

STRATEGIES TO MITIGATE THE ADVERSE HEALTH EFFECTS OF A CHANGING PLANET

**University of Michigan Medical School
White Coats for Planetary Health**

**Presenters: Laura Donahue, Emily Johnson, Anita Vasudevan
*Great Lakes Bioneers Detroit Conference 2019***

IMPACT OF HEALTHCARE ON THE ENVIRONMENT

- Healthcare industry makes up 8-10% of US greenhouse gases
 - US produced 1.51 tCO₂/capita, compared to 0.83 in Canada, 0.61 in UK
- Produces 4 billion pounds of landfill bound waste annually (second only to food industry)
- Supply procurement accounts of 65% of UK NHS carbon footprint



WHY HEALTHCARE?

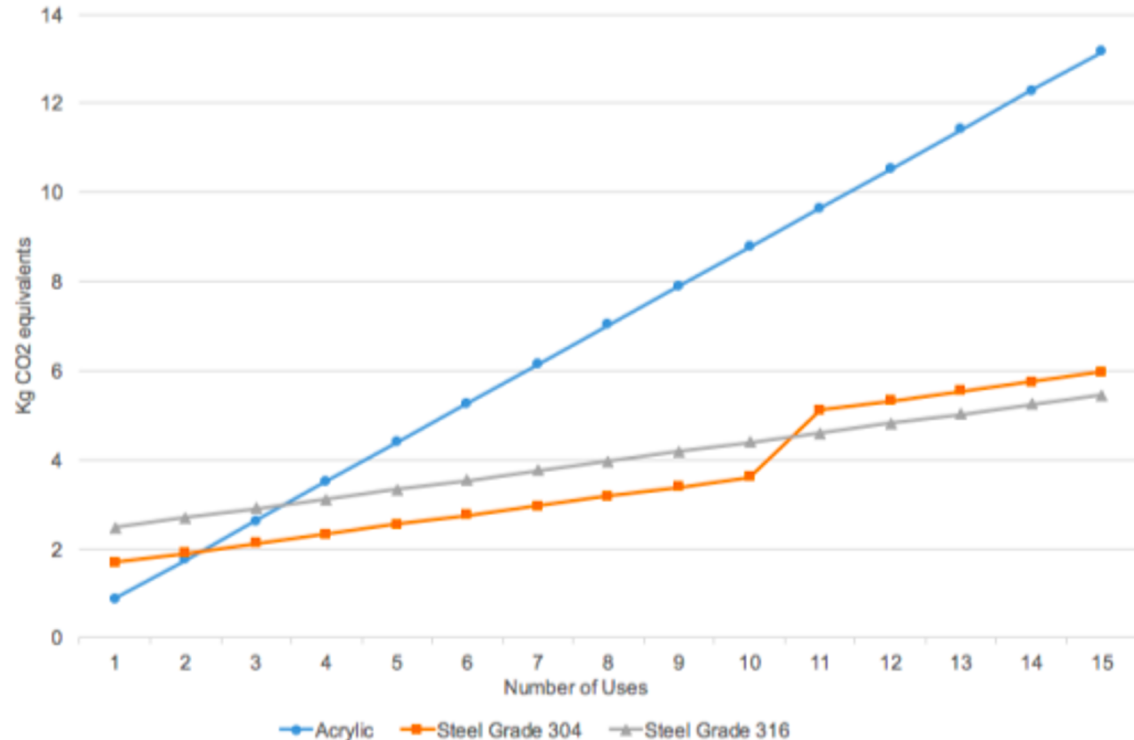
- Consistently high lighting and HVAC demands
- Increased use of disposable products for infection control



A TALE OF TWO SPECULUMS



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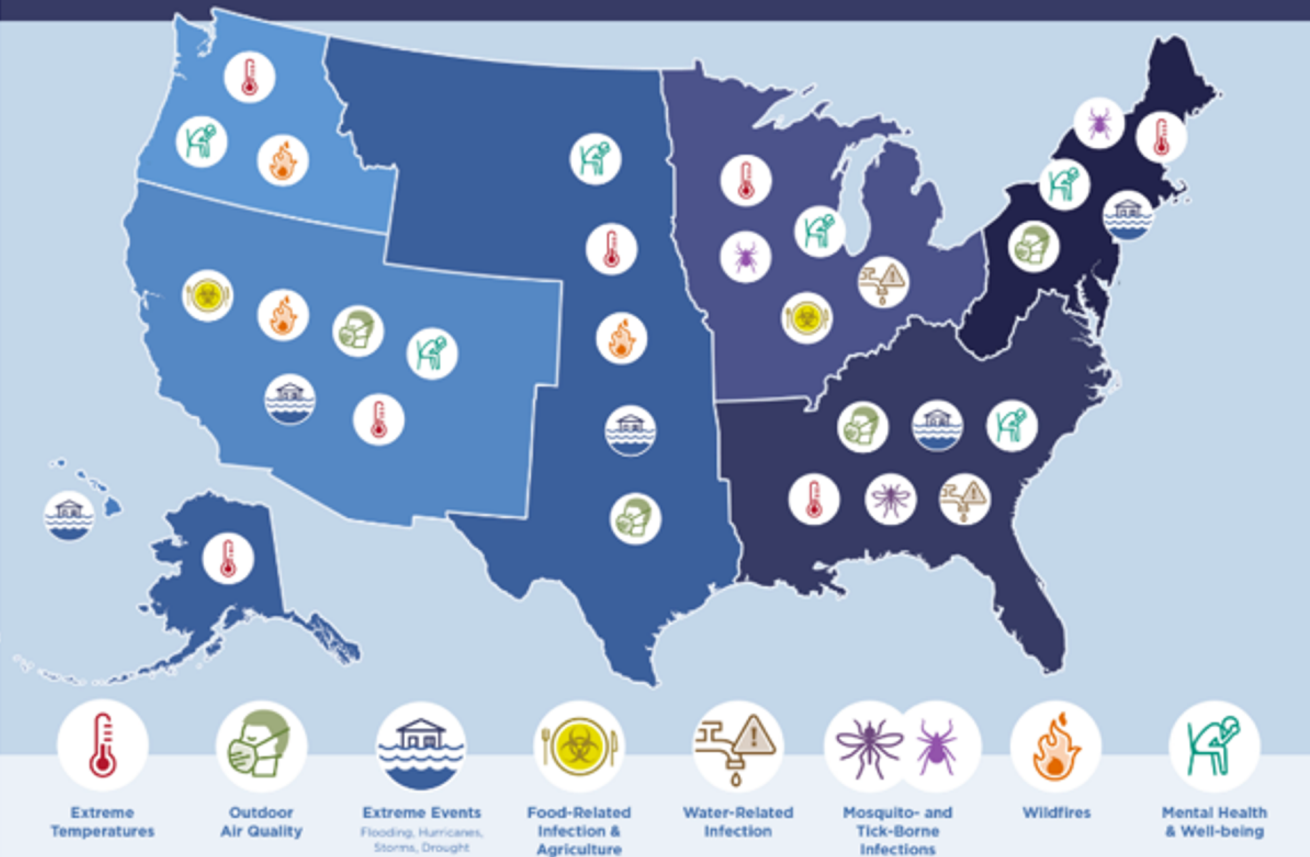


NEXT STEPS IN HEALTHCARE SUSTAINABILITY

- Addressing regulations that promote wasteful practices
- Reducing HVAC and lighting demands
- Investing in renewable energy to offset carbon footprint that cannot be reduced



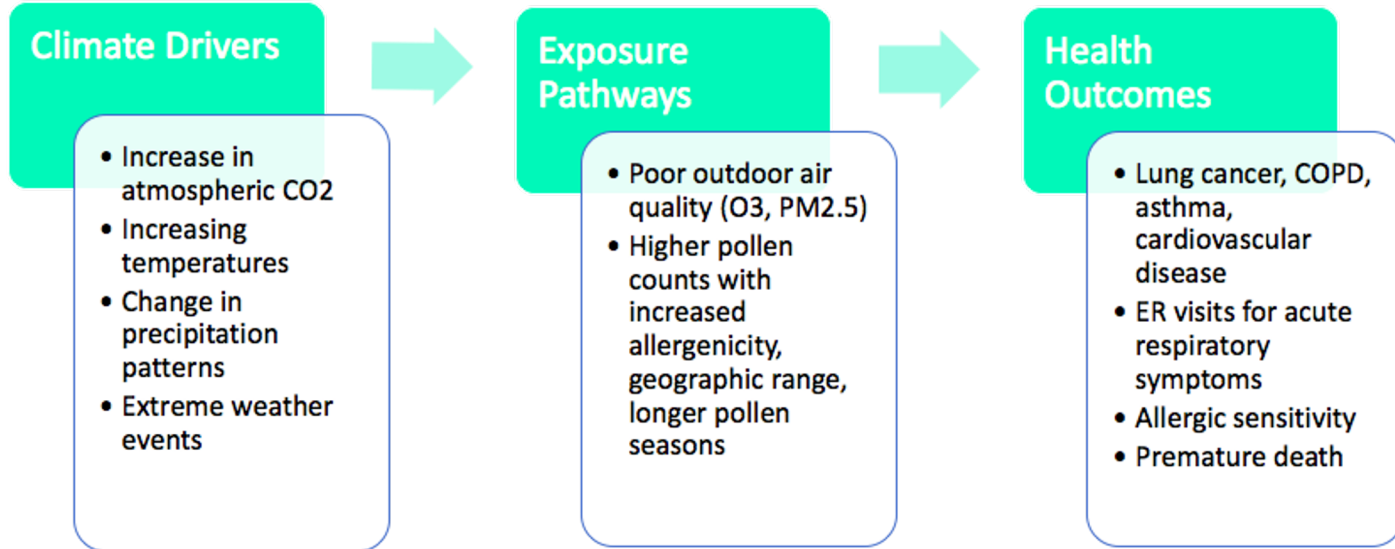
How Our Health is Harmed by Climate Change: Impacts Differ by Geographic Region



This graphic illustrates key impacts of climate change on health and is based on reports from the U.S. Global Change Research Program. For more information, visit www.globalchange.gov.

HOW HAS OUR CHANGING PLANET
AFFECTED YOUR, OR A LOVED ONE'S,
HEALTH?

RESPIRATORY DISEASE AND ENVIRONMENTAL CHANGE

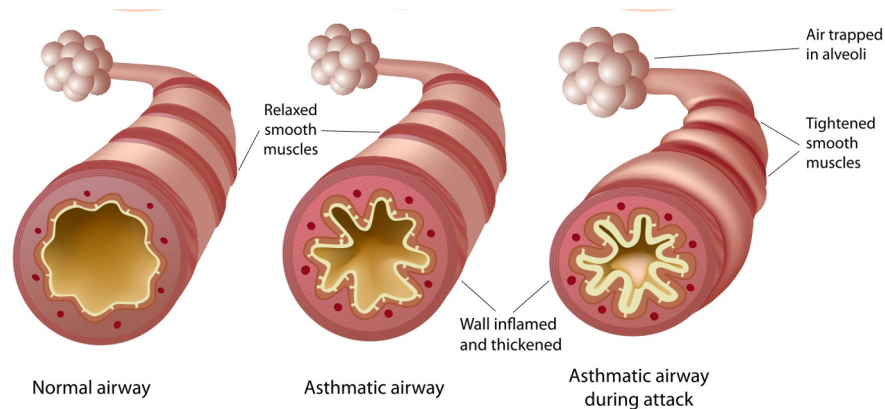


- People at risk: Anyone!

- Particularly pre-existing respiratory conditions such as asthma or chronic lung disease

ASTHMA

1. Climate change (temperatures, precipitation patterns, concentrations of atmospheric CO₂) → increasing levels of airborne allergens
2. Air pollutants (O₃, PM, VOCs, NO_x) can directly and indirectly induce airway inflammation, airway hyperresponsiveness



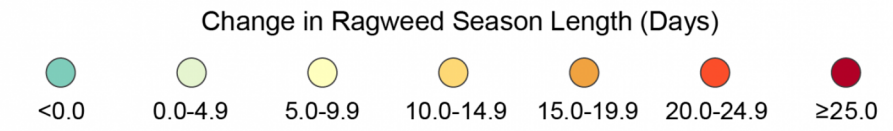
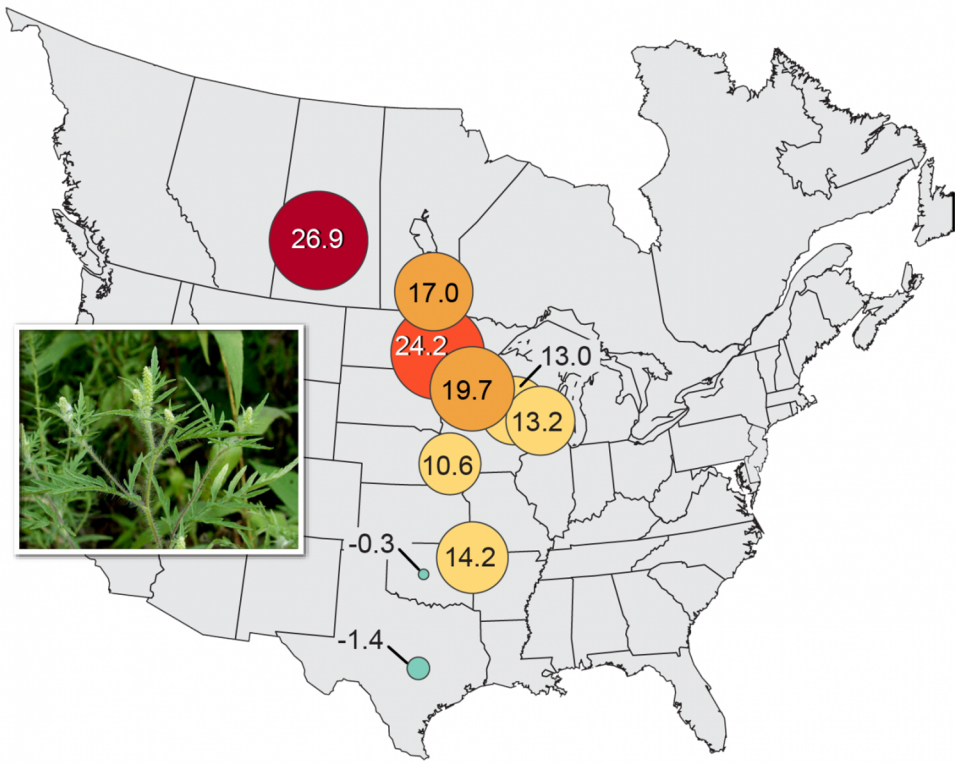
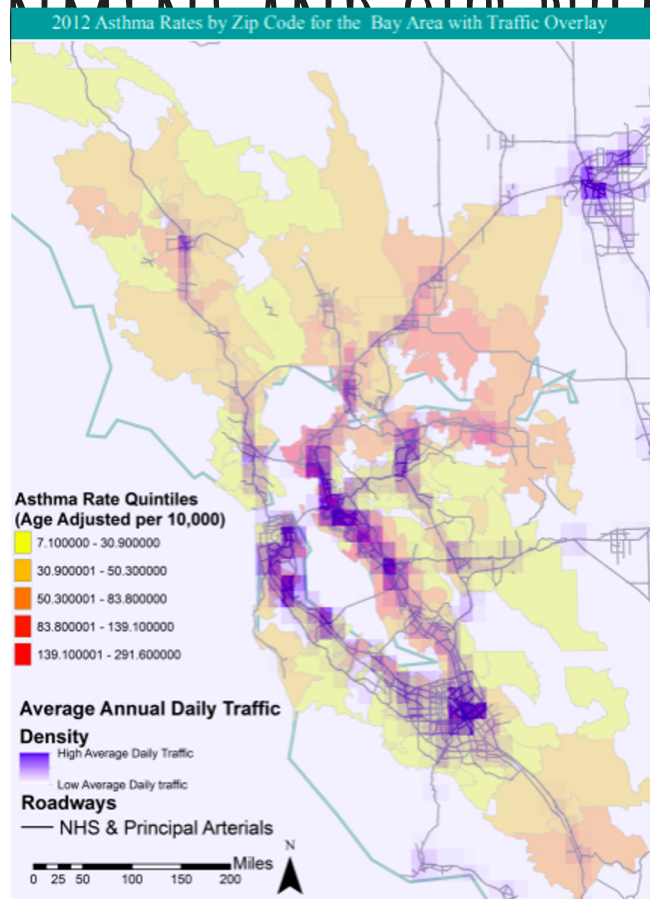
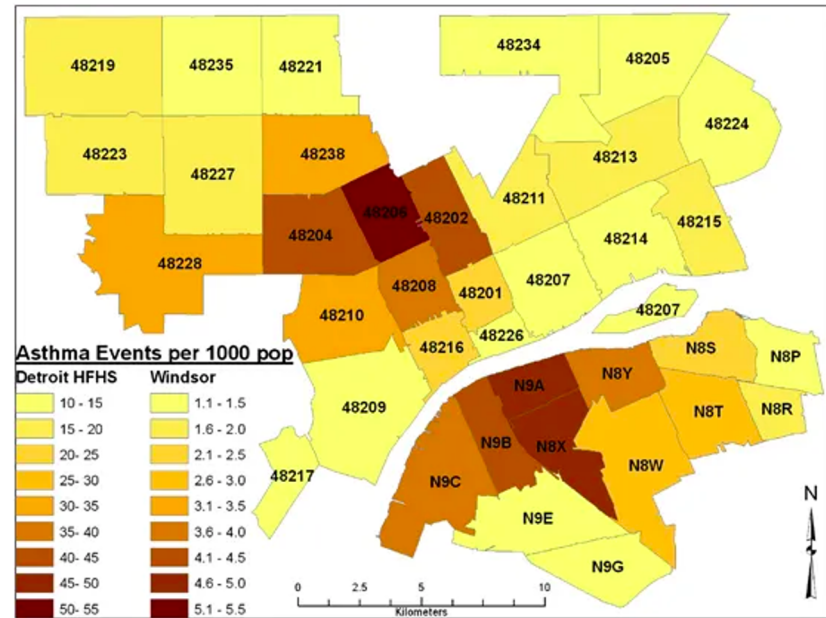
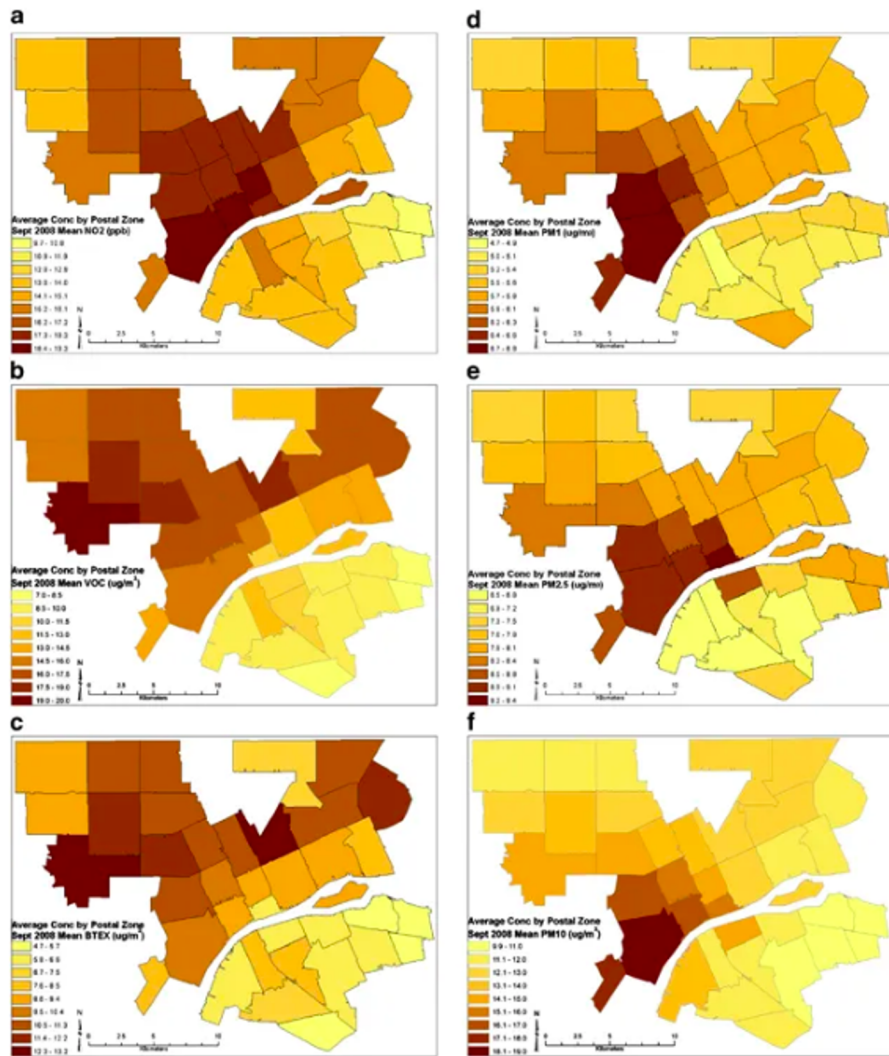


Figure source: Melillo et al. 2014. Photo credit: Lewis Ziska, USDA.

OUR BUILT ENVIRONMENT AND OUR PULMONARY HEALTH





Lemke, Lawrence D., Lois E. Lamerato, Xiaohong Xu, Jason C. Booza, John J. Reiners Jr, Delbert M. Raymond Iii, Paul J. Villeneuve, Eric Lavigne, Dana Larkin, and Helene J. Krouse. "Geospatial relationships of air pollution and acute asthma events across the Detroit-Windsor international border: Study design and preliminary results." *Journal of Exposure Science and Environmental Epidemiology* 24, no. 4 (2014): 346.

CLEAN AIR INITIATIVES; OPPORTUNITY FOR ADVOCACY

BREATHELIFE

A global campaign for clean air

Yes, I commit to reduce air pollution in my home and city for a Pollution Free Planet, supporting the outcomes of the UN Environment Pollution Summit in December 2017. Please send me information on actions I can take with my family and community.

ACT NOW

PROTECTING YOUR LUNGS

1. Check daily air pollution forecasts in your area.
(airnow.gov)
2. Avoid exercising outdoors when pollution levels are high. Always avoid exercising near high traffic area.
3. Petition school's to reduce school bus emissions with no bus idle zones (US EPA Clean School Bus Campaign)
4. House plants for “scrubbing” indoor air pollution
 - a. Gerbera Daisy, English Ivy, Snake Plant

Click on the city name for more detailed information. printable summary	FORECAST		CURRENT AQI
	Fri Oct 25	Sat Oct 26	
Ann Arbor	Mod	Mod	24
Benton Harbor	Good	Good	43
Detroit	Mod	Mod	69
Eastern U.P.	Good	Good	28
Flint	Good	Good	20
Grand Rapids	Good	Good	34
Houghton Lake	Good	Good	43
Kalamazoo	Good	Good	43
Lansing	Good	Good	26
Ludington	Good	Good	43
Saginaw	Good	Good	23
Traverse City	Good	Good	43



VECTOR BORNE ILLNESS AND CLIMATE CHANGE



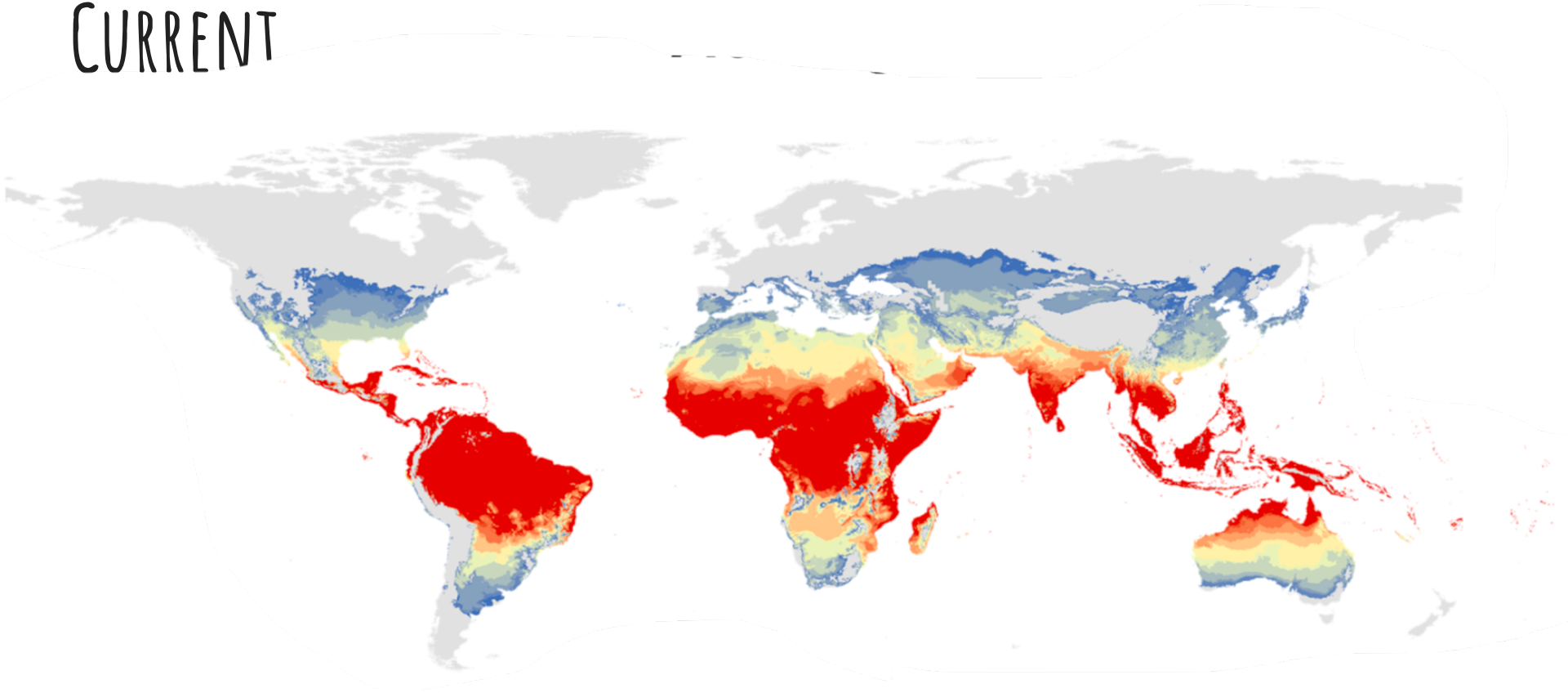
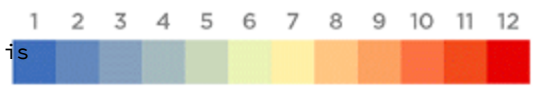
Mosquito-borne diseases: West Nile virus, malaria, Zika, dengue, St. Louis encephalitis, eastern equine encephalitis, Chikungunya



Tick-borne diseases: Lyme disease, Rocky Mountain Spotted Fever, Anaplasmosis, Babesiosis, Tularemia

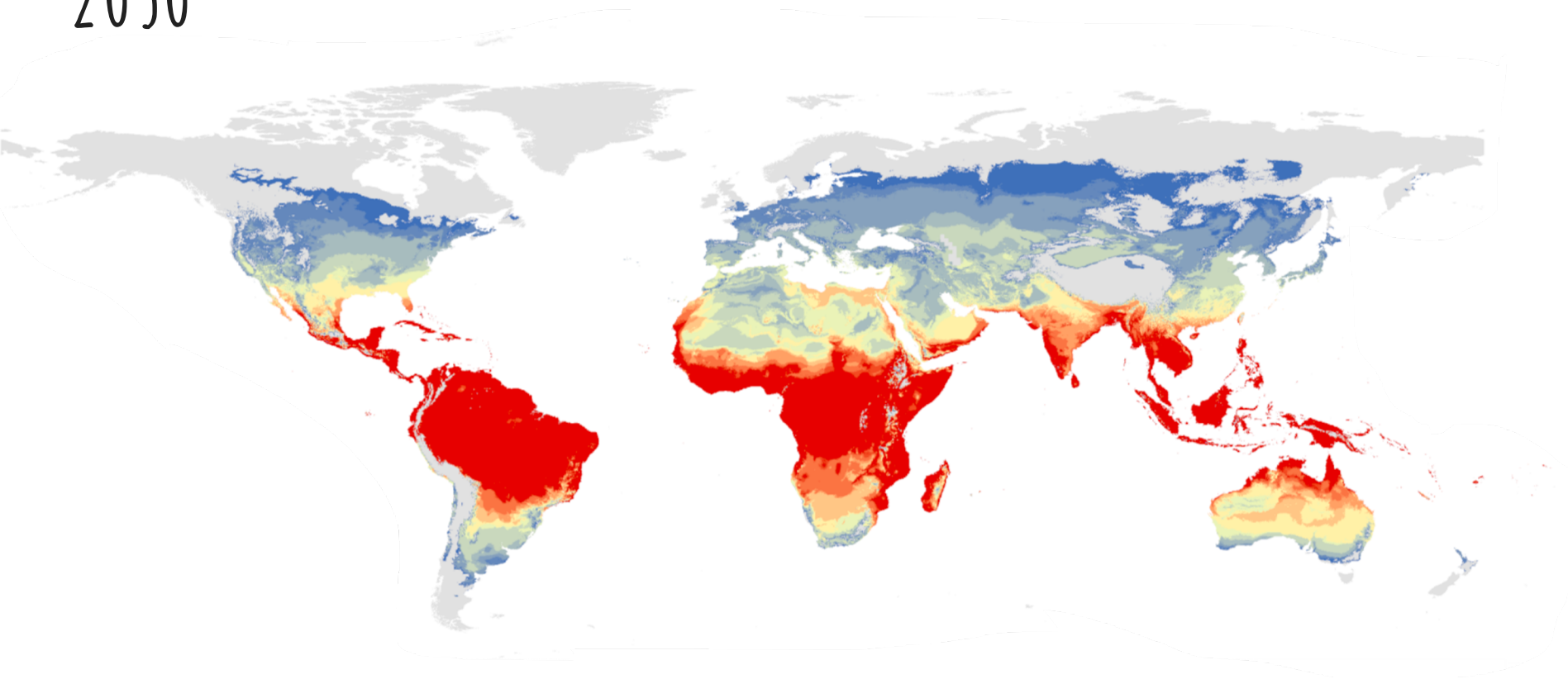
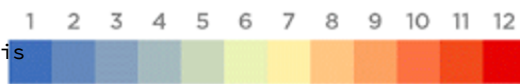
CURRENT

months/year when disease transmission by *Aedes aegypti* is possible



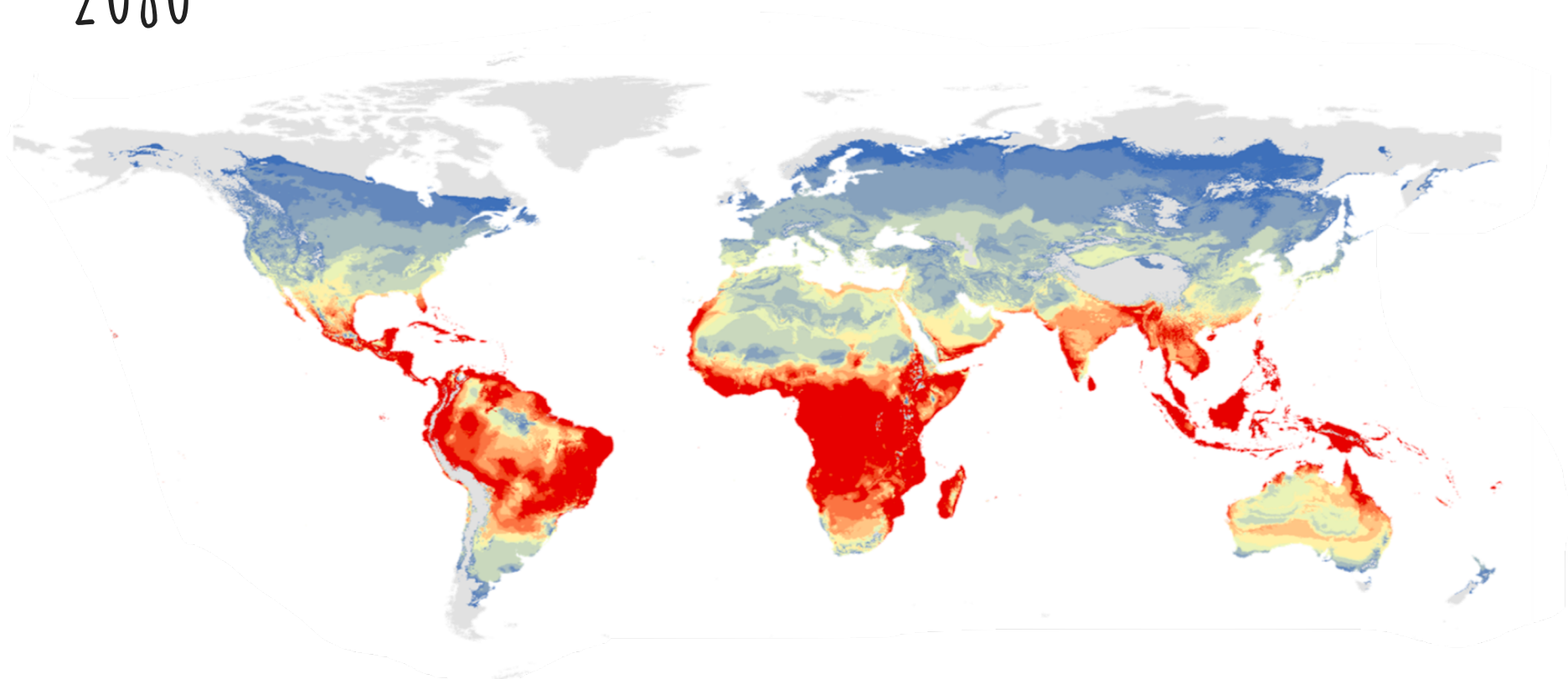
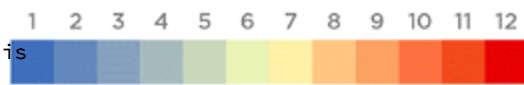
2050

months/year when disease
transmission by *Aedes aegypti* is
possible



2080

months/year when disease
transmission by *Aedes aegypti* is
possible



LYME DISEASE

- Caused by spirochete *Borrelia burgdorferi*, carried by the Ixodes tick.
 - **Early localized:** skin rash; fatigue, anorexia, headache, neck stiffness, myalgias, arthralgias, lymphadenopathy, and fever occurring days-weeks after infection
 - **Early disseminated disease:** skin rashes, neurologic symptoms, cardiac symptoms occurring weeks-months after infection
 - **Late disease:** intermittent/persistent arthritis (large joint), neurologic problems occurring months-years after infection



LYME DISEASE IN UNITED STATES



Michigan Disease Mapper
Zoonotic and Vector Borne

Figure 1. Reported Cases of Lyme Disease in the United States, 1991–2014

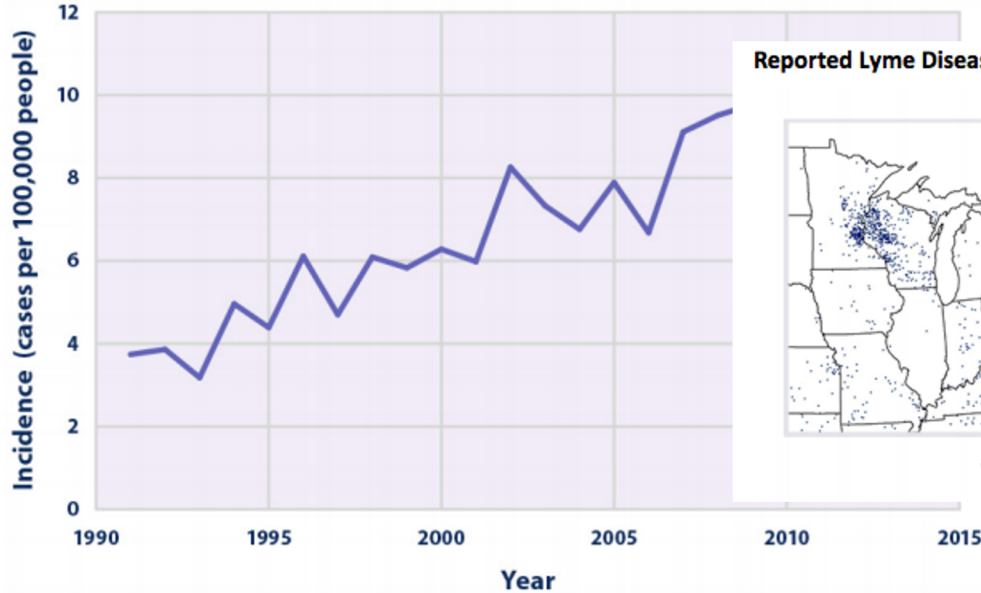
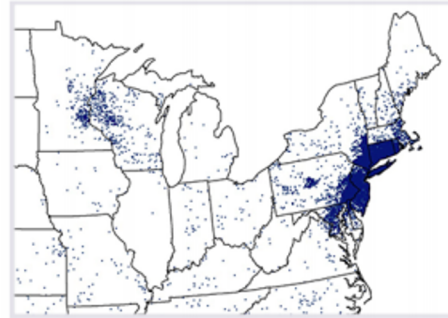
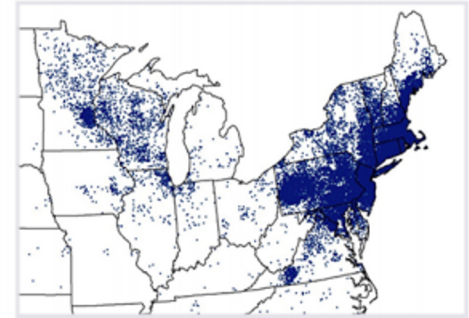


Figure 2. Change in Reported Lyme Disease Incidence in the Northeast and Upper Midwest, 1991–2014

Reported Lyme Disease Cases in 1996 and 2014



1996



2014

Total increase in cases per 100,000 people:



Trend not able to be calculated

PROTECTING YOURSELF

Avoid tick-infested areas.

- Walk in the center of trails to avoid contact with overgrown grass or brush at trail edges.
- If hiking in deep woods, or exploring off trail, keep legs and arms covered.
- Protect your pets with tick prevention products.

Perform daily tick checks.

- Always check yourself and your animal for ticks after being outdoors. Checking during shower/bath can help inspect all body surface areas.
- Remove attached ticks with tweezers: grasp the tick firmly close to the skin, with a steady motion pull the tick's body away from the skin.

MENTAL HEALTH & CLIMATE CHANGE

- Extensive **Crop-damaging temperatures increase**
effects **suicide rates in India**

Article | [Publish](#) **Ecological grief as a mental health**

1354114

Higher responses to climate change-related loss

Correlation Between Climate Change and Dysphoria in Primary Care

Jonathan L. Temte, MD, PhD; John R. Holzhauer, MD; Kenneth P. Kushner, PhD

Nature Climate Change **8**, 723–729 (2018) | [Download Citation](#) ↓

MENTAL HEALTH & CLIMATE CHANGE

“Ecological Grief”: intense feelings of grief as people suffer climate-related losses to valued species, ecosystems and landscapes



MENTAL HEALTH & CLIMATE CHANGE

01

Acute Climate-Related Events

- Increased PTSD
- Increased anxiety
- Increased grief

02

Subacute Climate-Related Events

- Heat waves increase mental health issues, especially in those with existing conditions
- Increased ambient temperatures increases criminal and aggressive behavior

03

Long-Lasting Climate-Related Effects

- Existential threat of Climate Change

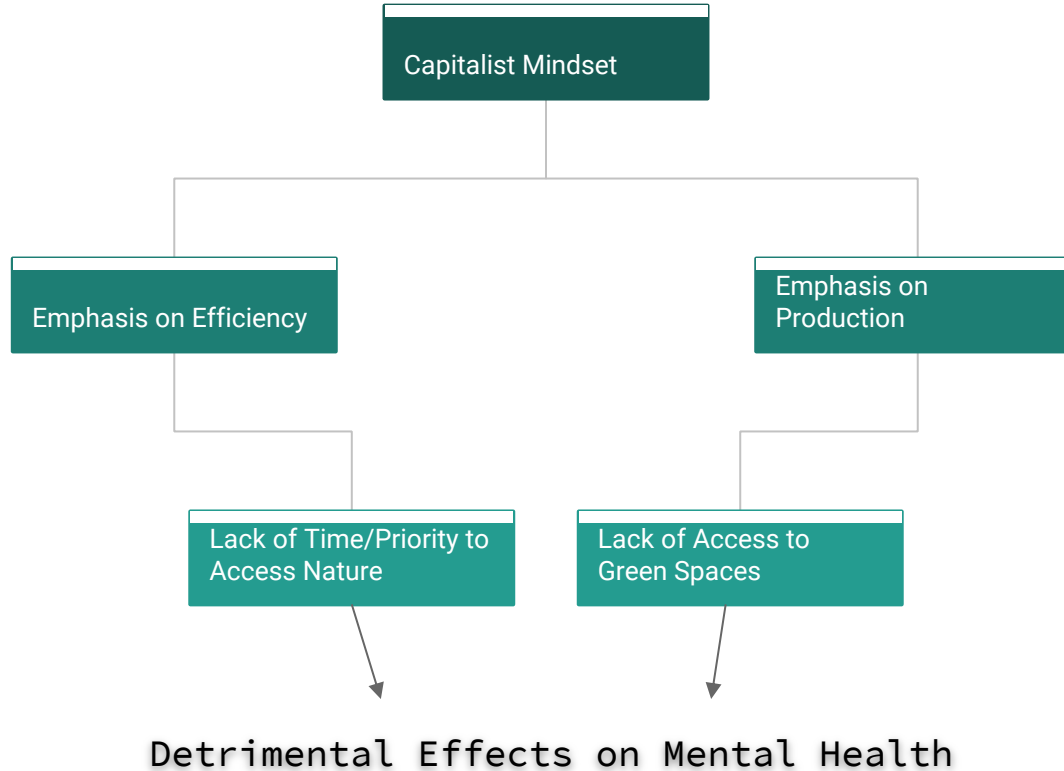
MENTAL HEALTH, THE ENVIRONMENT, & YOU

Research in the growing field of Ecotherapy shows a strong connection between time spent in nature and reduced levels of stress, anxiety, and depression

There's a significant difference between active time spent in urban settings versus active time spent in natural settings!

- Decreased self-reported rumination
- Decreased activity in the subgenual prefrontal cortex (associated with self-focused behavioral withdrawal)

A CAPITALIST MINDSET & MENTAL HEALTH



HOW CAN WE MITIGATE THIS?

Intentional connection with ourselves through change in and around us...





BETTER HEALTHCARE

Mayo Clinic

Operates its own recycling facility in Rochester, Minnesota. Food waste is repurposed for composting and animal feed at local farms.

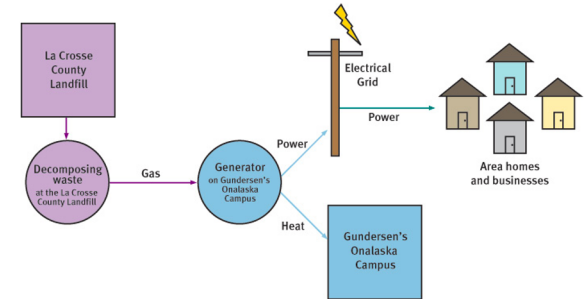


New York State Nurses Association

Nurses are engaged in local, statewide and national struggles for clean air, land and water. **Advocating for environmental health justice.**

Gundersen Health System

Partnered with La Crosse County to capture waste biogas at a local landfill, turning it into electricity and heat. Onalaska multi-building campus is 100 percent energy independent.



A BETTER CLINIC?

Following the **Union Carbide toxic gas release in 1984**, the **Sambhavna Clinic** was opened in Bhopal, India to treat those injured.

Sustainable model of free, appropriate scale and integration of the best of western medicine, ayurveda (indigenous systems of medicine based on herbs) and yoga therapy.



ACTIVITY

Imagine you are forming a healthcare clinic in your local community, that will engage with the physical, emotional and spiritual impacts of our changing planet. What does this clinic look like?

