

2022 Missouri Extreme Weather Toolkit



MISSOURI DEPARTMENT OF
**HEALTH &
SENIOR SERVICES**

Acknowledgments

The Missouri Department of Health and Senior Services (DHSS), Division of Senior and Disability Services have created this Extreme Heat Toolkit in cooperation with the Missouri State Mass Care Extreme Weather Workgroup to increase readiness among communities during excessively hot days during the summer months. This toolkit closely follows one created by the Minnesota Climate and Health Program at the Minnesota Department of Health who graciously gave us permission to replicate parts of their work.

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Summary

Introduction

Extreme heat events are, and will continue to be, facts of life in the United States. These events are a public health threat because they often increase the number of daily deaths (mortality) and other nonfatal adverse health outcomes (morbidity) in affected populations. Distinct groups within the population, generally those who are older, very young, poor, or who have physical challenges or mental impairments, are at elevated risk for experiencing extreme heat attributable health problems. However, accurately forecasted extreme heat events and a number of low cost and understood effective responses allow the reduction of future health impacts of extreme heat events. This toolkit provides critical information that local emergency managers and others need to begin assessing their extreme heat event vulnerability and developing and implementing extreme heat event notification and response programs.

Health Impacts of Extreme Heat Events

When exposed to extreme heat, people can suffer from potentially deadly illnesses, such as heat exhaustion and heat stroke. Hot temperatures can also contribute to deaths from heart attacks, strokes, and other forms of cardiovascular disease. Heat is the leading weather-related killer in the United States, even though most heat-related deaths are preventable through outreach and intervention.

Some statistical estimates say more than 1,300 deaths per year in the United States are due to extreme heat.

Responding to Extreme Heat Events

Broad consensus exists on the types of actions that will provide relief to those at risk during extreme heat events and help minimize associated health impacts. These actions include:

- Establishing and facilitating access to air-conditioned public shelters.
- Ensuring real-time public access to information on the risks of the extreme heat event conditions and appropriate responses through broadcast media, web sites, toll-free phone lines and other means.
- Establishing systems to alert public health officials about high-risk individuals or those in distress during an extreme heat event (e.g., phone hotlines, high-risk lists).
- Directly assessing and, if needed, intervening on behalf of those at greatest risk (e.g., the homeless, older people, those with known medical conditions).

Experience in several American cities has demonstrated that comprehensive and effective extreme heat event notification and response programs can be developed and implemented at relatively low cost. These programs generally use available resources instead of creating extreme heat event specific institutions. This approach recognizes that short-term resource reallocations for extreme heat events are justified by the severity of their public health risks, the limited duration and frequency of the events and the cost-effectiveness of the reallocations¹.

Overview of Extreme Heat Event Toolkit

The purpose of this toolkit is to provide information to local governments and public health professionals about preparing for and responding to extreme heat events.

The toolkit describes practical, implementable steps and strategies to prevent morbidity and mortality from extreme heat at the local level. The toolkit provides several appendices, including a generic heat response plan, tailored to meet the needs of a specific location. The toolkit does not describe comprehensive surveillance systems for morbidity and mortality from extreme heat because this would most likely occur in only a few jurisdictions in Missouri, or at the state level.

The goal of the toolkit is to increase Missouri's preparedness for extreme heat events by providing information and resources to local governments and public health departments to create their own heat response plan.

Introduction to Extreme Heat Events

Extreme heat events can cause a number of health-related problems, including an increase in deaths (mortality) and nonfatal outcomes (morbidity). By acting appropriately, the public can stay cool and hydrated during extreme heat events and prevent the negative health outcomes from extreme heat. As more counties and cities begin to prepare for extreme heat, we hope Missouri will experience fewer heat-related deaths and illnesses.

Why Care about Extreme Heat Events?

Although most heat-related deaths and illnesses are preventable, a significant number of people die and suffer from extreme heat events every year in the U.S. From 1979 to 2003, more people in the U.S. died from extreme heat than from hurricanes, lightning, tornadoes, floods and earthquakes combined². From 1999-2003, about 3,442 deaths resulted from exposure to extreme heat in the U.S.³.

The magnitude of deaths and illnesses from extreme heat events is often underreported and little understood by the general public. Extreme heat events do not typically make the news headlines compared to other extreme weather events, such as tornadoes and floods, and they do not leave a lasting trail of infrastructural damage that continuously reminds people of their impact. Therefore, extreme heat events are a “silent killer”⁴. In recent years, several notable heat waves that have caused a catastrophic number of deaths. In the historic 2003 European heat wave, about 14,800 people in France and about 50,000 people in Europe died from heat-related illnesses⁵. In 2010, Russia experienced a heat wave that caused an estimated 4,824 excess deaths in July in Moscow alone⁶. The United Nation News Centre reported that this Russian heat wave caused about 56,000 total fatalities across the country⁷, likely a result of the combination of extreme heat, smog and smoke from wildfires⁸. Closer to home, more than 700 deaths have been attributed to the 1995 Chicago heat wave⁹.

Missouri is Warming

Since the beginning of the 20th century, temperatures in Missouri have risen almost 1°F (Figure 1), and temperatures in the 2000s have been higher than in any other historical period with the exception of comparable temperatures in the early 1930s Dust Bowl era¹⁰.

Since 2010, summer temperatures, characterized by much higher nighttime minimum temperatures, shown slightly above Dust Bowl levels (Figure 2), while daytime maximum temperatures have been near the long-term average (Figure 3).

At St. Louis Lambert International Airport, the number of very warm nights has increased from 13 per year during 1961–1990 to 20 per year during 1991–2020. There is also an upward trend in summer humidity since the mid-20th century.

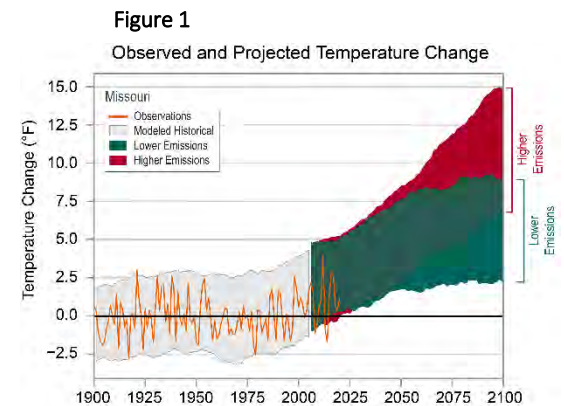


Figure 2

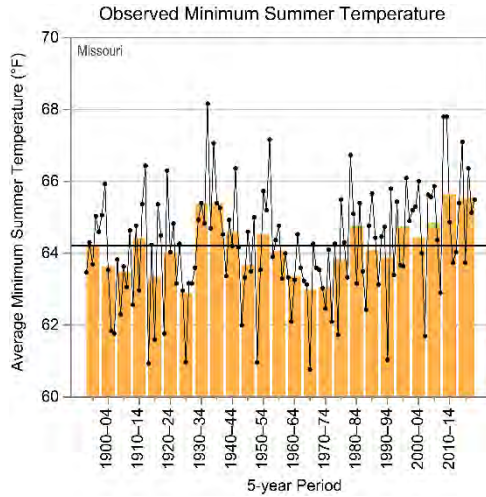
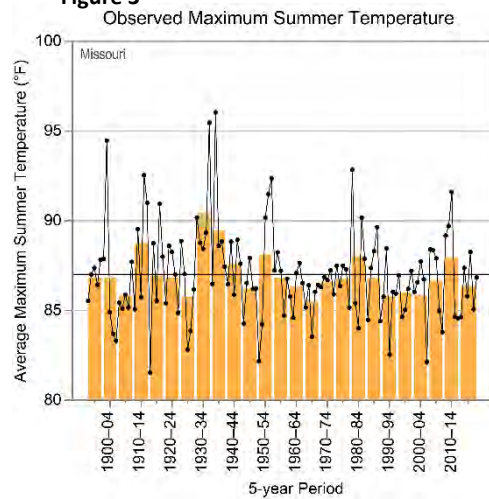


Figure 3



Observed summer average minimum temperature (Figure 2) and summer average maximum temperature (Figure 3) for Missouri from 1895 to 2020. Dots show annual values. Bars show averages over 5-year periods (last bar is a 6-year average). The horizontal black lines show the long-term (entire period) averages. Sources: CISESS and NOAA NCEI. Data: nClimDiv.

Currently, Missouri averages 15 days a year with high temperatures reaching extreme and dangerous levels. Projections show by 2050, the state will see more than 60 such days a year¹¹.

Based on observed and predicted trends, extreme heat events have a high probability of occurring more frequently in Missouri. Despite this likely increase in extreme heat events, many counties and cities in Missouri are not prepared to deal with these events. Lessening the impact of extreme heat events requires improving the awareness of public health officials and the general public about the health risks of extreme heat events, and developing and implementing effective extreme heat notification and response plans.

Defining Extreme Heat Events

Extreme heat events, characterized by weather that is substantially hotter and/or more humid than average for a particular location at a particular time, especially in the spring and summer. How hot it feels depends on location, time of year, and the interaction of multiple meteorological variables (e.g., temperature, humidity, cloud cover, wind). Hotter temperatures earlier in the spring are likely to have more detrimental health impacts than the same temperatures later in the summer because people have not had time to gradually adjust to the warmer temperatures¹². Definitions of an extreme heat event can shift based on location and time of year. Thus, definitions of an extreme heat event need to be sensitive to the variables important for a particular location.

Defining an extreme heat event is important for two reasons. First, the National Weather Service (NWS) needs a definition of extreme heat in order to issue a heat advisory, watch or warning. Second, local jurisdictions need to define an extreme heat event locally to determine if, and when, to implement a heat response plan. Timely forecasting of extreme heat events, transferring the forecast information to the agency responsible for the heat response plan and deciding when to implement the heat response plan are the first crucial steps in preventing heat-related morbidity and mortality.

There are five NWS offices serving Missouri. Each NWS office releases heat advisories, watches and warnings depending on the weather in its own service area. Below is a map of the stations. Note that in some cases, the NWS office serving Missouri communities may be located in another state.

Local emergency managers, elected officials, public health professionals and other organizations that participate in planning and/or providing services for preventing heat-related illnesses should identify the NWS station for their jurisdiction and build relationships with the NWS staff to ensure receiving the most current information available on predicted extreme heat events.

National Weather Service Definitions

EXCESSIVE HEAT OUTLOOK

Issued when the potential exists for an excessive heat event in the next three to seven days. An Outlook provides information to those who need considerable lead-time to prepare for the event.

EXCESSIVE HEAT WATCH

Issued when conditions are favorable for an excessive heat event to meet or exceed Excessive Heat Warning criteria in the next 12 to 48 hours.

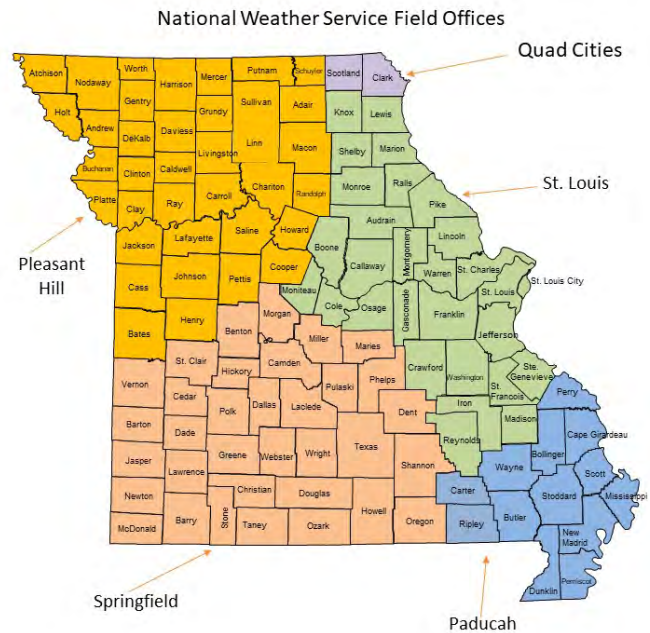
EXCESSIVE HEAT WARNING

Issued if the maximum Heat Index (HI) is expected to be around 110°, or will be around 105° for four consecutive days and the minimum HI is expected to be 75° or higher.

EXCESSIVE HEAT ADVISORY (HEAT ADVISORY)

Issued if the maximum HI is expected to be around 105° or the HI will range from 100° to 104° for at least four consecutive days.

Review definitions of extreme heat events regularly to ensure that they are, and continue to be, applicable to the locality and responsive to actual health impacts.



Extreme Heat Events and Public Health

Extreme heat events can cause a range of health problems from relatively minor health issues, such as a heat rash, to life-threatening conditions, such as heat stroke and ultimately death. Everyone is susceptible to heat-related illnesses, but some people may be more susceptible or 'at risk' for a heat-related illness because of factors that increase exposure to the extreme heat and/or affect their ability to stay cool. The following section reviews heat-related illnesses and the characteristics or risk factors that increase the risk of experiencing morbidity and/or mortality from extreme heat.

Health Issues Caused by Extreme Heat

The body needs to maintain an internal temperature of approximately 98.6°F to function properly. When it is hot outside, it is a challenge for the body to stay cool. When the internal temperature rises, the human body's ability to perform critical functions becomes impaired and a person becomes susceptible to serious adverse health effects.

Of all the heat-related illnesses, heat exhaustion is the most common. Heat exhaustion is serious type of heat-related illness, and needs addressed as quickly as possible when the body is extremely depletion of water and salt. Symptoms of heat exhaustion are often similar to those of the flu — headache, weakness, fatigue and nausea — though heat exhaustion symptoms can also include an elevated body temperature, excessive sweating and decreased urine output. Treatment includes monitoring the patient in a cool, shady environment and ensuring adequate hydration. See Table 1 on the following page for a list of some of the medical conditions directly attributable to excess heat exposure along with recommended treatment responses.

Exposure to extreme heat can also aggravate already existing conditions¹³. An analysis of hospital admissions in Chicago during the July 1995 heat wave estimated that the heat wave was responsible for over 1,000 excess hospital admissions, particularly among people with pre-existing diabetes, respiratory illnesses and nervous system disorders¹⁴. Another study found that elevated air temperatures were associated with short-term increases in cardiovascular-related hospital admissions for 12 US cities¹⁵.

Table 1: Heat-Related Illnesses¹⁶	
What To Look For	What To Do
Heat Stroke	
<ul style="list-style-type: none"> • High body temperature (103° or higher) • Hot, red, dry or damp skin • Fast, strong pulse • Headache • Dizziness • Nausea • Confusion • Losing consciousness (passing out) 	<ul style="list-style-type: none"> • Call 911 right away – heat stroke is a medical emergency • Move the person to a cooler place • Help lower the person’s temperature with cool cloths or a cool bath • Do not give the person anything to drink
Heat Exhaustion	
<ul style="list-style-type: none"> • Heavy sweating • Cool, pale and clammy skin • Fast, weak pulse • Nausea or vomiting • Muscle cramps • Tiredness or weakness • Dizziness • Headache • Fainting (passing out) 	<ul style="list-style-type: none"> • Move person to a cool place • Loosen person’s clothing • Put cool, wet cloths on the person’s body or help them take a cool bath • Give person cool water to drink <p>Get medical help immediately if:</p> <ul style="list-style-type: none"> • Person is throwing up • Person’s symptoms get worse • Person’s symptoms last longer than 1 hour
Heat Cramps	
<ul style="list-style-type: none"> • Heavy sweating during intense exercise • Muscle pain or spasms 	<ul style="list-style-type: none"> • Stop physical activity and move person to a cool place • Give person water or a sports drink • Advise person to wait for cramps to go away before returning to physical activity <p>Get medical help immediately if:</p> <ul style="list-style-type: none"> • Cramps last longer than 1 hour • Person is on a low-sodium diet • Person has heart problems
Sunburn	
<ul style="list-style-type: none"> • Painful, red, warm skin • Blisters on skin 	<ul style="list-style-type: none"> • Stay out of sun until sunburn is healed • Put cool cloths on sunburned areas or take a cool bath • Put moisturizing lotion on sunburned areas • Do not break blisters
Heat Rash	
<ul style="list-style-type: none"> • Red clusters of small blisters that look like pimples on the skin (usually on the neck, chest, groin or in elbow creases) 	<ul style="list-style-type: none"> • Stay in cool, dry place • Keep rash dry • Use over-the-counter creams or powders to sooth the rash

Characteristics that Increase the Risk of Heat-related Illnesses

Everyone is susceptible to illnesses due to extreme heat; however, certain characteristics can increase a person’s risk. Demographic characteristics, social/behavioral factors and geography/location may affect the ability of an individual to maintain normal body temperature and stay hydrated. Certain populations may have more than one characteristic/risk

factor that could put them at increased risk. Table 2 below provides a quick reference of characteristics that increase the risk of heat-related illnesses. Pages 10-12 provide more details of each characteristic.

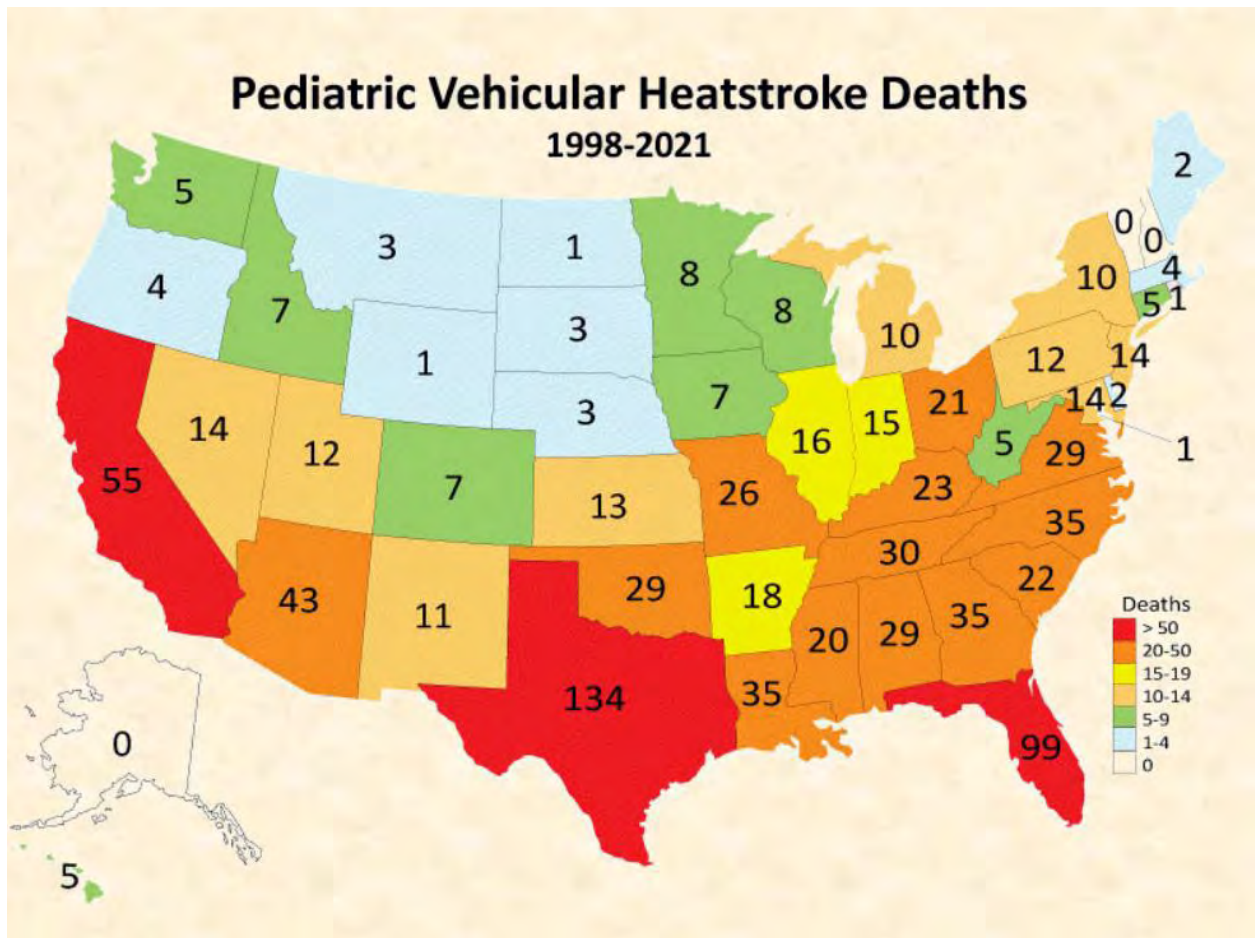
Identification of populations that are more vulnerable to extreme heat events is useful for targeting limited resources to people who need additional aid during an extreme heat event and an important strategy for preventing negative health outcomes from extreme heat.

Table 2: Characteristics that increase the risk for heat-related illness	
Demographic characteristics, social/behavioral factors and geography/location may affect the ability of an individual to maintain normal body temperature and stay hydrated.	
Demographic characteristics	
<ul style="list-style-type: none"> • Age - persons 65 years old or older or children ages five years and younger (including infants) • Economic constraints – persons living at or below the poverty line • Persons with pre-existing diseases or mental health conditions • Persons on certain medications including over-the-counter medications, such as anti-inflammatories and anti-histamines 	
Social/Behavioral factors	
<ul style="list-style-type: none"> • Social isolation – persons living alone, especially the elderly • Prolonged exposure to the sun • Use of alcohol 	
Geographic/Location factors	
<ul style="list-style-type: none"> • Living in urban areas • Lack of air conditioners or lack of properly functioning air conditioners • Living in top floor apartments • Living in nursing homes/bedridden 	

Demographic Characteristics

Age: Persons 65 years old or older are more vulnerable to negative health outcomes from extreme heat events than younger adults^{17, 18}. Additionally, the older the person is the greater the risk for a heat-related illness. A person 75 years old has a greater risk for heat-related illnesses than someone who is 65 years old. Certain physiological changes associated with aging, especially the body’s decreased ability to thermoregulate, increase older adults’ risk of experiencing heat-related illnesses¹⁹. Chronic disease conditions and the use of certain medications also may increase older adults’ susceptibility to adverse health outcomes from heat²⁰. Elderly persons who live alone and/or at or below the poverty line are particularly vulnerable to negative health outcomes from extreme heat because of a combination of factors associated with aging, social isolation and economic constraints. Older adults are a growing segment of the population. Individuals 65 years of age and older currently make up 17.3% of the Missouri population and are expected to make up 21% of the population by 2030²¹.

Research identifies children, especially children ages five years and younger (including infants), as being at a greater risk for mortality during hot weather^{22, 23}. Children may be at increased risk due to dependency on other people for their care and/or physiological differences, including smaller body mass to surface area ratio than adults, blunted thirst response, production of more metabolic heat per pound of body weight and lower cardiac output^{24, 25}. In the US between 1998 and 2021, an average of 38 children (five days old to 14 years old) died per year from being left in a motor vehicle during warm weather. With more than half of the deaths being children under two years of age²⁶.



Economic constraints: Several studies have demonstrated increased risk of mortality among people with low socioeconomic factors²⁷. Persons living at or below the poverty line are less likely to have air conditioners in their homes^{28,29}, more likely to live in deteriorating and substandard homes³⁰ and may have difficulty paying for higher electricity bills from increased electricity usage during an extreme heat event. Persons living at or below the poverty line might be more concerned about safety and unwilling or unable to open doors and windows to increase circulation or to seek cooling centers³¹.

Persons with pre-existing diseases or mental health conditions: Heat can exacerbate existing conditions, putting certain people at increased risk for heat-related illnesses and possibly death. Any condition that affects the body’s ability to cool itself or puts additional stress on already compromised systems will make a person more susceptible to negative health effects from heat. Additionally, persons with mental illness or intellectual disabilities are at increased risk for negative health outcomes due to extreme heat^{32,33}. They may be unable to make rational decisions that would help them recognize symptoms of excessive heat exposure or limit their exposure to excessive heat.

Persons on certain medications: Persons on certain medications are vulnerable to negative health consequences from extreme heat events. Drugs, such as diuretics, anticholinergics, beta-blockers, calcium channel blockers, antipsychotic drugs and some over-the-counter medications make it difficult for the body to dissipate excess heat by interfering with normal thermoregulatory systems.

Social/Behavioral Factors

Social isolation: Persons living alone, especially the elderly, are more vulnerable to extreme heat events^{34,35}. Socially isolated people may be less likely to recognize the symptoms of excessive heat exposure, less likely to leave their homes if hot and/or less willing or able to reach out for help from others.

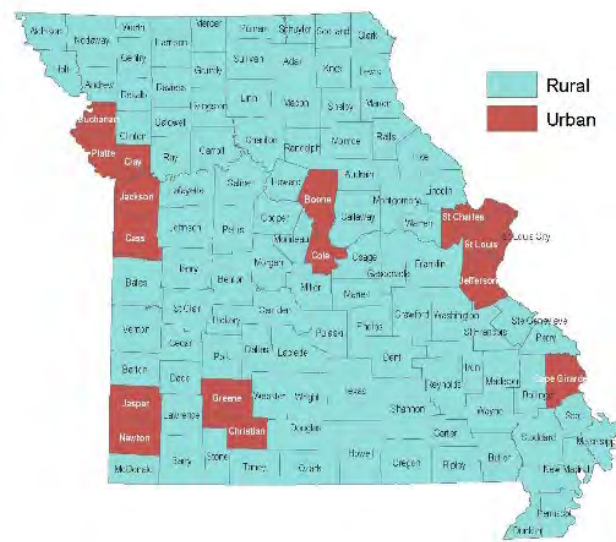
Prolonged exposure to sun: People who are involved in sporting activities or work in outdoor occupations, like farming, landscaping, roofing and construction, are at an increased risk for heat-related illnesses. These people have longer exposure to the sun and extreme heat for longer periods of time and need to take extra precautions to stay cool and hydrated.

Use of alcohol: The consumption of alcoholic beverages during extreme heat events increases the risk of heat-related illnesses. Alcoholic beverages can cause dehydration and depress the thermoregulatory system. In addition, alcohol impairs judgment, influencing a person’s ability to make decisions to limit exposure to and recognize symptoms of extreme heat exposure.

Geographic/Location Factors

Living in urban areas: The urban heat island effect is a measurable increase in ambient urban air temperature and results primarily from the replacement of vegetated land with buildings, roads and other heat-absorbing and reflecting infrastructure. Urban dwellers are more at risk for heat-related illnesses than rural dwellers because of the urban heat island effect. Urban areas are usually hotter and cool off less at night than rural areas. The urban heat island effect is proportional to the size of the city, but all cities, large and small experience the effect. Urban heat islands can increase health risks from extreme heat by increasing the potential maximum temperatures and the length of time that residents are exposed to elevated temperatures³⁶. Missouri is the 28th most densely populated state in the country, despite being 18th in terms of population and 21st in terms of land area. Missouri does have a higher rural population than most of the country, however nearly 18% of Missourians do reside in our four largest cities - St. Louis (315,685), Kansas City (475,378), Springfield (166,810) and Columbia (119,108)³⁷.

Rural/Urban County Classification Missouri 2019



Source: Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination.

Lack of air conditioners: Living in houses without air conditioning and/or not having access to air-conditioned spaces increases the risk of experiencing heat-related illnesses. During periods of extreme heat, air conditioners regulate and cool indoor air temperatures, putting less strain on the body’s thermoregulatory system.

Living in top floor apartments: Persons living in top floor apartments are at increased risk of suffering from heat-related illnesses. Hot air rises and is trapped by the roof, so that people who live on the top floors of a building have longer exposure to higher temperatures.

Living in nursing homes/bedridden: Persons living in long-term care facilities (e.g., nursing homes, assisted living, group homes) and/or are bedridden are at increased risk of suffering from heat-related illnesses. These persons may be at increased risk due to dependency on others for care, and they frequently have underlying medical conditions and take medications that affect their ability to regulate their body temperature.

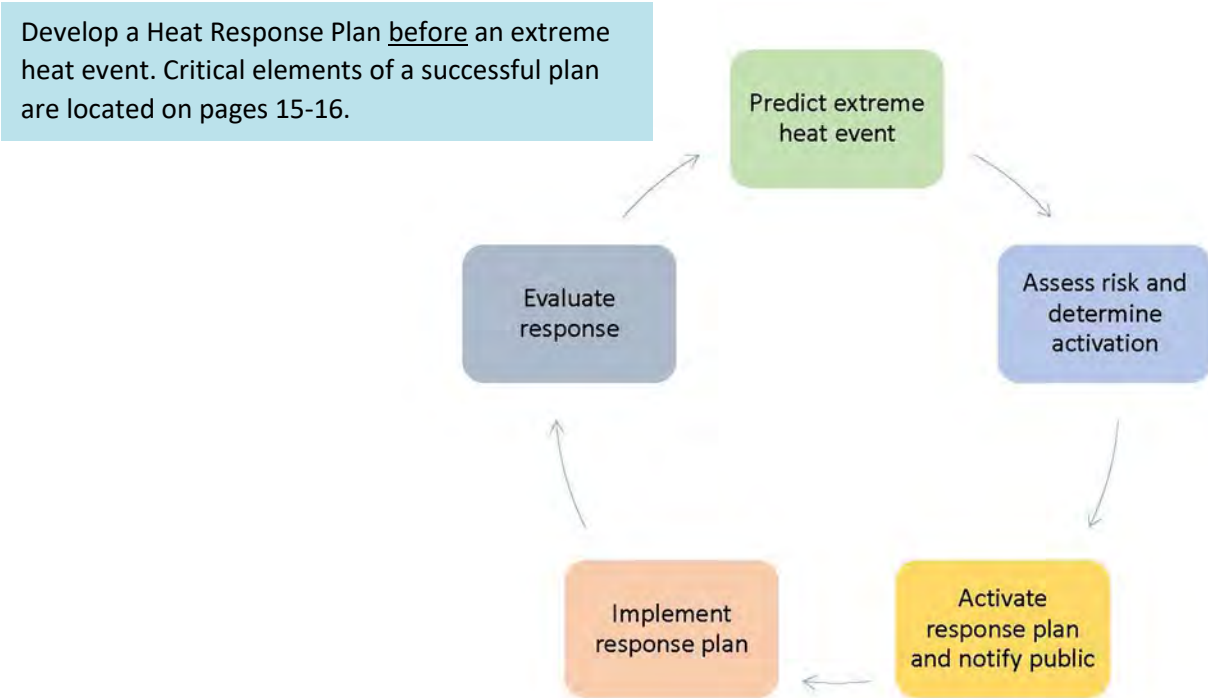
Preparing Missouri for Extreme Heat Events

Extreme heat notification and response plans are critical to preparing Missourians for extreme heat events. Notification systems and plans reflect local conditions and draw upon available local expertise and resources. As a result, local notification and response plans vary. This section discusses the key steps in responding to an extreme heat event, and developing a heat response plan. The section also summarizes a range of strategies that can be included in the response plan and used to prevent morbidity and mortality from extreme heat events.

Key Steps in Planning for and Responding to an Extreme Heat Event

The summaries for key steps for planning for and responding to an extreme heat event are in Figure 4 below. Although this diagram presents the key steps in responding to an extreme heat event as distinct steps, actual details and timing of each step will vary locally. For example, determining the activation of the response plan may happen simultaneously with notifying the public of an impending extreme heat event. The response plan should reflect local conditions and resources and should clearly articulate each step, along with the agencies and organizations that are responsible for implementing each step of the process. Listed below are detailed descriptions of each step.

Figure 4: Key Steps for Responding to an Extreme Heat Event



Step 1: Create a heat response plan

The first step in preparing to respond to an extreme heat event is to develop a heat response plan. The next section, “Developing a heat response plan,” describes the minimum elements of an effective response plan, which includes defining the lead agency responsible for the plan, criteria for activating the plan, and the roles of agencies and organizations involved with the plan. The plan should also contain a communications plan, identify high-risk and vulnerable persons, describe strategies to prevent heat-related illnesses and deaths, and establish an evaluation process.

Step 2: Predict extreme heat event and transfer information to lead agency

For successful notification of an upcoming heat event, it is critical for the lead agency of the response plan (see the next section for a description of the lead agency) to develop partnerships with the NWS to ensure early weather forecasts capable of predicting extreme heat conditions a few days in advance of an extreme heat event. In Missouri, the NWS provides weather forecasts and determines the issuance of heat advisories, watches or warnings. All Missouri jurisdictions involved in planning and implementing heat response plans should develop relationships with their local NWS station to ensure daily monitoring of weather conditions and early detection and transfer of information regarding the characteristics of the upcoming event to the lead agency of the response plan.

Step 3: Assess risk and determine activation of response plan

Once informed of a possible extreme heat event, the lead agency in collaboration with its partners needs to determine if the characteristics are indicative of an extreme heat event that could trigger activation of the heat response plan. Generally, the lead agency reviews the NWS forecast data and health-impact information to determine whether location-specific criteria for an extreme heat event are satisfied, and then, if the conditions are met, the agency activates the plan. Activation of the heat response plan should happen before the extreme heat event occurs to ensure that preventive measures and strategies are implemented at the most opportune time for preventing illnesses and deaths from extreme heat.

Step 4: Activate response plan and notify the public

Assuming the impending heat event meets location-specific criteria for an extreme heat event, the lead agency activates the response plan. Immediately after a decision to activate the extreme heat response plan, informing the public of the timing, severity and duration of the forecasted extreme heat event is next. Effective public notification of an upcoming extreme heat event helps eliminate the risk of the heat event taking a population by surprise. Notifying the public of anticipated conditions, strategies to stay cool and hydrated and places to go to cool off will enable residents to prepare themselves and will enable the organizations involved in the response to concentrate on known high-risk individuals and locations. Advance public notification about the cooling centers (if used as a strategy) will increase the likelihood that at-risk individuals can take advantage of these services. All messages regarding an upcoming extreme heat event should be coordinated with media outlets to ensure the public receives consistent and accurate information. Within the heat response plan is a detailed communication strategy.

Step 5: Implement the response plan

The fifth step in responding to an extreme heat event is to implement the strategies in the response plan. The strategies should reflect the demographics and vulnerabilities of the community. See the next section 'Developing a heat response plan' for detailed descriptions of several strategies that can be inserted into the response plan. The response plan should clearly delineate which participating agencies and organizations are responsible for implementing each strategy.

Step 6: Evaluation of response plan

Evaluation is critical for improving the plan and making it more effective for preventing heat-related illnesses and deaths in the future. After each heat related event, a review and evaluation of each step is key to improving response plans.

Developing a Heat Response Plan

Heat response plans are effective in reducing heat-related mortality³⁸. Heat response plans describe in detail the roles and actions of government agencies and nongovernmental organizations for preventing morbidity and mortality from an extreme heat event. Each city and county in Missouri is encouraged to have a heat response plan. The level of detail and the number of strategies in the plan will vary based on available resources, geographic location, agencies and organizations involved in planning and responding and the types and distribution of vulnerable populations. Appendix A has a draft of a heat response plan cities and counties can modify and adapt for local jurisdiction.

Critical Elements of a Heat Response Plan

Lead agency: Identifying a lead agency for implementing the extreme heat response plan is important. Typically, a health department or emergency management is the lead agency in charge of responding to extreme heat events, but this can vary at the local level. The lead agency will activate the plan and help coordinate the efforts of organizations involved in the response.

Criteria for activating and deactivating the plan: Activating and deactivating an extreme heat response plan will vary and based on location-specific factors that affect the relationship between weather and mortality. These factors may include air temperatures, dew point temperatures, wind, daytime highs and overnight lows and how long the hot weather will last. Some public health departments have their own thresholds and calculations that include health-related criteria for extreme heat events. Others use the NWS criteria for activation. Appendix N provides examples of triggers used in the United States to issue a heat alert.

Roles and activities of agencies and organization involved with the plan: Implementation of a heat response plan requires close collaboration between government agencies (e.g., local public health department, city/county emergency management, NWS) and non-governmental organizations, especially organizations that serve the community and vulnerable populations (e.g., the American Red Cross, Meals on Wheels, Salvation Army). Engaging local organizations that work with vulnerable populations in planning and implementing the response plan will make it easier to identify appropriate strategies for the vulnerable populations in the community. Additionally, these organizations are most likely to perform successful outreach and strategies targeted to specific populations. The plan must clearly articulate the roles and responsibilities of all the organizations involved in the plan.

Communications plan: The communications plan needs to articulate communication strategies both between partners involved in the response plan and with the public. There should be frequent communication between the NWS, the lead agency in charge of the response plan and other collaborating agencies and organizations. Additionally, the plan should identify communication strategies for communicating heat-related information before and during an extreme heat event. For example, the lead response agency, in coordination with other partner organizations, should coordinate extreme heat education/awareness campaigns in their communities in the spring before a heat event to help prepare and educate residents of the dangers of extreme heat.

In addition to messages to the public, provide information to organizations/companies that have at-risk populations (e.g., young children, outdoor workers, elderly) and may include the following: schools, daycares, landscape/construction businesses, sports teams/camps and senior living facilities. Messages should include information on what to do (e.g., how to prevent illnesses from extreme heat), symptoms of heat-related illnesses, characteristics of persons more vulnerable to extreme heat and where to go for more information. Transmit messages through a variety of media outlets, including television, radio, internet and distribution of fliers and posters. Messages should be tailored, translated and sensitive to the demographics and population of the area. For example, translations of tip sheets for individuals into the languages spoken in the local jurisdiction. Develop the communications plan before the heat event and updated after the event using lessons learned from implementing the plan.

Identification of vulnerable persons: Quantifying and mapping vulnerable populations and other risk factors provide important information for planning and implementing appropriate strategies that reach the most vulnerable members of a community. The lead response agency, or another entity, should create data summaries and/or maps to identify the most vulnerable and where they reside in their community, so that appropriate preventative actions and strategies for these populations can be determined before an extreme heat event. See the section, “Characteristics that increase the risk of heat-related illnesses,” on pages 9-12 for more information on characteristics to map.

DHSS and the Centers for Disease Control and Prevention (CDC) provided the resources listed in the table below are to aid local emergency managers and public health departments in locating their community’s vulnerable populations. Additional resources are in Appendix B.

Resource	Website/URL	Snapshot
Missouri Public Health Information Management System (MOPHIMS)	https://healthapps.dhss.mo.gov/MoPhims/MOPHIMSHome	Provides a common means for users to access public health related data including chronic disease profiles, death profiles, injury profiles, hospital and ER visits, etc.
CDC-EPHT Heat and Health Tracker	https://ephtracking.cdc.gov/DataExplorer/	Search environmental justice or populations and vulnerabilities
CDC-Environmental Justice Dashboard	https://ephtracking.cdc.gov/Applications/ejdashboard/	Contains data on environmental exposures, community characteristics, and health burdens
DHSS Environmental Public Health Tracking portal	https://ephtn.dhss.mo.gov/EPHTN_Data_Portal/communitydata.php	Community profiles and links to demographics, income, poverty, housing and other socio-economic data

Evaluation: After each extreme heat event, a review and evaluation of each step needs completed to improve response plans. Modifications to the plan should address lessons learned and changes in local conditions. This ensures continuous quality improvement and rectifies any challenges or mistakes observed from implementing the plan during previous events. The agencies and organizations involved in responding to the extreme heat events should partake in the evaluation process. Adjusting strategies and/or criteria for activating heat response plans use collected and analyzed records on heat-related morbidity and mortality that occurred during the extreme heat event.

Additional Strategies to Prevent Heat-related Illnesses

In addition to those essential elements described above, additional strategies that may be included in a local heat response plan. Not all of the following strategies will be feasible or appropriate for every location. The best strategies for any given jurisdiction utilize local resources and tailor to the at-risk populations within the community. For a listing of some best practice strategies, see Appendix C, which provides a checklist of response plan elements and strategies to prevent morbidity and mortality from extreme heat.

Coordinate distribution of information on heat exposure symptoms and tips on how to stay cool for public

broadcasts: Educating and communicating prevention information to the public before and during an extreme heat event is critical to reducing illnesses and deaths due to extreme heat exposure. Publicly broadcasting cooling tips and symptoms of excessive heat exposure should complement broadcasts about the extreme heat conditions and help residents respond to the heat appropriately (e.g., stay well-hydrated, seek air-conditioned locations, minimize direct sun exposure). See Appendix E for a sample press release.

Disseminate information related to preventing heat-related illnesses to community organizations and facilities with concentrations of high-risk individuals: Developing a database/list of facilities (e.g., those with mobility/health impaired residents) and organizations that serve vulnerable populations and their locations aids prioritization of prevention efforts to populations vulnerable to extreme heat and facilitates dissemination of extreme heat information to the organizations that serve these populations through faxes, emails, and/or telephone contact trees. For example, contacting nursing homes and senior living centers that might not have air conditioning and providing information to ensure that their populations are staying cool and assessed for symptoms of overexposure to heat.

Activate a heat line: An emergency heat line provides real-time advice and information during extreme heat events that can help prevent heat-related illnesses. A heat line activation happens when the response plan is activated or heat-related messages can be incorporated into more general, full-time systems (e.g., 211 line). In Missouri, the United Way supports a 211 line that provides information to individuals during an extreme heat event. Monitoring heat line calls and 911 calls made during an extreme heat event can provide information about how well the community is adapting to the heat. An activated reverse 911 call system allows numbers that call 911 during an extreme heat event to dial and notification of current information on weather forecasts and safety measures.

Identify and designate buildings with air conditioning as public cooling centers and extend hours of operation: Spending time in an air-conditioned building during an extreme heat event is one of the most effective means of reducing a person's risk of developing a heat-related illness. Work with partners to identify and designate specific public or private buildings with air conditioning as official cooling centers. If possible, choose buildings with back-up generators for cooling centers. DHSS maintains an online statewide map of known cooling center locations on the following webpage: <https://health.mo.gov/living/healthcondiseases/hyperthermia/index.php>.

Cooling centers should be ADA accessible and monitored by appropriate staff. Information on providing full access to a cooling center located in Chapter 7 of the ADA Best Practices Tool Kit for State and Local Governments, available online at: <http://www.ada.gov/pcatoolkit/toolkitmain.htm>.

Extending the hours of operation of the cooling centers increases the opportunity for high-risk individuals to spend time in an air-conditioned environment.

Providing free public transportation to cooling centers helps individuals who may have limited access to transportation and financial resources to reach the center.

Work with the public and private sector to allow public gathering at buildings with air conditioning and extend hours of operation: Allowing the public to congregate freely at air-conditioned places where they already frequent, such as shopping malls, libraries and movie theaters, can increase the use of air-conditioned buildings and minimize negative health impacts. Before making announcements to the public about visiting the facilities, be sure to reach an agreement with the owners. Many of the people who are at greatest risk for negative health effects from an extreme heat event may regularly visit specific air-conditioned locations and may be more likely to go to these places versus a cooling center. Extended hours of operation of public spaces, such as libraries and public swimming pool, increase accessibility for working families. Providing free public transportation to cool places during an extreme heat event helps individuals who may have limited access to transportation and financial resources to reach a cool destination. DHSS provides a Best Practice Guide for organizations such as those mentioned above, who wish to become a cooling center. See Appendix F.

Outreach to vulnerable populations: Contact high-risk individuals (e.g., elderly living alone, people experiencing homelessness) directly; and, observe several times a day during an extreme heat event. This is to ensure people are following cooling tips and resources are available (e.g., fluids being consumed, appropriate clothing is being worn) and that any symptoms of overexposure are recognized and alleviated as early as possible. Depending on local resources, persons involved in the outreach process can include social and health workers, volunteers, church organizations, other

nongovernmental agencies and the police, including outreach and evaluate the homeless. Every county in Missouri is covered by a regional planning body for homeless services, known as a Continuum of Care. For contact information for your area, visit <https://www.endhomelessnessmo.org/continua>.

Increased outreach efforts, supported by authorizing officials, to move individuals believed to be experiencing medical difficulties or at extreme risk to cooling shelters for observation and treatment.

Arrange for extra staffing of emergency support services: Extreme heat events place additional burdens on emergency medical and social support services through increased use of these services. Increasing staffing helps avert any crises that may arise from the systems becoming overwhelmed. Hospital/clinic administrators should be encouraged to prepare for increased patient loads during extreme heat events.

Suspend utility shutoffs and provide transportation and financial assistance: Local governments should develop partnerships and/or policies to prevent power and water companies from shutting off services to their customers due to nonpayment of bills during extreme heat events. Drinking water, taking cool baths/showers and using air conditioners are some of the most effective ways of preventing heat-related morbidity and mortality. Providing free bus passes and/or other subsidized means of transportation to cooling centers for low-income people. Vouchers for buying air conditioners and financial aid for electricity bills are other ways of providing assistance to low-income people.

Provide water at public places: Providing sources of clean potable drinking water at strategic locations in public places (e.g., parks, malls, cooling centers) enhances people's ability to stay hydrated.

Reschedule outdoor public events when possible: Developing and implementing policies that identify when large outdoor events or activities (e.g., sports games, outdoor camps and concerts) should be canceled or rescheduled due to extreme heat can help prevent heat-related illnesses. To the extent that local officials can control these events (e.g., through permits or use of facilities), efforts taken to reschedule an event or, when rescheduling is not feasible, require water stations, medical staff and/or "cool zones" for attendees.

Provide information to pet owners on protecting their pets from extreme heat: Some pet owners are reluctant to leave their homes to go to a cool place if they cannot bring their pets with them. Providing messages to pet owners on tips for keeping their pet cool and hydrated can help to alleviate their anxiety. In addition, pet owners can be encouraged to call their veterinarian if they have any specific concerns. If possible, identify a local cool place that may be willing to accept people and their pets.

Prepare strategies for a power outage: If a widespread power outage occurs during an extreme heat event, air conditioning may be unavailable. Ideally, messages regarding tips on how to stay cool and hydrated, as well as public sources of clean potable water provided to the public and vulnerable populations. Buildings where vulnerable populations reside, such as hospitals, nursing homes, etc. may want to consider buying a back-up generator to ensure that their building will stay cool if there is a power outage.

Mitigation/Adaptation to Extreme Heat

It is important to support and promote programs and policies to reduce effects of urban heat islands. Although strategies to reduce the urban heat island effect typically are not included within a response plan, they are important for long-term adaptation to climate changes and reduce the severity and duration of urban residents' exposure to high-heat conditions. Programs and policies that increase urban vegetation, especially shade trees, and encourage the use of cool building materials can help reduce the urban heat island effect. Some strategies that help reduce the urban heat island effect can provide multiple health benefits. For example, green roofs can help reduce the urban heat island effect, can help capture and clean storm water and can provide a green space for mental health benefits for people in the city.

Training and Resources for Extreme Heat

DHSS developed a list of links to additional online resources. Appendix B provides a listing and brief description of several websites that contain additional information on extreme heat events.

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APPENDIX A

Heat Response Plan Template

Introduction

Planning for excessive heat events has traditionally not been as robust as that for floods, fires, earthquakes and typical disaster scenarios. But while heat events destroy less property, they claim more lives on average than all other declared disaster events combined.

Heat emergencies can be slow to develop, taking a number of days to have a measurable impact on human health. Vulnerable populations may not be affected immediately, but rather experience the cumulative effects of high heat and humidity that can result in serious illness or even death.

The human body does adapt to changing temperatures, but only to a narrow range of temperatures if over a relatively short period of time. Heat-related illness occurs when the body is unable to cool off in high heat environments. When the body's temperature rises rapidly, vital organs may be damaged, which could result in death.

Humidity exacerbates the effects of high heat by limiting the effectiveness of sweating. For this reason, it is important to consider the heat index, which is a measurement of the air temperature in relation to the relative humidity, as a more accurate indicator of discomfort and danger. See Appendix D for heat index and health effects charts.

Purpose

The purpose of this Heat Response Plan (hereby referred to as Plan) is to guide the **[Jurisdiction]** in preparation for, and during an extreme weather-related heat situation. This plan identifies resources, actions and critical issues regarding a weather event including monitoring, dissemination of public information and congregate care and/or shelter.

This Plan is intended to provide a written action plan to prepare the **[Lead Agency]** in managing and responding to an extreme heat event. As with all emergency plans, these are guidelines that may be deviated from as the situation dictates and justifies.

The objective of this Plan is to:

- Ensure all community agencies/organizations working with at-risk individuals are provided with information on precautions to take when temperatures reach extreme levels
- Coordinate community response when temperatures reach extreme levels
- Ensure at-risk populations are cared for when temperatures reach extreme levels
- Provide cooling centers when appropriate

Scope

This is a public health emergency response plan; therefore the **[Lead Agency]** will lead the response with support from **[Include list of partners]**. There is a shared understanding among the partners that they will work together to monitor, assess, activate, and support local needs. (*Lead agency can be local health department (LPHA), emergency manager (EM), or other; partners can be LPHA, EM, community organizations, etc.*)

Planning Assumptions

- **[Jurisdiction]** will continue to experience extreme heat events in the future

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- Residents are not prepared for extreme heat events
- Because an extreme heat event is primarily a public health emergency, emergency preparedness and response planning have not included a plan for an extreme heat event
- Certain residents would be considered vulnerable or at great risk in a heat emergency
- Local public health and emergency management professionals have communications networks that could be activated in advance of, and during an extreme heat event
- Social service agencies and local elected officials play a critical role in symptom recognition, early intervention, and communicating important information to individuals and families
- A coordinated approach to an extreme heat event could reduce morbidity and mortality

Concept of Operations

The primary concept of operation for a response to an extreme heat event will focus on providing public information using different notification tools including press releases, websites and other mechanisms discussed later in this Plan. Dependent on the progression, duration and impact of the extreme heat event, cooling center locations may be made available to community members.

Response to an extreme heat event will utilize a four-phase approach based on weather information from the National Weather Service (NWS), or an electrical emergency or planned rotating outage occurring during an extreme heat event. These phases are intended to provide adequate time for dissemination of information and implementation of appropriate actions. These trigger points should be reviewed and/or revised before the heat season, based on the changes from historical data compiled by the NWS and any recommendations made by them.

Phases of Activation

The NWS defines excessive heat as a combination of high temperatures (significantly above normal) and high humidity that can lead to heat-related illness, including heat cramps, heat exhaustion and heat stroke.

The Heat Index is a subjective measure by the NWS of what it feels like to the human body when relative humidity is factored into the actual air temperature. When temperatures are at a level for two or more consecutive days where heat-related illnesses are possible, without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to community members without cooling capabilities, identified health problems, or fragility due to age. Therefore, the definition of excessive heat for a particular climate zone will consider both daytime maximum temperatures and nighttime minimum low temperatures.

The NWS Excessive Heat Watch, Warning and Advisories will serve as one of the trigger points for decision-making. The experimental NWS Potential Heat Risks can be found at <https://www.wrh.noaa.gov/wrh/heatrisk/?wfo=sto> and gives a snapshot of the current risk and a 7 day forecast.

Phase I – Seasonal Readiness

Actions are taken prior to hotter months to prepare for and maintain a state of readiness. (*Threshold temperatures not expected to be reached.*) This is the minimum state of vigilance to prepare for and maintain a state of increased readiness.

Response Actions:

- Review of existing plans, procedures and resources
- Initial notification of key stakeholders (*LPHA, community organizations, etc.*)
- Verification of use/availability of key facilities (*cooling centers, public buildings willing to extend hours, etc.*)
- Updating/validating notification processes
- Initiating awareness campaigns, disseminating information to public

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Phase II – Excessive Heat Watch

Trigger:

- Excessive Heat Watch alert issued by NWS
- Conditions are favorable for an excessive heat event within 24-72 hours but timing is uncertain

Response Actions:

- **[Lead Agency]** notifies all community heat response partners through established communication network (*communication protocol outlined under Alert and Warning below*)
- News release/social media posted that includes the following information:
 - Heat Watch has been issued
 - The criteria upon which the watch was based
 - General information on heat-related health effects
 - Recommended prevention measures for the public
 - Means by which to obtain additional information
 - Emphasis on the need for residents to check on family, friends and neighbors who may be vulnerable to the heat or who may need assistance in implementing recommended protective actions
- Continued monitoring of weather

Phase III – Excessive Heat Advisory

Trigger:

- NWS issues an Excessive Heat Advisory indicating a Heat index of over 100°F for two or more consecutive days
- Power outage (scheduled or unexpected) expected to last more than 24 hours when daytime temperature exceeds 90°
- Increased reports of heat-related illnesses or medical emergencies reported by local healthcare providers or other credible sources

Response Actions:

- Continued monitoring of weather
- Consider need to activate public information call lines
- Increase monitoring of persons with disabilities, access and functional needs, or homeless
- Increase surveillance of heat related injuries/illnesses from local healthcare providers
- Monitor electric demands and any electrical issues
- Request normal cooling centers be *opened (check DHSS map at <https://health.mo.gov/living/healthcondiseases/hyperthermia/> to identify normal cooling centers)*
- Determine need for additional cooling center activation in city/county owned facilities
- Look ahead to Phase IV activities

Phase IV – Excessive Heat Warning

Trigger:

- NWS issues an Excessive Heat Warning indicating a Heat Index of 105° or higher for two or more consecutive days
- Nighttime minimum temperature of 80° or more for two or more consecutive days
- NWS Warning issued for more than three days

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- Power outage (scheduled or unexpected) expected to last more than 48 hours when daytime temperatures exceed 100°
- Increased reports of heat-related illnesses or medical emergencies reported by local healthcare providers or other credible sources

Response Actions:

- All actions in Phase III continue
- Open additional cooling centers at the following city/county owned facilities
 - *List facilities, addresses and contact information*
- Expand hours of operation at city owned pools and parks
- Request local utility providers to halt service cancellations until after heat warning has passed
- Distribute bottled water, in conjunction with community partners, to vulnerable populations
- Provide shuttle service/bus passes to cooling centers
- Increase public outreach using additional resources such as
 - Police
 - Postal workers on rounds
 - Utility staff
- Distribute fans in conjunction with community partners

Deactivation of Response

Conservative deactivation thresholds are recommended. [Responsible Partner] is responsible for declaring the end of Phase III and Phase IV response. Deactivation will be clearly communicated to all heat response partners through the established communication network.

Following deactivation, a press release/social media messaging will be issued with the following information:

- Announcement of the end of the heat advisory or heat warning
- The criteria upon which the deactivation was based
- Reinforcing the need for continued vigilance against heat-related health effects within vulnerable populations as there can be a lag period between exposure to heat and ill effects
- Directions on where the public can obtain additional information
- Announcement of the closing of city/county cooling centers

Evaluation

The [Lead Agency] will review the effectiveness of the Extreme Heat Response Plan and make any necessary revisions annually.

Information will be collected including the number of watches/advisories/warnings issued, the number of days under such conditions, actions taken and associated costs. *See Appendix I for sample indicators for process evaluation.*

Roles and Responsibilities

The roles and responsibilities of the heat response partners is described below. It is understood between all partners that the success of the heat response depends on the coordination of all partners. There will be a general sharing of information as appropriate for the lead agency to make decisions on activation, deactivation and evaluation of this Plan.

Use this area to define each partner and their responsibility. The table below is a sample only.

Partner	Role	Responsibilities
<p>ABC City Manager</p> <p><i>Insert address, contact information, etc. as appropriate</i></p>	<p>Lead Agency</p>	<p>Monitor weather information from NWS</p> <p>Determine activation of the Heat Response Plan (in conjunction with ABC health Department)</p> <p>Notify heat response partners of activation through established communication network</p> <p>Notify elected officials of need to open city/county facilities and/or to extend hours</p> <p>Notify city park officials of need to extend pool/park hours of operation</p> <p>Coordinate distribution of bottled water</p> <p>Determine deactivation of the Heat response Plan</p> <p>Notify heat response partners of deactivation through established communication network</p>
<p>ABC Health Department</p>	<p>Public Health Authority</p>	<p>Provide public education regarding heat-related illnesses and prevention methods</p> <p>Draft and issue press releases and social media messages</p> <p>Monitor reports of heat related illnesses and medical emergencies reported by local healthcare providers or other credible sources</p>
<p>ABC Senior Center</p>	<p>Support Agency</p>	<p>Act as cooling center when requested including extending hours of operation</p> <p>Share press releases, social media messages and other heat related information issued by the ABC Health Department</p>
<p>ABC Mayor/City Council</p>	<p>Support Agency</p>	<p>Authorize use of city/county owned facilities as cooling centers when needed</p> <p>Share press releases, social media messages and other heat related information on the city's website and social media</p>
<p>ABC Police Department</p>	<p>Support Agency</p>	<p>Distribute bottled water to at-risk populations and/or public venues</p> <p>Share press releases, social media messages and other heat related information on the department's website and social media</p>
<p>ABC Church</p>	<p>Support Agency</p>	<p>Agrees to be emergency cooling center if needed</p> <p>Share press releases, social media messages and other heat related information on the church's website and social media</p>

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Communication Protocol

Heat Response Partners

The **[Lead Agency]** will utilize the communication matrix listed as Appendix K for ensuring all partners are notified as appropriate

Public Information

Information sharing and dissemination of public information is crucial during an extreme heat event. **[Partner]** (*Make sure this matches in Roles and Responsibility section*) will be the lead for press releases and related health messages. However, multiple departments and organizations have a role in the risk communication process.

Risk communication priorities include (but are not limited to):

- Assist in informing and educating the public regarding health precautions and provide other heat related materials
- If warranted, provide continual updates (via press releases, news conferences, etc.) on the incident to the media
- Provide direction and instruction regarding cooling center activation, locations and operational hours

See Appendix L for targeted communication strategies for delivering health-related messages.

Alert and Warning

Every extreme heat related advisory, watch or warning will be communicated to the public as soon as possible. **[Partner]** (*Make sure this matches in Roles and Responsibilities section*) will be responsible for community outreach before, during and after an extreme heat event. *Sample social media messages, public service announcements and talking points are provided in Appendix J.*

The following methods will be utilized for alert and warning to ensure the widest possible dissemination of emergency communications to the public.

Emergency Mass Notification System

Include information about your county/city system if applicable

Local Media

List any local newspapers, radio/TV stations along with contact and other pertinent information

City Website

List city/county websites and/or social media outlets along with contact and other pertinent information

Note: *Language barriers must always be considered when warning messages are developed for the public. The most common non-English languages spoken in your jurisdiction can be found at <https://datausa.io/>*

It should be requested that television stations utilize closed captioning and media crawls to provide information visually. Sign language can also be used.

At-Risk Populations

Identifying high-risk groups in **[Jurisdiction]** allows public health officials to develop and implement targeted notification and response actions that focus surveillance and relief efforts on those at greatest risk. At risk individuals should be fully informed regarding high heat events in order to ensure their health and safety, including relocation, if necessary. The table below indicates those facilities and known locations where at-risk populations live, work or gather and will be included in emergency communications. *Below is a sample only. Customize to fit your needs.*

Facility	Contact Person	At-Risk Population/Comments
ABC Nursing Home 123 Main Street ABC City, MO 11111	Jane Smith 555-555-5555	55 bed nursing home, no backup power
Sunny Acres	Joe Williams 111-111-1111	40 unit retirement housing complex, has backup generator feeding community center
ABC Church	Rev. Paul 123-456-7890	Russian Speaking congregation, can provide Russian translation

Evaluation

An after-action report will be completed following each heat event that requires activation above Phase I – Seasonal Readiness. This ensures continuous quality improvement and allows the plan to be modified to correct any challenges or gaps identified during the event. *Appendix I provides sample indicators for process evaluation.*





APPENDIX B

On-line Resources

Name	Website/URL	Purpose
National Environmental Public Health Tracking	https://www.cdc.gov/nceh/tracking/topics/ClimateChange.htm	Provides data sets that can be used to understand how changes in temperature and precipitation and occurrence of heat waves, floods, droughts, and wildfires can influence human health
Data.gov Climate – Human Health	https://data.gov/climate/humanhealth/	Allows users access to data, information and decision tools analyzing climate change impacts on public health
EPA Integrated Climate and Land-Use Scenarios	https://www.epa.gov/gcx/about-iclus	Information on climate and land use change as they effect global environmental change.
National Integrated Heat Health Information System	https://nihhis.cpo.noaa.gov/	Provides current heat forecasts, health risks, and heat safety tips
National Institute of Environmental Health Services	https://tools.niehs.nih.gov/cchhl/index.cfm	An integrated, curated bibliographic database of global peer-reviewed research and gray literature on the science of climate impacts on human health.
NASA Health and Air Quality Applied Sciences Team	https://haqast.org/	Provides NASA data and tools to help solve public health and air quality problems
National Weather Service	https://www.weather.gov/safety/heat-outreach	Provides social media materials, Heat Guidebook, Online classes



APPENDIX C

Checklist of Response Plan Elements and Strategies

Response Plan Elements	
Identify lead agency responsible for the response plan	<input type="checkbox"/>
Provide criteria for activating and deactivating the plan	<input type="checkbox"/>
Assign roles and activities of agencies and organizations involved with the plan	<input type="checkbox"/>
Develop communications plan for communicating heat-related information to partners and the public before, during and after an extreme heat event	<input type="checkbox"/>
Develop plan for identifying vulnerable individuals within jurisdiction	<input type="checkbox"/>
Include strategies for preventing morbidity and mortality from extreme heat (see below)	<input type="checkbox"/>
Provide for evaluation of the response plan	<input type="checkbox"/>
Response Plan Strategies	
Before an extreme heat event and during seasonal readiness	
Identify heat-vulnerable populations and target groups	<input type="checkbox"/>
Meet with community partners to review and plan for upcoming heat season	<input type="checkbox"/>
Offer training for public health staff	<input type="checkbox"/>
Offer education and training to residential building managers of heat-vulnerable groups	<input type="checkbox"/>
Plan to provide drinking water in public places (water fountains, portable water stations)	<input type="checkbox"/>
Identify cooling centers and ensure they are equipped with provisions if needed	<input type="checkbox"/>
Identify transportation options to get individuals to and from a cooling center	<input type="checkbox"/>
Distribute information to community service providers and issue public service announcements with reminders about heat-related health risks	<input type="checkbox"/>
Prediction	
Establish partnership with local National Weather Service (NWS) station to ensure access to weather forecasts capable of predicting extreme heat conditions a few days in advance of an event	<input type="checkbox"/>
Ensure timely transfer of weather forecasts to lead agency	<input type="checkbox"/>
Assessment, Activation and Notification	
Review activation criteria based on predicted meteorological characteristics and health impacts and determine activation of the response plan	<input type="checkbox"/>
Coordinate distribution of information about the anticipated timing, severity, and duration of the extreme heat event; heat exposure symptoms; and tips on how to stay cool during an extreme heat event for public broadcast	<input type="checkbox"/>
Develop accessible record of facilities and locations with concentrations of high-risk individuals	<input type="checkbox"/>
Implementation	
Disseminate information related to preventing heat-related illnesses to community organizations and facilities with concentrations of high-risk individuals	<input type="checkbox"/>
Activate an informational heat phone line (have nurse available to answer specific medical questions if possible)	<input type="checkbox"/>
Identify and designate buildings with air conditioning as public cooling centers and extend hours of operation	<input type="checkbox"/>
Work with the public and private sector to allow public gatherings at buildings with air conditioning and extend hours of operation	<input type="checkbox"/>

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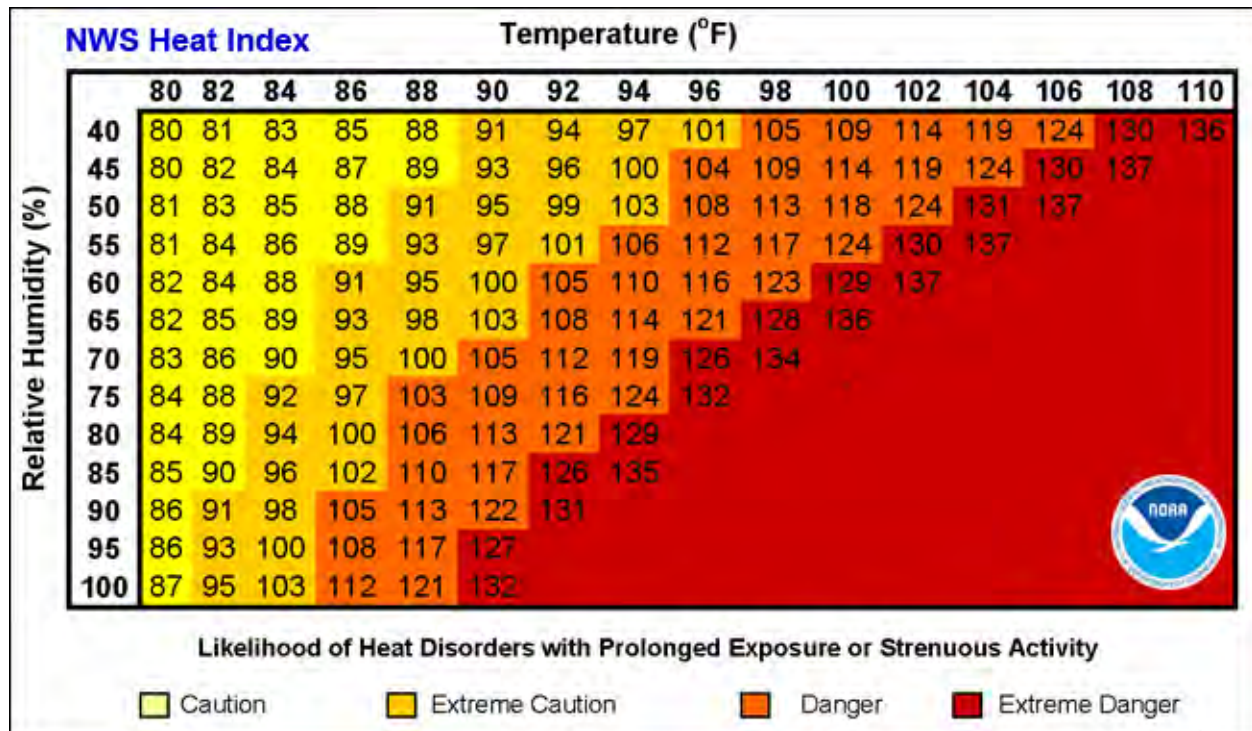
Provide outreach to vulnerable individuals	<input type="checkbox"/>
Arrange for extra staffing of emergency support services	<input type="checkbox"/>
Suspend utility shutoffs and provide transportation and financial assistance	<input type="checkbox"/>
Provide water at public places	<input type="checkbox"/>
Reschedule outdoor events when possible	<input type="checkbox"/>
Provide information to pet owners on protecting their pets from extreme heat	<input type="checkbox"/>
Prepare for power outages	<input type="checkbox"/>
Evaluation	
Perform after action review of plan after implementation	<input type="checkbox"/>
Mitigation	
Support and promote programs and policies to reduce effects of urban heat islands	<input type="checkbox"/>





APPENDIX D

Heat Index and Health Effects Chart



Celsius	Fahrenheit	Effects
27° - 32° C	80° - 90° F	Caution – Fatigue is possible with prolonged exposure and activity. Continuing activity could result in heat cramps
32° - 41° C	90° - 105° F	Extreme caution – Heat cramps and heat exhaustion are possible
41° - 54° C	105° - 130° F	Danger – Heat cramps and heat exhaustion likely; heat stroke probable with continued activity
>54° C	>130° F	Extreme danger – heat stroke is imminent

Note: Exposure to full sunshine can increase Heat Index values by up to 8° C (14° F).



APPENDIX E

Sample Press Releases

Customize highlighted areas for the specific incident.

Sample 1 -

Extreme Heat Event Media Release

The National Weather Service has issued a **Heat Advisory** for **XX**. A **Heat Advisory** is issued when conditions can be expected that cause significant discomfort and could lead to a threat to life or property if caution is not taken. National Oceanic and Atmospheric Administration's (NOAA) heat alerts are based mainly on Heat Index Values. The Heat Index, sometimes referred to as the apparent temperature, is a measure of how hot it really feels when relative humidity is factored with actual air temperature.

Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. You are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Air-conditioning is the number one protective factor against heat related injuries and death. During conditions of extreme heat, spend time in locations with air conditioning such as shopping malls, public libraries, or a cooling center. **A list of local cooling centers can be found at**

Even short periods of high temperatures can cause serious health problems or heat related injuries. You are encouraged to know the symptoms of heat injuries and to monitor themselves, neighbors, and co-workers for signs of heat-related illness or injury.

Sample 2 –

Officials Urge Caution During Heat Advisory

The **health department** of **location** urge residents to protect themselves from heat related illness. The National Weather Service forecasts temperatures to be **in the triple digits** this week. Most heat-related illnesses involve the elderly or individuals who have chronic illnesses, but also at risk are children, athletes, and outdoor workers.

We ask everyone to take precautions to avoid heat exhaustion, and to check on their family, friends and neighbors who may be especially vulnerable to extreme heat. Infants, young children, older adults, and people with chronic disease have a tougher time regulating their body temperature. Help them stay cool and hydrated.

Risks associated with a heat wave include:

- **Heat cramps:** This includes muscular pains and spasms resulting from heavy exertion. These symptoms are often the first signal that the body is suffering from excessive heat.
- **Heat exhaustion:** This includes fainting, rash, fatigue, and nausea. Skin may become clammy and moist.
- **Heat/Sun Stroke:** Symptoms include hot, dry skin, the absence of sweat, nausea, confusion, and unconsciousness. This is a life-threatening condition.

To prevent risks from excessive heat, individuals should do the following:

- **Seek air-conditioning:** If your home does not have air-conditioning, seek areas that do such as libraries, shopping malls, community/senior centers, grocery stores and movie

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theatres. If you must stay in a home without air-conditioning, stay on the lowest floor out of the sunshine. For a complete list of cooling centers in **location**, please **list local information**.

- Avoid strenuous activities: This is particularly true during the hottest time of the day. Individuals who perform strenuous work during the heat of the day are especially at risk.
- Wear light-weight, light-colored clothing: Light colors reflect the sun's rays better than dark colors, which absorb the heat. Protect the face and head with a wide-brimmed hat.
- Check on family members, neighbors and friends who are vulnerable. Move them to air conditioned places if possible.
- Drink plenty of fluids: Increase fluid intake even if you are not thirsty.
- Never leave pets or people, especially children and infants, unattended in cars during a heat wave. If heat risks do occur, cool the body as soon as possible, and call 9-1-1 for symptoms of heat stroke.

For a list of cooling sites throughout **location**, please visit **list location information**.

Sample 3 –

Notice of Cooling Center Opening

In response to the extreme heat predicted for **location**, the **organization name** is operating a Cooling Center at **building name and address**. The facility complies with the Americans with Disabilities Act. The Center is open to **general public/residents of _____**.

Operating hours are daily from _____ to _____ until further notice.

Individuals who need transportation to the Center should call **organization** at _____.

The following services will be available:

- [Electrical outlets for charging electronic devices and operating medical equipment]
- [First Aid (call 9-1-1 for serious injuries or illnesses)]
- [Food/snacks and water]
- [Information about the current situation]

Service **and emotional support** animals are permitted in the Center. Pets will be accommodated at **building name and address**. Owners should expect to toilet and feed their animals.

Residents should to bring their disaster kit, including:

- Prescribed Medications/Medical Supplies
- Electronic Devices and Charging Cords
- Pet crates, food/bowls, leashes, muzzles, litter/litter boxes, and disposable pads.

For information call _____. Do not call 9-1-1 except for life-threatening emergencies that require police, fire, or emergency medical services.



BEST PRACTICES GUIDE

Establishment of Cooling Center

The purpose of this document is to provide guidance to local governments, non-profit, faith-based and community organizations that intend to operate a cooling center in the local community. We encourage the use of this document as part of a larger hot weather response strategy.

For purposes of this guidance, a cooling center is a facility that is temporarily made available to the general public during extreme temperature conditions. **Centers are not overnight shelters.** They are open for a limited number of hours for a limited number of days and provide limited services. Centers are not day-care for children, the elderly or others who cannot care for themselves. It is assumed that individuals who use the centers can return to their homes when the center is closed.

All elements of this guide might not be relevant or required in all situations. The cause, scope and duration of the incident, the demographics of the community and available resources will drive decisions about the size of the center, hours of operation and services provided.

While this guide contains the most common elements of cooling centers, additional consideration might be required. Center operators should tailor this guide to the unique aspects of their jurisdiction.

Before opening a center, operators should consult their legal counsel and insurers to determine if all legal requirements are met and liability issues are covered.

Operations

Facility

Almost any facility can be used as a cooling center including:

- libraries
- recreational or community centers
- city hall / courthouse
- places of worship
- senior centers
- legion halls
- bingo halls
- museums
- shopping malls
- movie theaters



Requirements

The Department of Health and Senior Services does not regulate or license cooling centers. Operators should ensure that the facility;

- is available to all individuals
- is compliant with the Americans with Disabilities Act (ADA) including restrooms
- drop off location is near entrance for those with mobility constraints
- provides parking access
- provides access to drinking water
- provides a safe and secure environment
- has convenient hours of operation
- can accommodate the expected number of individuals
- has lavatory capacity for the expected number of individuals
- has sufficient electrical outlets for charging stations (including medical equipment)
- has refrigeration available for medications
- be in areas frequented by individuals requiring cooling
- uses existing facilities known by and already catering to vulnerable individuals
- has access to 911 services

Additionally, staff or volunteers should have excellent interpersonal skills and be able to recognize the [signs and symptoms of a heat related-illness](#).

If possible, staff or volunteers who have been trained in basic first aid, cardiopulmonary resuscitation (CPR), and automated external defibrillation (AED) should be available during operating hours. Medical services beyond first aid are not provided at cooling centers. Access to advanced medical services (i.e. 911) is highly recommended.

Services

Prior to opening a cooling center, operators should determine the services that can be provided. Minimal services include tables and chairs, charging area and information updates.

If food (beyond snacks) is to be provided, consultation with the local health authorities is especially important before opening a center.

If at all possible, centers should be prepared to accommodate pets. Best practices for accommodating pets include:

- separately spaced seating areas for owners/pets; **dogs must be on a leash and under the control of the owner**
- availability of crates nearby for animals that are harder to control or with owners that are frail
- cats must be in carriers at all times
- provide multiple water dishes scattered throughout the room
- access to a green space outdoors for dogs to relieve themselves and supplies for clean-up



- dogs that are too aggressive towards people or other animals should not be allowed to stay if they present a danger or disruption
- animals need to be healthy or non-contagious if they have medical issues
- no pet food is provided
- have space for people who are afraid of or highly allergic to animals
- availability of backup leashes
- no retractable leashes to prevent animals from wandering and getting entangled
- additional staff/volunteer to monitor to ensure owners are controlling their pets to avoid incidents and injuries

NOTE: Service animals must be allowed to accompany their owners. Under the ADA, a service animal is defined as a dog that has been individually trained to do work or perform tasks for an individual with a disability. The task(s) performed by the dog must be directly related to the person's disability.

Emotional support, therapy, comfort or companion animals are not considered service animals under the ADA. However, some local governments have laws that allow people to take emotional support animals into public places. Check with your local government agencies to find out about these laws. **Currently Missouri's service dog law does not require owners of public accommodations to allow emotional support animals.**

Communication

An important component to the success of a cooling center is communication. Individuals need to know your facility is open and available to them. Development of a communication plan is recommended. This plan can be very simple but should include communication with the local emergency manager as well as appropriate messaging on your organization's website and social media platform. Contact information for all Missouri emergency managers can be found at the bottom of the [State Emergency Management Agency website](#).

Your communication plan should take into consideration the unique needs of the population in your area including those with limited English proficiency, vision and/or hearing challenges, etc.

When to Open a Center

Development of a protocol which indicates at what specific temperature or National Weather Service (NWS) alert would determine the activation of the cooling center is highly recommended. Likewise, development of a protocol for determining when the cooling center would deactivate is also recommended.



See National Weather Service Definitions below for definitions of hot weather advisories, watches and warnings for counties in Missouri.

Local government staff, public health professionals and other organizations that participate in planning for operation of a cooling center should identify the NWS station for their jurisdiction and build relationships with the NWS staff to ensure receiving the most current information available on predicted extreme winter weather events.

National Weather Service Definitions

...Heat ADVISORY...

means that temperatures of at least 100°F* or Heat Index values of at least 105°F* are expected generally within the next 24 hours.

Consider postponing or rescheduling any strenuous outdoor activities. If you must be outside, be sure to drink plenty of water and take frequent breaks in the shade. The young and elderly and those with medical conditions should use extra caution outdoors..

... Excessive Heat Watch...

means that Heat Index values are expected to reach or exceed 110°F* and not fall below 75°F* for at least a 48 hour period, beginning in the next 12 to 48 hours.

Plan to suspend all major daytime outdoor activities if a warning is issued. If you do not have air conditioning, locate the nearest cooling shelter or discuss staying with nearby family or friends who have A/C.

... Excessive Heat Warning...

means that Heat Index values are expected to reach or exceed 110°F* and not fall below 75°F* for at least a 48 hour period, beginning in the next 24 hours.

Refrain from outdoor activities of any nature during the warmest time of the day. Drink plenty of water and take frequent breaks if you must be outside. Stay indoors in an air conditioned building as much as possible. Check on elderly family members if they are living alone.

A cooling center is designed for non-continuous (non 24/7) operation. If a heat related emergency persists and it is not safe for individuals to return to their homes, a shelter might need to be opened.

Sheltering is beyond the scope of this guidance. Center operators should discuss the logistical and legal considerations involved in operating a shelter with their legal counsel and the American Red Cross.





APPENDIX G

Suggested Cooling Center Checklist

The following is a suggested list of important criteria for setting up a cooling center. There is no established criteria for cooling centers. Additionally, unless a special exemption has been given by the local utilities, facilities used as cooling centers are not exempt from rotating outages.

Important Criteria

- Air conditioning or equivalent (temperature maintained at 79°F)
- Accessible to all / ADA compliant
- Ample seating appropriate to the jurisdiction
- Public restrooms accessible to people with disabilities and others with access and functional needs
- Access to potable water (drinking fountain, etc.)
- Access to 911 services
- Publicly advertised
- Parking access
- Proximity to public transit

Suggested Criteria

- Back-up generators
- Secure, facility has security service
- Communications, phone (including TDD/TTY/video capabilities), internet access, sign-language interpreters
- Child friendly with materials for children to play with while at the cooling center
- Medical personnel such as nurses and/or aides or personnel trained in CPR and first aid
- Large capacity
- Personal assistance services for people with disabilities and others with access and functional needs
- Available televisions, books, games
- Transportation for those lacking their own, including wheelchair accessible services
- Follow-up procedures for those in need of additional services (health care, social services, etc.)
- Area for pets
- Veterinary resources available if needed



APPENDIX H

Cooling Center Activation Protocol

Below is a sample activation protocol. Customize to fit your needs

Level 1 – Excessive Heat Watch has been issued by NWS (Potential exists 6-14 days out)

Monitoring	<ul style="list-style-type: none">• Determine method of notifying the public of center availability• Determine whether transportation can be provided• Determine number of volunteers / staff available• Identify/procure supplies needed• Determine policies (registration, pets allowed, etc.)
-------------------	--

Level 2 – Advisory Issued by NWS (Heat Index projected to be 100° or higher for 2+ consecutive days)

Activation	<ul style="list-style-type: none">• Open normal business hours• Water provided• No transportation provided
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Level 3 – Warning (Heat Index 105° for 2+ consecutive days)

Activation	<ul style="list-style-type: none">• Open extended hours• Provide snacks and water• Have CPR certified staff / volunteer on site• Provide TV, cards, other activities• Transportation provided
-------------------	---



APPENDIX I

Sample Indicators for Process Evaluation

Evaluation question	Potential indicators
What resources were used?	<ul style="list-style-type: none"> • Resources used by each partner • Resources required for collecting and monitoring surveillance data • Staff time • Costs to communicate messages to stakeholders and the public • Costs of maintaining the alert notification system
Were the alerts issued efficiently?	<ul style="list-style-type: none"> • Frequency of partner notifications and public alerts • Timeliness of alert information received • Timeliness and efficiency of message delivery to public
Are extreme heat events forecasted and monitored accurately?	<ul style="list-style-type: none"> • Quality of surveillance data • Frequency of warnings and alerts issued in relation to actual weather conditions occurring • Capacity of participating agencies to monitor and deliver surveillance and weather data
How involved were stakeholders with implementing response measures?	<ul style="list-style-type: none"> • Level of participation of agencies and community groups in education activities, issuing alerts and responding to an alert • Number and type of response measures delivered by stakeholders
Did stakeholders follow the response plan and find it helpful?	<ul style="list-style-type: none"> • Number and diversity of engaged stakeholders and meeting frequency • Perceived importance of heat response among stakeholders • Partners' views on the degree of coordination of activities • Stakeholders' views on the adequacy of support offered • Level of stakeholder satisfaction
Are response measures being used by the public (e.g. cooling centers)	<ul style="list-style-type: none"> • Number of at-risk people who took preventive actions • Number of people, their demographic makeup and length of visit to cooling centers • Number of people and their demographic makeup who took advantage of other response measures (e.g. 'Heatline' 211, heat registration)
Were key messages and services provided to the public?	<ul style="list-style-type: none"> • Number of planned communication elements delivered • Vulnerable and general populations reached by each communication element

	<ul style="list-style-type: none"> • Number and types of inquires received • Number and types of resources distributed • Promotion and publicity received through media activities
Were target populations reached with key messages?	<ul style="list-style-type: none"> • Number of media and information sources engaged in outreach campaign • Accessibility of information to the public (e.g. multiple languages, bold print)
Did the target population understand and follow the key messages?	<ul style="list-style-type: none"> • Number of at-risk people who perceived extreme heat to be a health risk • Number of at-risk people who can identify prevention measures • Capacity of targeted population to recall accurate messaging





APPENDIX J

Talking Points and Messaging

General Guidelines for Messaging

- Stick to 3 key messages or 1 key message with 3 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 uses of the words no, not, never, nothing, none.

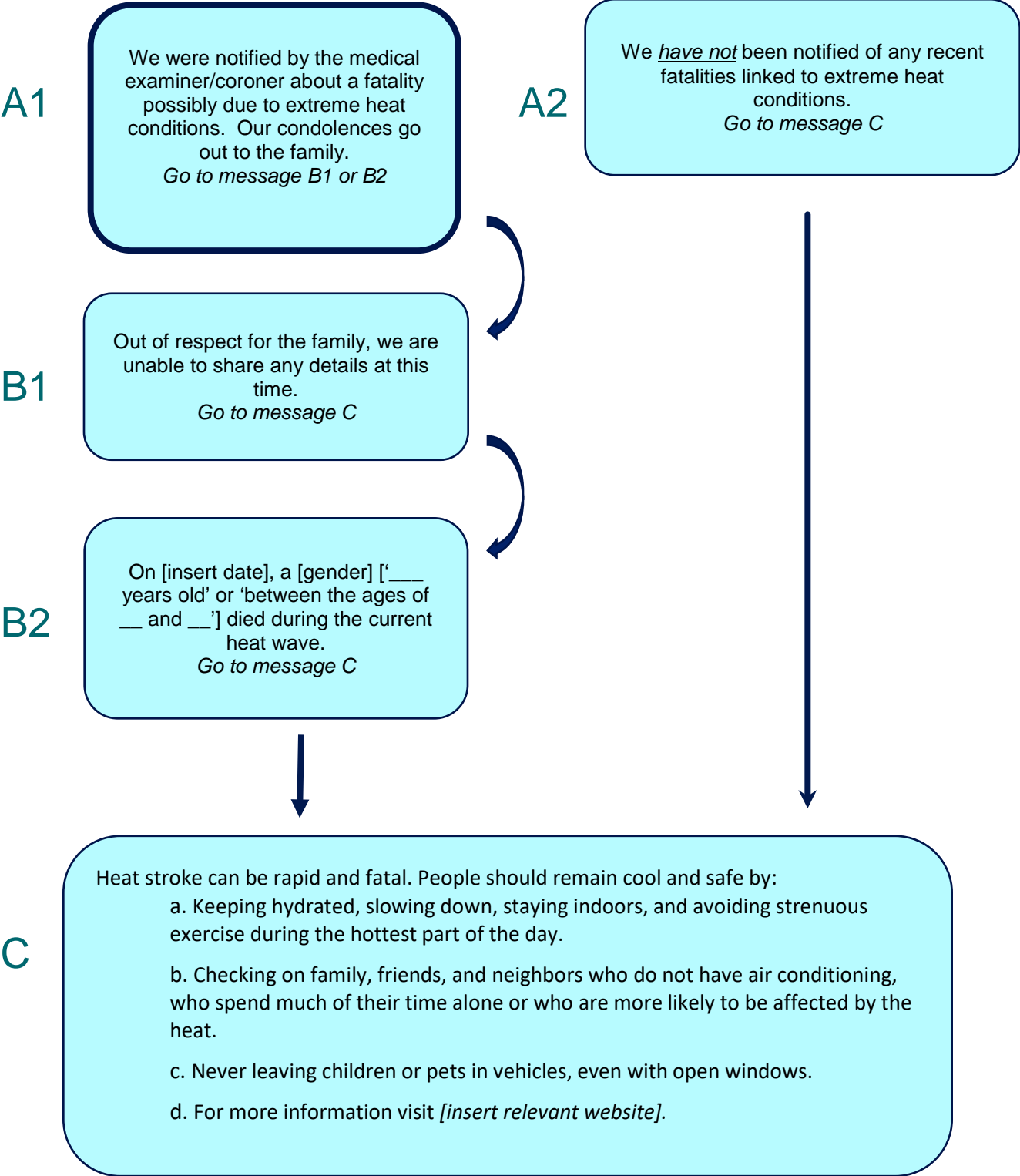
Sample Messages

Key Message	Supporting Information
Check on your neighbors to make sure they are okay, especially the elderly and those living alone.	<p>The elderly are less likely to sense and respond to high temperatures</p> <p>Those living alone can be isolated and unaware of the dangers posed by extreme heat.</p> <p>When regularly checking with your neighbors, look for signs of heat-related illness.</p>
If you must be out during the hottest time of the day, be alert for signs of heat illness.	<p>Symptoms include feeling hot, weak, dizzy or faint.</p> <p>Protect yourself by limiting physical activities, drinking plenty of water, and wearing light loose-fitting clothing.</p> <p>Call 911 or seek medical attention if you or someone you know develops heat illness.</p>
Cooling centers are available across the city.	<p>Cooling centers are designated buildings with air conditioning where the public can seek relief from the heat.</p> <p>Call 211 to find the cooling center closest to you.</p> <p>Ask 211 whether transportation is available to the cooling center.</p>

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Talking points for heat-related fatality in your jurisdiction



Social Media Samples

Facebook	Twitter
<p>Increased temperatures are expected in the XXX area over XXXXX. Prepare for the heat by pulling shades down during the day. Drink plenty of water and try to keep out of the sun. When it is very hot outside, stay indoors in places with air conditioning. If you do not have air conditioning find a cool place near you by checking out the map located at https://mogov.maps.arcgis.com/apps/webappviewer/index.html?id=a40c7955be2f41f09a4e11520c6ee34b Remember to check on neighbors and the elderly!</p>	<p>Heat wave in XX. Abnormally hot weather lasting from XX until XX. Tips: https://health.mo.gov/living/healthcondiseases/hyperthermia/</p>
<p>Air conditioning is the strongest protective factor against heat-related illness. Exposure to air conditioning for even a few hours a day will reduce your risk. Find a cooling center near you at www.health.mo.gov/coolingcenters</p>	<p>Each year approximately 175 Americans die from extreme heat. Learn what to do during severe heat and heat emergencies to stay safe. https://health.mo.gov/living/healthcondiseases/hyperthermia/index.php #HeatKills</p>
<p>During extreme heat, check frequently on neighbors who do not have air conditioning and spend much of their time alone. Report anyone suffering from the heat and needing assistance by calling 911.</p>	<p>Visit your older neighbors, friends and family members to make sure they are cool and hydrated #HeatstrokeKills</p>
<p>It's hot out there! Stay in air conditioning to reduce your risk for heat related illness. Find a cooling center near you at www.health.mo.gov/coolingcenters</p>	<p>A fan is not enough! In extreme heat, visit a cooling center. Find one at www.health.mo.gov/coolingcenters #BeatTheHeat</p>
<p>Heat related deaths ARE preventable! Learn what to do during severe heat and heat emergencies to stay safe. https://health.mo.gov/living/healthcondiseases/hyperthermia/index.php #HeatKills</p>	<p>Be aware of the warning signs of heat-related illness, such as light-headedness, mild nausea or confusion, sleepiness or profuse sweating. #HeatKills</p>
<p>Pop by your neighbors', friends' and family members' homes to make sure they're drinking enough water and staying cool! #HeatSafety</p>	<p>Go to a designated public shelter if your home loses power during periods of extreme heat. #BeatTheHeat</p>
<p>Heat exhaustion is the body's response to an excessive loss of the water and salt contained in sweat. Those most prone to heat exhaustion are elderly people, people with high blood pressure, and people working or exercising in a hot environment</p>	<p>Extreme heat can often lead to power outages. For tips on preparing check out https://health.mo.gov/emergencies/readyin3/ #Prepare</p>

<p>Extreme heat is the most common cause of weather-related deaths in the US. Protect those most at risk. (Link to local information)</p>	<p>It's hot outside. Stay Cool, Stay Hydrated and Stay Informed during extreme heat events. (link to local information)</p>
<p>Know anyone pregnant, elderly, ill or with young children? Check in on them during extreme heat – they'd appreciate it! (link to local information)</p>	<p>Summer's here! Learn tips to help stay healthy during extreme heat (link to local information)</p>

Sample PSA Script:

Keeping Cool in a Heat Wave :30

This is an important message from [XX](#). In a heat wave, keeping your cool will keep you healthy. People and animals should stay indoors. If you don't have air conditioning, go to a mall, the library or another cooling center. Remember to drink more fluids, but avoid alcohol and high sugar drinks. When going out, wear light clothing and never leave anyone, especially infants or young children, or animals in a parked vehicle. To learn more, [\[insert local information\]](#).

Power Failure in Hot Weather :30

This is an important message from [\[insert appropriate information\]](#). In hot weather, power failures can be deadly. When the "heat is on," but the power is out, check on neighbors, relatives and others at risk, including the elderly and young children. To keep yourself and loved ones cool, drink plenty of non-alcoholic fluids, reduce activities, take cool showers or baths, wear light colored clothing, and know where to go for emergency relief. To learn more, [\[insert local information\]](#).





APPENDIX K

Extreme Heat Event Communication Plan

Sample communication plan. Customize to fit your needs

Extreme Heat Event Communication Plan

Messages to be sent by *[list responsible person/partner]*

Yellow highlighted sections should be tailored to specific event.

Phase II – Monitoring / Watch (Potential exists 6-14 days out)

<p>Sent to these partners:</p> <p><i>List partners who will receive this communication</i></p>	<p>Sample email for watch 3-6 days out</p> <p>Hello all –</p> <p>The National Weather Service has issued a heat xxxx for [jurisdiction] Increased temperatures are expected over xxxx (insert the next few days, weekend, etc.).</p> <p>Please plan accordingly for your facilities and be aware of the impact on patients as well as on staff working over the next few days/weekend.</p> <p>Keep up with the latest conditions and alerts from NWS: [link to NWS office]</p>
<p>Social Messaging</p>	<p>Social Media for watch 3-6 days out –</p> <p>Facebook:</p> <p>Increased temperatures are expected in the xxx area over xxxxx. Prepare for the heat by pulling shades down during the day. Drink plenty of water and try to keep out of the sun. When it is very hot outside, stay indoors in places with air conditioning. If you do not have air conditioning find a cool place near you by checking out the map located at [link to local resource]. Remember to check on neighbors and the elderly!</p> <p>Twitter:</p> <p>Heat wave in #XX. Abnormally hot weather lasting from XX until XX. Tips: https://health.mo.gov/living/healthcondiseases/hyperthermia/</p>

Phase III – Advisory (Heat Index projected to be 100° or higher for 2+ consecutive days)

<p>Send to these partners:</p>	<p>Sample email for a NWS Heat Advisory (100° or higher for 2+ days)</p> <p>Hello all, The National Weather Service has issued a heat xxxx. Increased temperatures are expected in over xxx (insert the next few days, weekend, etc). Please post the information below to your websites and share the social media messages.</p>
<p>Social Messaging</p>	<p>Social Media for Advisory</p> <p>Post to website The National Weather Service is predicting increased temperatures in our area from xxxx to xxxx. Prepare for the heat by pulling the shades down during the day and keeping the windows open at night. Drink water and try to keep out of the sun. When it is very hot outside, stay inside, preferably in places with air conditioning. For relief from the heat, consider visiting a community center, movie theater, public library, swimming pool, or shaded park. For more information please [insert local information].</p> <p>Facebook: Increased temperatures are expected in the San Francisco Bay Area over xxx. Prepare for the heat by pulling the shades down during the day and keeping the windows open at night. Drink water and try to keep out of the sun. When it is very hot outside, stay inside, preferably in places with air conditioning. For relief from the heat, consider visiting a community center, movie theater, public library, swimming pool, or shaded park. For more information [insert local information].</p> <p>Twitter: Heat wave in #[location]: abnormally hot weather lasting 2+ days. #BeatTheHeat Tips: [insert local information or link to https://health.mo.gov/living/healthcondiseases/hyperthermia/ #HeatSafety</p> <p>Press Release: <i>Draft and identify press release during readiness phase.</i></p>

Phase IV – Warning (Heat Index 105° for 2+ consecutive days)

Send to these partners:	<p>Sample email for excessive heat warning (heat index of 105° for 2+ days)</p> <p>Hello All, The NWS has issued an excessive heat warning for XXXX from XX until XX. Temps are predicted to be XX with heat indexes of XX.</p> <p>These are dangerous temperatures. Individuals should take precautions to avoid heat exhaustion and heat stroke, including drinking plenty of <u>water</u>, wearing light colored clothing and staying out of the sun as much as possible. Heat cramps and heat exhaustion are likely and heat stroke is possible with prolonged exposure to these heat indices.</p> <p>As you know, seniors, young children, the homeless and those with certain medical conditions are at higher risk. For individuals who need a cool place to go, a list of local cooling centers are listed [insert local information or list centers]. Please share these resources with your partners and clients.</p>
Social Messaging	<p>Social Media for Excessive Heat Warning</p> <p>Facebook: The NWS has issued an excessive heat warning for XXXX from XX until XX. Temps are predicted to be XX with heat indexes of XX. Individuals should take precautions to avoid heat exhaustion and heat stroke, including drinking plenty of water, wearing light colored clothing and staying out of the sun as much as possible.</p> <p>Twitter: Be aware of the warning signs of heat-related illness, such as light-headedness, mild nausea or confusion, sleepiness or profuse sweating. [Link to local information or to http://health.mo.gov/living/healthcondiseases/hyperthermia/index.php]</p> <p>Press Release: <i>Draft and identify press release during readiness phase.</i></p>



APPENDIX L

Targeted Communication Strategies

<p><i>Older adults</i></p> <ul style="list-style-type: none"> • Provide concise, clear and easy-to-understand information in large font and translated into appropriate and plain language • Disseminate heat information through health care providers (e.g. pharmacists, doctors, in-home care providers), places of worship, retirement/nursing homes and landlords • Set up system for people to self-register to receive alerts by telephone, email or text message
<p><i>Infants and young children</i></p> <ul style="list-style-type: none"> • Disseminate information through health care providers, schools and/or daycares • Provide additional resources in doctor's offices, pharmacies, hospitals, grocery stores, places of worship and libraries • Educate caregivers (e.g. parents, grandparents, daycare staff) how to recognize and respond to heat-health risks • Educate caregivers on the risks of leaving children in vehicles
<p><i>People with chronic illness or who are physically impaired</i></p> <ul style="list-style-type: none"> • Disseminate heat-health information to long-term care facility, health care providers and caregivers • Raise awareness about the danger of leaving those in your care inside vehicles
<p><i>Socially disadvantaged (e.g. low income, homeless, living alone)</i></p> <ul style="list-style-type: none"> • Develop labels with plain language heat-health messages to be distributed with water, hats or other items • Disseminate plain language messages at shelters and through community outreach groups • Raise awareness of appropriate places to cool off during extreme heat • Provide guidelines on ways to stay cool if people do not have air conditioning • Encourage increased monitoring of this vulnerable group during extreme heat
<p><i>Occupational groups</i></p> <ul style="list-style-type: none"> • Educate employers on heat-health risks and appropriate actions to take (e.g. work-rest cycle) • Raise awareness about heat-health risks among coaches, athletic trainers, sports organizations, schools and daycares • Provide guidelines for outdoor recreation groups on how to minimize risks during heat alerts



APPENDIX M

Animal Vulnerabilities During Excessive Heat Events

Dogs and cats are designed to conserve heat and are less efficient at cooling than humans. They are in danger of heat stroke at 110 °F. Pets' sweat glands are located on the nose and footpads, which are inadequate for cooling on hot days. Panting and drinking water help cooling, but if the air temperature is overheated, brain and organ damage can occur in 15 minutes. Risk factors to heat stress include body size, age (young and old), breed (short nosed breeds, such as bulldogs), obesity, and existing metabolic, cardiovascular or respiratory disease.

Facts:

A car with windows rolled down slightly combined with windows collecting light, is trapping heat inside that equals a pressure cooker effect:

Outside air = 85 ° F

- After 10 minutes: inside car = 102 °F
- After 30 minutes: inside car = 120 °F

Outside air = 72 ° Fahrenheit + humidity

- After 30 minutes: inside car = 104 °F
- After 60 minutes: inside car = 112 °F

Prevention:

- Never leave pets in a car on warm days
- Call animal control or police immediately if an animal is in distress in a car
- Be alert for any sign of heat stress: heavy panting, glazed eyes, a rapid pulse, unsteadiness, a staggering gait, vomiting, deep red or purple tongue
- Never leave pets tied up without shade, air circulation, and fresh water
- Offer a cool place to rest when temperatures are uncomfortable
- If you are going to take advantage of a local Cooling Center and feel the need to bring your pet, always call ahead to find out if they are able to accept pets and what preparations are necessary (i.e., leash for dog, cage for cats, etc.)

Treatment:

Overheated pets must be cooled immediately

- Move pet to shade
- Apply cool water all over body
- Apply ice packs to neck and chest area
- Allow licking ice and small amount of water (large amount will cause vomiting)
- Take to veterinarian immediately for evaluation



APPENDIX N

Best Practices and Lessons Learned

Below are best practice strategies adapted from United States Environmental Protection Agency (US EPA). Excessive Heat Events Guidebook in Brief. Accessed on 7/21/2022 from http://www.epa.gov/heatisland/about/pdf/EHEguide-brief_final.pdf

Interventions

Send a clear public message

- Communicate that Extreme Heat Events (EHEs) are dangerous and conditions can be life-threatening. In the event of conflicting environmental safety recommendations, emphasize that health protection should be the first priority.

Inform the public of anticipated conditions

- When will EHE conditions be dangerous?
- How long will EHE conditions last?
- How hot will it FEEL at specific times during the day (e.g., 8 a.m., 12 p.m., 4 p.m., 8 p.m.)?

Assess those at greatest risk

- Assess locations with vulnerable populations, such as nursing homes and public housing
- Staff additional emergency medical personnel to address the anticipated increase in demand
- Shift/expand homeless intervention services to cover daytime hours
- Open cooling centers to offer relief for people without air conditioning and urge the public to use them

Provide access to additional sources of information

- Provide toll-free numbers and website addresses for heat exposure symptoms and responses
- Open hotlines to report concerns about individuals who may be at risk
- Coordinate broadcasts of EHE response information in newspapers and on television and radio

Lessons Learned

The following are lessons learned that may be helpful when planning your response to an extreme heat emergency:

Philadelphia –

- Use local AAA senior line to double as heat information line; expand hours of operation for the Senior line/Heatline

Missouri Department of Health and Senior Services

912 Wildwood Drive | Jefferson City, MO 65109

- Have nurse available to handle calls with specific medical questions
- Provide heat information to block captains and neighborhood watch groups

Toronto –

- Coordinate with local EMS to help with Heatline to address specific medical questions, conduct follow-up visits with callers to evaluate conditions and transport to cooling center when needed
- Provide functional drinking fountains in city parks (portable if permanent is not available)
- Extend hours of city pool
- Provide bus tokens to those who have been evaluated by street patrol teams and found to be in need of a cooling center
- Relax enforcement of late-night park closure rules

Phoenix –

Due to the prevalence of air conditioning in the city, the below strategies proved effective in limiting the health risks and impacts of a severe extreme heat event.

- Open homeless shelters during daytime hours
- Provide donated bottled water