Climate and Health Syndromic Surveillance – An Analysis of Current Practices by National Climate Assessment Region

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Presenting To

Council of State & Territorial Epidemiologists

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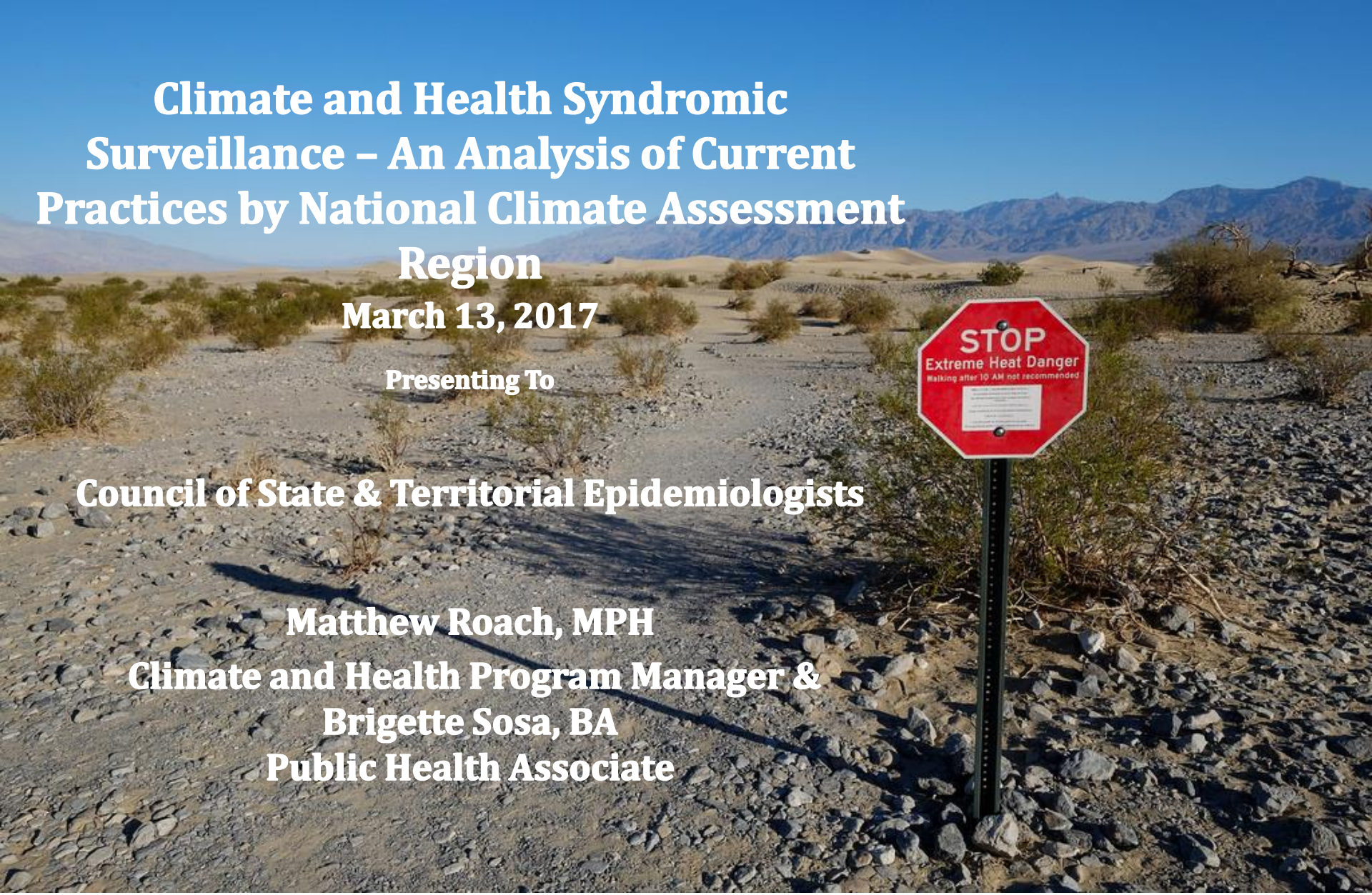
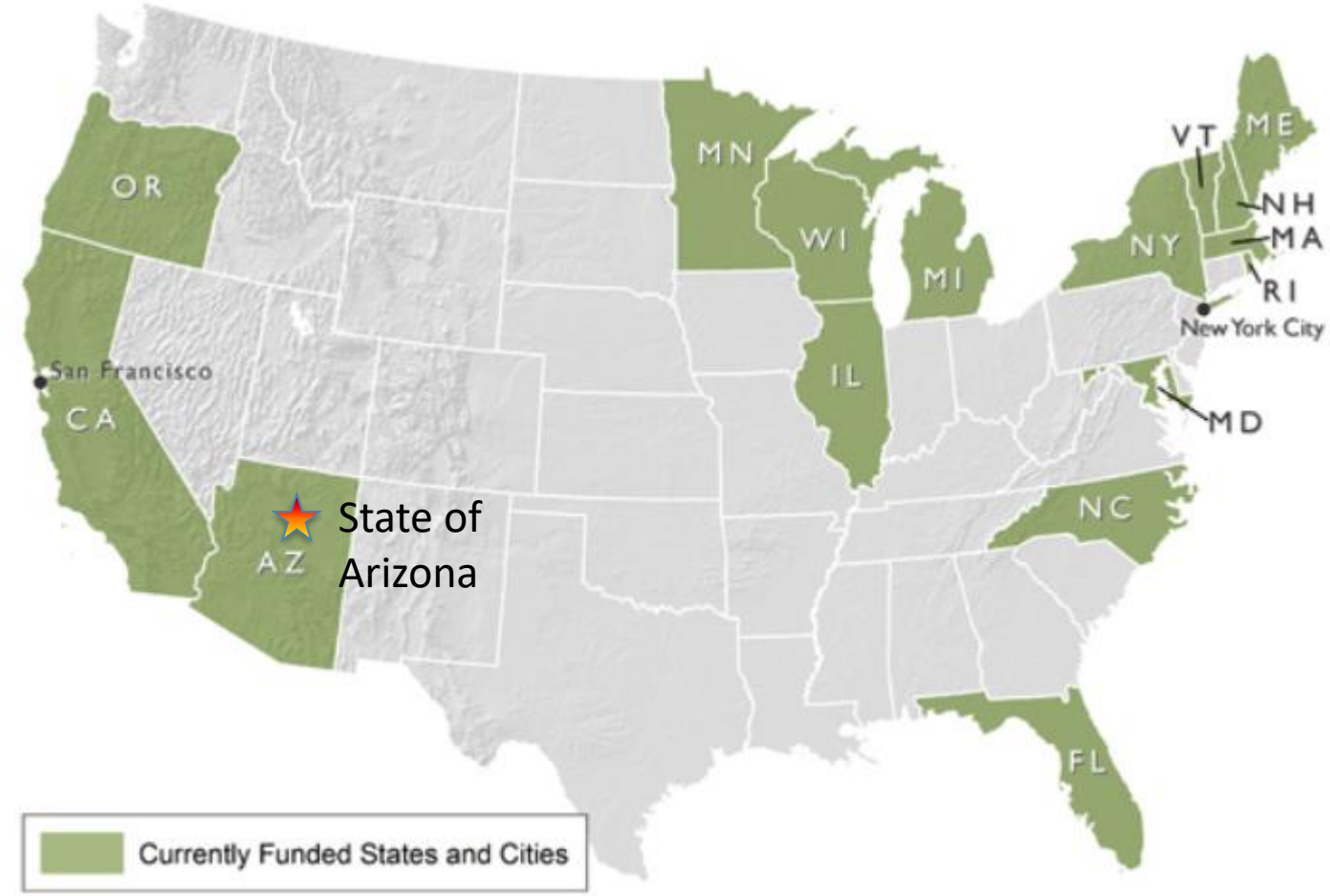


CDC Climate-Ready States & Cities Initiative Grantees



Extreme Heat in Arizona

- Phoenix Sky Harbor Airport recorded an annual average of 114 days over 100°F/ (37.8° C) from 2001-2011

- The average summer day in Phoenix, meets outcomes-based definitions of a heat wave

Heat-Related Illness in Arizona (2015)

- 582 Inpatient Admissions
- 2,434 Emergency Department Visits

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LIVE
WEATHER ALERT
RECORD-BREAKING RAIN IN THE VALLEY
MONSOON STORMS DAMAGE HOMES, ROADS IMPASSABLE
CURRENTS
TOP STORIES
15 I-17 NORTH: ALL LANES NOW CLEAR AT BUMBLE BEE (MILE 253)
15 Desert DOPPLER
#abc15
abc 15
8:49
74°

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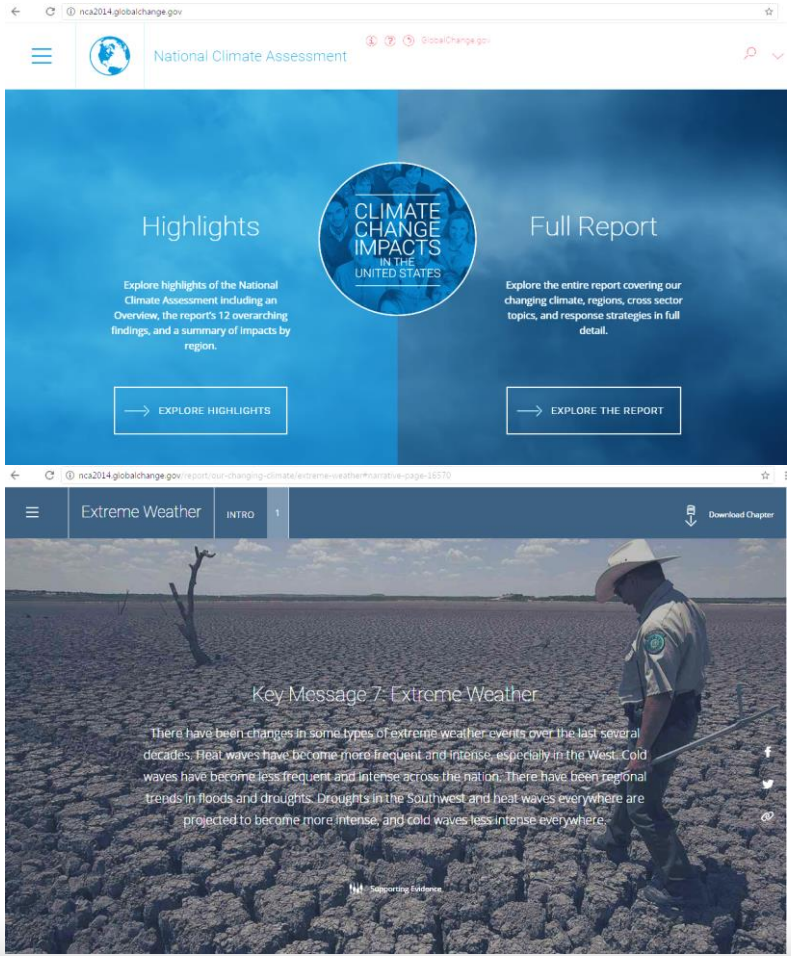
Climate & Health Syndromic Surveillance Workgroup

- Joint initiative of public health agencies in Canada and the United States
  - Share Best Practices
- Council of State & Territorial Epidemiologists currently facilitating workgroup

- This survey was created to understand the use of Syndromic Surveillance Systems (SyS) for detecting and reducing illnesses related to extreme weather events.
- Online survey sent to Syndromic Surveillance Coordinators in the U.S. and Canada in July 2015
  - CSTE disseminated the survey in the U.S.
- Results will help to:
  - Create inventory of Canadian and United States SyS systems
  - Inform the development of a public health guidance document with best practices and recommendations on how to use SyS for weather related events

The National Climate Assessment (NCA)

- Federal interagency government report
- Coordinated through the US Global Change Research Program
- http://nca2014.globalchange.gov/



National Climate Assessment Regions (2018)

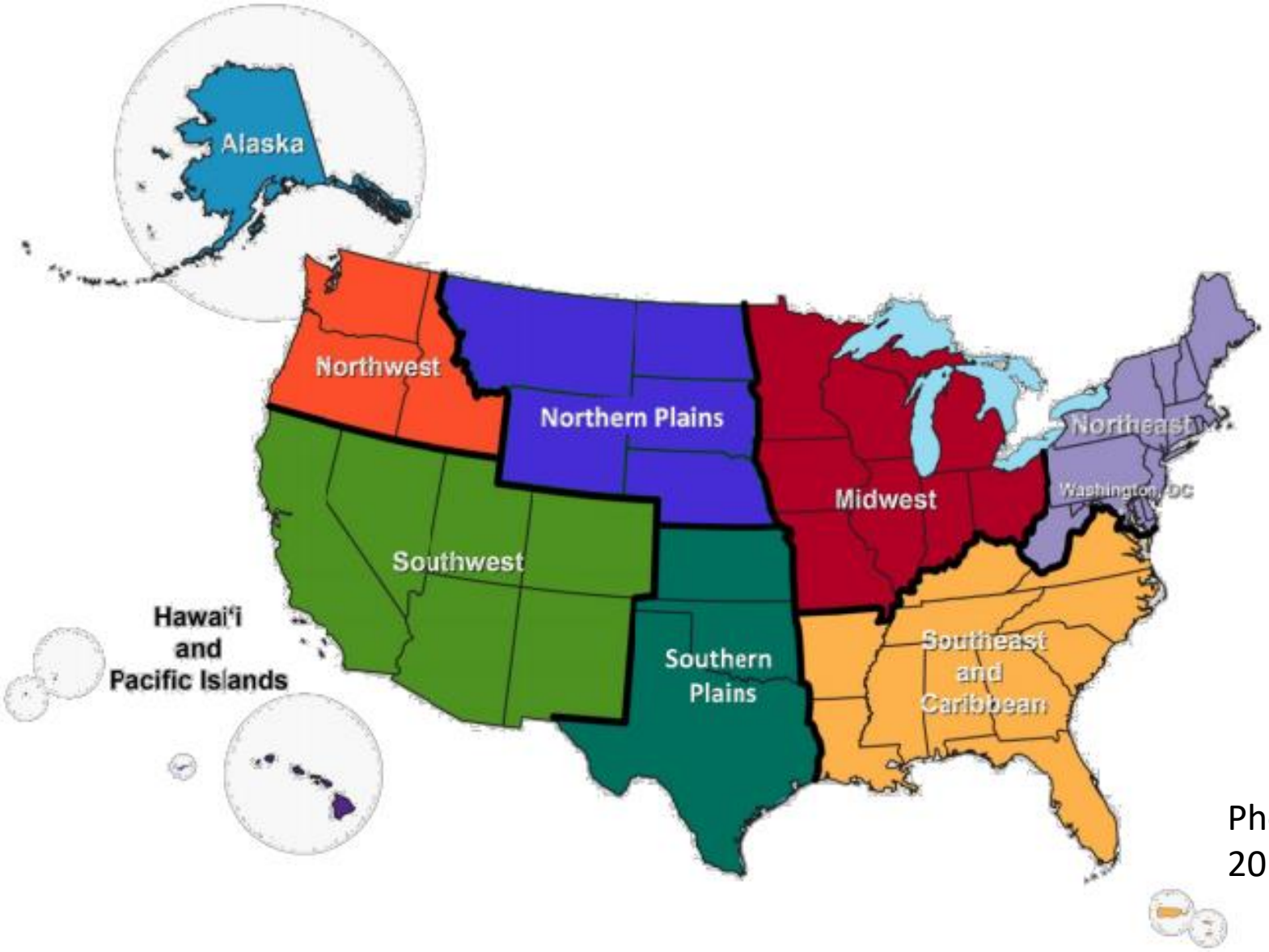
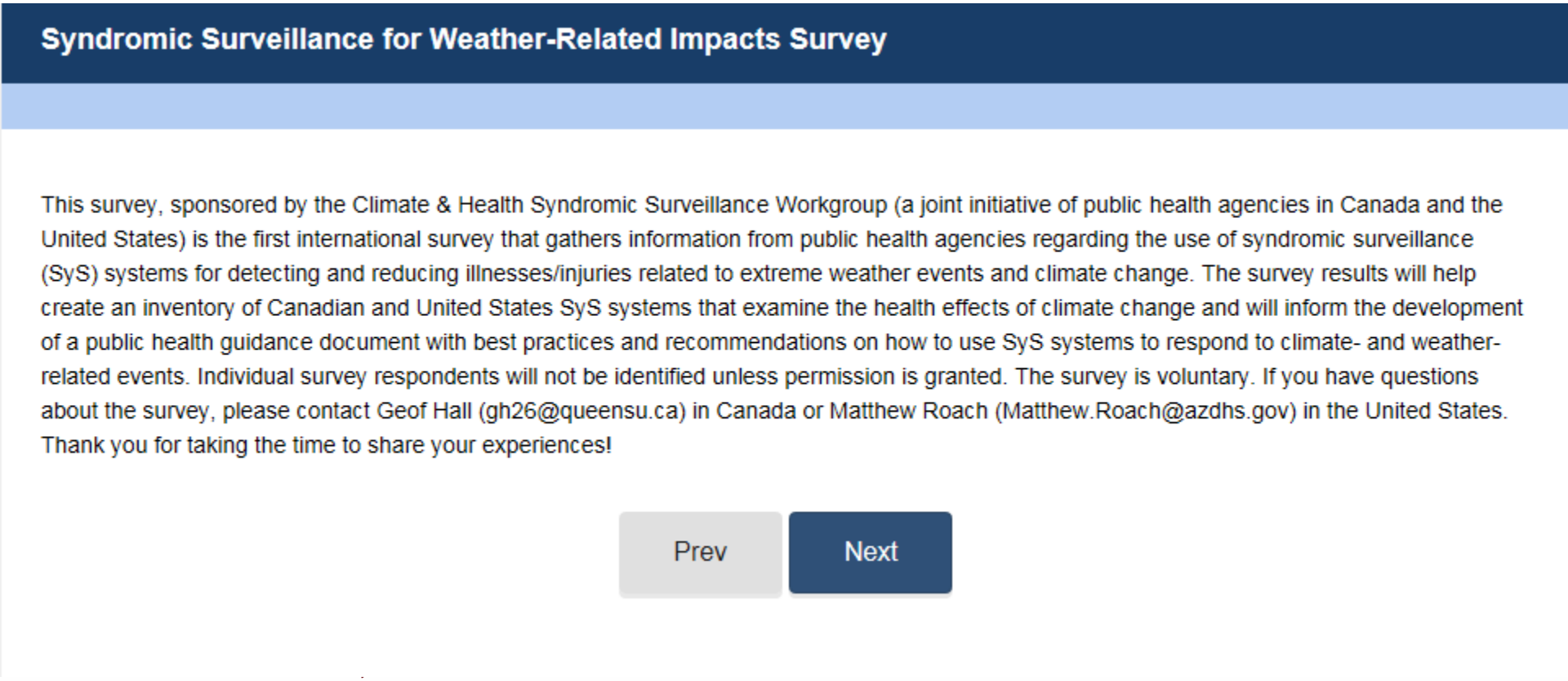


Photo: NCA 2018

Survey Results

- 34 Responses from State and Local Public Health Agencies



Have you used your SyS System to track weather related events with potential health outcomes?

Extreme Heat

Extreme Cold

Snow/Ice

Hurricanes

Tornadoes

Poor Air Quality

Photos: Flickr Creative Commons

Have you used your SyS System to track weather related events with potential health outcomes? (continued)

Wildfire

Drought

CO Poisoning

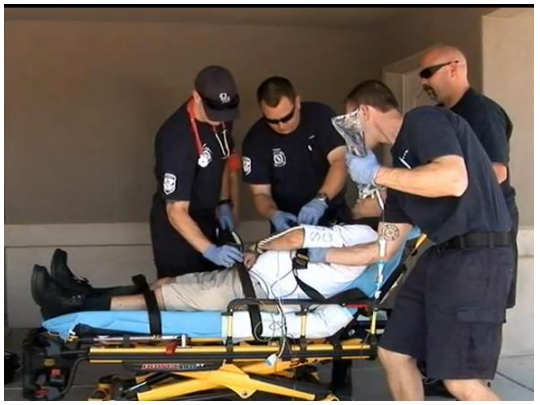
Flooding

Disease Vectors

Photos: Flickr Creative Commons

What syndromes/illnesses/conditions do you typically track with your SyS system?

- Bio-terrorism agents
- Alcohol-related incidents
- Injuries
- Respiratory
- Gastrointestinal
- Infectious Dermatological
- Neurological
- Influenza-like Illness
- West Nile Virus
- Heat-related illness
- Cold-related illness
- Asthma



Photos: Flickr Creative Commons

NCA & Regional Analysis Comparison

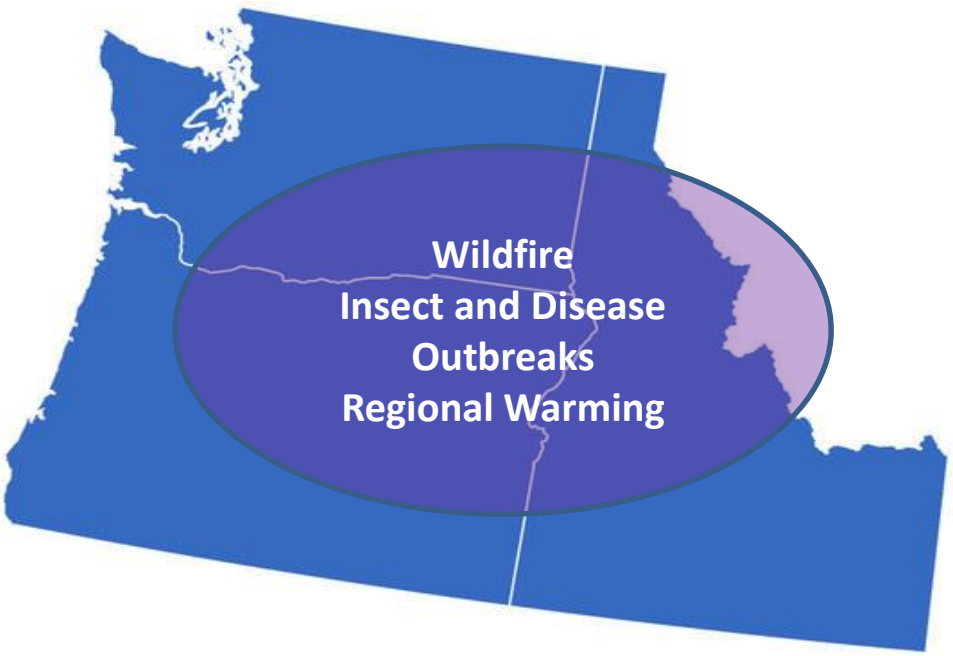
- Responses aggregated by National Climate Assessment 2014 Region

Comparison

- Current Practices by Public Health Agencies in the Region
- NCA Priorities

Northwest Region

Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Extreme Cold
Snow/Ice
Wildfire

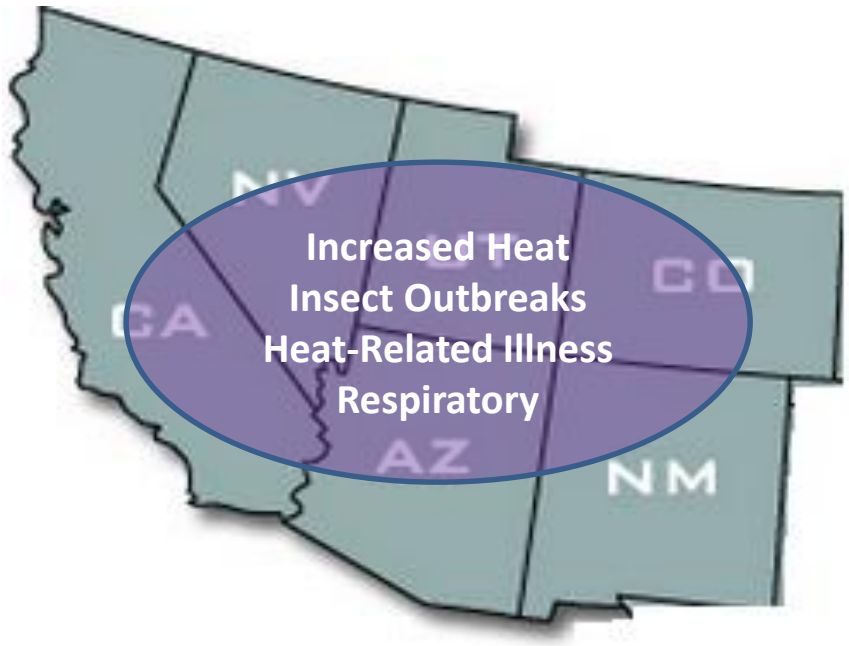


NCA Priority
Wildfires
Insect and Disease Outbreaks
Regional Warming

Syndromic Outcomes Tracked: Alcohol-related incidents, Influenza Like Illness, Lyme Disease, Heat-Related Illness, Cold- Related illness, Asthma, Carbon Monoxide (CO) Poisoning

Southwest Region

Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Air Quality
Disease Vectors

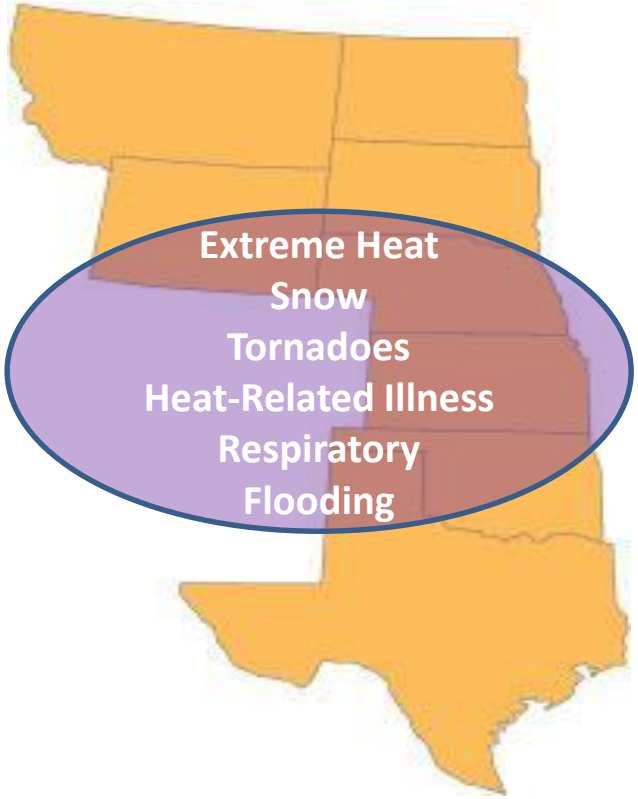


NCA Priority
Increased Heat
Drought
Insect Outbreaks
Flooding
Agriculture
Heat-Related Illness
Respiratory Conditions
Vector-borne diseases

Syndromic Outcomes Tracked: Injuries, Respiratory, Bio-terrorism Agents, Gastrointestinal, Influenza Like Illness, Asthma, Heat-Related Illness

Great Plains Region

Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Air Quality
Disease Vectors
Tornadoes
Extreme Cold
Snow/Ice
Flooding



NCA Priority
Extreme Weather Events
Warming Winters
Extreme Precipitation
Drought
Flooding
Extreme Heat
Snow
Tornadoes
Heat-Related Illness
Respiratory

Syndrome Outcomes Tracked: Bio-terrorism agents, Respiratory, Gastrointestinal, Neurological, Influenza Like Illness, Heat-related illness, Cold-related illness, Asthma, CO Poisoning

Midwest Region

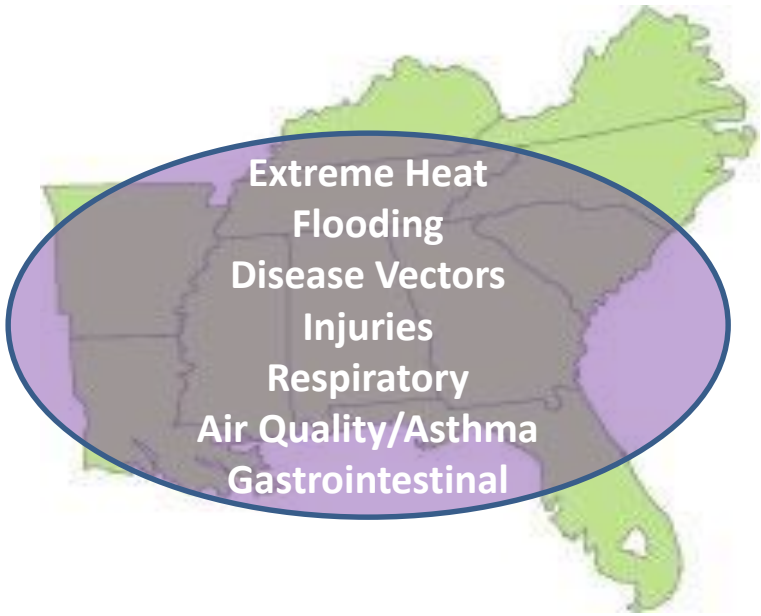
Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Extreme Cold
Snow/Ice
Drought
Flooding
Tornadoes
Poor Air Quality
Disease Vectors

NCA Priority
Extreme Heat
Air Quality
Reduced Water Quality
High Emissions of Greenhouse Gases
Extreme Precipitation
Flooding
Extreme Cold
Disease Vectors
Heat related Illness
Respiratory

Syndrome Outcomes: Bio-terrorism agents, Injuries, Respiratory, Gastrointestinal, Infectious Dermatological, Neurological, Influenza like Illness, Heat-related illness, cold-related illness, asthma, CO Poisoning

Southeast Region

Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Extreme Cold
Snow/Ice
Flooding
Wildfire
Tornadoes
Air Quality

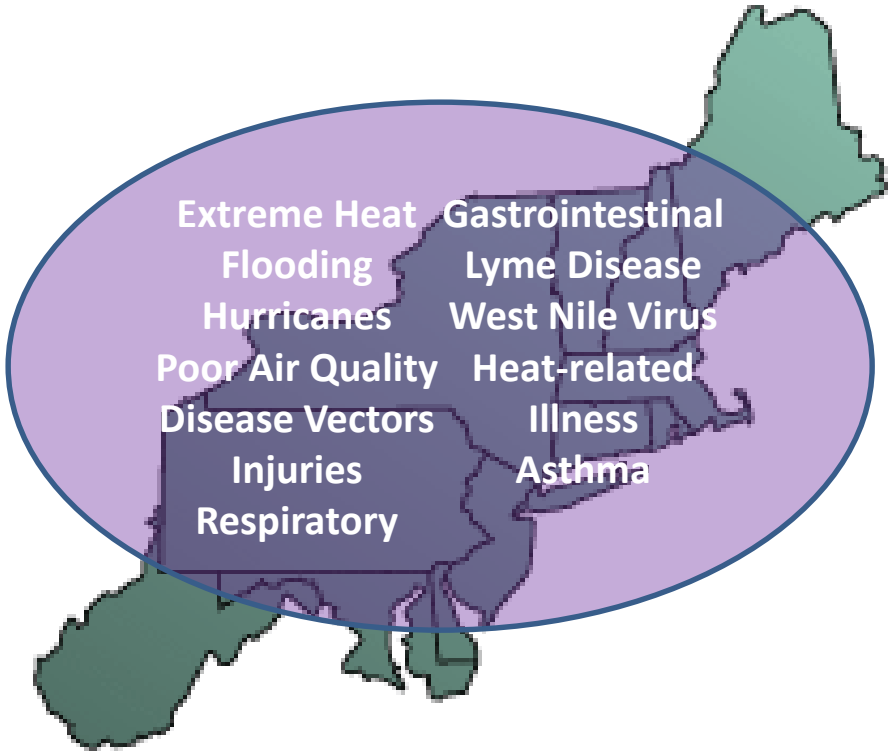


NCA Priority
Extreme Heat
Hurricanes
Decreased Water Availability
Disease Vectors
Extreme Precipitation
Higher Sea Levels
Air Quality
Respiratory
Asthma
Vector-borne disease
Gastrointestinal
Injuries

Syndrome Outcomes: Disease Vectors, Bio-terrorism agents, Alcohol-related incidents, Injuries, Respiratory, Gastrointestinal, Neurological, Influenza-Like Illness, Lyme Disease, West Nile Virus, Heat-Related Illness, Cold-Related Illness, Asthma

Northeast Region

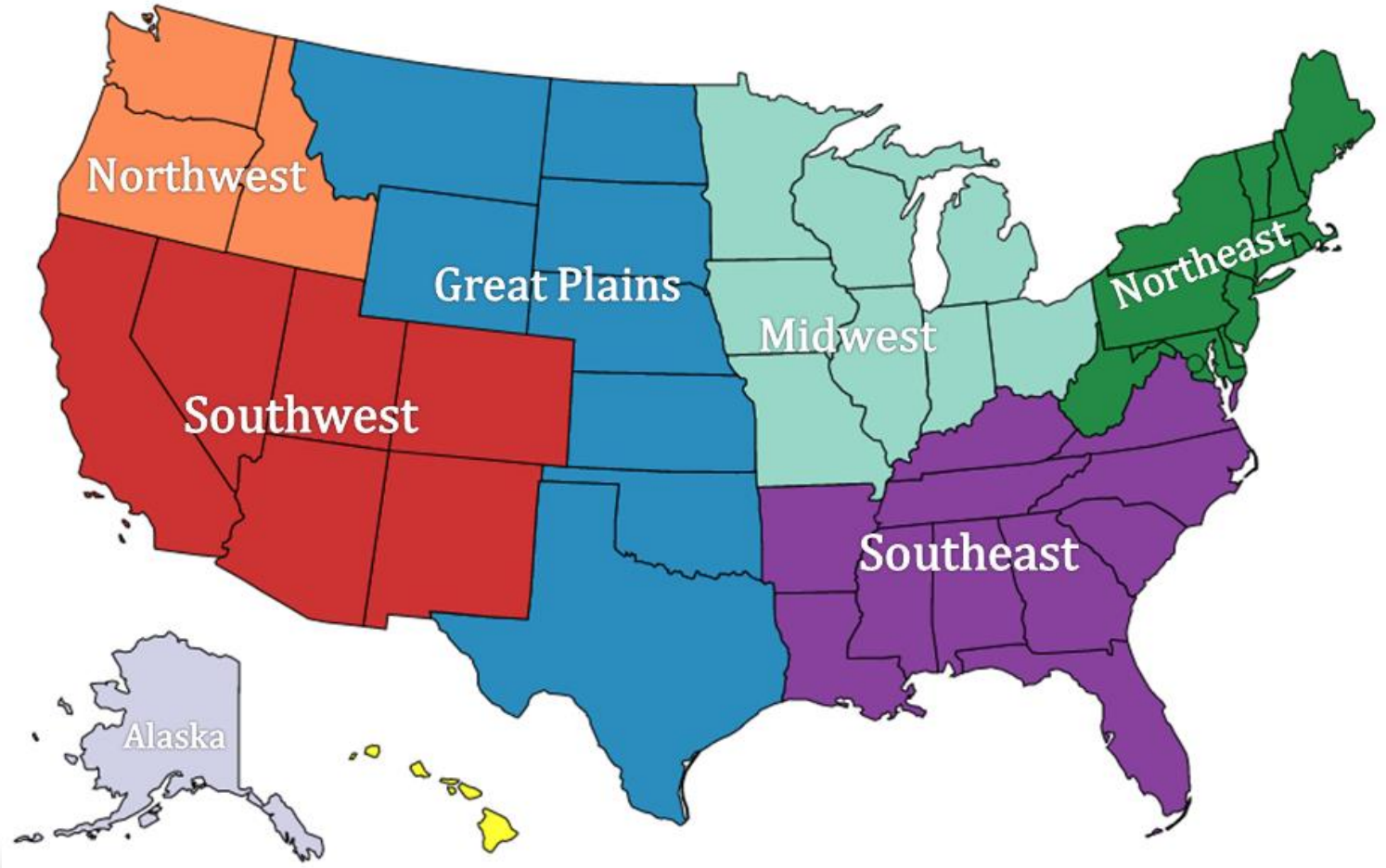
Climate Hazards Tracked by Public Health Agencies
Extreme Heat
Extreme Cold
Snow/Ice
Flooding
Hurricanes
Poor Air Quality
Disease Vectors



NCA Priority
Extreme Heat
Flooding (Coastal and River)
Extreme Precipitation
Hurricanes
Poor Air Quality
Disease Vectors (Lyme Disease, West Nile Virus)
Asthma
Heat- Related Illness
Gastrointestinal
Injuries
Respiratory

Syndrome Outcomes: Bio-terrorism agents, Alcohol-related Incidents, Injuries, Respiratory, Gastrointestinal, Infectious Dermatological, Neurological, Influenza Like Illness, Lyme Disease, West Nile Virus, Heat-Related Illness, Cold-Related Illness, Asthma

National Data Summary



Climate and Weather Hazards Tracked

Extreme Heat	68%
CO Poisoning	59%
Extreme Cold	35%
Hurricanes	29%
Poor Air Quality	29%
Snow/Ice	26%
Climate-Related Disease Vectors	24%
Flooding	18%
Tornadoes/Straight Line Winds	15%
Wildfire	12%
Drought	3%

Syndromes Tracked

Influenza-like illness	85%
Respiratory	74%
Gastrointestinal	71%
Bio-terrorism agents	53%
Neurological	47%
Heat-related illness	47%
Infectious dermatological	41%
Injuries	38%
Cold-related illness (e.g. hypothermia)	38%
Asthma	38%
Alcohol-related incidents	18%
Lyme disease	15%
Wile Nile Virus	6%

Sources of Information

Emergency Department-Chief complaint data	91%
Emergency Department-ICD 9/10 codes	62%
Emergency Department-Triage notes	38%
Sales of over the counter pharmaceuticals	18%
School/work absenteeism data	15%
Inpatient-Chief complaint data	9%
Inpatient-ICD 9/10 codes	9%
Ambulatory/outpatient	9%
Prescription drug data	6%
Emergency calls (911 calls)	3%
Coroner's data/OME (Office of Medical Examiner)	0%
Death registration records	0%
Telehealth	0%
Trauma data	0%
Internet searches	0%

Common Platforms

- BioSense
- Essence
- RODS
- Epicenter
- EARS

Interventions Implemented due to SyS Data

"We send results to the state emergency operations center who will advise local authorities on decisions to open **cooling centers**"

"Heat illness data in SyS was shared with local NWS offices to tailor their **messaging** and products for early season heat events."

Interventions Continued

"During winter ice storms that caused major prolonged power outages, we used SyS to monitor **CO poisoning** data. Data was shared with NWS which began adding CO warnings with impending ice storm/strong wind alerts."

"Following a hurricane in 2011, surveillance was performed on **carbon monoxide (CO) exposures**. Surveillance identified an increase in CO illnesses. Upon investigation, this was discovered to be due to improper generator usage that was common due to power outages by the storm. **Public health messaging** was distributed regarding hurricane safety, CO poisoning prevention, including proper generator use."

Interventions Continued

"SyS data has prompted press events and **increased public messaging** during heat waves and CO poisoning heath alerts to providers following a hurricane"

"After Tropical Storm Irene and Super storm Alfred, CO SYS data was shared with the EOC to inform on the ground **interventions** and used to inform long-term **policies** and **education** surrounding generator use at point of purchase."

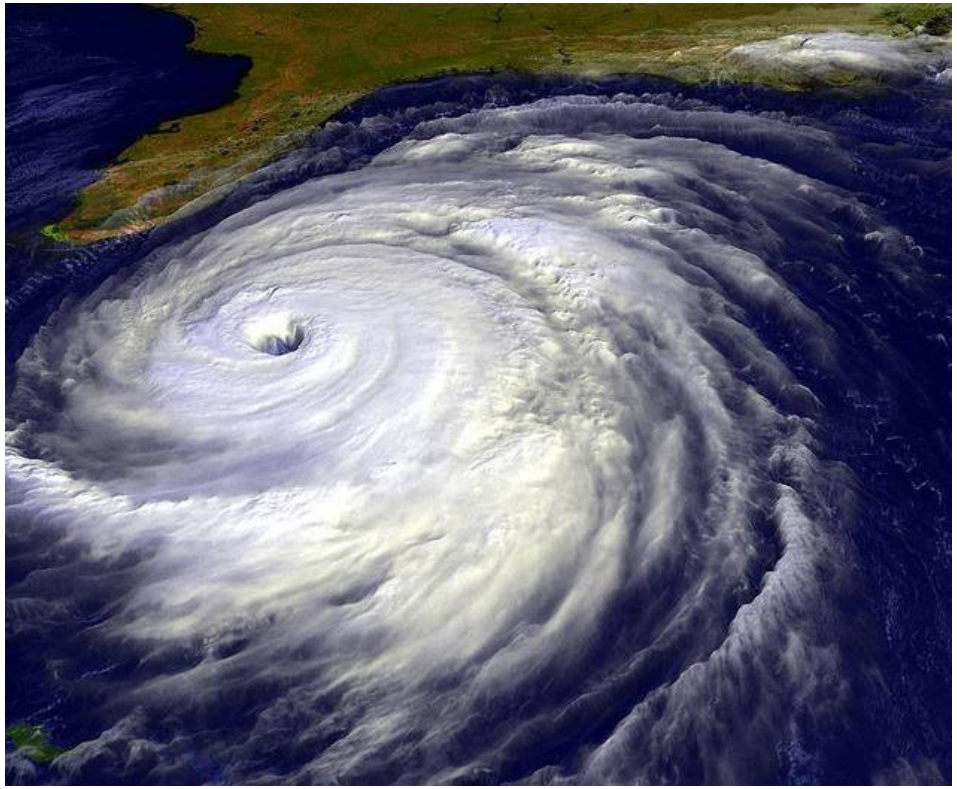


Photo: Flickr Creative Commons - kakela

Benefits

- Improved situational awareness
- Quickly identify emerging public health issues
- Timely public health messaging to community partners prevention strategies
- Improved situational awareness for mass gathering events

Challenges

- Small sample size
- Not all hospitals submit in real-time
- Data quality
- Granularity
- Communicating findings
- Communicating limitations
- Not useful for small scale events in poorly represented areas

Suggestions for Improvement

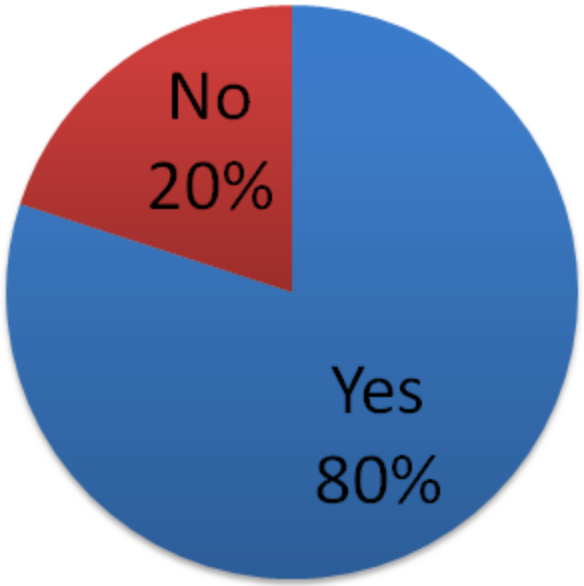
- Including weather data (maximum temperature)
- More specific injury codes for weather-related events
- Codes for work-related injuries from clean up of weather events

Lessons Learned

- Data quality from the start
- Good working relationship with IT staff
- Having strong leadership in PH who champion SyS is helpful
- Difficult to detect some climate-related outcomes such as waterborne disease, vector-borne disease, and asthma

Have you found your system a valuable tool for protecting the public's health when weighing both the costs of the system and the benefits?

Quote: “We are the beginning stages of implementing syndromic surveillance. Costs are higher than the benefits at this point, but this may change in the future.”



Summary

- Syndromic Surveillance is currently being used around the country for a variety of weather-related hazards
- With the increasing frequency of extreme weather events, rapid identification of health hazards is helpful for situational awareness
- Understanding the experience of jurisdictions implementing systems is beneficial for identifying effective interventions

Acknowledgements

- Kristin Raab, Minnesota Department of Health
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- KFLA Public Health

THANK YOU

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