Wisconsin Extreme Heat Toolkit

Wisconsin
Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health
P-00632 (3/2014)

Acknowledgements

The Wisconsin Extreme Heat Toolkit was made possible through funding from cooperative agreement 5UE1/EH001043-02 from the Centers for Disease Control and Prevention (CDC) and the commitment of many individuals at the Wisconsin Department of Health Services (DHS), Bureau of Environmental and Occupational Health (BEOH), who contributed their valuable time and knowledge to its development.

Special thanks to:

Jeffrey Phillips, *RS,* Building Resilience Against Climate Effects (BRACE) Program Manager, DHS

Megan Christenson, *MS, MPH,* Epidemiologist, DHS

Brooke Thompson, MPH, Healthy Homes Program Manager, DHS

Stephanie Krueger, Public Health Associate, CDC/DHS

Eleanor Ganz, BRACE Toolkits Intern, DHS

For more information, please contact:

Jeffrey Phillips, BRACE Program Manager

Department of Health Services

Bureau of Environmental and Occupational Health

1 W. Wilson St., Room 150

Madison, WI 53703

Jeffrey.Phillips@dhs.wisconsin.gov

608-266-6761

Wisconsin
Department of Health Services

Division of Public Health
Bureau of Environmental and Occupational Health

Contents

Introduction

Purpose

Background

Climate Trends

Health Impacts

Extreme Heat Response and Recovery Guidance

Definitions

Guides

Guide 1: Definitions of Heat Alerts

Guide 2: Heat Illnesses and Symptoms

Guide 3: Extreme Heat Tips

Guide 4: Populations Vulnerable to Heat

Guide 5: Talking Points for Heat-related Fatality

Guide 6: Message Maps about Heat-related Safety

Guide 7: Long-term Preparation Checklist

Guide 8: Imminent Heat Event Checklist

Guide 9: Extreme Heat Event Response Checklist

Appendices

Appendix A: References

Appendix B: Additional Resources

Introduction

Purpose

The purpose of this extreme heat toolkit is to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to extreme heat events. The toolkit focuses on providing background information, practical guidance, strategies, media releases, talking points, definitions, and useful reference materials on this topic.

The guides in this toolkit may be copied onto agency letterhead for distribution to residents affected by extreme heat. Additional resources may be found in Appendix B: Additional Resources.

Background

The National Weather Service (NWS) estimates that 148 U.S. residents die from extreme heat and humidity each year, "making heat the number one weather killer in this country."[1] Wisconsin does not have a reputation of being a "warm climate" location. However, in 2012, Wisconsin experienced 27 heat-related fatalities. From 1982 to 2008, NWS data estimates there were 116 direct heat-related fatalities in Wisconsin.[2] The most susceptible populations to heat include the elderly, the very young (under 5 years of age), socially isolated persons, and residents with low economic status (incomes near or below the poverty level). Heat fatality data indicate that preparing for extreme heat events must remain a priority for Wisconsin governmental units, citizens, and businesses.

Climate Trends

Long-term trend analysis of Wisconsin's climate indicates that the state is becoming warmer and wetter. After analyzing historical climate data from 1950 to 2006 and developing downscaled local climate models, University of Wisconsin climate scientists created potential climate projections based on the historical trends and scientifically

validated models.[3] Several of the modeled outcomes suggest that extreme heat events may become more likely and longer lasting in the future.

Health Impacts

These trends and projections suggest that Wisconsin should prepare for public health impacts due to extreme heat illnesses, including heat stress, respiratory disease, and asthma aggravation, kidney failure, cardiovascular failure, and mental health issues. Emergency planning must consider heat-related needs, such as placement of cooling centers, transportation needs for residents, use of electrical appliances, excessive electrical power needs and potential power outages, and clear messages about the dangers of extreme heat.

Extreme Heat Response and Recovery Guidance

Under the Wisconsin "Home Rule" principle, heat preparedness and response are considered local activities. The local or county Emergency Management office, health agency, or police/fire first responders will be the lead agency during an extreme heat event. However, when requested, state resources will be provided to assist and support the local response.

Definitions

Extreme Heat Event

A weather condition with excessive heat and/or humidity that has the potential to cause heat-related illnesses or fatalities.

An extreme heat event occurs when any of the following takes place:

- The NWS issues an Excessive Heat Warning for at least 25 percent of Wisconsin's population.
- The Wisconsin State Emergency Operations Center is activated due to the prediction of excessive heat.
- Division of Public Health regional offices or local and tribal public health agencies request assistance in a heat emergency with confirmed or suspected heat-related fatalities.

Heat-Related Fatality

A death directly caused by exposure to high temperature or in which exposure to high temperature is a significant factor.

Heat-Related Illness

A group of physical symptoms caused when the human body is unable to compensate for high temperatures and humidity levels and cannot properly cool.

Heat Wave

A period of abnormally, uncomfortably hot, and unusually humid weather. Typically a heat wave lasts two or more days.

Heat Index

A measure expressing the discomfort felt as a result of the combined effects of the temperature and humidity of the air.

Guide 1: Definitions of Heat Alerts

National Weather Service Heat Wave Program in Wisconsin

1. **Outlook Statement** – Issued daily to highlight potential hazardous weather in the next one to seven days. Periods when Heat Index will equal or exceed 95 °F are mentioned (could lead to Heat Advisory or Excessive Heat Warning conditions). Issued as a Hazardous Weather Outlook (HWO). Broadcasted on NOAA Weather Radio All Hazards, and posted on NWS websites (www.weather.gov).

2. **Heat Advisory** – Issued 6 to 36 hours in advance of a daytime period in which daytime heat index (HI)* values of 100 °F or more are expected. Additionally, if daytime HI values are expected to be 95 to 99 °F for four consecutive days or more, an Advisory should be issued.

3. **Excessive Heat Watch** – Issued generally 12 to 48 hours in advance if Excessive Heat Warning conditions are expected.

4. **Excessive Heat Warning** – Issued 6 to 36 hours in advance of any occurrence of a 48-hour period in which daytime heat index (HI) values are expected to be 105 °F or higher and nighttime HI values will be 75 °F or higher for a 48-hour period. Additionally, if four consecutive days of daytime HI values of 100 °F or higher are expected, an Excessive Heat Warning will be issued.

For additional information about heat awareness, contact your local public health department, county emergency management director, or the NWS.

*The Heat Index (HI) or the "Apparent Temperature" is an accurate measure of how hot it really feels when the Relative Humidity (RH) is added to the actual air temperature.

Guide 2: Heat Illness Chart

Heat illnesses and their symptoms[1,2,3]			
Medical Condition	**Symptom(s)**	**Causes**	**Safety Tips**
Heat rash	• Red cluster of pimples • Blisters • Itching • Red rash on the skin that usually occurs on the neck, chest, breast and/or groin	• Excessive sweating that blocks sweat ducts	• Remove the affected person from heat. Minimize exposure of skin to sun. Keep the affected area dry. Seek medical attention if rash does not improve.
Heat edema (swelling)	• Swelling in the ankles, feet and hands • Body temperature normal or elevated core temperature up to 104° F	• Occurs in persons who are not used to heat • Increased blood flow to the skin in limbs	• Elevate and apply compressive stockings to the affected limbs.
Heat tetany (heat stress)	• Respiratory problems, such as breathing difficulty • Muscular problems, including spasms or numbness or tingling of muscles • Body temperature normal	• Hyperventilation • Respiratory alkalosis – the blood becomes basic	• Remove the affected person from the heat and advise the person to breathe slowly.
Heat cramps	• Muscle spasms • Muscles usually affected include the abdomen, calf, thighs and shoulder muscles • Body temperature normal or elevated core temperature up to 104° F	• Dehydration • Electrolyte deficiency	• Stop all activities, relocate to a cool location, rest and drink electrolyte-containing fluids (sports drinks). Seek medical attention if symptoms persist.
Heat syncope (fainting)	• Dizziness • Fainting • Body temperature normal or elevated core temperature up to 104° F	• Increased blood flow to the skin resulting in decreased blood flow to the central nervous system	• Lay the affected person gently on the floor and provide lots of fluid. Seek medical attention.

Medical Condition	Symptom(s)	Causes	Safety Tips
Heat exhaustion	• Profuse sweating • Weakness • Rapid breathing • Dizziness • Nausea/vomiting • Muscle cramps • Normal mentation • Body temperature normal or elevated core temperature up to 104° F	• Dehydration • Electrolyte deficiency	• Stop all activities, relocate to a cool location, rest and drink electrolyte-containing fluids. • It can be difficult to determine if someone has heat stroke and not exhaustion. • If symptoms do not quickly improve, or unable to orally rehydrate, seek medical attention.
Heat stroke *This is a life-threatening condition due to extreme heat, usually occurring when the body temperature is greater than 104°F.*	• Oral body temperature of 104°F and above • Often sudden onset of symptoms • Confusion or loss of consciousness • Rapid and strong pulse • Hot, red and dry skin • Headache • Dizziness • Nausea/vomiting	• Profound dehydration • Profound electrolyte deficiency • Body is unable to maintain heat diffusion through the skin • Normal regulation of body temperature is no longer intact • Mortality can be as high as 50%	• Call 911 immediately if you see anyone with these symptoms and who has a body temperature of 104°F and above. • While waiting for first responders, the affected person should be taken to a cool, shady area. • Cool the person with immersion in cool water, spraying the person with cool water while fanning the person vigorously, or placing ice packs on neck, underarm, and groin. • The person is unlikely to be able tolerate oral fluids.

1. Centers for Disease Control and Prevention. (2006). Frequently Asked Questions (FAQ) About Extreme Heat. Retrieved April 17, 2012, from http://www.bt.cdc.gov/disasters/extremeheat/faq.asp.
2. Platt M, and Vicario S. (2010). Heat Illness. In Rosen's Emergency Medicine: Concepts and Clinical Practice, 7th Ed. P 1882-3.
3. Zimmerman JL, and Hanania NA. (2005). Chapter 111. Hyperthermia. In: Hall JB, Schmidt GA, Wood LD, eds. Principles of Critical Care. 3rd ed. New York: McGraw-Hill.

Chart courtesy of Minnesota Department of Health:
http://www.health.state.mn.us/divs/climatechange/docs/toolkit_chapter2.pdf

Guide 3: Extreme Heat Tips

- **Never leave children, disabled persons, or pets in a parked car - even briefly**.

  On an 80°F day, the temperature inside a car even with the windows cracked slightly can reach 100°F in less than 10 minutes!

- **Keep your living space cool or seek shelter at a cooling center**.

  If you have an air conditioner, use it! If you don't have an air conditioner and the temperature is above 95°F, go to a community cooling center because using a fan will not prevent heat-related illnesses at this temperature.

- **Slow down and limit physical activity**.

  Plan outings or exercise for the early morning or after dark, when temperatures are cooler.

- **Drink plenty of water and eat lightly**.

  Don't wait for thirst, but instead drink plenty of water throughout the day. Avoid alcohol and caffeine and stay away from hot, heavy meals.

- **Wear lightweight, loose-fitting, light-colored clothing**.

  Add a hat or umbrella to keep your head cool…and don't forget sunscreen!

- **Don't stop taking medication unless your doctor says you should**.

  Take extra care to stay cool, and ask your doctor or pharmacist for any special heat advice.

- **Taking a cool shower or bath will cool you down**.

  A cool shower or bath will actually work faster at reducing your body temperature than an air conditioner. Apply cold, wet rags to your head and neck to quickly cool down.

For more information, visit: http://readywisconsin.wi.gov/heat/

Guide 4: Populations Vulnerable to Heat

Vulnerable Population	Risk Factor
Adults over 65	Less aware and adaptable to extreme heat www.cdc.gov/extremeheat/seniors.html
People living alone and/or without air conditioning	May not know when to call for help www.bt.cdc.gov/disasters/extremeheat/heat_guide-page-2.asp
Individuals with disabilities	May not know how to call for help or realize they are in danger http://readywisconsin.wi.gov/heat/
Children under 5	Sensitive to effects of extreme heat and must rely on others to keep them cool and hydrated www.cdc.gov/extremeheat/children.html
People with chronic medical conditions	People with medical conditions can include those with cardiovascular disease or mental illness, especially those taking medications (e.g., psychotropics) that can worsen the impact of extreme heat www.cdc.gov/extremeheat/medical.html
Homeless people	May be unaware of cooling centers and may have limited access to other cooling protections (e.g., cool showers) http://www.health.state.mn.us/divs/climatechange/docs/mnextremeheattoolkit.pdf
Pets	Dependent on owner for adequate protection from heat http://readywisconsin.wi.gov/heat/default.asp
Outdoor workers	More likely to become dehydrated and more likely to get heat-related illness www.cdc.gov/extremeheat/workers.html
Non-English speakers	May not have access to current information about heat advisories and health risks http://www.dhhs.nh.gov/dphs/cdcs/alerts/documents/heatadvisory.pdf

Guide 5: Talking Points for Heat-Related Fatality

If you are approached by the media regarding a reported heat-related fatality in your jurisdiction, the following talking points may be used.

1. We were notified by the Medical Examiner/Coroner about a fatality possibly due to extreme heat conditions. Our condolences go out to the family.

2. Out of respect for the family, we are unable to share any details.

or

3. On *[insert date]*, a *[gender] ["___ years old" or "between the ages of ___ and ___"]* died during the current heat wave.

or

4. We have *not* been notified of any recent fatalities linked to extreme heat conditions.

Any of the above can be followed up by these points:

5. Heat stroke can be rapid and fatal. People should remain cool and safe by:

   a. Keeping hydrated, slowing down, staying indoors, and avoiding strenuous exercise during the hottest part of the day.

   b. Checking on family, friends and neighbors who do not have air conditioning, who spend much of their time alone or who are more likely to be affected by the heat.

   c. Never leaving children or pets in vehicles, even with open windows.

   For more information visit *[insert relevant website].*

Guide 6: Message Maps about Heat-related Safety

Message mapping is one of the most important risk communication tools that public health agencies can employ. The goal of a message map is to convey important information in a concise and easy-to-understand fashion.

General guidelines to follow when creating a message map include:

- Stick to three key messages or one key message with three parts for each underlying concern or specific question.
- Keep key messages brief. The reader should ideally spend less than 10 seconds per line.
- Develop messages that are easily understood by the target audience. (For communications with the general public, use a 6th to 8th grade readability level.)
- Place messages within a message set. The most important messages should occupy the first and last positions.
- Develop key messages that cite credible third parties.
- Use graphics and other visual aids to enhance key messages.
- Keep a positive tone. Messages should be solution oriented and constructive. Try to balance negative messages with positive ones.
- Avoid unnecessary use of the words no, not, never, nothing, and none.[5]

The following is a message map that could be used when addressing the general public regarding heat-related safety.

Main Message: "Since June/July/August __, there has/have been __ heat-related fatalities in Wisconsin. To help you and your loved ones stay safe during this heat wave…"

Key Messages (3 key messages)	Supporting Information (3 items of supporting information for each key message)
Message 1: *Check on your neighbors to make sure they are OK, especially the elderly and those living alone.*	**Supporting information 1** *The elderly are less likely to sense and respond to high temperatures.* **Supporting information 2** *Those living alone can be isolated and unaware of the dangers posed by extreme heat.* **Supporting information 3** *When regularly checking with your neighbors look for signs of heat-related illness.*
Message 2: *If you must be out during the hottest time of the day, be alert for signs of heat illness.*	**Supporting information 1** *Symptoms include feeling hot, weak, dizzy or faint, cramping/muscle spasms, nausea, or rapid pulse.* **Supporting information 2** *Protect yourself by limiting physical activities, drinking plenty of water, and wearing light, loose-fitting clothing.* **Supporting information 3** *Call 9-1-1 or seek medical attention if you or someone you know develops heat illness.*
Message 3: *Hundreds of cooling centers are available to the public across Wisconsin.*	**Supporting information 1** *Cooling centers are designated buildings with air conditioning where the oublic can seek relief from the heat.* **Supporting information 2** *Call 2-1-1 to find the cooling center closest to you.* **Supporting information 3** *Ask 2-1-1 whether transportation is also available.*

Guide 7: Long-term Preparation Checklist

- ☐ Identify extreme heat event partners and define their roles and responsibilities.

- ☐ Involve community organizations and other stakeholders in the response planning process (include medical examiner/coroner in this process).

- ☐ Develop a response plan, including, but not limited to, the following:
  - Develop a cooling center plan that identifies and maps air-conditioned locations for cooling centers. Ensure that cooling centers are evenly distributed throughout jurisdiction.
  - Consider transportation options to cooling centers (e.g., free buses). Consider the accessibility of cooling centers (e.g., for walkers and wheelchairs).
  - Develop strategies that can be used if there is a power outage.

- ☐ Understand local and state roles in the reporting process for heat-related fatalities.

- ☐ Monitor weather reports during the summer months.

- ☐ Develop maps of vulnerable populations, if feasible.

- ☐ Develop a database/list of facilities and organizations that serve populations especially vulnerable to extreme heat (e.g., social service agencies, senior living centers, daycare centers, long-term care facilities, organized sports, construction companies) so they can be immediately notified of an impending extreme heat event.

- ☐ Ensure that heat fact sheets are current.

Guide 8: Imminent Heat Event Checklist

Steps to take when an extreme heat event is imminent:

- ☐ Notify local extreme heat partners.
- ☐ Alert contacts in database/list of facilities and organizations that serve vulnerable populations.
- ☐ Ensure that message map is current.
- ☐ Work with media to alert public of the extreme heat event and advise people on recognizing and preventing heat-related illnesses.
- ☐ Activate transportation assistance program.
- ☐ Provide maps showing locations of cooling centers and cool places (after permission from owner is received).
- ☐ Consider extension of hours at public pools and other public air-conditioned places.

- ☐ Consider suspending outdoor public events.
- ☐ Coordinate with relevant organizations to provide water to homeless people.

Guide 9: Extreme Heat Event Response Checklist

Steps to take when responding to an extreme heat event:

- ☐ Notify local extreme heat event partners.
- ☐ Coordinate with medical examiner/coroner if heat fatality occurs.
- ☐ Continue to monitor weather and make appropriate media release with safety tips.
- ☐ Activate cooling center plans.
- ☐ Continue promotion of cooling centers hours and locations.
- ☐ Ensure outreach to vulnerable populations (e.g., email contacts in facilities database).
- ☐ Consider canceling, rescheduling or heightening mitigation protections for outdoor public events.

Appendix A: References

1. National Weather Service Weather Forecast Office, Milwaukee/Sullivan, WI. Heat Wave: A major summer killer in Wisconsin. (http://www.crh.noaa.gov/mkx/?n=heatflyer)

2. National Weather Service Weather Forecast Office, Milwaukee/Sullivan, WI. Heat Wave: A major summer killer in Wisconsin. (http://www.crh.noaa.gov/mkx/?n=heatflyer)

3. Climate projections in this toolkit come from: Wisconsin's Changing Climate: Impacts and Adaptation. 2011. Wisconsin Initiative on Climate Change Impacts. Nelson Institute for Environmental Studies. UW-Madison and Wisconsin Department of Natural Resources, Madison, WI.

4. Climate Change 2001: Synthesis Report. A Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, R.T. Watson and the Core Writing Team (eds.) IPCC. 2001. Cambridge University Press, Cambridge, UK.

5. Covello VT. Message mapping. Accessed March 7, 2014, at: http://www.orau.gov/cdcynergy/erc/content/activeinformation/resources/Covello_message_mapping.pdf

Appendix B: Additional Resources

Wisconsin Department of Health Services (DHS)
http://www.dhs.wisconsin.gov/health/injuryprevention/weatherrelated/heat.htm
608-258-0099

Wisconsin Emergency Management (WEM)
http://readywisconsin.wi.gov/flooding/default.asp
608-242-3232

American Red Cross
http://www.redcross.org/prepare/disaster/heat-wave
1-877-618-6628

American Red Cross Heat Information in Other Languages
http://www.redcross.org/prepare/disaster-safety-library

American Red Cross Heat Wave Safety Checklist
http://www.redcross.org/images/MEDIA_CustomProductCatalog/m4340158_HeatWave.pdf

Federal Emergency Management Agency (FEMA)
http://www.fema.gov/

FEMA Spanish Language Portal
http://www.fema.gov/es/

Federal Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov/extremeheat/

Federal Environmental Protection Agency (EPA)
http://www.epa.gov/emergency/naturalevents/extremeheat.html

List of Wisconsin Local Public Health Departments
http://www.dhs.wisconsin.gov/localhealth/

List of Wisconsin Tribal Health Directors
http://www.dhs.wisconsin.gov/localhealth/

List of County Building, Code, and Zoning Officials
http://www.wccadm.com/staff_directory.htm

Refugee Health Information Network (RHIN)
http://rhin.org/AZIndex.aspx