies – to mitigate those expected stressors.
By characterizing each phase from the perspective of three primary groups (survivors, community leaders, and responders), we can better help each to understand "Where am I?", "What's coming next?", and most importantly, "What can I do to most adaptively manage the stress?"
Higher risk groups are likely to experience disaster differently than the general population. These groups are likely to be both disproportionately negatively impacted and experience inequity in aid and response. Higher risk groups include underrepresented communities such as racial minorities (such as Black, Indigenous communities, Asian, Pacific Islander, Latinx), religious minorities, ethnic minorities, people with disabilities, the LGBTQ+ community, people with low income, people residing in rural and remote areas, refugees/displaced communities, and others. Community leaders and responders must identify and assess these higher risk groups to ensure more equitable response.
Anticipation
Characterized by threat and anticipatory anxiety which immediately precedes the Impact Phase
The level of anticipation and preparation may be high, depending on the nature of thedisaster
If there is no anticipation, with an initial sudden onset event, it is brief
If there are intervals between cycles which allow for preparation, or ebbs and flows of intensity, this phase is relatively calm
It is key to make the most of opportunities available during this time for recuperation, integrating lessons learned, triage, and preparation
Impact
An intense, memorable phase
Characterized by an extreme focus on survival
People and groups may have little ability to assess overall impact beyond the immediate line of sight
The psychological impact of this phase is largely defined by the degree of exposure to trauma and amount of uncertainty of survival
Isolation and lack of knowledge of the fate of loved ones significantly amplifies the risk of negative impact to individuals
Adaptation
Immediately follows the Impact Phase
Characterized by feelings of relatively greater safety and stability and the opportunity to begin acute recovery
There is an initial sense of altruism, followed by potential disappointment, anger, and resentment
Initially, energy is high, people are grateful to have survived the disaster, and work hard to help each other
Next, individuals and communities realize the limits of disaster assistance and people may feel abandoned, especially given delays in aid or failures of unfulfilled promises of aid
Growth & Recovery
Marked by a restoration of previous or new routines, accompanied by the feeling of things being "back to normal" for some groups, with appropriate modifications
Temporary response teams are disbanded and resources are replenished
The trajectory of this phase is highly dependent on the intensity of disaster experiences, perception of social support, availability of resources, and conflict within and between sub-communities
How Do We Reach Recovery?

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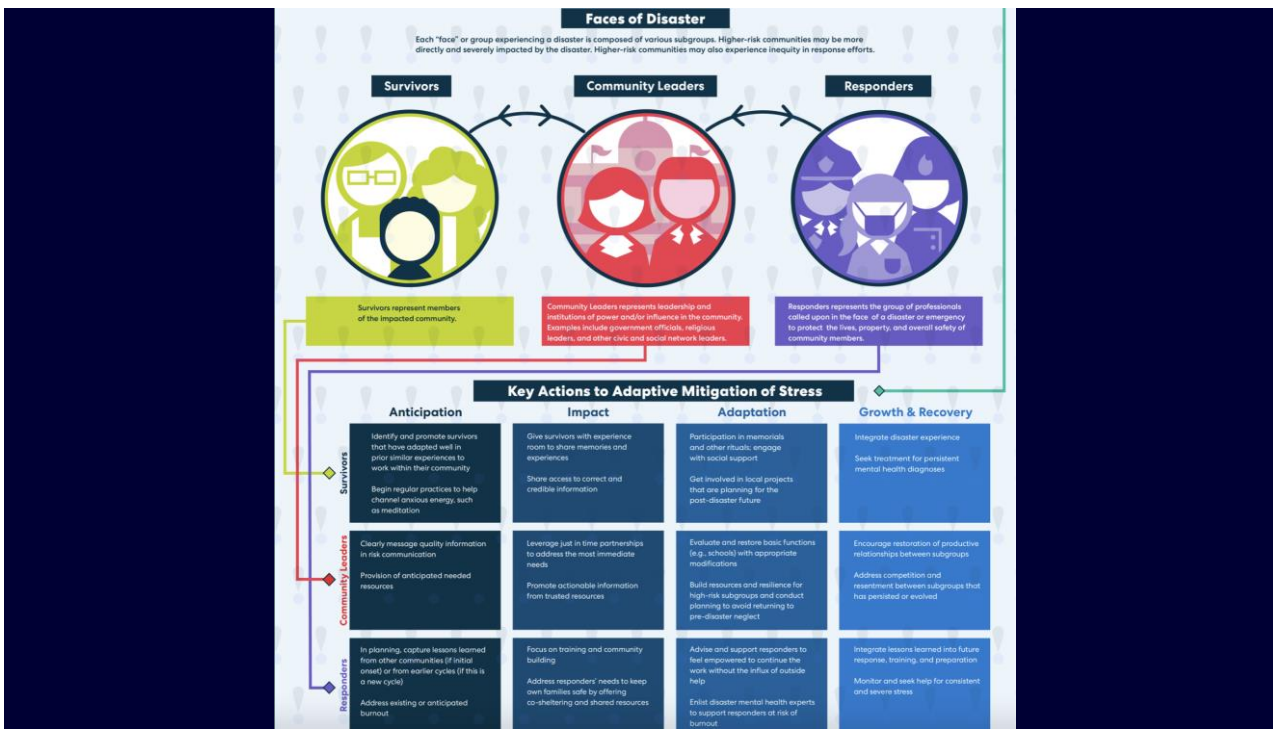
Faces of Disaster
Each "face" or group experiencing a disaster is composed of various subgroups. Higher-risk communities may be more directly and severely impacted by the disaster. Higher-risk communities may also experience inequity in response efforts.
Survivors
Community Leaders
Responders
Survivors represent members of the impacted community.
Community Leaders represents leadership and institutions of power and/or influence in the community. Examples include government officials, religious leaders, and other civic and social network leaders.
Responders represents the group of professionals called upon in the face of a disaster or emergency to protect the lives, property, and overall safety of community members.
Key Actions to Adaptive Mitigation of Stress
Anticipation
Impact
Adaptation
Growth & Recovery
Survivors
Identify and promote survivors that have adapted well in prior similar experiences to work within their community
Begin regular practices to help channel anxious energy, such as meditation
Give survivors with experience room to share memories and experiences
Share access to correct and credible information
Participation in memorials and other rituals; engage with social support
Get involved in local projects that are planning for the post-disaster future
Integrate disaster experience
Seek treatment for persistent mental health diagnoses
Community Leaders
Clearly message quality information in risk communication
Provision of anticipated needed resources
Leverage just in time partnerships to address the most immediate needs
Promote actionable information from trusted resources
Evaluate and restore basic functions (e.g., schools) with appropriate modifications
Build resources and resilience for high-risk subgroups and conduct planning to avoid returning to pre-disaster neglect
Encourage restoration of productive relationships between subgroups
Address competition and resentment between subgroups that has persisted or evolved
Responders
In planning, capture lessons learned from other communities (if initial onset) or from earlier cycles (if this is a new cycle)
Address existing or anticipated burnout
Focus on training and community building
Address responders' needs to keep own families safe by offering co-sheltering and shared resources
Advise and support responders to feel empowered to continue the work without the influx of outside help
Enlist disaster mental health experts to support responders at risk of burnout
Integrate lessons learned into future response, training, and preparation
Monitor and seek help for consistent and severe stress

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Transformational Resilience Act

- The product of several years of work by Bob Doppelt (ITRC) and a broad coalitions of mental health organizations including the APA
- To be introduced by Paul Tonko (D-NY) and Brian Fitzpatrick (R-PA)
- Establishes funding for small local community grants that use a public health approach to strengthen the capacity for mental wellness across age categories
- Establishes a specific office (CDC most likely) for funding of mental health needs of climate change
- Emphasis is on resilience training

* The International Transformational Resilience Coalition (ITRC) is a network of mental health, social services, disaster management, faith, environmental, social justice, education and other professions working to establish methods to prevent and heal the mental health and psychosocial problems generated by the climate emergency and other adversities. Website: http://www.theresourceinnovationgroup.org/

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Resources:

https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf

https://toolkit.climate.gov

https://resilience.climate.gov/#assessment-tool

https://www.adaptationclearinghouse.org

http://www.theresourceinnovationgroup.org/itrc-2021-training-program-sli/

http://www.cakex.org

https://greenhealthcare.ca/wp-content/uploads/2020/07/1-CCGHC-HealthCareFacilityResiliencyChecklist.pdf

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Resources:

Health Professionals for a Healthy Environment: https://www.facebook.com/groups/hpforhc/

U MN Climate Health Action Program (CHAP):
https://med.umn.edu/dom/research/programs-centers/climate-health-action-program

Climate Psychiatry Alliance: https://www.climatepsychiatry.org

Medical Societies Consortium: https://medsocietiesforclimatehealth.org

Committee on Climate Change: jrwortzel@gmail.com, https://www.psychiatry.org/membership/get-involved/

Climate Reality Project: https://www.climaterealityproject.org

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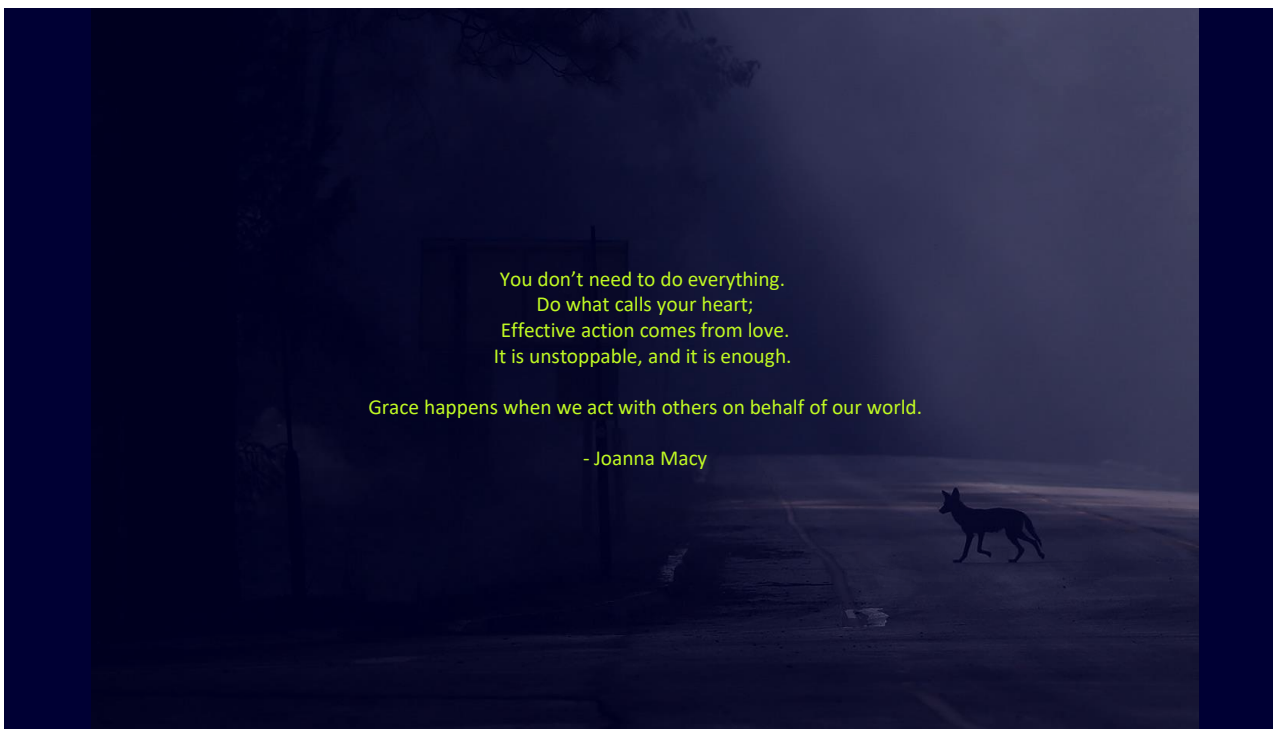

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Extra Material:

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Extreme Weather: Polycrisis/Multiple Disaster Model

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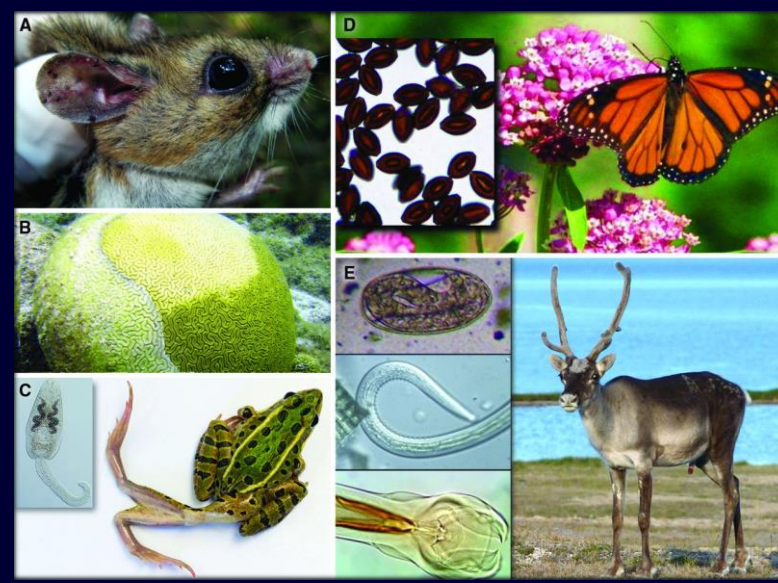
Infectious Diseases:

- Unpredictable Interactive Effects
- Multiple vectors, habitats, and hosts all differentially impacted by climate changes
- Variable human response systems
- 1500 human pathogens

Altizer, *Science*, 2013



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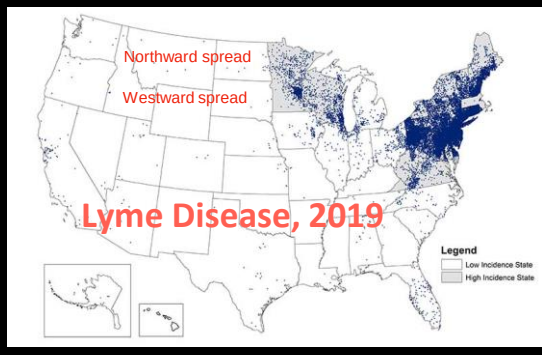
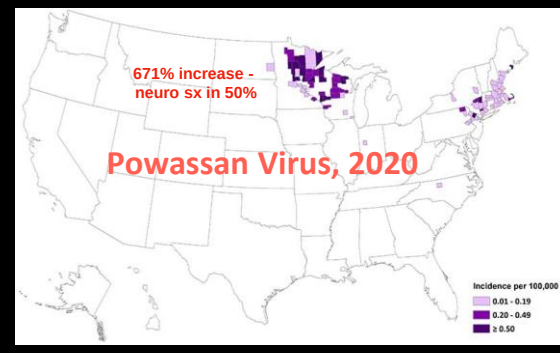
Two Examples relevant to Minnesota Psychiatrists:





- Increased survival season and change in range of mosquitos, ticks and other vectors
- Increased water-borne diseases (cholera and typhoid) due to flooding and natural disasters

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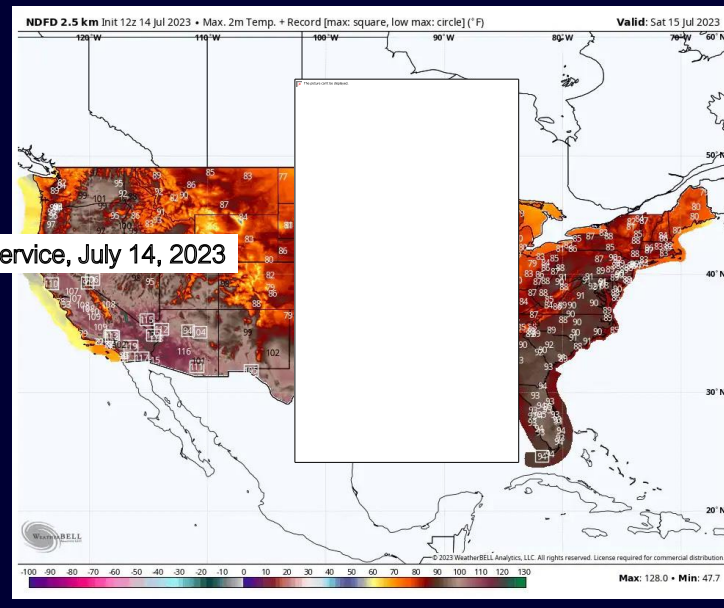
Extreme Heat



National weather service, July 14, 2023

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Heat-stroke migrant deaths in USA 2022
KSAT/NY Post, June 27,2022

Deaths in Pakistani heat wave, 2015
- Rizwan Tabassum, AFP

Extreme Heat Incompatible with Life

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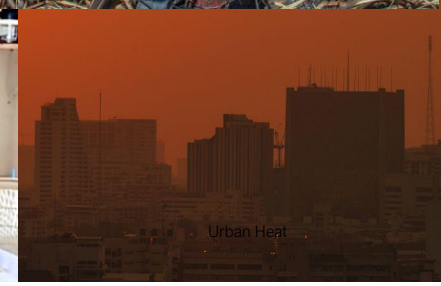
Phoenix, AZ homeless camp
Associated Press, June, 2022

Photo: Ed Kashi

Oklahoma family
NY, April, 2020



Urban Heat

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Psychiatric patients have high heat mortality

- Mental Illness carried an increased risk of death and ER visits/hospitalization during heat waves with approximate OR 3.6. Dementia, schizophrenia, & substance abuse dx had the greatest risk.
- Patients with mental disorders have more social risks of heat illness and death: Homelessness, poverty, urban residence, disability, failure to leave home, poor social support, lack of air con/fan
- Psychiatric Medications increase heat morbidity and mortality, especially antipsychotics, anxiolytics and anticholinergics
- Thermoregulation is different in psychiatric patients: Schizophrenia, Neuroleptic malignant syndrome, depression etc.

Yoo et al 2021, Environ Sci & Pollution Res Intel, 28(29): 39243-56

Semenza JC et al 1996. Heat-related deaths during the July 1995 heat wave in Chicago, N Engl J Med 335:84-90

Hansen A et al 2008, The effect of heat waves on mental health in a temperate Australian city, Env Health Persp 116(10) 1369-75

Bouchama et a 2007 Prognostic factors in heat related death: a meta-analysis, Ann Int Med 167(20): 2170-76

Schmeltz & Gamble 2017, PloSOne 12:(10)

Page et al 2012. Temperature-related deaths in people with psychosis, dementia, and substance misuse BJ Psych 200:485-490

Sherbakov et al 2018, Environmental Research 160:83-90

Wang et al 2013, Jl Affective Dis 155:154-161

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Collapse of Heat Response: (Heat Exhaustion and) Heat Stroke

Body Temp HOT: over 40.5° C or 105°

MORTALITY: up to 80%

- Impaired sweating, skin hot and dry
- Na+ and K+ depletion, increased IL-6 & HSP72
- Pupils constricted as cholinergic action tries to increase vasodilatation
- BP decreased, HR increased
- Cerebral edema with listlessness, seizures and coma
- Cardiovascular collapse, DIC, organ failure
- Edematous gut from poor perfusion releases toxins
- Temperature sensitive enzymatic reactions fail; cellular death

from Nursing Education Consultants, 2007

Horseman, MA, 2013. Jl Int Care Med 28(6) 334-340

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Brain imaging in heat death

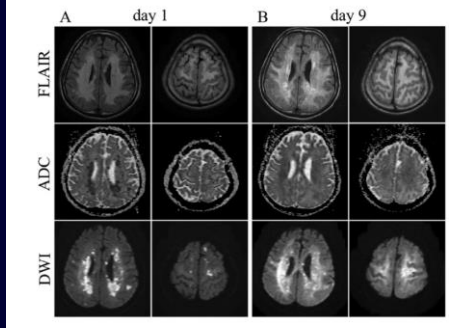

Figure 3. *MRI for case 1 on day 1 (A) and day 9 (B). DWI on day 1 showed a dotted lesion in the white matter and FLAIR on day 1 showed a high-intensity area in the white matter. On day 9, white matter lesions had expanded.*

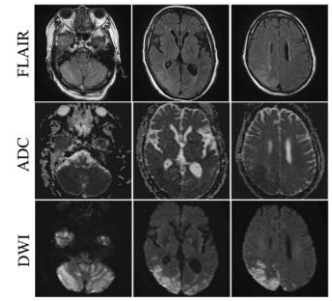

Figure 4. *MRI for case 2 on admission to our hospital. DWI revealed a dotted lesion in the posterior lobe. Cerebellar lesions were homogeneous, but posterior lesions resembled dot-like aggregates.*

Shimada et al, Journal of Stroke and Cerebrovascular diseases 29(2):104511

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What the breakdown of the gut lining looks like:

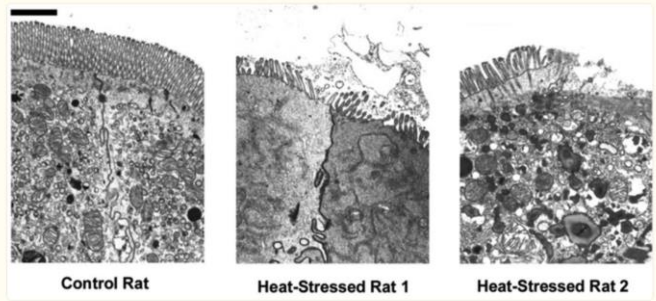

Figure 4.

Transmission electron micrographs of small intestinal epithelial cells from one control rat and two rats heated to 42.5°C core temperature. Each image partially depicts two adjacent enterocytes. In heat-stressed rats 1 and 2, there is visible damage to the microvilli compared with the control cells. Bar represents 1 μm. Reprinted with permission from [30], copyright (2002), American Physiological Society

Fung et al 2021

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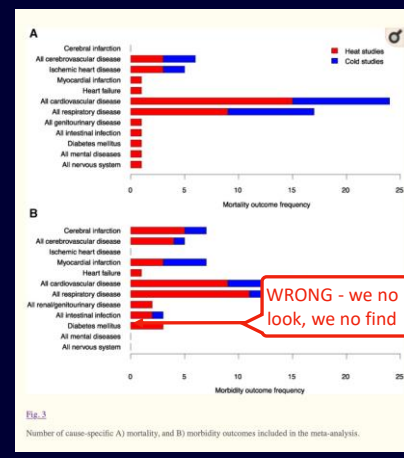
Most Heat Morbidity & Mortality from Underlying Illness

Bunker A et al, 2016, Effects of air temperature on climate sensitive mortality and morbidity outcomes in the elderly; Epidemiology 2014; 25:781



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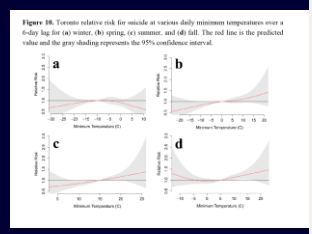
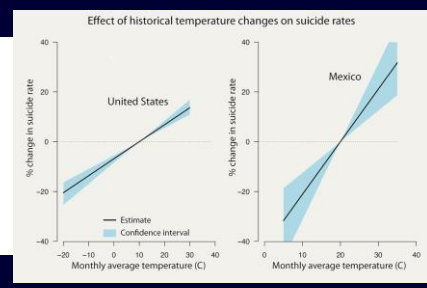
Suicide Rates Increase with Higher Temperatures

1% per 1°C over ~70°F



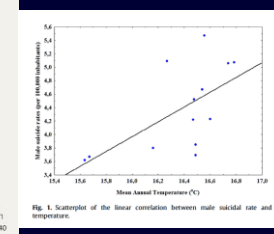
Dixon et al 2014

Suicide as a function of lowest daily temperature over 4 seasons, with summer and fall at the bottom



Burke M et al 2018

Suicide as a function of monthly average temperature



Fountoulakis et al 2016

Suicide as a function of mean annual temperature

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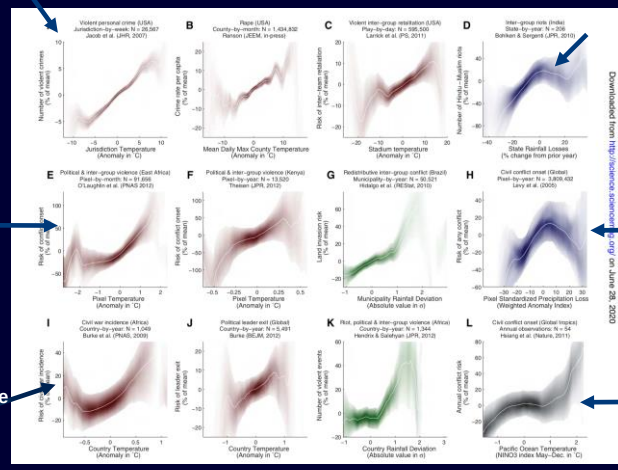
Heat increases both interpersonal and civic violence

Rape in USA by jurisdictional temperature



Group on group violence in USA by rainfall loss

Violent individual crime in USA by temperature Anomaly

Rain makes us nice

African Civil wars by average country temperature

Global Tropical Conflict by ocean temperature

Hsiang M et al 2016, Quantifying the Influence of Climate on Human Conflict, Science 341:1235367

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How to Cool Off:

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https://www.heat.gov

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Acclimatization:

- Involves changes in >210 genes
- Improves ability to stay cool *APPROX* 25%
- Day 1: 24 subjects can walk a few hundred yards in 120° heat; Day 8: They can walk for 100 minutes.
- Changes include primarily improved sweating, reduced HR and temp
- Increased sodium resorption such that sweat has only 15% of prior sodium.
- Thirst sensitivity improves, plasma volume expands
- Most of benefit in 4-7 days of 2 hrs, 30 min exercise exposure

Sample Acclimatization Schedule

NIOSH Acclimatization Recommendations for ***New Workers***	
1st day	20% usual work duration
2nd day	40% usual work duration
3rd day	60% usual work duration
4th day	80% usual work duration
5th day	100% usual work duration

NIOSH Acclimatization Recommendations for ***Workers with Previous Experience**** with the Same Job	
1st day	50% usual work duration
2nd day	60% usual work duration
3rd day	80% usual work duration
4th day	100% usual work duration

**Workers returning from an absence*

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New OSHA Heat Policy

On April 12, 2022, OSHA announced the workers' protection NEP, (National Emphasis Project)

PROVIDES FOR:

- Compliance in high risk industries
- Inspection of heat-related workers complaints
- Proactive help & tech to keep workers safe

RECOMMENDS:

- Training for all in heat illness and first aid
- Using dermal pads/sensors and HR monitors to monitor core temp and HR in high risk environment
- Cooling vests and reflective clothing
- Improve air conditioning, venting, steam leaks, shade and other aspects of built environment
- Specific acclimatization schedules
- Flexible work hours, relief workers and work/rest cycles

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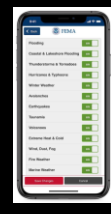
Preparing for Heat

- Prepare for heat by insulating air conditioning ducts, putting aluminum-foil covered cardboard/reflective surfaces in windows, & setting up a go-kit for power failures



- Check on neighbors, pets and children frequently
- Download the FEMA App or go to NOAA Weather Radio for heat alerts
- Text SHELTER + your zip code to 4FEMA (43362) for the nearest cooling center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