

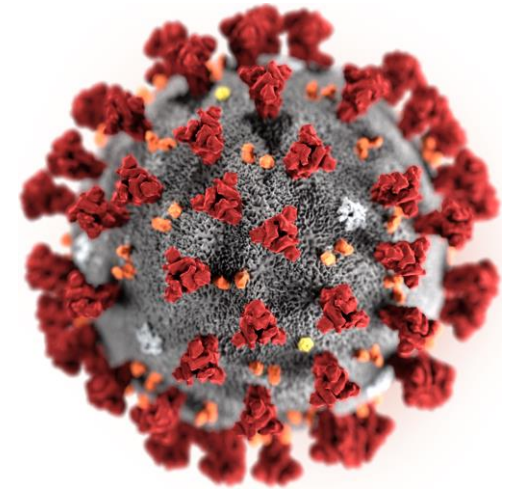
Shared Drivers of COVID19 and Climate Change Challenge and Opportunities

Climate Change and Health

MPHP 441

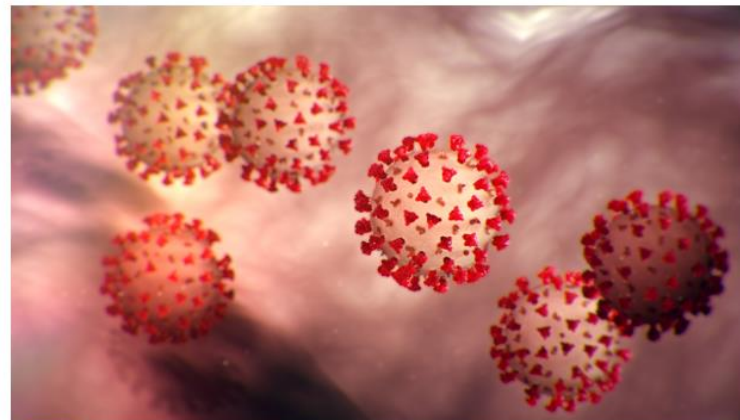
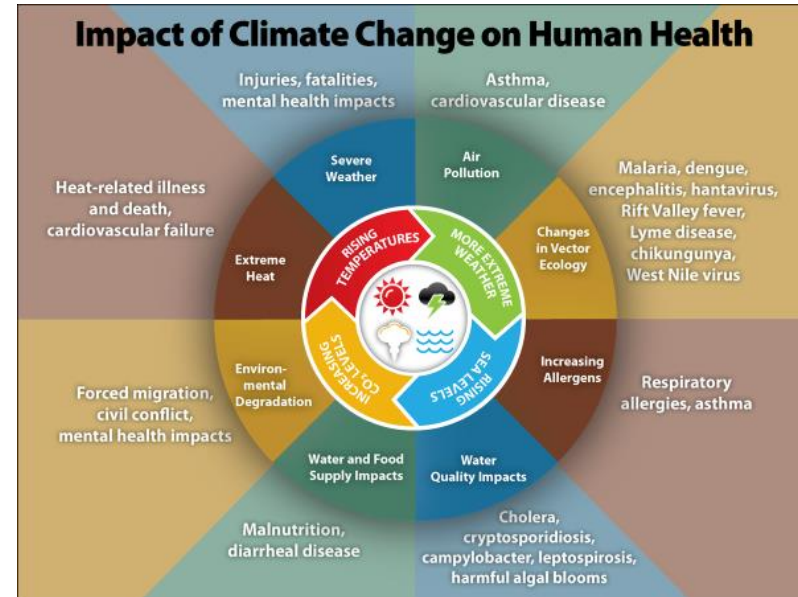


Holly Rosencranz, MD
April 2021



Climate Change Health Impacts

- Maternal and reproductive health
- Cardiovascular effects of climate change
- Climate change and disability
- Heat stress and kidney disease
- Infectious diseases and climate change
- Air degradation, allergies, and pulmonary diseases
- Climate change and zoonotic diseases
- Worker safety and health
- Health effects of wildfires



Objectives

1. Understand how drivers of climate change can increase the risk of pandemics
2. Identify overlapping and disproportionate impacts of climate change and COVID19 on vulnerable communities already suffering from poor health
3. Recognize challenges in adaptation and mitigation for both climate change and COVID19
4. Inspire actions that will impact both climate change and COVID19



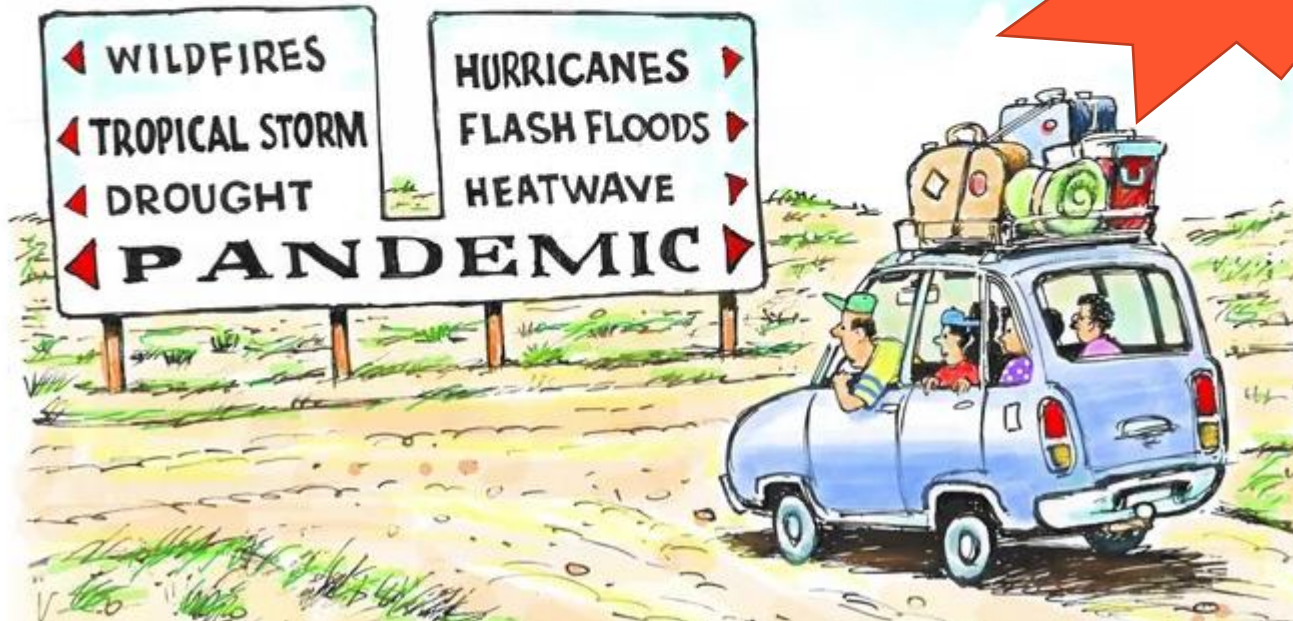
Granlund cartoon: Weekend getaway choices

Staff Writer Cheboygan Daily Tribune

Published 3:57 p.m. ET Sep. 1, 2020

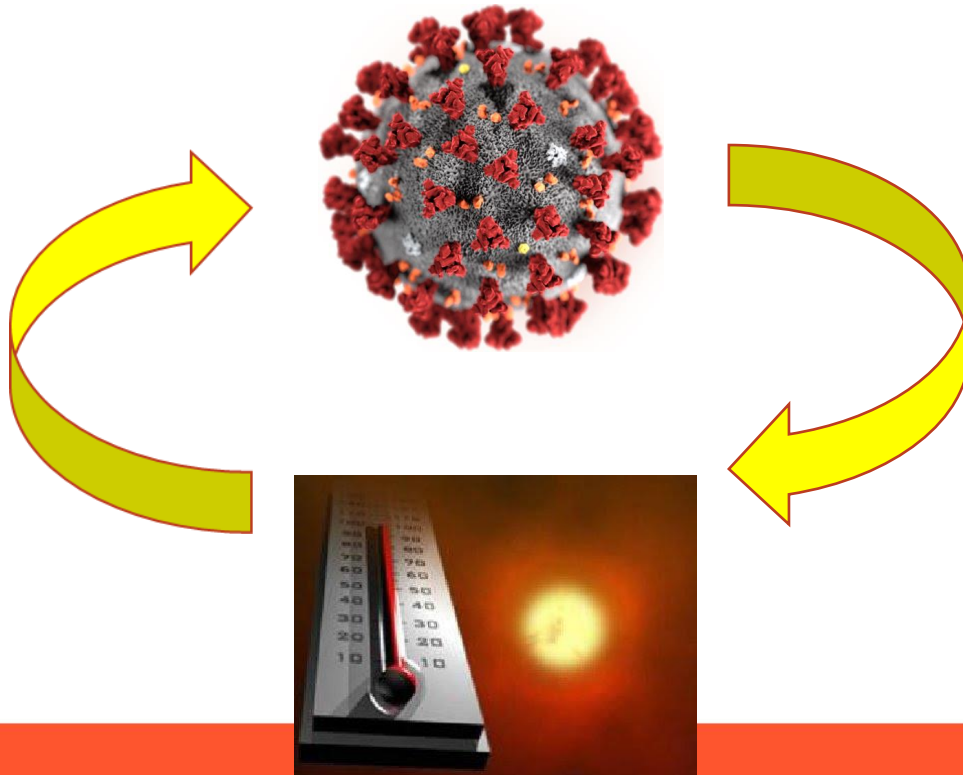


Confluence of the two most pressing global health threats



Syndemic of Climate Change and COVID

Syndemic: Synergistic health problems that affect the health of a population within the context of persistent social and economic inequalities.



Coronavirus disease (COVID-19): Climate change

22 April 2020 | Q&A

Will Climate Change Make COVID19 Worse?

There is **no evidence of a *direct* connection between climate change and the emergence or transmission of COVID-19 disease....**

...most emerging infectious diseases, and almost all recent pandemics, originate in wildlife, and **there is evidence that increasing human pressure on the natural environment may drive disease emergence.**



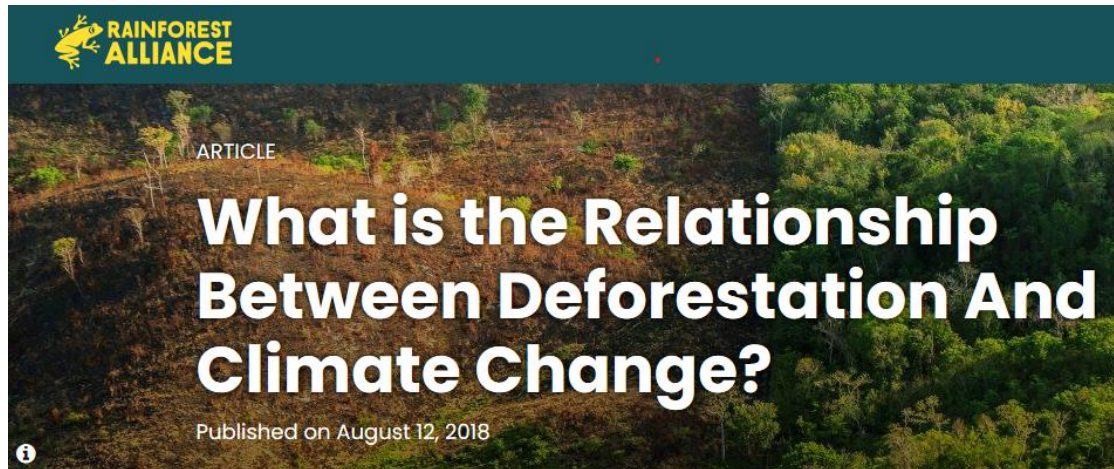
“If we wish to reduce the risk of future pandemics, we must prioritize action on the climate crisis – one of the most powerful forces driving zoonoses today.”

Dr Richard Horton, editor-in-chief of *The Lancet*



Root Causes of Climate Change Increase the Risk of Pandemics

Loss of Habitat *Deforestation* for agricultural purposes-largest cause of habitat loss worldwide



Trees capture greenhouse gases (GHGs) like carbon dioxide, preventing them from accumulating in the atmosphere and warming our planet.

Felled trees release stored carbon into the atmosphere

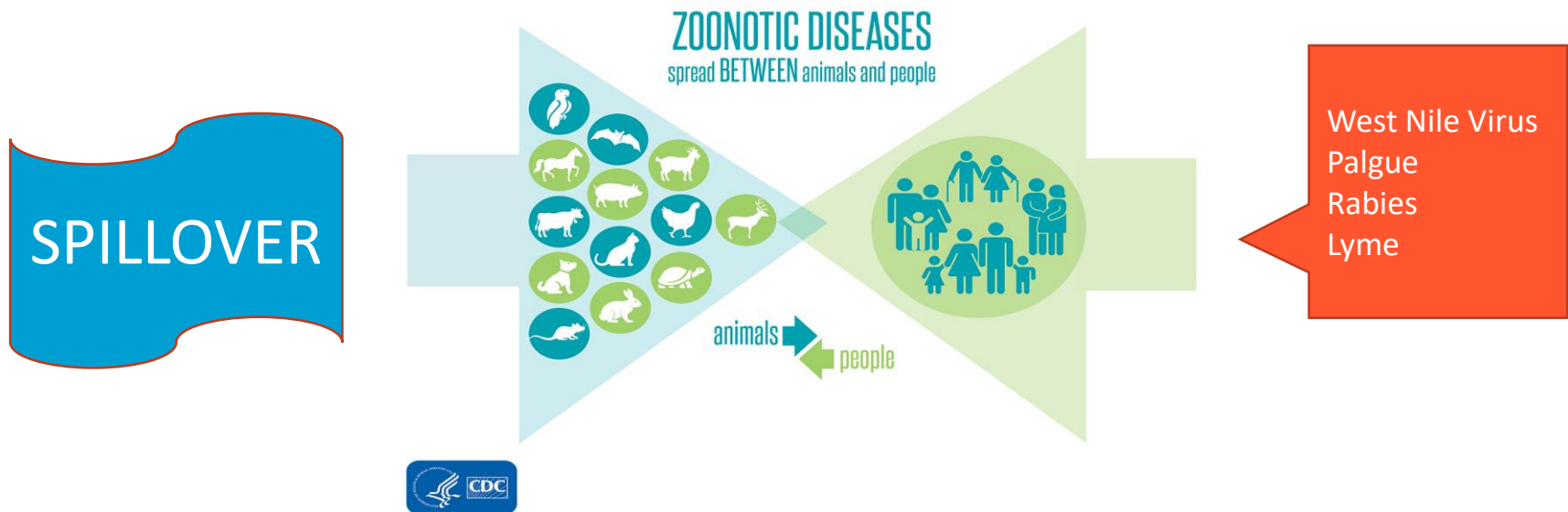


Forest Destruction Increases Climate Change and Risk of Pandemics

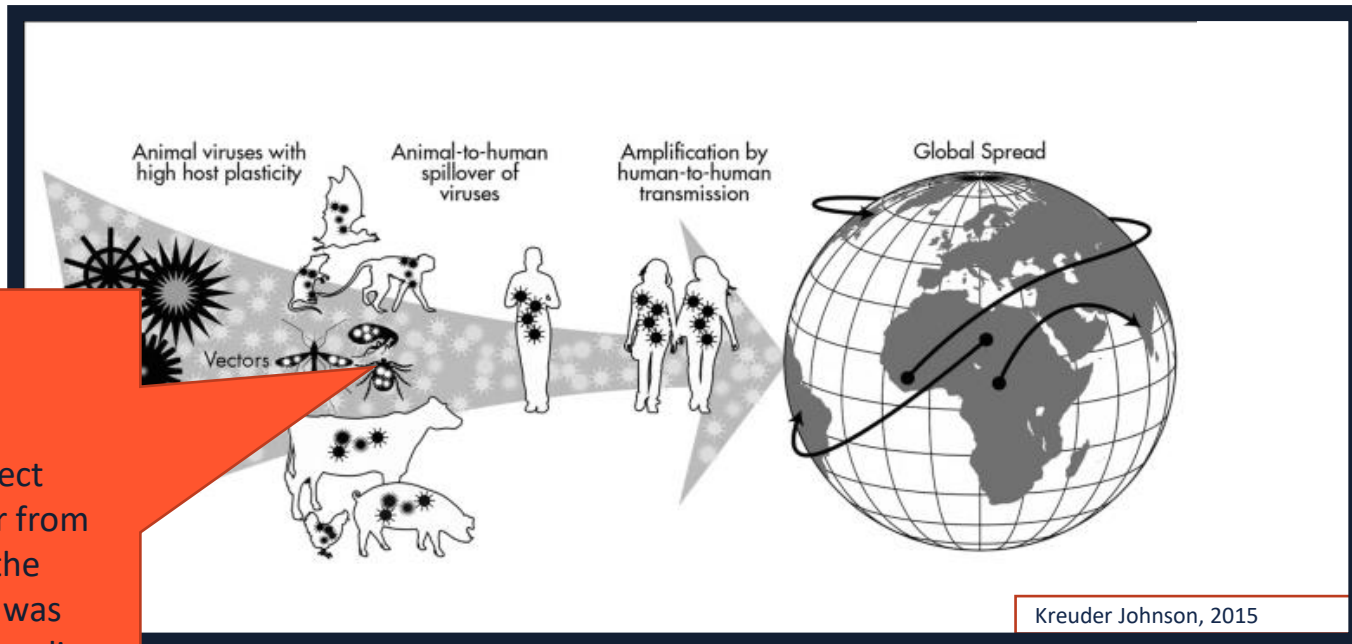
Loss of Habitat

- Animal movement creates opportunity for pathogens to get into new hosts.
- Exploitation and devastation of wildlife and places where animals live put people at risk of encountering new zoonotic diseases like coronavirus

Proximity between people and wildlife carries huge disease risks



Pandemics



HYPOTHESIS :
Rather than a direct zoonotic spillover from horseshoe bats, the most likely route was through an intermediary animal species. (WHO 2021)

COVID19:
“Emerging Infectious disease of probable animal origin.” (Haider, 2020)



WHO calls for further studies, data on origin of SARS-CoV-2 virus, reiterates that all hypotheses remain open

30 March 2021 | News release | Geneva, Switzerland | Reading time: 2 min (667 words)



“our ability to prevent and respond to future pandemics depends on **identifying the natural reservoirs and intermediate hosts of SARS-CoV-2 and the natural events that propelled the novel coronavirus onto the world stage**” Director-General of WHO

Shared Disproportionate Impacts



EXECUTIVE BOARD
148th session
Provisional agenda item 16

EB148/24
6 January 2021

The COVID-19 pandemic has highlighted the scale of **health inequalities** at all levels. It has **disproportionately affected communities already suffering from poor health and living in vulnerable conditions**, leading to increases in mortality and disastrous economic damage



Impacts of COVID19 and Climate Change Shared by Vulnerable Populations

- Low income and minority
- Air pollution exposure
- Chronic diseases
- Food insecure/obese
- Elderly



Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non-Hispanic persons	Black or African American, Non-Hispanic persons	Hispanic or Latino persons
Cases ¹	1.7x	0.7x	1.1x	1.3x
Hospitalization ²	3.7x	1.0x	2.9x	3.1x
Death ³	2.4x	1.0x	1.9x	2.3x

Race and ethnicity are risk markers for other underlying conditions that affect health, including socioeconomic status, access to health care, and exposure to the virus related to occupation, e.g., among frontline, essential, and critical infrastructure workers.





- Long-term exposure to PM_{2.5} leads to large increase in COVID19 death rate.
- Higher death rates among the poor and people of color reflect existing health and economic inequalities that both contribute to, and result from, greater exposure to **air pollution**. (Wu,2020)

Overlap: Minorities and Air Pollution

Perspective



The NEW ENGLAND
JOURNAL of MEDICINE

The Climate Crisis and Covid-19 — A Major Threat to the Pandemic Response

Renee N. Salas, M.D., M.P.H., James M. Shultz, Ph.D., and Caren G. Solomon, M.D., M.P.H.

July 2020



Marginalized groups are at higher risk than others for exposure to high levels of air pollution and associated chronic illnesses, as well as for Covid19–related illness and death.



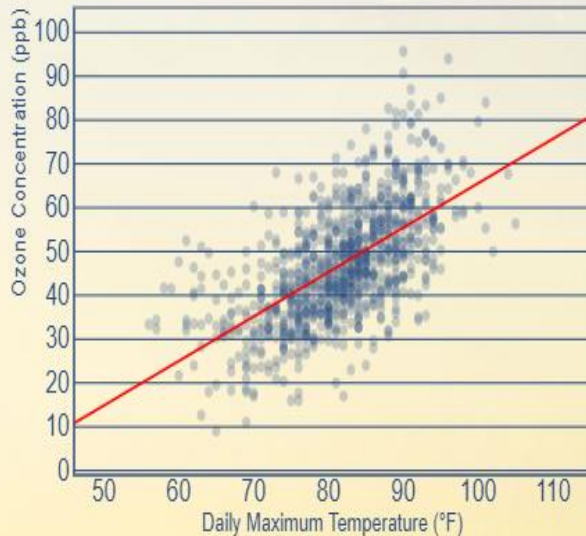
During heat waves, air becomes stagnant, and traps emitted pollutants, often resulting in increases in surface ozone

(ncdc.noaa.gov)

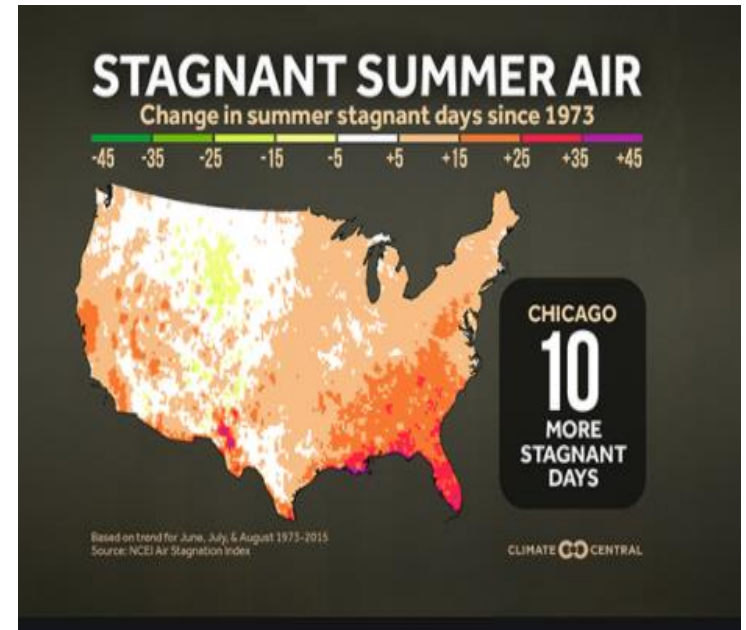
SUMMER IN THE CITY Chicago ▾

CLIMATE CO2 CENTRAL

Hotter Chicago Temperatures Mean More Air Pollution



Hot summer city temperatures have serious health impacts, including heat stress during heat waves, and dangerous ground-level ozone levels on the hottest days of the year. Higher summer temperatures also stress the electricity grid as air conditioner use soars.



Chicagoans in minority neighborhoods on the West and South Sides have the greatest exposure to toxic air pollution and other environmental health hazards in the city. (Chase 2018)



Minorities and Air Pollution

Back of the Line

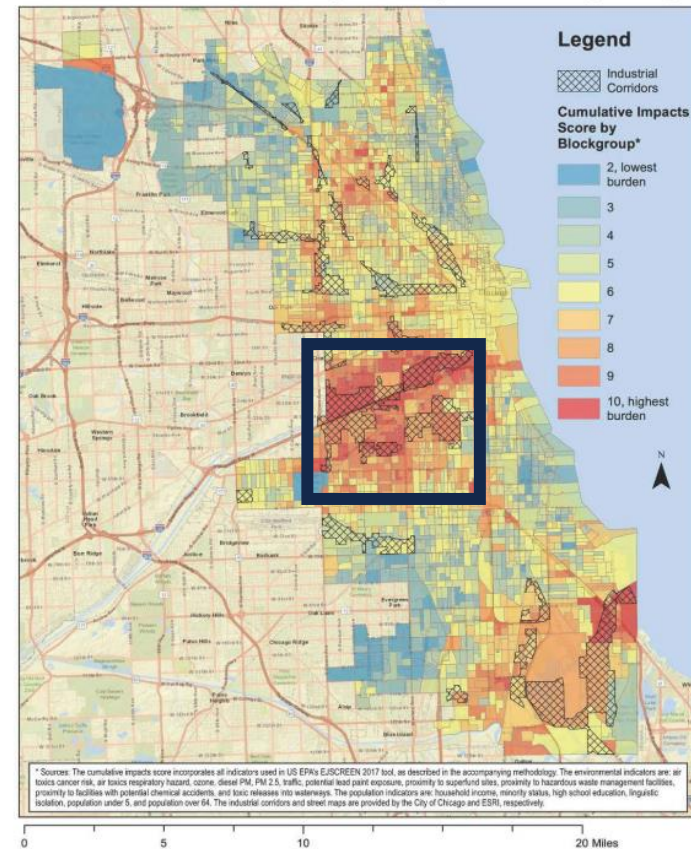
Chicago's COVID-19 vaccine plan put polluted communities last



Grist / Malte Mueller / Getty Images

Residents 15X more likely to die of COVID19
20% fewer vaccines (January 2021)

Cumulative Burden of Environmental Exposures & Population Vulnerability in Chicago



* Sources: The cumulative impacts score incorporates all indicators used in US EPA's EJSCREEN 2017 tool, as described in the accompanying methodology. The environmental indicators are: air toxics cancer risk, air toxics respiratory hazard, ozone, diesel PM, PM 2.5, traffic, potential lead paint exposure, proximity to superfund sites, proximity to hazardous waste management facilities, proximity to facilities with potential chemical accidents, and toxic release into waterways. The population indicators are: household income, minority status, high school education, linguistic isolation, population under 5, and population over 64. The industrial corridors and street maps are provided by the City of Chicago and ESRI, respectively.

Chicago Cumulative Impacts Map

Yukyan Lam, NRDC







RESEARCH ARTICLE

PNAS

Proceedings of the
National Academy of Sciences
of the United States of America

Anthropogenic climate change is worsening North American pollen seasons

February 2021

 William R. L. Anderegg,  John T. Abatzoglou,  Leander D. L. Anderegg,  Leonard Biel...



Anthropogenic climate change has already exacerbated pollen seasons in the past three decades with attendant deleterious effects on respiratory health.



Higher airborne pollen concentrations correlated with increased SARS-CoV-2 infection rates, as evidenced from 31 countries across the globe (Athanasios, 2021)



Positive association between COVID 10 infection rates and airborne pollen concentrations

Chronic disease

Annals of
**Nutrition &
Metabolism**

Climate Change, Labor, and Kidney Health

Ann Nutr Metab 2019;74(suppl 3):38–44
DOI: 10.1159/000500344

Published online

Climate Change and the Kidney



Heat Stress Nephropathy

Having chronic kidney disease of any stage **can make you more likely** to get severely ill from COVID-19.

CKD more common in older individual and no Hispanic Black adults



Obesity



Home

Articles

Authors

Home » American Journal of Public Health (AJPH) » December 2020

Food Insecurity During COVID-19: An Acute Crisis With Long-Term Health Implications

Julia A. Wolfson PhD, MPP, and Cindy W. Leung ScD, MPH

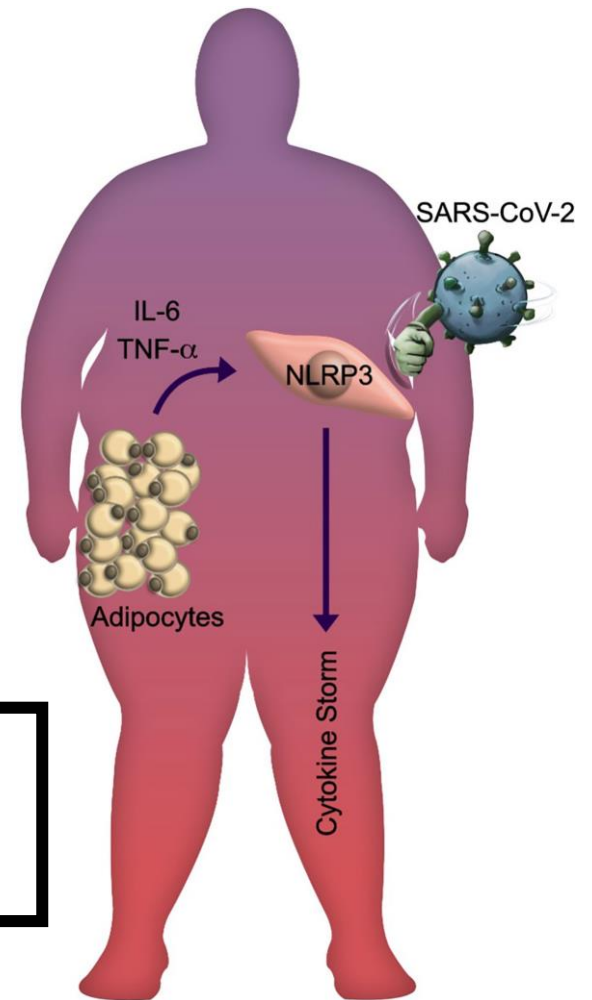
Climate change affects crop yields, nutritional value and cost of food and stability of food systems and food security.



Body Mass Index and Risk for COVID-19–Related Hospitalization, Intensive Care Unit Admission, Invasive Mechanical Ventilation, and Death — United States, March–December 2020 (Kompaniyets 2021)

Obesity increases risk for severe COVID19–associated illness, invasive mechanical ventilation, hospitalization and death, particularly among adults aged <65 years.

Proinflammatory *mediators* predispose to worse outcomes in obese patients with COVID19 (Banerjee 2020)



Older adults are vulnerable to climate change-related health impacts



Heat exposure- increases risk of illness and death in elderly especially those with chronic health conditions

Risk for COVID-19 Infection, Hospitalization, and Death By Age Group

Rate compared to 5-17-years old ¹	0-4 years old	5-17 years old	18-29 years old	30-39 years old	40-49 years old	50-64 years old	65-74 years old	75-84 years old	85+ years old
Cases ²	<1x	Reference group	2x	2x	2x	2x	1x	1x	2x
Hospitalization ³	2x	Reference group	6x	10x	15x	25x	40x	65x	95x
Death ⁴	1x	Reference group	10x	45x	130x	440x	1300x	3200x	8700x

All rates are relative to the 5-17-year-old age category. Sample interpretation: Compared with 5-17-year-olds, the rate of death is 45 times higher in 30-39-year-olds and 8,700 times higher in 85+-year-olds.

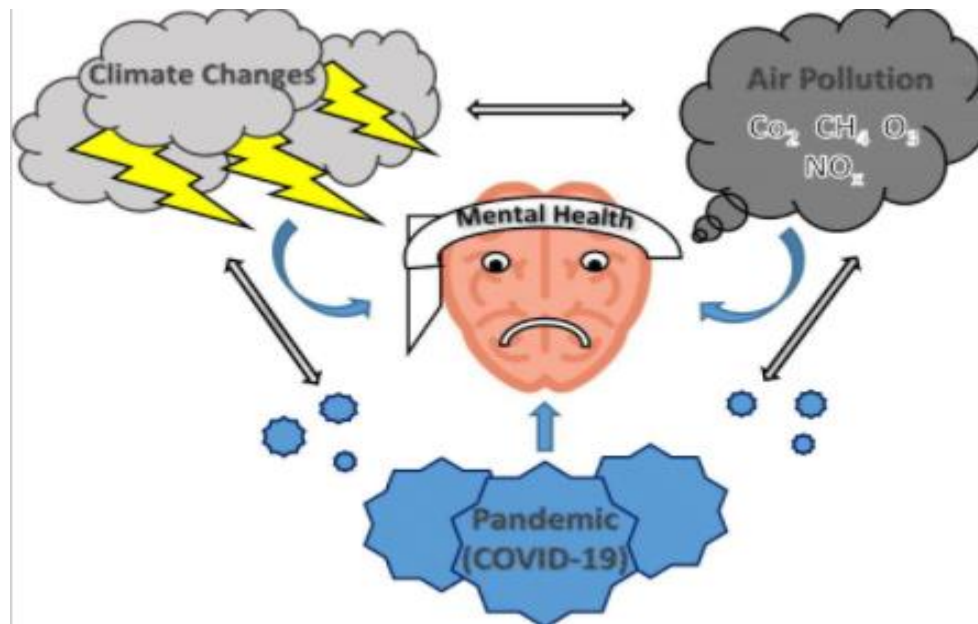


Mental Health Influences

Mild negative emotional responses to full-blown psychiatric conditions, (anxiety and depression, stress/trauma-related disorders, and substance abuse).

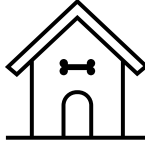
Most Vulnerable

Elderly... people with pre-existing health problems especially mental illnesses... individuals with low socio-economic status, and immigrants.



Climate change threatens efforts to contain COVID19

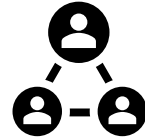
Shelter in place with destruction of infrastructure



Testing and vaccination access with heatwaves, heavy storms



Social distancing in evacuation or cooling center



Sanitizing hands and surfaces without adequate clean water



Access to health care



'Oven-like conditions': Scorching heat and coronavirus endanger people without AC this summer



Climate change drove hotter-than-normal temperatures across the U.S. in 2020- **putting Americans already vulnerable to coronavirus at heightened risk of heat-related illness and death.**

A disproportionate number of people who don't have AC in their homes are **low-income and minority groups.**

Many public cooling centers **shuttered due to the pandemic**, and those that were open could **cause disease spread.**

HEALTH

Winter storm delays vaccinations; FEMA opens first mass vaccination sites in California. Latest COVID-19 updates.

John Bacon, Elinor Aspegren and Grace Hauck USA TODAY

Published 4:00 a.m. ET Feb. 16, 2021 | Updated 9:36 a.m. ET Feb. 17, 2021



Vehicles are at a standstill southbound on Interstate Highway 35 in Killeen, Texas. Photo: Joe Raedle/Getty Images

NATION

At least 4 dead, 150M people under winter advisories as 'unprecedented' storm stretches across 25 states; 4.3M without power in Texas

Doyle Rice and Elinor Aspegren USA TODAY

Published 6:44 a.m. ET Feb. 15, 2021 | Updated 10:04 a.m. ET Feb. 16, 2021

CORONAVIRUS

Climate Change Won't Stop for the Coronavirus Pandemic

The next several months could bring hurricanes, floods and fire, on top of the pandemic currently raging through the country. How do you shelter in place during an evacuation?

by Abrahm Lustgarten, April 13, 2020, 2 p.m. EDT

April 13, 2020

Flight from disaster:

- Large numbers of people evacuate on short notice housed in shelters that are overcrowded, understaffed and undersupplied
- Potential for spreading virus to distant locations



BRIEF

Flooding in China disrupts medical, PPE suppliers. Shippers should expect delays

Leonard, July 23, 2020



Pixabay

Flooding impacted supply chains for personal protective equipment, crucial to healthcare workers fighting the pandemic.

COVID19 threatens efforts to contain climate change

Carbon footprint of PPE manufacture/distribution

Commercial and medical single-use plastic




The average rate of the medical waste generated for coronavirus treatment was **...more than tenfold higher** than the average generation rate during regular hospital operations. (Abu-Qdais 2020)

Think Covid-19 Disrupted the Food Chain? Wait and See What Climate Change Will Do

The pandemic has revealed deep flaws in the world's food system and food leaders are calling for global coordination and climate resilient agriculture.



By Georgina Gustin 

July 7, 2020



- The pandemic disrupted global supply chains, induced **panic buying** and **cleared supermarket shelves**.
- Edible produce rotting in fields.
- Livestock because slaughter plants were shut down.

Develop Strategy for Pandemic Preparedness and Climate Adaptation

“Leveraging COVID19 recovery programs to simultaneously advance the climate agenda presents a strategic opportunity to transition toward a more sustainable post-COVID-19 world.” (Rosenbloom, 2020)

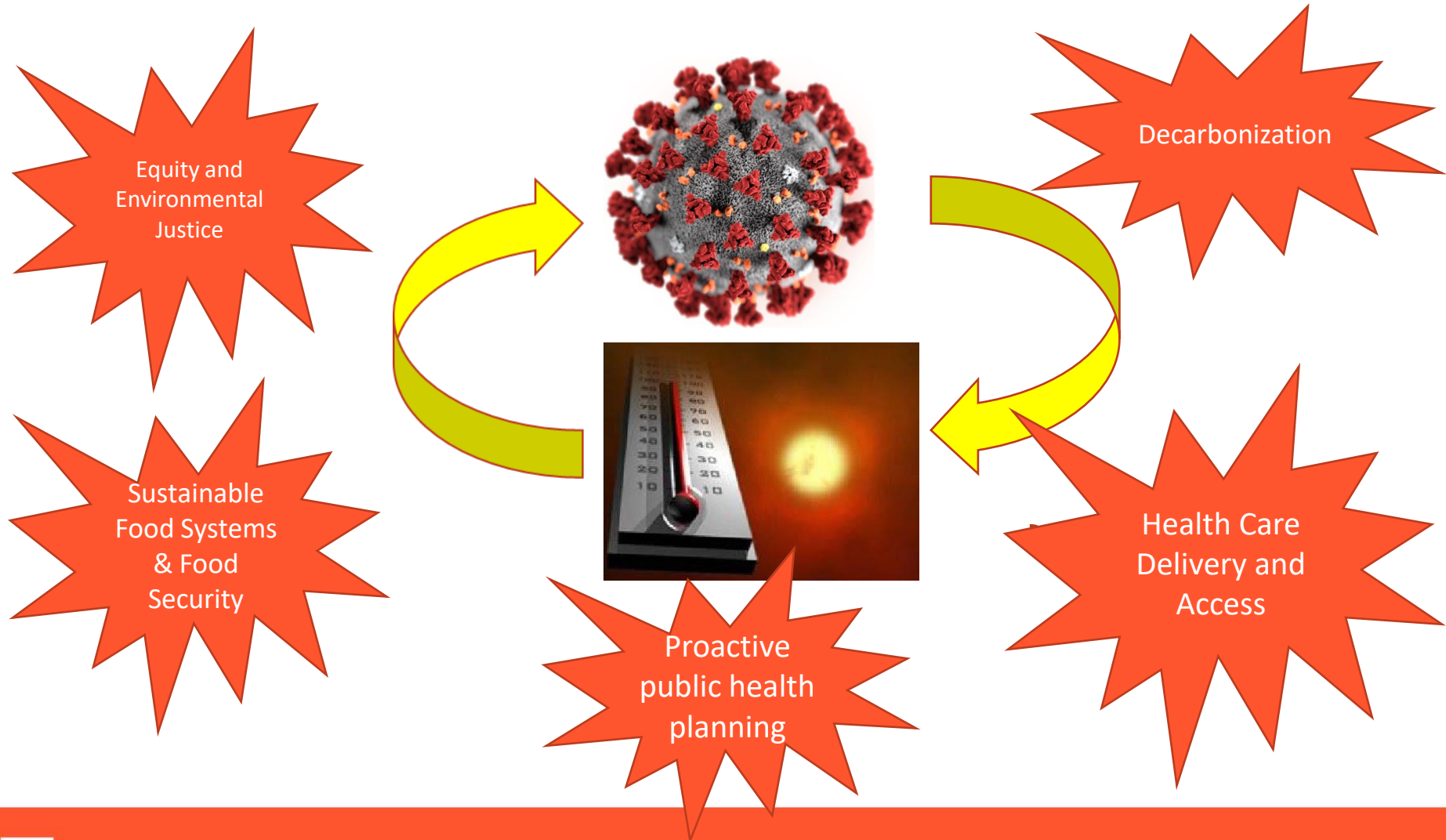


“Never let a good crisis go to waste.”

- Winston Churchill



Syndemic of Climate Change and COVID



Advocate for Actions by Health Care Systems

Decarbonization and Improved Resilience

- Low carbon energy transition in built environment

Decide where you can contribute

- Educate public, policy makers, providers
- Implement programs in your health system
- Reduce plastics and single use items
- Support telemedicine and remote work
- Reimagine health care delivery models
- Reduce financial barriers to health care access
- Preparation for predictable health crises
-



CLIMATE CHANGES IN YOUR BACKYARD

PRESENTED BY THE CHAMPAIGN COUNTY MASTER
GARDENERS

Champaign County Master Gardeners present *Climate Changes in Your Back Yard* with guest lecturers Warren Lavey and Holly Rosencranz.

August 27,
7 P.M.

Extension
Auditorium
(801 N.
Country Fair
Drive,
Champaign)

Register online at:
go.illinois.edu/BackYardClimate

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& ENVIRONMENTAL SCIENCES



Educate Public





Educate Policy Makers





Educate Providers



Asthma Exacerbation Triggered by Wildfire: A Standardized Patient Case to Integrate Climate Change Into Medical Curricula

Published: January 4, 2021

Japhia Ramkumar, MD, Holly Rosencranz, MD, MPP, Leslie Herzog, MBA, MEd

[Preview Abstract ^](#)

Implement Programs in
Health System





“...calling for action to eliminate health inequities, as part of a year-long global campaign to bring people together to build a fairer, healthier world.”



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