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Climate Change in Illinois – Health

Dr. Jim Angel, former State Climatologist for Illinois

Logistics

- PowerPoint slides will be uploaded and available for anyone
- At around 30 minutes, there will be a pause for questions about material already covered
- At the end of the lecture, there will be plenty of time for additional questions

Overview of the course

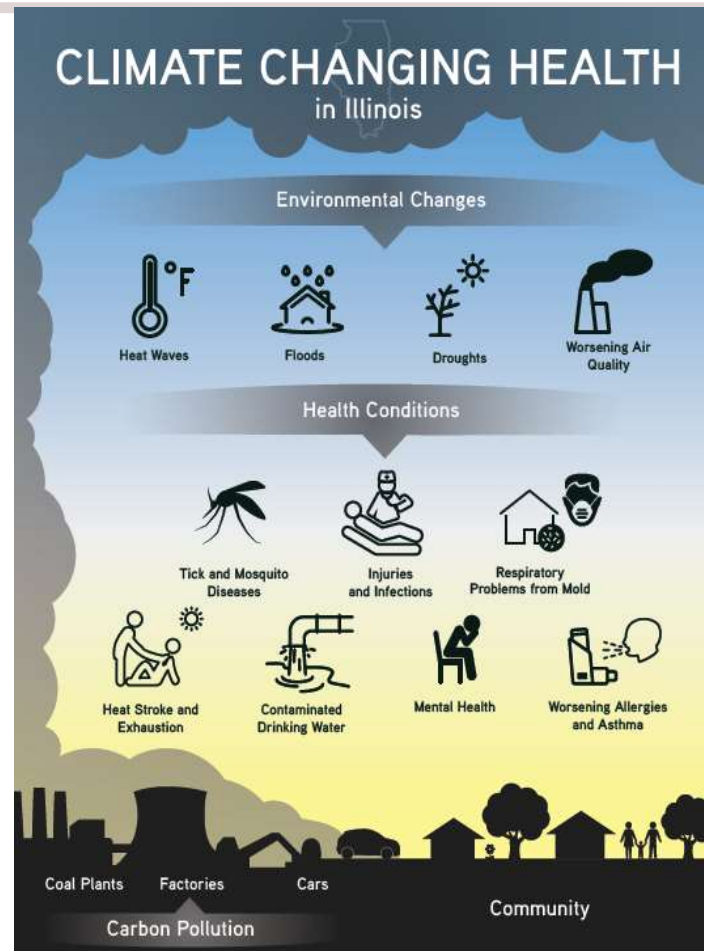
- The focus will be on Illinois with limited discussion about national issues
 - Week 1: Overview of current trends and future projections for Illinois.
 - Week 2: Impacts on agriculture.
 - Week 3: Impacts on water resources.
 - **Week 4: Impacts on health.**



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IMPACTS TO PUBLIC HEALTH

Impacts to Public Health

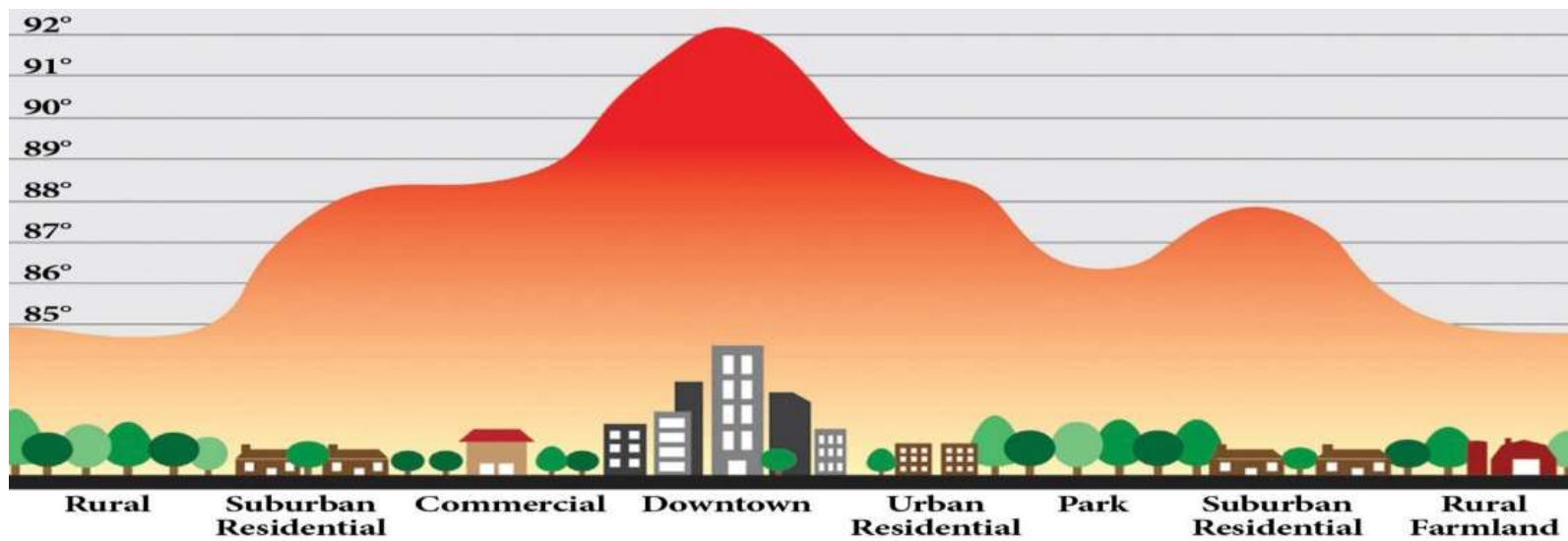


Source: Ziska et al., 2011

Climate change and health in Illinois

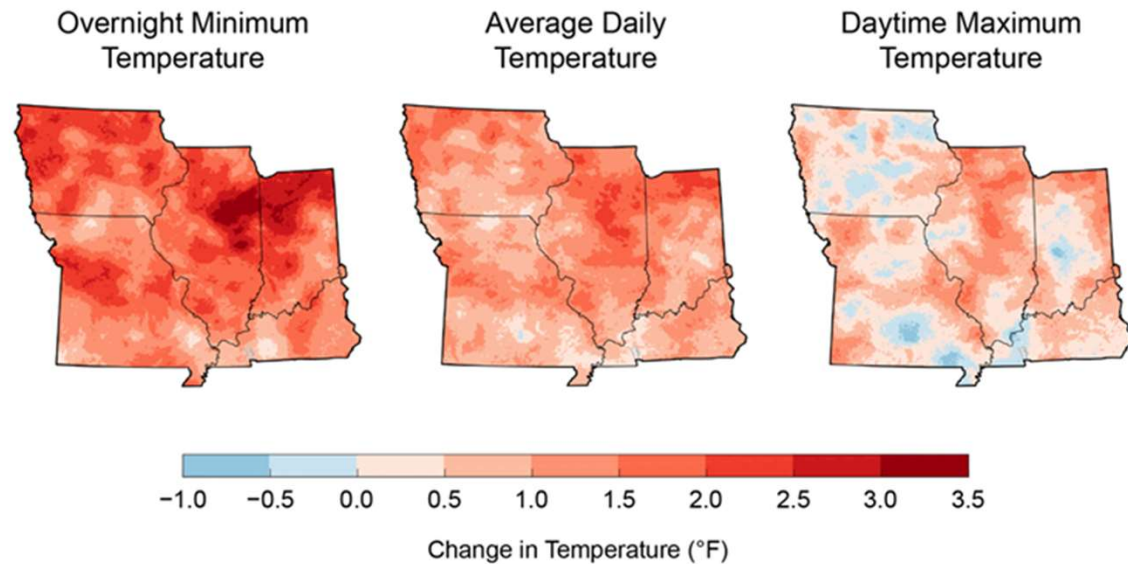
- **Heat stress**
- **Respiratory health**
- **Tick and mosquito-borne diseases**
- **Mental health**
- **Access to health**

Urban Heat & Flooding



Observed Temperature Changes

Season	Overnight Minimum Temperature	Average Daily Temperature	Daytime Maximum Temperature
Winter	+ 3.0	+ 2.5	+ 2.2
Spring	+ 1.8	+ 1.6	+ 1.4
Summer	+ 1.7	+ 0.5	-0.7
Fall	+ 1.3	+ 0.8	+ 0.4

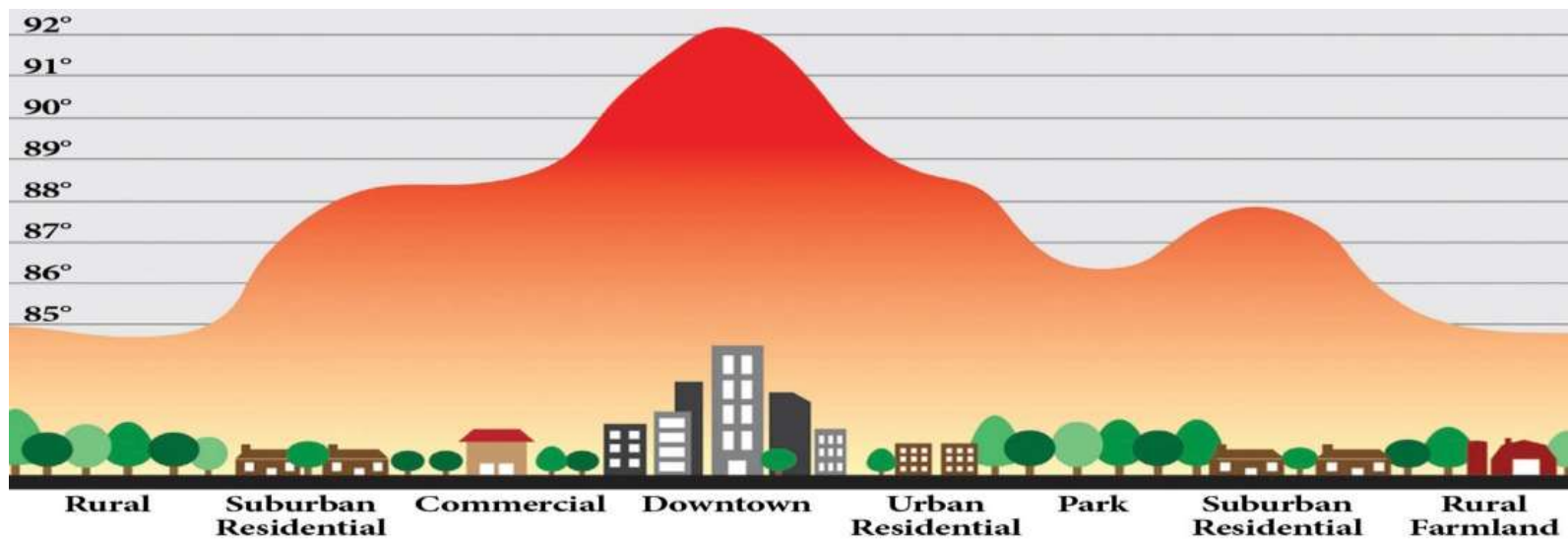


Changes between the early 20th century (1895-1924) and early 21st century (1990-2019)

Projected temperature parameters (RCP 4.5)

	Average Temperature	Days 100°F or Higher	Nights 70°F or Higher
Mid Century	3-4°F increase	0-12 more days	8-24 more days
Late Century	4-5°F increase	6-18 more days	16-32 more days

Urban Heat & Flooding



		Relative Humidity (%)													
°F		40	45	50	55	60	65	70	75	80	85	90	95	100	
Air Temperature	110	136													
	108	130	137												
	106	124	130	137											
	104	119	124	131	137										
	102	114	119	124	130	137									
	100	109	114	118	124	129	136								
	98	105	109	113	117	123	128	134							
	96	101	104	108	112	116	121	126	132						
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	90	91	93	95	97	100	103	106	109	113	117	122	127	132	
	88	88	89	91	93	95	98	100	103	106	110	113	117	121	
	86	85	87	88	89	91	93	95	97	100	102	105	108	112	
	84	83	84	85	86	88	89	90	92	94	96	98	100	103	
	82	81	82	83	84	84	85	86	88	89	90	91	93	95	
80	80	80	81	81	82	82	83	84	84	85	86	86	87		

Heat Index
(Apparent
Temperature)

With Prolonged Exposure
and/or Physical Activity

Extreme Danger
Heat stroke or sunstroke highly likely
Danger
Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Caution
Sunstroke, muscle cramps, and/or heat exhaustion possible
Caution
Fatigue possible

1995 Chicago Heatwave

- Over 700 deaths in the Chicago area alone
- Deadly combination of heat and humidity over 5 days
- Made worse by the Urban Heat Island, which prevented cooling at night
- Vulnerable communities such as low-income families and the elderly were hardest hit.

	Temperature	Heat Index
July 12	98°	108°
July 13	106°	124°
July 14	102°	119°
July 15	99°	108°
July 16	94°	100°

Lessons Learned

- Enhanced heat wave warnings that focus on longer duration, high humidity events that are fine-tuned for urban areas and with longer lead times.
- Improved communication between NWS and the City.
- Chicago implemented neighborhood cooling centers (usually public buildings) to provide temporary relief.
- Chicago used a variety of resources to check on people at risk for heat-related health issues.

Increased risk of heat stress

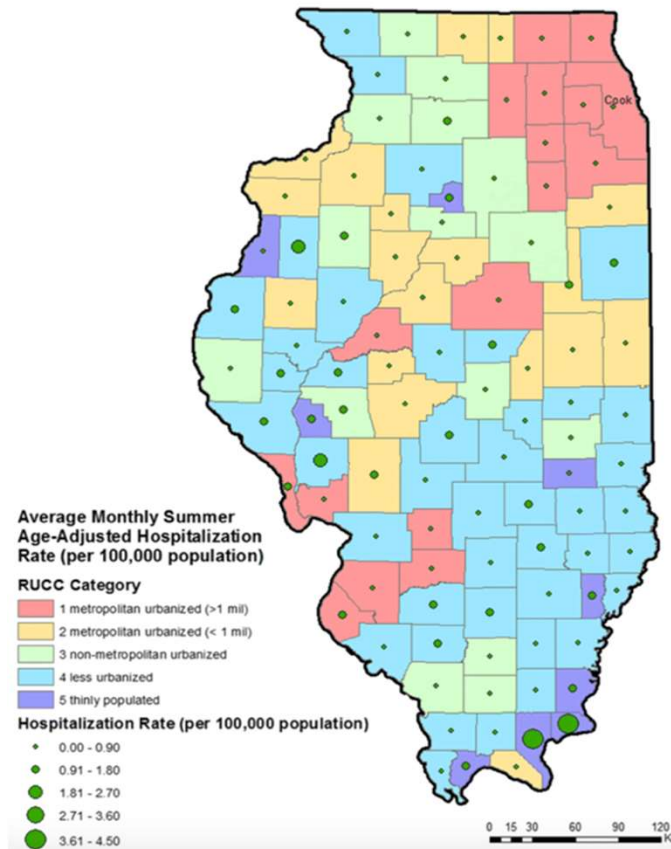
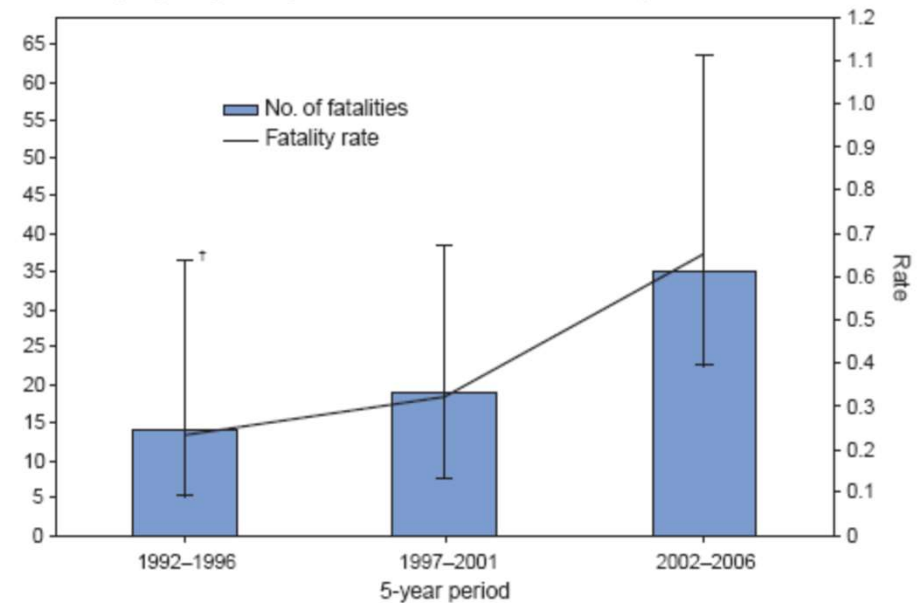


FIGURE. Number and rate* of heat-related deaths among crop workers, by 5-year period — United States, 1992–2006



* Per 100,000 workers. Rates calculated using annual national average estimates of employed civilians aged ≥ 15 years based on the Current Population Survey.

[†] 95% confidence interval for fatality rate.

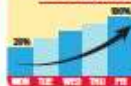


Prevent Heat Illness at Work

Outdoor and indoor heat exposure can be dangerous.

Ways to Protect Yourself and Others

Ease into Work. Nearly 3 out of 4 fatalities from heat illness happen during the first week of work.



- ✓ **New and returning workers** need to build tolerance to heat (acclimatize) and take frequent breaks.
- ✓ **Follow the 20% Rule.** On the first day, work no more than 20% of the shift's duration at full intensity in the heat. Increase the duration of time at full intensity by no more than 20% a day until workers are used to working in the heat.



Drink Cool Water
 Drink cool water even if you are not thirsty -- at least 1 cup every 20 minutes.



Dress for the Heat
 Wear a hat and light-colored, loose-fitting, and breathable clothing if possible.



Take Rest Breaks
 Take enough time to recover from heat given the temperature, humidity, and conditions.



Watch Out for Each Other
 Monitor yourself and others for signs of heat illness.



Find Shade or a Cool Area
 Take breaks in a designated shady or cool location.



If Wearing a Face Covering
 Change your face covering if it gets wet or soiled. Verbally check on others frequently.

First Aid for Heat Illness

The following are signs of a medical emergency!



- Abnormal thinking or behavior
- Slurred speech
- Seizures
- Loss of consciousness



- 1 > **CALL 911 IMMEDIATELY**
- 2 > **COOL THE WORKER RIGHT AWAY WITH WATER OR ICE**
- 3 > **STAY WITH THE WORKER UNTIL HELP ARRIVES**

Watch for any other signs of heat illness and act quickly. When in doubt, call 911.

If a worker experiences:

- Headache or nausea
- Weakness or dizziness
- Heavy sweating or hot, dry skin
- Elevated body temperature
- Thirst
- Decreased urine output



Take these actions:

- > Give water to drink
- > Remove unnecessary clothing
- > Move to a cooler area
- > Cool with water, ice, or a fan
- > Do not leave alone
- > Seek medical care if needed



OSHA Occupational Safety and Health Administration

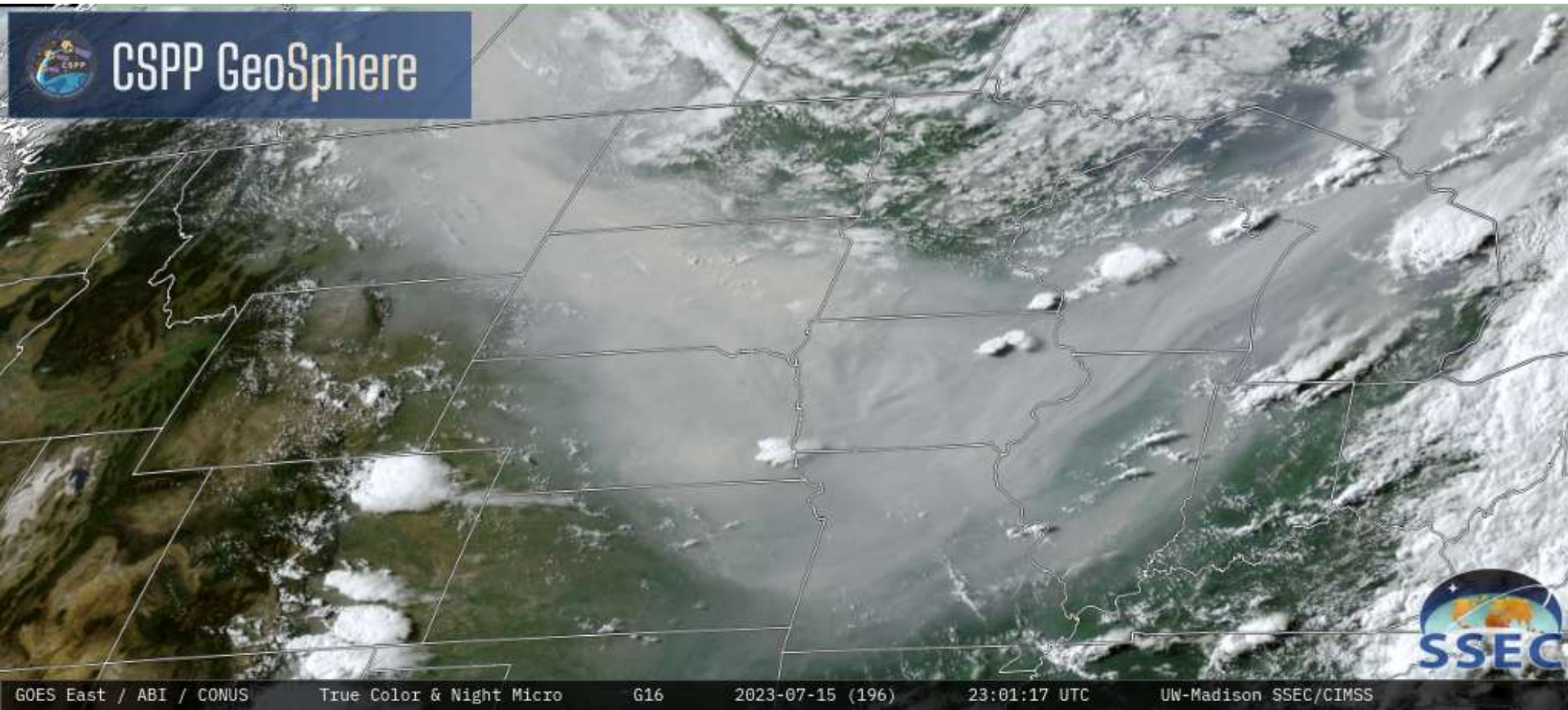
For more information: 1-800-321-OSHA (6742)
TTY 1-877-889-5627 www.osha.gov/heat

Federal law allows you to a safe workplace. You have the right to speak up about hazards without fear of retaliation. See www.osha.gov for more information about how to file a confidential complaint with OSHA and ask for an inspection.

OSHA 3603 (Rev. 10-18)



CSPP GeoSphere



GOES East / ABI / CONUS

True Color & Night Micro

G16

2023-07-15 (196)

23:01:17 UTC

UW-Madison SSEC/CIMSS

<https://cimss.ssec.wisc.edu/satellite-blog/archives/53472>



June 27, 2023 (WCIA)

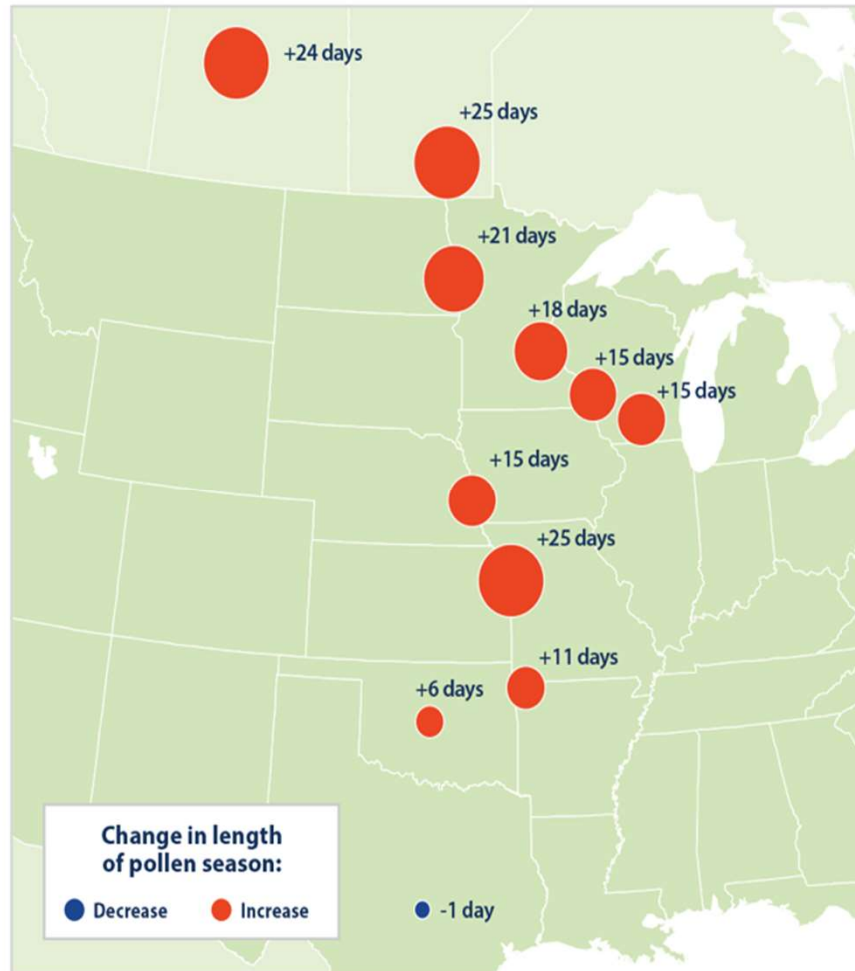
How to protect yourself from poor air quality?

- **Air Now:** <https://www.airnow.gov/aqi/aqi-basics/>

AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Increased risk of worse allergies and asthma





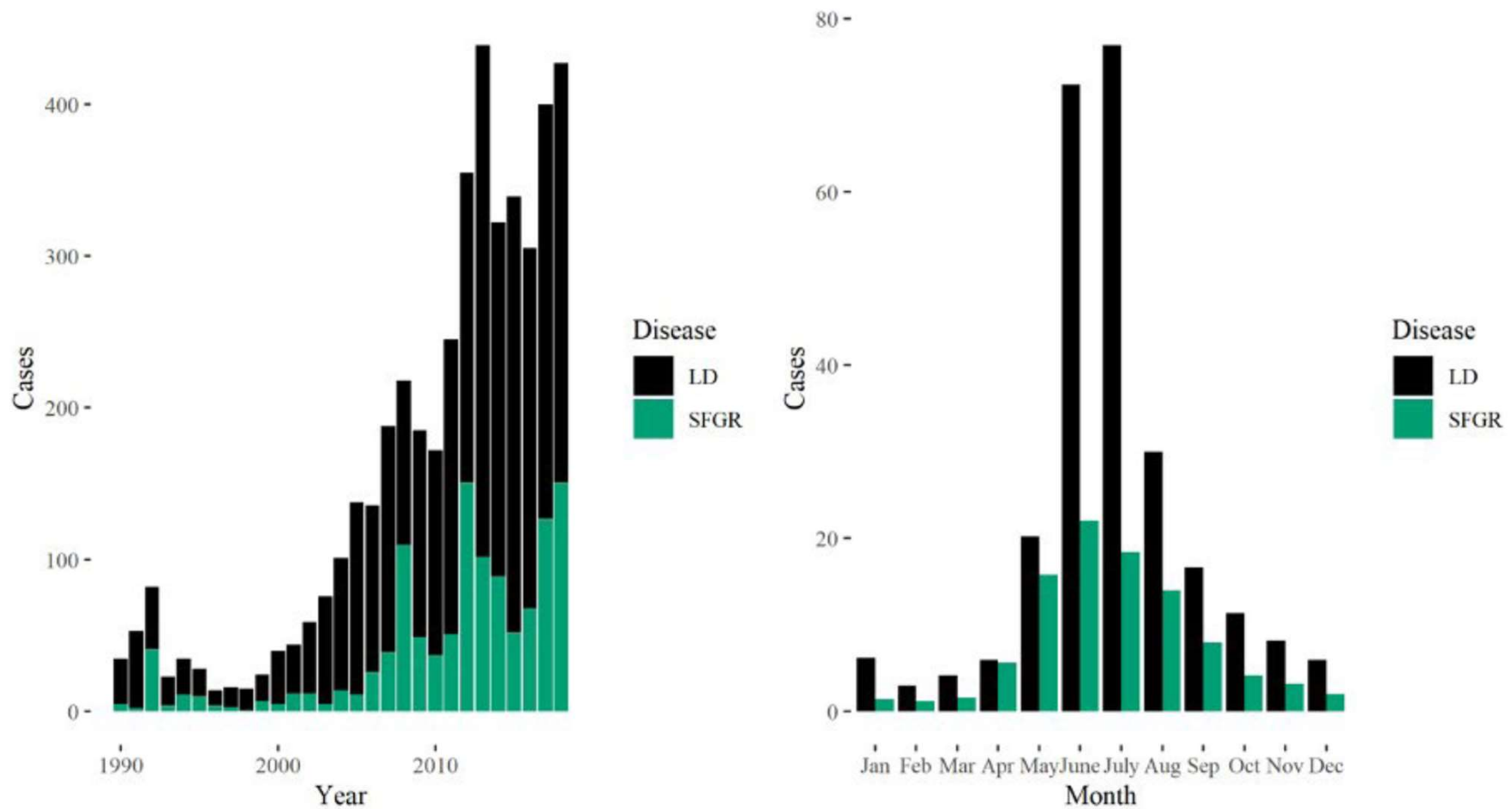
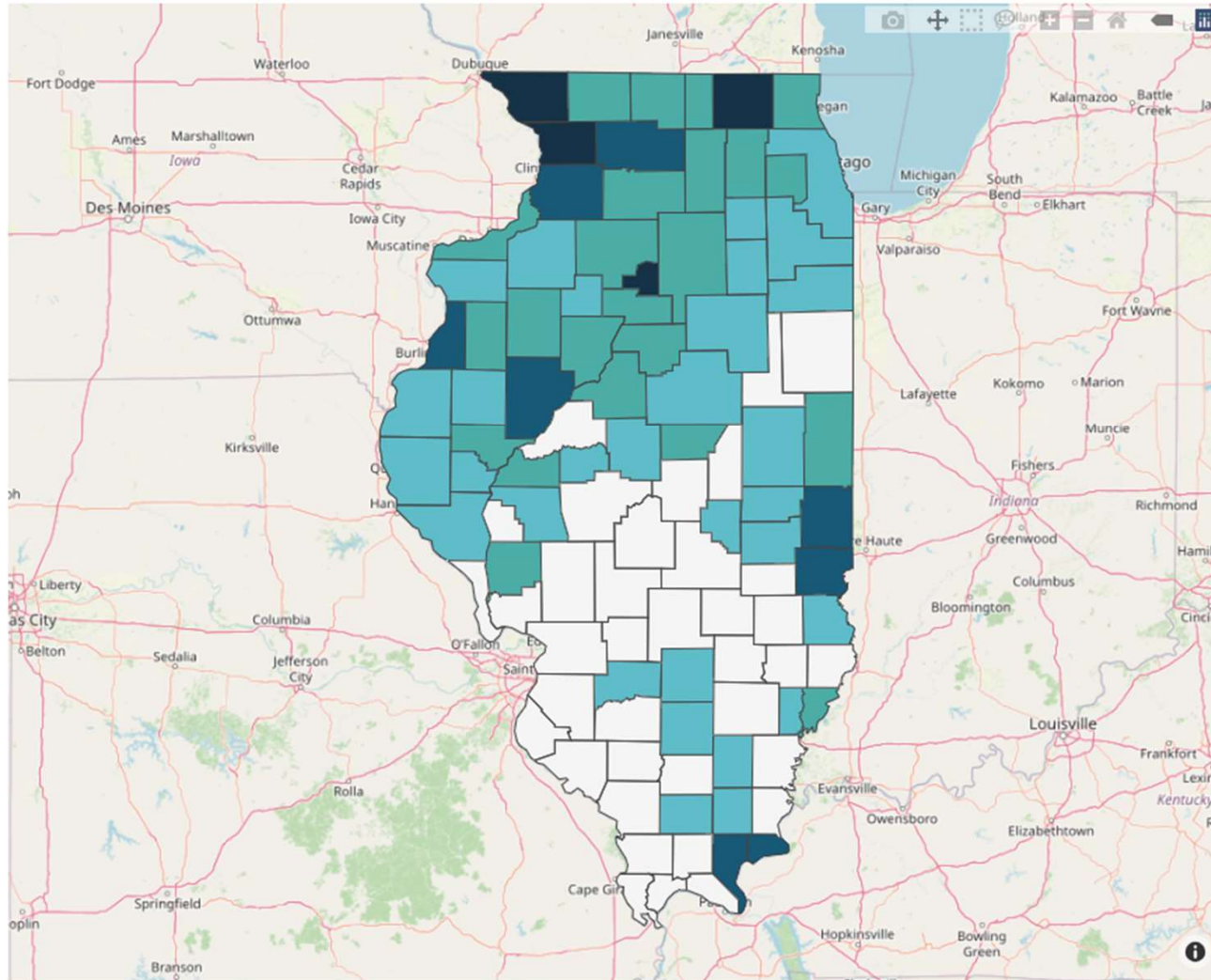


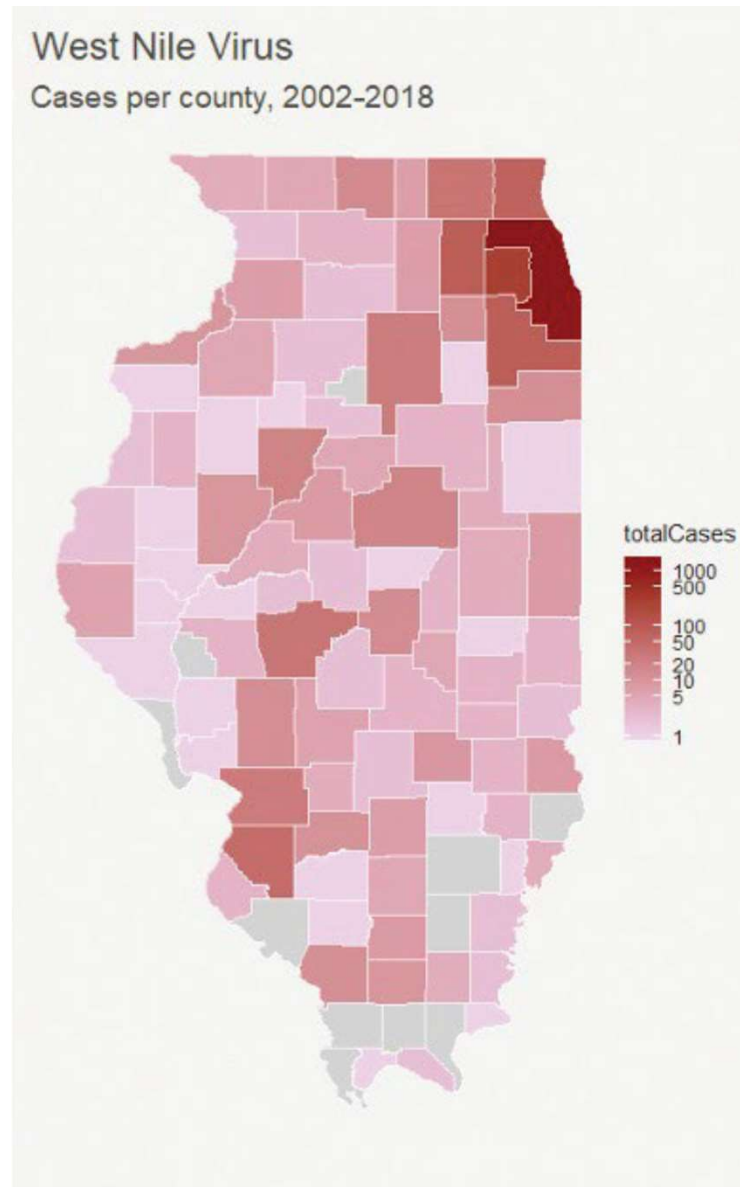
Figure 5.10 Reported human cases in Illinois of two common tick-borne illnesses, Lyme disease (LD) and spotted fever group rickettsial disease (SFGR) by year for the period 1990–2018 (left); and the average number of cases over a 5-year period per month for these diseases in Illinois (right). Sources: Illinois Department of Public Health 2018b, 2018c.

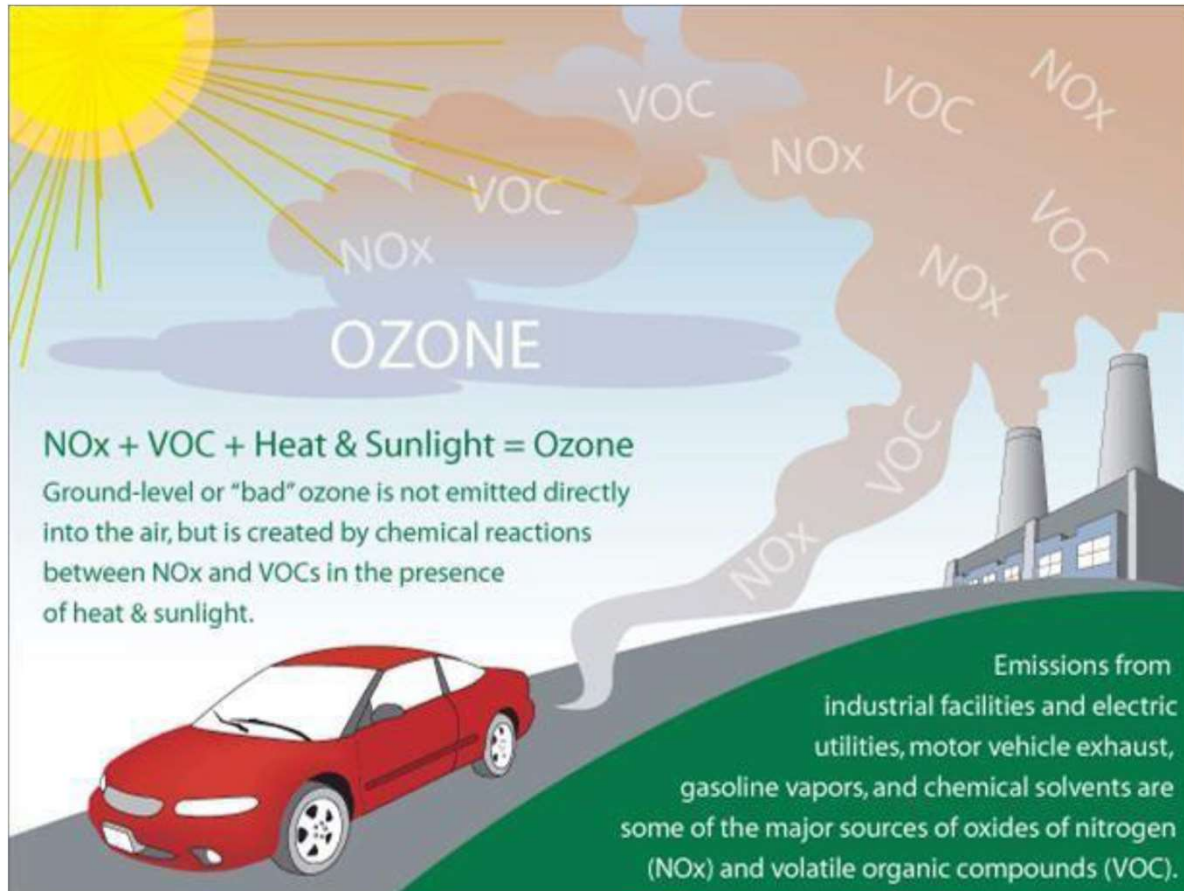
Reported Incidence Rate of Lyme Disease By County, 2012-2021



Lyme disease is transmitted to humans through the bite of infected blacklegged ticks. Typical symptoms include fever, headache, fatigue, and a characteristic skin rash called erythema migrans. If left untreated, infection can spread to joints, the heart, and the nervous system.

West Nile virus human cases per county. area that needs further research. While the total number of cases is highest in Cook County, West Nile is present throughout the state. Source: IDPH.





Source: EPA

Increased risk of mental health threats

WHY?

- **CDC Report:** Farmers are among the most likely to die by suicide compared to other occupations

- Long hours
- Heavy workloads
- Financial risks and unstable prices
- Social isolation
- **Rely on weather that is more unpredictable and extreme**

Increased risk of mental health threats

Rural population per mental health provider

State	Ratio
Illinois	2,779:1
Indiana	3,445:1
Iowa	5,668:1
Kansas	2,930:1
Michigan	1,780:1
Minnesota	3,374:1
Missouri	3,056:1
Nebraska	3,007:1
North Dakota	3,208:1
Ohio	3,143:1
South Dakota	2,507:1
Wisconsin	1,600:1

**Overall in
Illinois:
410:1**

Source: County Health Rankings & Roadmaps

Increased risk of mental health threats: What can you do?

Resources

1. Farm Family Resource Initiative Helpline: 1-833-FarmSOS or 1-833-327-6767
 - *Serves farm families in Christian, Logan, Macon, Macoupin, Morgan & Sangamon Counties*
2. National Suicide Prevention Lifeline: 1-800-273-TALK (8255)
3. Crisis Text Line: Text TALK to 741-741
 - *Text with a trained counselor from the Crisis Text Line for free, 24/7*
4. Substance Abuse and Mental Health Services Administration (SAMHSA) National Helpline: 1-800-662-HELP (4357)
5. Farm Aid Farmer Hotline: 1-800-FARM-AID (1-800-327-6243)
6. Avera Farm and Rural Stress Hotline: 1-800-691-4336
7. Illinois Warm Line: 1-866-359-7953 (call) or 1-866-880-4459 (text)
 - *The Warm Line is a new opportunity in Illinois for persons with mental health challenges and their families to receive support by phone. Peer and Family Support Specialists are professionals who have experienced mental health recovery in their own lives as an individual or family member. They have been trained in recovery support, mentoring, and advocacy and are ready to listen and help you. The warm line is not a crisis hotline, but is a source of support as you recover or help a family member to recover. Call or text Monday-Friday 8am-5pm*
8. [Planting Resilience in Seasons of Uncertainty:](#) Webinar, IL Farm Family & Ag Wellness Advocate

Impact on rural health: Access to healthcare

Illinois Counties by Rural/Urban Classification

- Rural Counties
- Urban Counties



Rural is defined as a county not part of a metropolitan statistical area (MSA), as defined by the U.S. Census Bureau; or a county that is part of an MSA but has a population fewer than 60,000

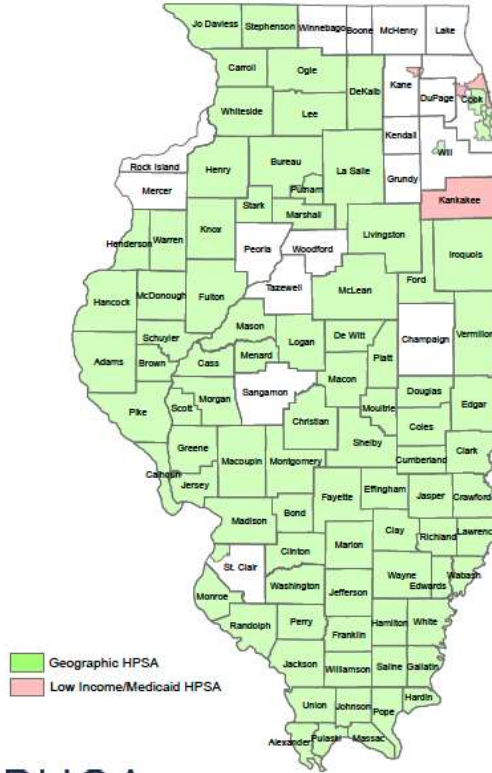


Prepared by the Illinois Primary Health Care Association December 2020



Federally Designated Health Professional Shortage Area (HPSAs)

Mental Health



- Geographic HPSA
- Low Income/Medicaid HPSA

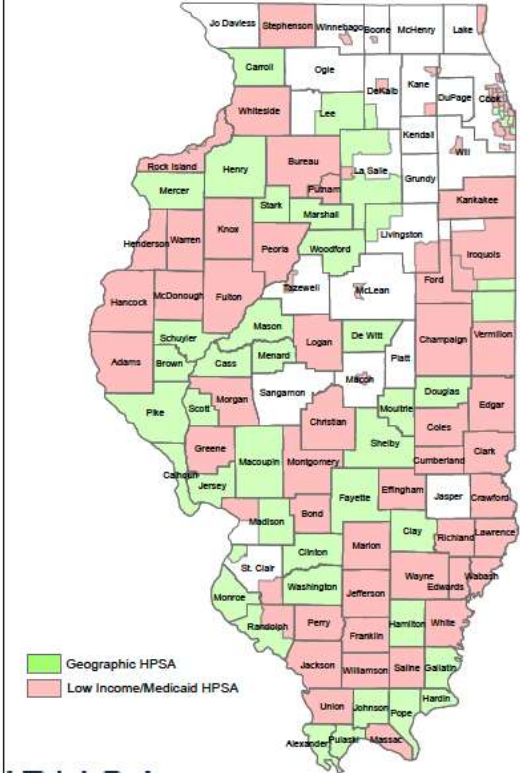


Prepared by the Illinois Primary Health Care Association May 2020



Federally Designated Health Professional Shortage Area (HPSAs)

Primary Care



- Geographic HPSA
- Low Income/Medicaid HPSA



Prepared by the Illinois Primary Health Care Association May 2020

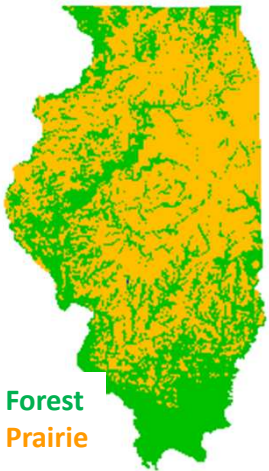




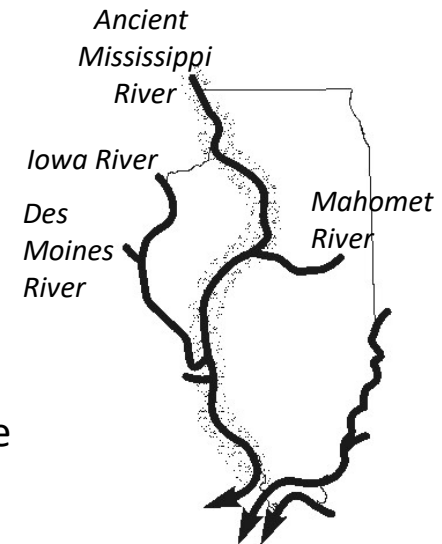
© Lloyd DeGrane

IMPACTS TO ECOSYSTEMS

Impacts to Ecosystems



- Change is a fundamental characteristic of the ecosystems of Illinois, but the current situation is unique in at least two ways:
 - The rate of climate change is much more rapid than in the past.
 - Natural ecosystems in the state are much reduced in area and isolated.
- Projected changes in climate will enhance conditions for some native species, while conditions will become less suitable for others.



Ascendant



Sweetgum

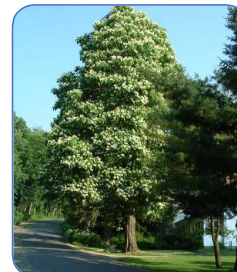


Post Oak



Hackberry

Declining



Ohio Buckeye



Basswood



Quaking Aspen

Impacts to Ecosystems

- The likelihood that climate change will advantage a variety of undesirable species is of particular concern.



Emerald Ash Borer



Amur Honeysuckle



Johnson Grass



Oriental Bittersweet



Japanese Stiltgrass

- Species associated with aquatic habitats will be affected by reduced ice cover on Illinois lakes, and watercourses swollen with heavy winter and spring rains.



- Climate change interacts with and amplifies impacts of other stresses; ecosystems that are already stressed will be less resilient.



Impacts to Ecosystems

- Lands that remain in a natural condition in Illinois are mostly in private ownership. Managing these lands in a changing climate will require high levels of cooperation and outreach.



© Mark Godfrey/TNC



In A Nutshell:

- *Conserve* intact native ecosystems
- *Restore* degraded systems
- *Reconnect* fragmented landscapes

Thank you