Kansas Extreme Heat Toolkit

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Kansas
Department of Health and Environment

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This Extreme Heat Toolkit has been created by the Kansas Extreme Weather Workgroup to increase awareness and readiness among the population in the event of excessively hot days during the summer months. This tool follows closely a similar one created by the Minnesota Climate and Health Program at the Minnesota Department of Health which graciously gave us permission to replicate parts of their work.

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Overview of Extreme Heat Toolkit

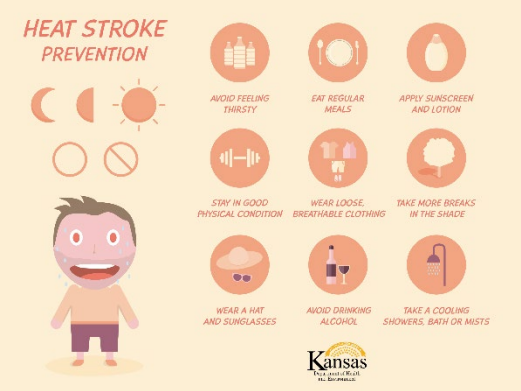
The purpose of this toolkit is to provide information to local governments and public health professionals about preparing for and responding to extreme heat events. The toolkit is organized into six interdependent chapters. The first three chapters contain the body of the toolkit, while the last three chapters include definitions, references and appendices. The first chapter, “Introduction to Extreme Heat Events,” describes the magnitude of health consequences from extreme heat, changing weather conditions in Kansas, and the National Weather Service’s definitions of extreme heat. The second chapter, “Extreme Heat Events and Public Health,” discusses health illnesses caused by extreme heat and characteristics or risk factors that increase a person’s risk for heat-related illnesses. The third chapter, “Preparing Kansas for Extreme Heat Events,” describes key steps in preparing for and responding to an extreme heat event, how to develop a heat response plan, and strategies for preventing heat-related illnesses and deaths.

The toolkit focuses on Kansas examples and processes and 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 that can be 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 only in a few jurisdictions in Kansas or at the state level.

The goal of the toolkit is to increase Kansas’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

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). Yet, almost all of the negative health outcomes from extreme heat can be prevented by taking appropriate measures to ensure that the public stays cool and hydrated during an extreme heat event. As more counties and cities begin to prepare for extreme heat, it is hoped that Kansas 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 combined.[1] From 1999-2010, about 7,415 deaths resulted from exposure to extreme heat in the U.S.[2]

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 have been called the “silent killers.”[3] However, in recent years there have been 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 illnesses.[4] In 2010, Russia experienced a heat wave that caused an estimated 4,824 excess deaths in July in Moscow alone.[5] The United Nation News Centre reported that this Russian heat wave caused about 56,000 total fatalities across the country,[6] likely a result of the combination of extreme heat, smog, and smoke from wildfires.[7] Closer to home, more than 700 deaths have been attributed to the 1995 Chicago heat wave.[8]

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[1] Centers for Disease Control and Prevention (CDC). (2004). Extreme heat: a prevention guide to promote your personal health and safety. Available online: www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp.
[2] Centers for Disease Control and Prevention (CDC). (2012). Number of Heat-related Deaths, by Sex---National Vital Statistics System, United States, 1999--2010. Morbidity and Mortality Weekly Report, 61(36), 729.
[3] Luber, G & McGeehin. (2008). Climate Change and Extreme Heat Events. Am J Prev Med 2008:35(5).
[4] Haines, A., Kovats, R., Campbell-Lendrum, D., & Corvalan, C. (2006). Climate change and human health: impacts, vulnerability, and mitigation. Lancet, 367(9528), 2101-2109. doi:10.1016/S0140-6736(06)68933-2
[5] The Telegraph. (August 6, 2010). Russian heatwave kills 5,000 as fires rage out of control. http://www.telegraph.co.uk/news/worldnews/europe/russia/7931206/Russian-heatwave-kills-5000-as-fires-rage-out-of-control.html.
[6] UN News Centre. (January 24, 2011). UN: 2010 among deadliest years for disasters, urges better preparedness. http://www.un.org/apps/news/story.asp?NewsID=37357&Cr=disaster+reduction&Cr1.
[7] Huber, D., Gulledge, J. (2011). Extreme weather & climate change: understanding the link and managing the risk. Center for Climate and Energy Solutions. http://www.pewclimate.org/docUploads/white-paper-extreme-weatherclimate- change-understanding-link-managing-risk.pdf.
[8] Palecki, M.A., S.A. Changnon, and K.E. Kunkel. (2001). The nature and impacts of the July 1999 heat wave in the midwestern United States: Learning from the lessons of 1995. Bulletin of the American Meteorological Society 82(7):1353-1368.

Extreme heat events occur in Kansas; however, it is difficult to know the exact number of deaths and illnesses due to extreme heat events because Kansas does not have an official reporting system for deaths and illnesses attributable to extreme heat.[9] The counts below, in Table 1, likely underestimate the full burden of extreme heat illness and death because heat-related illnesses can cause various symptoms and exacerbate a wide variety of existing medical conditions.[10]

Table 1 | Number of Heat-Related Fatalities, Hospitalizations, and Emergency Department Vistis in Kansas, by Year

Year	Death Counts	Hospitalization Counts	Emergency Department Visit Counts
1999	Suppressed	Not Available	Not Available
2000	Suppressed	139	Not Available
2001	Suppressed	154	Not Available
2002	Suppressed	86	Not Available
2003	Suppressed	104	Not Available
2004	Suppressed	57	Not Available
2005	Suppressed	106	Not Available
2006	Suppressed	141	Not Available
2007	Suppressed	82	Not Available
2008	18	76	Not Available
2009	11	103	536
2010	Suppressed	124	915
2011	32	180	1,103
2012	Suppressed	122	894
2013	Suppressed	103	624
2014	Suppressed	64	579
2015	Suppressed	80	813
2016	Suppressed	113	1,072
2017	Not Available	Not Available	794
2018	Not Available	Not Available	Not Available

Note: Counts less than 10 are suppressed to protect privacy

Defining extreme heat events

According to the U.S. Environmental Protection Agency, extreme heat events are “periods of summertime weather that are substantially hotter and/or more humid than typical for a given location at that time of year.”[11]. So, how hot is too hot is based on the usual weather in the area and what is considered normal temperature for the season.

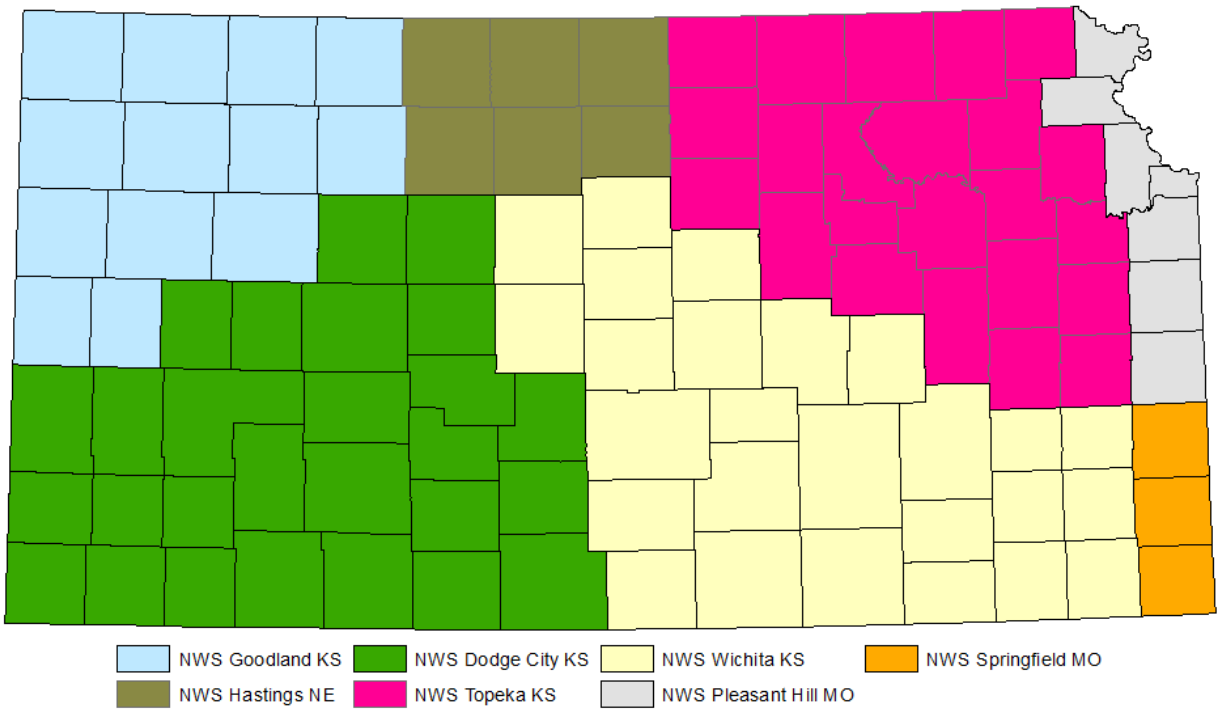
[9] Kansas Department of Health and Environment, Kansas Environmental Public Health Tracking Program (personal communication, July, 2013)
[10] Luber, G & McGeehin. (2008). Climate Change and Extreme Heat Events. Am J Prev Med 2008:35(5).
[11] U.S. EPA. 2006. Excessive Heat Events Guidebook. EPA 430-B-06-005. U.S. Environmental Protection Agency, Washington, DC.

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 temperatures.[12] 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 a heat response plan should be implemented. The following section describes the NWS stations that cover Kansas and how the NWS defines extreme heat events. Chapter 3, "Preparing Kansas for Extreme Heat Events," describes how local jurisdictions define extreme heat events for the purposes of implementing their 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 response plan are the first crucial steps in preventing heat-related morbidity and mortality.

There are seven NWS stations serving Kansas. Each NWS station releases heat advisories, watches, and warnings depending on the weather in its own service area. Below is a map of the stations and each service area.

National Weather Service Kansas Areas by County



[12] U.S. Environmental Protection Agency. (2005). Heat island effect. U.S. Environmental Protection Agency. Available online: http://www.epa.gov/heatisland/index.html.

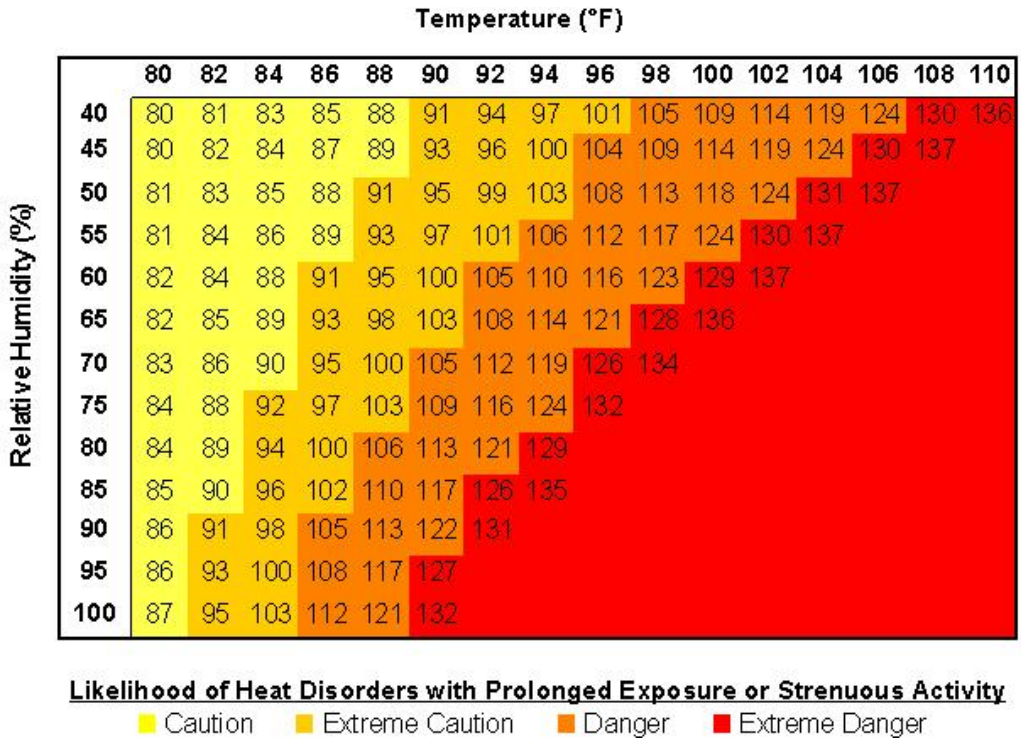
The NWS defines extreme heat events by using current and forecasted weather reports. For areas of Kansas, heat advisories, watches and warnings are issued based on a set of temperature thresholds over a certain period of time. See National Weather Service Definitions below for definitions of heat advisories, watches and warnings for counties in Kansas.

The NWS may consider revising its heat advisory, watch and warning definitions based on more current historical meteorological conditions and evidence of heat-attributable adverse health impacts.

Local government staff, 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.

The heat index (HI) is an index that combines air temperature and relative humidity in an attempt to determine how hot it feels also known as the apparent temperature. For example, when the temperature is 90 °F (32 °C) with very high humidity, the heat index can be about 105 °F (41 °C). The human body normally cools itself by perspiration, or sweating. Heat is removed from the body by evaporation of that sweat. However, relative humidity reduces the evaporation rate because the higher vapor content of the surrounding air does not allow the maximum amount of evaporation from the body to occur. This results in a lower rate of heat removal from the body, hence the sensation of being overheated.

Figure 1: Heat Index (HI) Chart



Source: National Weather Service (NWS)
Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

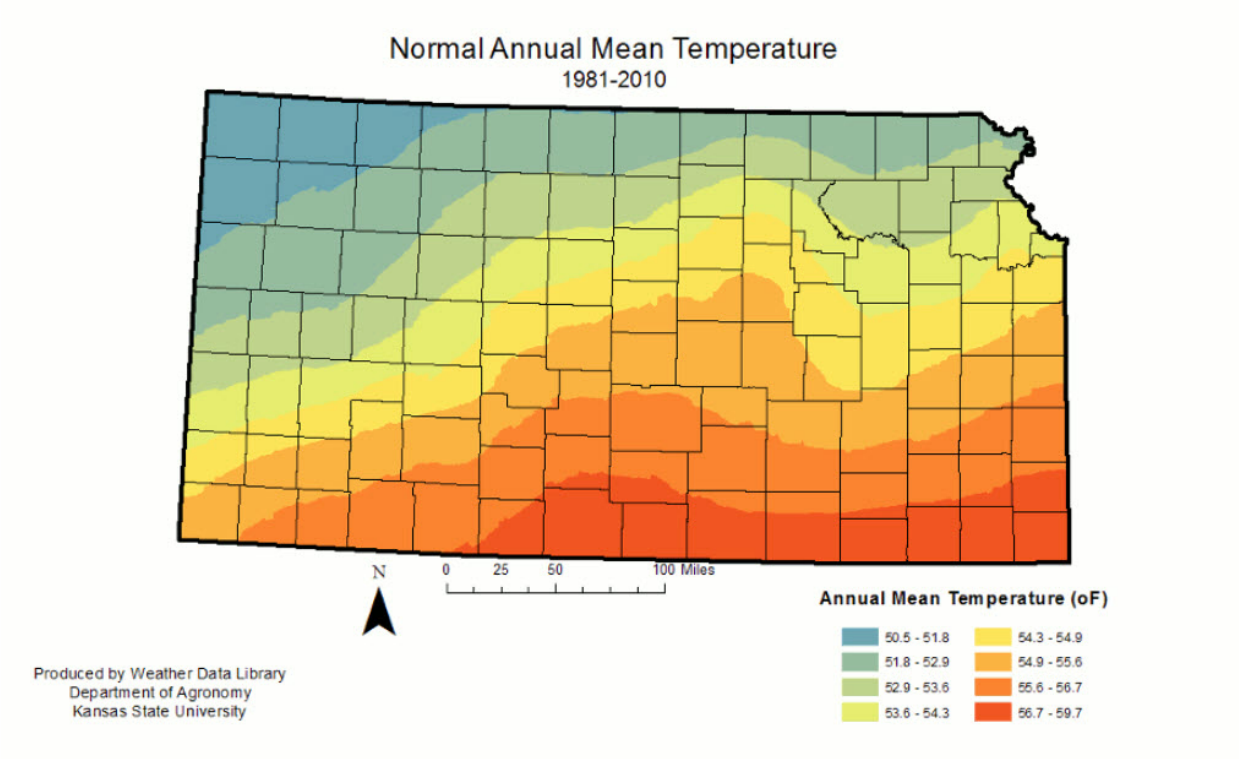
Recorded temperatures in Kansas have ranged from –40 degrees °F (Lebanon, February 1905) to 121 degrees °F (Alton, July 1934). Temperature extremes for each month are shown in Table 2. Also, the average number of days with temperatures over 90 degrees has been recorded from 1981 to 2010 and displayed in Figure 2. It shows that over 2/3rd of the State had over a month of high temperatures over 90 degrees and the southwestern counties that border Oklahoma, average two months of temperatures over 90 degrees. This map does not depict the overnight minimum temperature averages. If the temperature does not drop overnight, it is more important in a global sense than the record highs. People, mainly those without air conditioning and crops need the temperature to drop during the overnight so that they can sustain the heat during the next day.

Table 2: Kansas Temperature Extremes

Month	Maximum °F	Year	Place	Minimum °F	Year	Place
January	88	1967	Kinsley	–35	1947	Centralia
February	92	1981	Aetna	–40	1905	Lebanon
March	100	1910	Hugoton	–25	1948	Oberlin*
April	107	1989	Hays	–2	1935	Dresden*
May	108	1939	Ellsworth*	14	1909	Wallace
June	116	1911	Clay Center*	30	1917	Irene*
July	121	1936	Alton*	32	1880	Unknown
August	119	1936	Wellington*	33	1910	St. Francis*
September	117	1947	Lincoln	15	1984	Kirwin Dam
October	104	1947	St. Francis	–3	1917	Wallace
November	96	1909	Kingman	–20	1887	Monument
December	90	1955	Ashland	–34	1989	Atwood

Source: Information Please Database, Pearson Education, Inc. www.infoplease.com/ipa/A0930179.html
* Also on earlier dates at the same time or other places.

Figure 2: Normal Annual Mean Temperature, 1981 to 2010



Source: Kansas State Research and Extension, Climatic Maps of Kansas, http://climate.k-state.edu/basics/, date September 2019.

National Weather Service Definitions

... 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. The criteria are a daytime maximum Heat Index (HI) at or around 110 with a minimum HI of 75 or higher. If the criteria is not strictly met, but collaboration with surrounding offices yields a watch, it is recommended that the forecaster on duty use their discretion in issuing a collaborated product to keep the public safety the top priority.

... EXCESSIVE HEAT WARNING ...

Issued if the maximum Heat Index (HI) is expected to be around 110 and the minimum HI is expected to be 75 or higher. Emphasis should be placed on daytime maximum HIs when making a decision whether to issue. For example, you believe that daytime HIs will reach 110 or higher but not sure of the nighttime HIs will remain 75 or higher. In this situation issue the warning since daytime HIs are the risk to health of those working outdoors especially with pre-existing medical conditions. Keep collaboration in mind even if criteria is not strictly met.

... EXCESSIVE HEAT ADVISORY (HEAT ADVISORY)...

Issued if the maximum Heat Index (HI) is expected to be around 105. Longer durations of heat conditions just under advisory criteria can also pose a risk to the public. With this in mind, NWS offices should collaborate with their neighbors and consider issuing a heat advisory if the Max HI is expected to be 100 to 105 degrees for four or more consecutive days. Finally, NWS offices should issue an EXCESSIVE HEAT WARNING if advisory criteria are expected to be met for four days or more.

The use of the word "around" conveys a range of +/- two degrees on either side of the base criteria to give WFO forecasters flexibility especially during marginal events. Base criteria may also be adjusted, typically in urban areas, to match agreements with healthcare partners. Adjustments to base criteria should not be made for cities with less than 200,000 people.

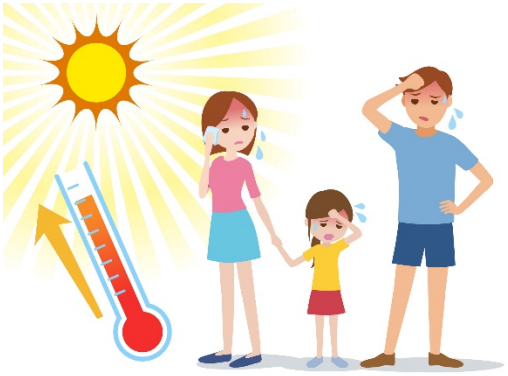
NWS Kansas City has additional guidance available through Heat Health Warning System algorithms. This tool is separate from the guidance criteria established in this supplement. Blending all available guidance into a cohesive decision-making process is left to local management.

The NWS may consider revising its heat advisory, watch and warning definitions every few years based on more current historical meteorological conditions and evidence of heat-attributable adverse health impacts.

Local government staff, 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.

Extreme Heat Events and Public Health

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. Extreme heat can aggravate some chronic diseases and can increase formation of certain air pollutants that can affect people's health. 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 chapter 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 98.6°F to function properly. When it is hot outside, the body becomes challenged 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.

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. Heat exhaustion is the most common heat-related illness.[13] Signs and symptoms of heat exhaustion include dizziness, thirst, fatigue, headache, nausea, visual disturbances, weakness, anxiety, confusion, and vomiting.[14] Treatment involves monitoring the person in a cool, shady environment and ensuring adequate hydration. Untreated heat exhaustion can progress to heatstroke, which can be fatal. See Table 3 for a list of some of the medical conditions directly attributable to excessive heat exposure along with recommended responses.

Exposure to extreme heat can aggravate already existing conditions.[15] 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 disorders.[16] Another study found that elevated air temperatures were associated with short-term increases in cardiovascular-related hospital admissions for 12 U.S. cities.[17] For a detailed description of pre-existing

[13] Lugo-Amador N.M., Rothenhaus T., Moyer P. (2004). Heat-related illness. Emerg Med Clin North Am;22:315–27.
[14] Glazer, J.L.. (2005). Management of Heatstroke and Heat Exhaustion. Am Fam Physician. Jun 1;71(11):2133-2140. http://www.aafp.org/afp/2005/0601/p2133.html
[15] Kalkstein, L. S. and Greene, J. S. (1997). An Evaluation of Climate/Mortality Relationships in Large U.S. Cities and the Possible Impacts of a Climate Change. Environ. Health Perspect., 105, 84-93.
[16] Semenza JC, Rubin CH, Falter KH, et al. (1996). Heat-related deaths during the July 1995 heat wave in Chicago. N Engl J Med;335:84 –90.
[17] Schwartz J, Samet JM, Patz JA. (2004). Hospital admissions for heart disease: the effects of temperature and humidity. Epidemiology;15:755– 61.

diseases/conditions that can increase the risk of heat-related illnesses and deaths, see the next section, “Characteristics that increase the risk of heat-related illnesses.”

There is growing evidence that the effects of extreme heat events on mortality are larger during high ozone and high particulate matter (PM10) days. Ozone is formed by the reaction of volatile organic compounds (VOCs) and nitrogen oxide (NOx) in the presence of sunlight and is highly sensitive to temperature[18]. Research indicates a strong association between temperatures above 90°F and ground-level ozone formation.[19] Ground-level ozone and high air temperatures have been associated with increased mortality.[20] Ground-level ozone exposure can cause harmful cardiopulmonary health effects, including lung irritation, breathing difficulties, reduced lung capacity, aggravated asthma, and increased susceptibility to bronchitis.[21] Populations at risk to ozone exposure include outdoor workers in landscape and construction, and adults and children who are performing strenuous outdoor exercise and play.[22]

Similarly, during an extreme heat event, mortality is greater on high PM10 days. The interaction of heat days and PM10 seems to more significantly affect the elderly.[23] Exposure to PM can aggravate chronic respiratory and cardiovascular diseases, and several studies suggest that the elderly and children may be particularly affected by PM.[24]

[18] Bernard SM, Samet JM, Grambsch A, Ebi KL, Romieu I. (2001). The potential impacts of climate variability and change on air pollution-related health effects in the United States. Environmental Health Perspectives Vol 109, Supplement 2, pp 199-209.
[19] Knowlton, K., et. al. (2004). Assessing Ozone-Related Health Impacts Under a Changing Climate. Environmental Health Perspectives, Volume 112, Number 15.
[20] World Health Organization (WHO) Europe. (2009). Improving public health responses to extreme weather/ heat-waves – EuroHEAT: Technical summary. Available online: http://www.euro.who.int/__data/assets/pdf_file/0010/95914/E92474.pdf.
[21] U.S. Environmental Protection Agency. (2011). Ground-level Ozone: Health and Environmental Effects. Available online: http://www.epa.gov/air/ozonepollution/health.html.
[22] Bernard SM, Samet JM, Grambsch A, Ebi KL, Romieu I. (2001). The potential impacts of climate variability and change on air pollution-related health effects in the United States. Environmental Health Perspectives Vol 109, Supplement 2, pp 199-209.
[23] World Health Organization (WHO) Europe. (2009). Improving public health responses to extreme weather/ heat-waves – EuroHEAT: Technical summary. Available online: http://www.euro.who.int/__data/assets/pdf_file/0010/95914/E92474.pdf.
[24] Bernard SM, Samet JM, Grambsch A, Ebi KL, Romieu I. (2001). The potential impacts of climate variability and change on air pollution-related health effects in the United States. Environmental Health Perspectives Vol 109, Supplement 2, pp 199-209.

Table 3: Heat illness and their symptoms

Medical Condition	Symptom(s)	Causes	Safety Tips
Heat rash	. Red cluster of pimples . Blisters . Itching . Red rash on the skin that usually occur on the neck, chest, breast and/or groin	. Blockage of sweat ducts	Remove the affected person from heat. Minimize exposure of skin to sun. Keep the affected area dry. Seek medical attention if rash does not improve.
Heat edema	. Swelling in the ankles, feet and hands . Body temperature normal or elevated core temperature up to 104° F	. Occurs in persons who are not acclimatized to heat . Increased blood flow to the skin in limbs	Elevate and apply compressive stockings to the affected limbs.
Heat tetany	. Respiratory problems, such as breathing difficulty . Muscular problems, including spasms or numbness or tingling of muscles . Body temperature normal or elevated core temperature up to 104° F	. Hyperventilation . Respiratory alkalosis	Remove the affected person from the heat and advise the person to breathe slowly.
Heat cramps	. Muscle spasms . Muscles usually affected include the abdomen, calf, thighs and shoulder muscles . Body temperature normal or elevated core temperature up to 104° F	. Drinking liquid without electrolytes . Dehydration . Electrolyte deficiency	Stop all activities, relocate to a cool location, rest and drink electrolyte containing fluids. Seek medical attention if symptoms persist.
Heat syncope	. Dizziness . Fainting . Body temperature normal or elevated core temperature up to 104° F	. Increased blood flow to the skin resulting in decreased blood flow to the central nervous system	Lay the affected person gently on the floor and provide lots of fluid. Seek medical attention.
Heat exhaustion	. Profuse sweating . Weakness . Rapid breathing . Dizziness . Nausea/vomiting . Muscle cramps . Normal mentation . Body temperature normal or elevated core temperature up to 104° F	. Drinking liquid without electrolytes . Dehydration . Electrolyte deficiency	Stop all activities, relocate toa cool location, rest and drinkelectrolyte containing fluids. It can be difficult to determine if someone has heat stroke and not exhaustion. If symptoms do not quickly improve, or unable to oral rehydrate, seek medical attention.
Heat stroke *This is a life threatening, adverse effect of exposure to extreme heat, ususlly occuring when the body temperature is greater than 104°F.*	. Oral body temperature of 104°F and above . Often sudden onset of symptoms . Confusion or loss of consciousness . Rapid and strong pulse . Hot, red and dry skin . Headache . Dizziness . Nausea/vomiting	. Profound dehydration . Profound electrolyte deficiency . Body is unable to maintain heat through the skin . Normal regulation of body temperature is no longer intact . Mortality can be as high as 50%	Call 911 immediately if you see anyone with these symptoms and has a body temperature of 104°F and above. While waiting for first responders, the affected person should be taken to a cool shady area. Cool the person with immersion in cool water, spraying the person with cool water while fanning the person vigorously, or placing ice packs on neck, axilla, and groin. The personis unlikely to be able to tolerate oral fluids.

1 Centers for Disease Control and Prevention. (2006). Frequently Asked Questions (FAQ) About Extreme Heat. Retreived April 17, 2012, from http://www.bt.cdc.gov/disasters/extremeheat/faq.asp.
2 Platt, M. and Vicario, S. (2010). Heat Illness. In Rosen's Emergency Medicine: Concepts and Clinical Practice, 7th Ed. p1882-3.
3 Zimmerman JL, Hanania NA. (2005). Chapter 111. Hyperthermia. In: Hall JB, Schmidt GA, Wood LD, eds. Principles of Critical Care. 3rd ed. New York: McGraw-Hill.

In addition to direct health impacts, extreme heat events can result in increased use of energy, power outages, damage to highways and roads, and an increase strain on the provision of available essential services like emergency hospital services, ambulance services and security.[25]

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, special health care needs, disability status, 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. Below is a review of characteristics that increase the risk of experiencing morbidity and/or mortality from extreme heat. (For a quick reference of characteristics that increase the risk of heat-related illnesses, see Table 4). 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. For more information on mapping vulnerable populations and risk factors for extreme heat events, see the Chapter 3, "Preparing Kansas for Extreme Heat Events."

Demographic characteristics

Age-Older adults: Persons 65 years old or older are more vulnerable to negative health outcomes from extreme heat events than younger adults.[26],[27] 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 illnesses.[28] Chronic disease conditions and the use of certain medications also may increase older adults' susceptibility to adverse health outcomes from heat.[29] 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. Recent studies of heat-related deaths in Kansas have shown that elderly persons with mental illness are at a higher risk than their peers with no mental illness to die of heat-related conditions because their condition allows them to be trapped outside of their homes an extreme heat event.[30] Older adults are a growing segment of the population. Kansas' population has been steadily growing in the past decades.

[25] Changnon, S. A., & Kunkel, K. E. (1996). Impacts and responses to the 1995 heat wave: A call to action. Bulletin of the American Meteorological Society, 77(7), 1497.
[26] Bouchama A, Knochel JP. (2002). Heat stroke. N Engl J Med;346:1978–88.
[27] Knowlton K, Rotkin-Ellman M, King G, Margolis HG, Smith D, and Solomon G, et al. (2009). The 2006 California heat wave: impacts on hospitalizations and emergency department visits. Environ Health Perspect 117:61-67.
[28] Foster, K. G., Ellis, F. P., Dore, C. et al. (1976). Sweat Responses in the Aged. Age and Ageing, 5, 91-101.
[29] Schifano P, Cappai G, De Sario M, Michelozzi P, Marino C, Bargagli AM, et al. (2009). Susceptibility to heat wave-related mortality: a follow-up study of a cohort of elderly in Rome. Environ Health; 8:50-.
[30] Ménager H (2013). *Preliminary Analysis of Kansas Resident Deaths Due to Exposure to Excessive Natural Heat, Summer 2012.*Kansas Health Statistics Reports, Feb 2013.

However, the elderly is the fastest growing segment of the population. It is predicted that the number of people 65 years old and older will continue to increase during the next two decades.

Age-Children: Research identifies children, especially children ages five years and younger (including infants), as being at a greater risk for mortality during hot weather.[31],[32] 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.[33],[34] In the U.S. between 1998 and 2018, 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. More than half of the deaths are children under two years of age.[35] Temperatures in parked cars can increase quickly even on relatively mild days (i.e., ~ 70°F), especially if the car is parked in the sun.[36],[37] Leaving the windows slightly open does not significantly decrease the heating rate.[38] For a short video demonstrating how quickly temperatures can increase in a parked car, see the following website: http:// www.nws.noaa.gov/os/heat/index.shtml. Never leave children, infants or pets unattended in a parked vehicle.

Time is critical when rescuing an individual or animal trapped in a hot car. Kansas citizens are empowered to intervene and potentially save a life without fear of legal repercussion through a Kansas law that went into effect on July 1, 2018. This law grants good Samaritans the legal right and immunity from civil liability to rescue a vulnerable person or domestic animal (livestock not included) from a locked vehicle when the individual believes that the person or animal is in imminent danger unless saved. The law can be found further below in Appendix D and also at http://www.kslegislature.org/li/b2019_20/statute/060_000_0000_chapter/060_054_0000_article/060_054_0001_section/060_054_0001_k/ .

[31] Basu R, Ostro BD. (2008). A multicounty analysis identifying the populations vulnerable to mortality associated with high ambient temperature in California. Am J Epidemiol.;168(6):632-7.
[32] Bridger, C. A., Ellis, F. P. and Taylor, H. L. (1976). Mortality in St. Louis, Missouri, during Heat Waves in 1936, 1953, 1954, 1955, and 1966. Environ. Res., 12, 38-48.
[33] Bytomski JR, Squire DL. (2003). Heat illness in children. Curr Sports Med Rep.;2(6):320-4.
[34] Rowland T. (2008) Thermoregulation during exercise in the heat in children: old concepts revisited. J Appl Physiol.;105(2):718-24.
[35] Null J. (2012) Hyperthermia Death of Children in Vehicles. Department of Geosciences, SFSU. Available online: https://www.noheatstroke.org/. Accessed July 10, 2019.
[36] McLaren C, Null J, Quinn J. (2005). Heat stress from enclosed vehicles: moderate ambient temperatures cause significant temperature rise in enclosed vehicles. Pediatrics.;116(1):e109-e12.
[37] King K, Negus K, Vance JC. (1981). Heat stress in motor vehicles: A problem in infancy. Pediatrics.;68(4):579.
[38] NOAA's National Weather Service. (2012) Heat: A Major Killer. Available online: http://www.nws.noaa.gov/os/heat/ index.shtml.

Table 4: Characteristics that increase the risk of 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
. Age-Older adults: persons 65 years old or older . Age-Children: children ages five years and younger (including infants) . Economic constraints: persons living at or below poverty line . Persons with pre-existing diseases or mental health conditions . Persons on certain medications
Social/Behavioral factors
. Social isolation: persons living alone, especially the elderly . Prolonged exposure to the sun . Use of alcohol
Geographic/location factors
. Living in urban areas . Lack of air conditioners . Living in top floor apartments . Living in nursing homes/bedridden

Economic constraints: Several studies have demonstrated increased risk of mortality among people with low socioeconomic factors.[39] Persons living at or below poverty line are less likely to have air conditioners in their homes,[40,41] live in deteriorating and substandard homes,[42] 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 seek cooling centers or open doors and windows to increase circulation.[43] The homeless are at increased risk for illnesses and death due to extreme heat possibly because of limited access to air-conditioned places and underlying medical conditions.

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. Pre-existing conditions that make a person more vulnerable to extreme heat

[39] O'Neill MS, Zanobetti A, Schwartz J. (2003). Modifiers of the temperature and mortality association in seven US cities. Am J Epidemiol.;157(12):1074-82.
[40] Hajat S, Kovats RS, Lachowycz K. (2007). Heat-related and cold-related deaths in England and Wales: who is at risk? Occup Environ Med.;64(2):93-100.
[41] Curriero FC, Heiner KS, Samet JM, Zeger SL, Strug L, Patz JA. (2002). Temperature and mortality in 11 cities of the eastern United States. Am J Epidemiol.;155(1):80-7.
[42] Semenza JC, Rubin CH, Falter KH, Selanikio JD, Flanders WD, Howe HL, et al. (1996). Heat-related deaths during the July 1995 heat wave in Chicago. N Engl J Med.;335(2):84-90.
[43] American Medical Association Council on Scientific Affairs. (1997). Heat-Related Illness During Extreme Weather Emergencies. Report 10 of the Council on Scientific Affairs (A-97). Presented at the 1997 AMA Annual Meeting.

include obesity;[44] cardiovascular disease conditions (e.g., congestive heart failure, myocardial infarction);[45] respiratory disease conditions (e.g., COPD, bronchitis);[46,47] neurological diseases;[48] endocrine disorders (e.g., diabetes mellitus);[49] renal failure; and liver diseases (e.g., liver cirrhosis). Additionally, persons with mental illness or intellectual disabilities are at increased risk for negative health outcomes due to extreme heat. [50,51] They may be unable to make rational decisions that would help them recognize symptoms of 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 and calcium channel blockers and antipsychotic drugs, make it difficult for the body to dissipate excess heat by interfering with normal thermoregulatory systems. For a complete list of categories of medicines that may increase a person's risk of heat-related illness, see Appendix B.

Social/Behavioral factors

Social isolation: Persons living alone, especially the elderly, are more vulnerable to extreme heat events.[52,53] 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 may be exposed 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 and drugs: 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 and drugs impair judgment, influencing a person's ability to make decisions to limit exposure to and recognize symptoms of extreme heat exposure.

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[44] Green H, Gilbert J, James R, and Byard, RW. (2001). An analysis of factors contributing to a series of deaths caused by exposure to high environmental temperatures. The American Journal of Forensic Medicine and Pathology, 22(2), 196.
[45] Centers for Disease Control and Prevention. (2006). Heat-related deaths—United States, 1999-2003. Morbidity and Mortality Weekly Report,; 55(29), 796-798.
[46] Baccini M, Biggeri A, Accetta G, Kosatsky T, Katsouyanni, K, et al. (2008). Heat effects on mortality in 15 European cities. Epidemiology, 19 (5), 711.
[47] Kaiser R, Le Tertre A, Schwartz J, Gotway CA, Daley WR, and Rubin CH. (2007). The effect of the 1995 heat wave in Chicago on all-cause and cause-specific mortality. American Journal of Public Health, 97(Supplement 1), S158.
[48] S. Vandentorren, P. Bretin, A Zeghnoun, L. Mandereau-Bruno, A. Croisier, C. Cochet, J. Ribéron, I. Siberan, B. Declercq and M. Ledrans. (2006). August 2003 Heat Wave in France: Risk Factors for Death of Elderly People Living at Home. Eur J Public Health., 16 (6): 583-591.doi:10.1093/eurpub/ckl063
[49] Swartz J. (2005). Who is sensitive to extremes of temperature?: A case-only analysis. Epidemiology, 16(1), 67.
[50] Hansen A, Bi P, Ryan P, Nitschke M, Pisaniello D, and Tucker G. (2008). The effect of heat waves on mental health in a temperate Australian city. Environmental Health Perspectives, 116(1), 1369.
[51] Bouchama, A., Dehbi, M., Mohamed, G. et al. (2007). Prognostic Factors in Heat Wave Related Deaths: A Meta- Analysis. Arch. Intern. Med., 167, 2170-2176.
[52] Thomas NS. (2002). Preventable Tragedies: Heat Disaster and the Elderly. Journal of Gerontological Social Work. 38:53-65.
[53] Naughton MP, Henderson A, Mirabelli MC, Kaiser R, Wilhelm JL, Kieszak SM, et al. (2002). Heat related mortality during a 1999 heatwave in Chicago. Am J Prev Med;22:221–27.

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 annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings. In the evening, the difference can be as high as 22°F.[69] 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 residents are exposed to and the length of time that they are exposed to elevated temperatures.[54]

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 are exposed 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.

[54] U.S. Environmental Protection Agency. (2006). Excessive heat events guidebook. Available online: http://www.epa.gov/heatisland/about/heatguidebook.html.

Preparing Kansas for Extreme Heat Events

Preparing Your Community for Extreme Heat Events

The impact of an extreme heat event depends on many factors including the effectiveness of the public health and safety systems to address or prepare for the event, the behavior, age, sex, and economic status of the individuals affected.[55] Extreme heat notification and response plans are critical to preparing Kansans 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 chapter discusses the key steps in responding to an extreme heat event and how to develop a heat response plan. The chapter 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 for Planning for and Responding to an Extreme Heat Event

The County Emergency Management may already have developed an *Extreme Heat Response Emergency Operations Guide*. Agencies and organizations interested in providing a response during an extreme heat event in their jurisdictions are strongly encouraged to coordinate their activities with County Emergency Management to avoid duplication of efforts. The following is provided as an alternative in case the *Extreme Heat Response Emergency Operations Guide* is not operational yet in your jurisdiction.

The key steps for planning for and responding to an extreme heat event have been summarized in Figure 3 below.

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. A heat response plan is essential for describing and coordinating activities to prevent heat-related morbidity and mortality. The next section, "Developing a heat response plan," describes the minimum elements of an effective response plan. The response plan should define 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 also should contain a

[55] U.S. EPA, 2013. Climate Change: Human Health Effects and Adaptations. Accessed on 8/28/13 at http://www.epa.gov/climatechange/impacts-adaptation/health.html#adapt

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 Kansas, the NWS provides weather forecasts and determines the issuance of heat advisories, watches or warnings. Definitions and processes used by the NWS to determine extreme heat events are described in the section, “National Weather Service Definitions” above. All Kansas 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.

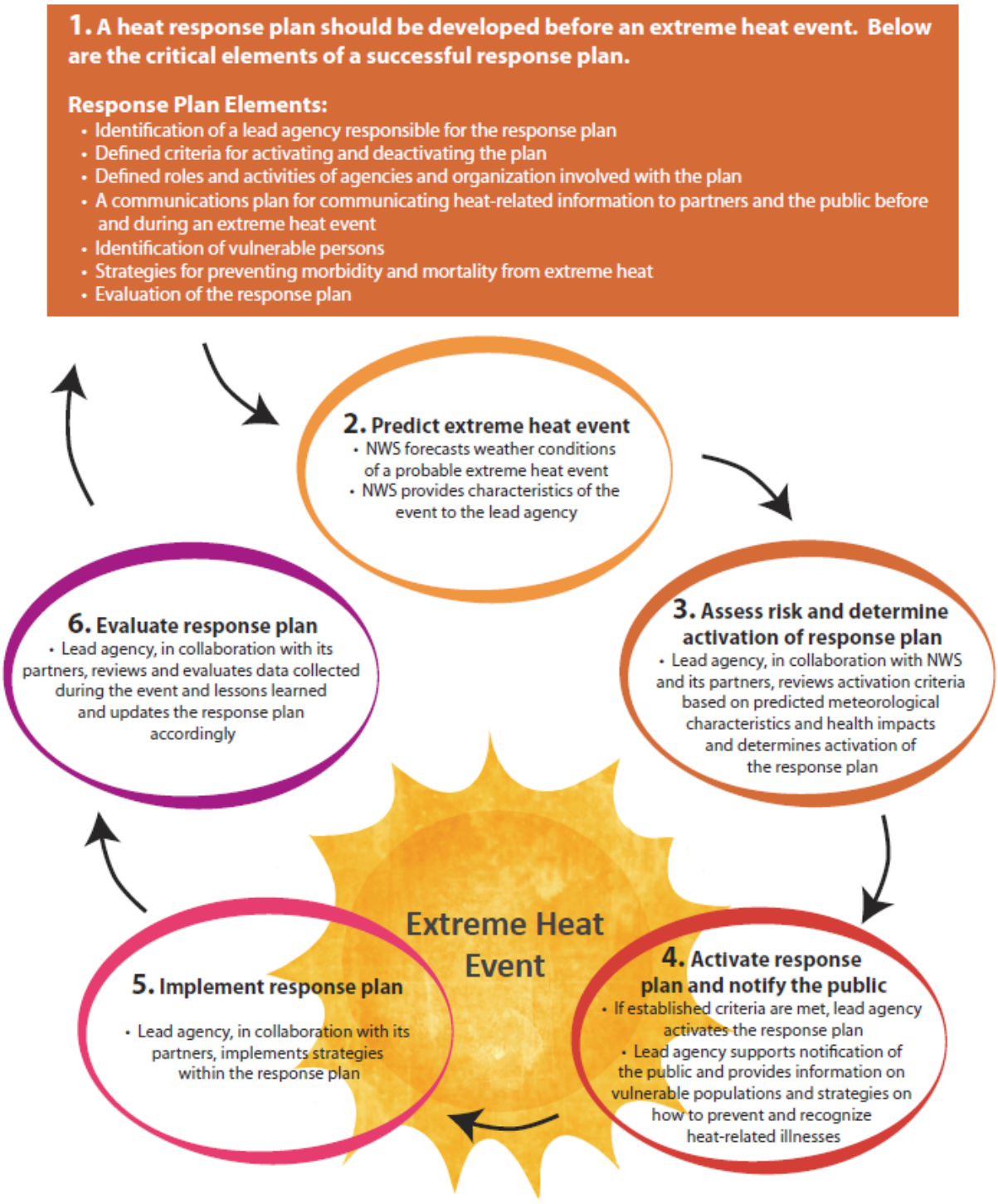
Step 3: Assess risk and determine activation of response plan

Once the lead agency is informed of a possible extreme heat event, the 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 has been made to activate the extreme heat response plan, the public needs to be informed of the timing, severity and duration of the forecasted extreme heat event. 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. The communications strategy should be described in detail within the heat response plan.

Figure 3: Key Steps Responding to an Extreme Heat Event*



* Although this diagram presents key steps in responding to an extreme heat event as discrete 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 in responding to an extreme heat event, along with the agencies and organizations that are responsible for implementing each step of the process.

Step 5: Implement 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 two sections 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: Evaluate response plan

Each step of responding to an extreme heat event should be reviewed and evaluated after an extreme heat event. Evaluation is critical for improving the plan and making it more effective for preventing heat-related illnesses and deaths in the future.

Developing a heat response plan

Before developing their own heat response plan, agencies and organizations should contact their county emergency management personnel to see if an *Extreme Heat Response Emergency Operations Guide* is not already in place for the area being considered.

Heat response plans have been shown to be effective in reducing heat-related mortality.[56] 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 or county in Kansas should 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.

All Response Plans Should Contain the following Elements:[57]

Lead agency: A lead agency for implementing the extreme heat response plan should be identified. 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: Criteria for activating and deactivating an extreme heat response plan vary and should be 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 is expected to last. Some public health departments may have their own thresholds and calculations that include health-related criteria for extreme heat events. Others may use the NWS criteria for activation.

[56] U.S. Environmental Protection Agency. (2006). Excessive heat events guidebook. Available online: http://www.epa.gov/heatisland/about/heatguidebook.html.
[57] Bernard SM, McGeehin MA. (2004). Municipal heat wave response plans. Am J Public Health;94:1520-2.

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, tribal health departments) 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, information should be provided to organizations/companies that have at-risk populations (e.g., young children, those with special health care needs or disabilities, 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) (see Appendix A for samples of press releases), symptoms of heat-related illnesses (see Table 3 above), characteristics of persons more vulnerable to extreme heat (see Table 4 above), and where to go for more information. Messages may be transmitted 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. The communications plan should be developed 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 populations in their community and where the populations reside, 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,” for more information on characteristics to map.

Table 5: Selected Resources to Help Local Agencies Identify Vulnerable Populations

Resource	URL	Comments
KS-EPHT Extreme Weather Events	https://keap.kdhe.state.ks.us/Ephtm	Provides data and general information on extreme weather events.
Kansas Information for Communities (KIC)	http://kic.kdheks.gov/	Allows you to generate a table for the population of Kansas, categorized by year, age, race, ethnicity, and county.
Kansas Health Matters	http://www.kansashealthmatters.org/	Generates quick facts in static tables about population and business characteristics at the state and county levels.
Kansas State Library's Data Center	https://kslib.info/423/State-Data-Center	Offers a collection of data products from the Census Bureau data.
County Business and Demographics from the Census Bureau	https://www.census.gov	Provides static and interactive data on state and county population, business patterns, industry establishments, and housing status.
USA Counties IN Profile	http://www.stats.indiana.edu/index.asp	Based at the Indiana University Kelley School of Business. It provides a select compilation of demographic and economic indicators focused on counties.
Institute for Policy & Social Research at the University of Kansas	http://www.ipsr.ku.edu/ksdata/	Provides a number of useful statistical resources on the web.
Kansas Syndromic Surveillance Program ESSENCE	http://www.kdheks.gov/phi/ESSENCE.htm	Enables local and state public health agencies to analyze and report on emergency department data submitted by Kansas hospitals.
Kansas Hospitals	https://www.kha-net.org/	Offers lists of hospitals and their mailing addresses.
Community Indicators, Kansas Health Matters	http://www.kansashealthmatters.org/index.php?module=indicators&controller=index&action=dashboard&alias=counties	Offers many indicators for at-risk populations such as lack of transportation, elderly living alone, and poverty rates.

There are many resources available to aid local agencies or organizations in identifying vulnerable populations in their communities. Table 6 provides a list of useful web resources. It will be updated as more of them become available.

Evaluation: Response plans should be reviewed and evaluated after an extreme heat event. 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. Records on heat-related morbidity and mortality that occurred during the extreme heat event also should be collected, analyzed and used to adjust strategies and/or criteria for activating the heat response plan.

Additional strategies to prevent heat-related illnesses

In addition to those essential elements described above, there are more 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 are tailored to the at-risk populations within the community. For a listing of some of the strategies that can be implemented in Kansas, see Table 6 below.

Coordinate distribution of information on heat exposure symptoms and tips on how to stay cool for public broadcasts: Educating the public and communicating prevention information to them 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 A for a sample press release. A tip sheet for preventing heat illnesses can be found at: https://www.cdc.gov/disasters/extremeheat/heattips.html .

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, nursing homes and senior living centers that might not have air conditioning should be contacted and provided information to ensure that their populations are staying cool and are being 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 can be activated when the response plan is activated, or heat-related messages can be incorporated into more general, full-time systems. 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. A “reverse 911” call system can be activated, so that numbers that call 911 during an extreme heat event can be dialed and notified 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. Cooling centers should be ADA accessible and monitored by appropriate staff. Information on providing full access to a cooling center can be found 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. Agreements should be made with the owners of these buildings before announcements are made to the public about visiting the facilities. 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. Hours of operation of public spaces, such as libraries and public swimming pool, may be extended to 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.

Outreach to vulnerable populations: Some high-risk individuals (e.g., elderly living alone, homeless persons) need to be contacted directly, and, preferably, observed several times a day during an extreme heat event to ensure that cooling tips are being followed (e.g., fluids are 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 the following: social and health workers, volunteers, church organizations, other nongovernmental agencies, and the police. Additional efforts must be made to outreach and evaluate the homeless. Increased outreach efforts should be supported by authorizing officials to move individuals believed to be experiencing medical difficulties or at extreme risk to cooling shelters for observation and treatment.[58]

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 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

[58] U.S. Environmental Protection Agency. (2006). Excessive heat events guidebook. Available online: http://www.epa.gov/heatisland/about/heatguidebook.html.

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. Free bus passes and/or other subsidized means of transportation to cooling centers also should be provided to 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 and cooling centers) enhances people's ability to stay hydrated.

Table 6: Selected Community Interventions and Best Practices[59]

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 EHE 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.)? Assist 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.

Reschedule outdoor public events when possible: Developing and implementing policies that identify when large outdoor events or activities (e.g., sports games, outdoor camps, 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

[59] Adapted from United States Environmental Protection Agency (US EPA). *Excessive Heat Events Guidebook in Brief*. Accessed on 4/18/2014 from http://www.epa.gov/heatisland/about/pdf/EHEguide-brief_final.pdf

of facilities), efforts should be 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. Also, 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 wide-spread power outage occurs during an extreme heat event, air conditioning may be unavailable. Ideally, messages regarding tips on how to stay cool and hydrated have already been provided to the public and vulnerable populations. People who do not want to leave their homes and are without air conditioning should be encouraged to drink plenty of water and take cold baths or showers to cool off. 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 of extreme heat effects

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 to help reduce the severity and duration of urban residents’ exposure to high-heat conditions.[60] 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.

[60] Luber, G & McGeehin. (2008). Climate Change and Extreme Heat Events. Am J Prev Med 2008:35(5).

Definitions

Definitions

Below are definitions of words, phrases and terminology used within the Kansas Extreme Heat Toolkit. It is important to note that some of the below definitions may differ outside the context of this toolkit. The definitions below clarify the usage of these words within the toolkit.

At risk

People who are "at risk" are people who are at an increased risk for heat-related illnesses because they have certain risk factors, e.g., young children, people with pre-existing conditions or diseases.

Extreme heat event

An extreme heat event is a period of time with abnormally high air temperatures and/or high dew point temperatures that affect human health. An exact definition of an extreme heat event varies by geographic location.

Extreme heat response plan/excessive heat annex

A plan/annex for states, communities, governments, etc. to use in the event of an extreme heat event and contains information on strategies for preventing heat-related illnesses and identifies who will perform the strategies.

Modified from: http://www.getreadyforflu.org/pg_glossary.htm

Risk factor

A risk factor is a characteristic that is statistically associated with, although not necessarily causally related to, an increased risk of morbidity (i.e., illness, disease, or condition) or mortality (i.e., death). For example, age is a risk factor for heat-related illnesses.

Modified from: http://dictionary.webmd.com/terms/risk-factor

Vulnerable population

Subpopulations who are at increased risk of heat-related illnesses because they have certain risk factors.

Modified from: http://www.hc-sc.gc.ca/dhp-mps/homologation-licensing/gloss/index-eng.php

Ways the human body loses heat

The human body loses heat in four different ways: [61]

1. Radiation – transfer of heat through electromagnetic waves (i.e., the body releases heat simply by being in an environment cooler than the body temperature). This is similar to heat leaving a woodstove. Radiation is a normal process of heat moving away from the body when air temperatures are lower than 68°F.[62]

[61] Platt M and Vicario S. (2010). Heat Illness in Rosen's Emergency Medicine: Concepts and Clinical Practice, 7th Ed. p1882-3.
[62] Healthwise. (2011). WebMD: First Aid & Emergencies: Ways in Which the Body Loses Heat. Available online: http://firstaid.webmd.com/ways-in-which-the-body-loses-heat. Accessed April 16, 2012.

2. Evaporation – conversion of liquid into a gas, which transfers heat energy to the gas and away from the skin (i.e., the body sweats and the evaporation of the sweat from the skin cools the body). During intense exercise, the body loses 85% of its heat through sweating.[62]

3. Convection – direct transfer of heat to water vapor molecules surrounding the skin. Heat is carried and dispersed from the body due to fluid motion. This is similar to sitting in front of a fan.[2]

4. Conduction – transfer of heat to air or water surrounding our bodies. Heat is lost when temperatures are lower than 68°F. This is heat lost from sleeping on the cold ground or when the body is submerged in water. Water causes more heat loss than air, so heat can be lost from the body very quickly when it is placed in cold water.[62]

As air temperature and humidity increases, the ability to cool the body through radiation is dramatically reduced. Under direct sunlight, heat is actually transferred back to the skin, reversing the process of heat transfer and warming the body. As air temperature rises, evaporation becomes the dominant mechanism of heat transfer through sweating; however, as humidity increases, the ability to transfer heat and cool the body through evaporation is dramatically reduced. Convection is minimal when there is little movement in the air around the skin but can become more important as wind speed increases. Convection does not cool the body when air temperatures are high. Only 2% of our body heat is lost through conduction when surrounded by air; however, heat loss through conduction in water can be 25 times greater.

Appendices

Appendices

Appendix A: Samples of Press Releases

Sample 1: Heat Advisory Media Release

The National Weather Service has issued a Heat Advisory for much of the state of Kansas. 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.

All Kansans should be informed of local weather conditions during the Heat Advisory period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Kansans are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit Kansas Department of Health and Environment's (KDHE) website at https://keap.kdhe.state.ks.us/Ephtm/.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions, symptoms and treatments of common heat-related injuries that Kansans should be aware of for this Heat Advisory.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

What to Do

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort.
Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

What to Do

Consult a doctor if the sunburn affects an infant younger than 1 year of age or if these symptoms are present:

- Fever
- Fluid-filled blisters
- Severe pain
- Also, remember these tips when treating sunburn:
- Avoid repeated sun exposure.
- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in one hour.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than one hour.

What to Do

Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages
- Rest
- Cool shower, bath or sponge bath
- An air-conditioned environment
- Lightweight clothing

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.
Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally)
- Red, hot and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

Sample 2: Outlook Media Release

The National Weather Service has issued an Excessive Heat Outlook for ********. An Excessive Heat Outlook is issued when the potential exists for an excessive heat event in the next 3-7 days. 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.

All Kansans should be informed of local weather conditions during the Excessive Heat Outlook period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Kansans are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit the Kansas Department of Health and Environment's (KDHE) website at https://keap.kdhe.state.ks.us/Ephtm/.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions of common heat related injuries that Kansans should be aware of for this Excessive Heat Outlook.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, more severe sunburn may require medical attention.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Sample 3: Warning Media Release

The National Weather Service has issued an Excessive Heat Warning for ********. An Excessive Heat Warning is issued when an excessive heat event is occurring or imminent and will pose a threat to life or property. 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.

All Kansans should be informed of local weather conditions during the Excessive Heat Warning period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Kansans are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit Kansas Department of Health and Environment's (KDHE) website at https://keap.kdhe.state.ks.us/Ephtm/.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following

are definitions, symptoms and treatments of common heat related injuries that Kansans should be aware of for this Excessive Heat Warning.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

What to Do

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort.
Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

What to Do

Consult a doctor if the sunburn affects an infant younger than 1 year of age or if these symptoms are present:

- Fever
- Fluid-filled blisters
- Severe pain
- Also, remember these tips when treating sunburn:
- Avoid repeated sun exposure.
- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in one hour.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than one hour.

What to Do

Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages
- Rest
- Cool shower, bath or sponge bath
- An air-conditioned environment
- Lightweight clothing

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.
Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally)
- Red, hot and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible.
  Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

Sample 4: Watch Media Release

The National Weather Service has issued an Excessive Heat Watch for ********. An Excessive Heat Watch is issued when the probability of a heat wave has increased but the occurrence and timing is still uncertain. 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.

All Kansans should be informed of local weather conditions during the Excessive Heat Watch period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Kansans are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit Kansas Department of Health and Environment's (KDHE) website at https://keap.kdhe.state.ks.us/Ephtm/.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions and symptoms of common heat related injuries that Kansans should be aware of for this Excessive Heat Watch.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than one hour.

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally)
- Red, hot, and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

EXERTIONAL HEAT ILLNESS
INFORMATION, GUIDELINES & RECOMMENDATIONS

Heat illness, sometimes called exertional heat illness (EHI), in athletes is a common and serious condition, but one that is preventable. High temperatures and humidity can put athletes at risk for heat illness and may have catastrophic consequences if not properly recognized and treated. Heat illness can present in several different ways, from muscle cramps to heat exhaustion and heat stroke. The Kansas State High School Activities Association wishes to provide its member schools recommended guidelines that can be useful in establishing or refining an individualized heat acclimatization plan or policy, as well as guidelines to help prevent, recognize and treat heat illness.

Heat Acclimatization and Heat Illness Prevention Position Statement

National Federation of State High School Associations (NFHS)
Sports Medicine Advisory Committee (SMAC)

The following is the **Heat Acclimatization and Heat Illness Prevention Position Statement** authored by the National Federation of State High School Associations and its Sports Medicine Advisory Committee. The substance of the position statement provides as follows:

Exertional Heatstroke (EHS) is the leading cause of preventable death in high school athletics. Students participating in high-intensity, long-duration or repeated same-day sports practices and training activities during the summer months or other hot-weather days, as well as those with sickle cell trait, are at greatest risk. Football has received the most attention because of the number and severity of exertional heat illnesses. Notably, the National Center for Catastrophic Sports Injury Research reports that **42 high school football players died of EHS between 1995 and 2014**. EHS also results in thousands of emergency room visits and hospitalizations throughout the nation each year.

This NFHS Sports Medicine Advisory Committee (SMAC) position statement is the companion piece to the NFHS's online course ***A Guide to Heat Acclimatization and Heat Illness Prevention.*** **This position statement provides an outline of "Fundamentals" and should be used as a guiding document**. Further and more detailed information can be found within the NFHS online course, the 4th Edition of the NFHS Sports Medicine Handbook, the NFHS SMAC "Position Statement and Recommendations for Hydration to Minimize the Risk for Dehydration and Heat Illness" and the resources listed.

Following the recommended guidelines in this position statement and *A Guide to Heat Acclimatization and Heat Illness Prevention* can reduce the risk and incidence of EHS and the resulting deaths and injuries in high school athletics. The NFHS recognizes that various states and regions of the country have unique climates and variable resources, and that there is no "one-size-fits-all" optimal acclimatization plan. However, it is recommended that all of the "Fundamentals" be incorporated into any heat acclimatization plan to improve athlete safety. In addition, ***Heat Illness Prevention*** **at www.NFHSLearn.com should be required viewing for all coaches**.

Heat Acclimatization and Safety Priorities:

- Recognize that EHS is the leading preventable cause of death among high school athletes.
- Know the importance of a formal preseason heat acclimatization plan.
- Know the importance of having and implementing a specific hydration plan, keeping your athletes well-hydrated, and encouraging and providing ample opportunity for regular fluid replacement.
- Know the importance of appropriately modifying activities in relation to the environmental heat and stress and contributing individual risk factors (e.g., sickle cell trait, illness, obesity) to keep your athletes safe and performing well.
- Know the importance for all members of the coaching staff to closely monitor all athletes during practice and training in the heat, and recognize the signs and symptoms of developing heat illnesses.
- Know the importance of, and resources for, establishing an emergency action plan and promptly implementing it in case of suspected EHS or other medical emergency.

FUNDAMENTALS OF A HEAT ACCLIMATIZATION PROGRAM

1. Physical exertion and training activities should begin slowly and continue progressively. An athlete cannot be "conditioned" in a period of only two to three weeks.

A. Begin with shorter, less intense practices and training activities, with longer recovery intervals between bouts of activity.
B. Minimize protective gear (helmets only, no shoulder pads) during the first several practices, and introduce additional uniform and protective gear progressively over successive days.
C. Emphasize instruction over conditioning during the first several practices.

Rationale: The majority of heat-related deaths happen during the first few days of practice, usually prompted by doing too much, too soon, and in some cases with too much protective gear on too early in the season (wearing helmet, shoulder pads, pants and other protective gear). Players must be allowed the time to adapt safely to the environment, intensity, duration and uniform/equipment.

2. Keep each athlete's individual level of conditioning and medical status in mind and adjust activity accordingly. These factors directly affect exertional heat illness risk.

Rationale: Athletes begin each season's practices and training activities at varying levels of physical fitness and varying levels of risk for exertional heat illness. For example, there is an increased risk if the athlete is obese, unfit, has been recently ill, has a previous history of exertional heat illness or has sickle cell trait.

3. Adjust intensity (lower) and rest breaks (increase frequency/duration), and consider reducing uniform and protective equipment, while being sure to monitor all players more closely as conditions are increasingly warm/humid, especially if there is a change in weather from the previous few days.

Rationale: Coaches must be prepared to immediately adjust for changing weather conditions, while recognizing that tolerance to physical activity decreases and exertional heat illness risk increases, as the heat and/or humidity rise. Accordingly, it is imperative to adjust practices to maintain safety and performance.

Use the heat index chart on the following page as a general guide in determining when activity modifications are necessary.

4. Athletes must begin practices and training activities adequately hydrated.

Rationale: While proper hydration alone will not necessarily prevent exertional heat illness, it will decrease risk.

See the hydration strategies in this document to use as a guide for hydrating your athletes.

5. Recognize early signs of distress and developing exertional heat illness, and promptly adjust activity and treat appropriately. First aid should not be delayed!

Rationale: An athlete will often show early signs and/or symptoms of developing exertional heat illness. If these signs and symptoms are promptly recognized and the athlete is appropriately treated, serious injury can be averted and the athlete can often be treated, rested and returned to activity when the signs and symptoms have resolved.

6. Recognize more serious signs of exertional heat illness (clumsiness, stumbling, collapse, obvious behavioral changes and/or other central nervous system problems), immediately stop activity and promptly seek medical attention by activating the Emergency Medical System. Onsite rapid cooling should begin immediately.

Rationale: Immediate medical treatment and prompt rapid cooling can prevent death or minimize further injury in the athlete with EHS. Ideally, pools or tubs of ice water to be used for rapid cooling of athletes should be available onsite and personnel should be trained and practiced in using these facilities for rapid cooling. Ice water baths are the preferred method for rapid cooling; however, if ice water pools or tubs are not available, then applying ice packs to the neck, axillae and groin and rotating ice water-soaked towels to all other areas of the body can be helpful in cooling an affected athlete. Remember, cool first, transport later.

Review the heat illness signs and symptoms information in this document.

7. An Emergency Action Plan with clearly defined written and practiced protocols should be developed and in place ahead of time.

Rationale: An effective emergency action plan (EAP) should be in place in case of any emergency, as a prompt and appropriate response in any emergency situation can save a life. The EAP should be designed and practiced to address all teams (middle school, freshman, junior varsity, varsity) and all practice and game sites.

HEAT ILLNESS RISK FACTORS

Understand and be aware of the following heat illness risk factors:

1. High temperature and humidity
   a. Heat index higher than 80 degrees (calculated from temperature and humidity)
   b. Wet Bulb Globe Temperature (WBGT) higher than 82 (calculated from WBGT monitor)

2. Poor hydration before and during practice/games

3. Inadequate rest/hydration breaks

4. Body Mass Index greater than 27 (based on height and weight)

5. Low fitness level

6. Lack of proper heat acclimatization

7. High intensity training

8. Lack of education, awareness and preparation

9. Sickle cell trait*

10. Illness*
    a. Fever greater than 100.4 degrees
    b. Nausea/vomiting/diarrhea
    c. Respiratory infection
    d. Serious skin rash

11. History of heat illness in the past*

* It is critically important for coaches and school medical personnel to have access to their student-athletes' health history information from the pre-participation physical.

KSHSAA RECOMMENDED HEAT ILLNESS PREVENTION STRATEGIES

1. Follow a proper heat acclimatization program (See next section – Heat Acclimatization)

2. Keep athletes hydrated
   a. Allow unrestricted access to water during practice and games (See *HYDRATION* section of this document).

3. Each school or district should develop a heat contingency policy **based on heat index or wet bulb globe temperature (WBGT)**. Your policy should address the following modifications:
   a. Modify use of equipment if necessary. Remove excess clothing, pads, helmets and other equipment.
   b. Increase breaks during practice when appropriate to provide water/sports drinks and shade.
   c. Change practice times to early mornings or evenings per heat index policy.
   d. Limit practice time if necessary.
   e. Give adequate cooling breaks between practice times.

   The wet bulb globe temperature is the gold standard to measure environmental conditions during exercise, but does require a specific monitor that will measure the WBGT at your local practice site. The WBGT takes temperature, humidity, wind speed, sun angle and cloud cover into account.

   The heat index level can be obtained several ways. Heat index meters are available for purchase. If you do not have access to a device to use onsite to obtain the WBGT or heat index, you can go to the KSHSAA website at http://www.kshsaa.org/Public/General/Weather.cfm to obtain the information for your location. Various weather websites and weather apps are also available to obtain the heat index.

   The heat index or wet bulb globe temperature should ideally be obtained at the site where the activity is taking place.

   See *SAMPLE HEAT POLICY* on page 11.

4. Don't allow an athlete with fever, nausea/vomiting, or other illness to practice or play in a contest.

5. A cooling area should be established and available at all times. This could be an area of shade, a tent or immediate access to an air conditioned facility. A cold tub should be located in the cooling area. The water temperature should be 35-58 degrees and the tub should be large enough to submerge someone up to their torso in a seated position. An old whirlpool tub, a large children's swimming pool or a livestock tank could be used. If a tub is not available, rotating wet ice towels over the entire body, dousing the person with cold water through a hose, or a cold shower could be other rapid cooling options.

6. Make sure your athletes are taking care of their overall health
   a. Adequate sleep
   b. Proper nutrition
   c. Proper hydration habits throughout the week

7. **NEVER allow student-athletes to consume nutritional supplements unless prescribed by a physician.** Energy drinks should also NEVER be consumed by your student-athletes. These substances create an even higher risk to athletes exercising in the heat.

KSHSAA RECOMMENDED HEAT ILLNESS PREVENTION STRATEGIES

8. Be prepared

a. Have an Emergency Action Plan that has been practiced and reviewed in case an athlete has a heat illness. Click HERE for emergency action planning information which includes a template you can download to begin building a plan. There is also a sample EAP on page 12.
   - When rapid onsite cooling is necessary, **ALWAYS COOL THE ATHLETE FIRST AND TRANSPORT SECOND!** Be sure this protocol is rehearsed and reviewed with your coaches and local EMS personnel BEFORE practices begin each August.

b. Have trained personnel available

c. Know your athletes and their health histories
   - Coaches and other staff, including athletic trainers, should always be aware of each athlete's risk factors for heat illness. Coaches MUST know their at-risk athletes and modify their activity accordingly. Student athletes who have sickle cell trait, a previous history of exertional heat illness, are obese, are unfit or are recovering from a recent illness are all more susceptible to heat illness.

d. Know your school's heat contingency policy (See example heat policy on page 11)

e. Educate coaches, staff, athletes and parents to recognize and treat heat illness. Prevention and early recognition is critical to avoiding heat illness. An easy-to-read handout is available on the NFHS website at https://www.nfhs.org/media/1015650/2015-nata-heat-illness-handout.pdf and can be printed and distributed at the beginning of each school year.

f. Have the proper equipment to recognize and treat heat illness. The following is a recommended list of equipment that should be available at any warm weather practice:
   - Wet bulb globe thermometer or heat index monitor
   - Cold water immersion tub
   - Ice immediately available for immersion tub
   - Rectal thermometer (when trained medical personnel are available)
   - Water source (such as garden hose)
   - Ice towels (towels submerged in ice water)
   - Tent, shaded area or access to an air conditioned facility

HEAT ACCLIMATIZATION

One of the most important factors in preventing heat illness is to follow a proper heat acclimatization progression

1. **What is heat acclimatization?**
   Heat acclimatization is the process of the body adjusting to intense physical activity in elevated levels of heat and humidity. The body normally sweats to cool off, but if the heat and humidity (heat index) are too high, sweating may not be enough and the inner body (core) temperature may rise to a dangerous level. During acclimatization the body gradually adjusts and becomes more tolerant to the elevated heat/humidity levels. This takes place through several physiologic mechanisms including increased sweat rate, lower heart rate, and better blood flow to the entire body. With the proper progression, the body can safely adjust to intense physical activity in hot/humid environments over a period of approximately 7 to 14 days. Most research on proper heat acclimatization indicates the first 5 days of the preseason is the most important period of the acclimatization process.

2. **Who needs to do go through heat acclimatization?**
   Every athlete is susceptible to heat illness and needs to acclimatize to the heat no matter their fitness level when they show up to the first day of practice. Even if athletes have been working out all summer their bodies may not be able to immediately adapt to the high temperatures and humidity often present in August in Kansas. In today's culture, we often spend many hours indoors during the summer with air conditioning which makes the body less tolerant to intense exercise in extreme heat and humidity.

3. **KSHSAA heat acclimatization rules**
   KSHSAA Handbook rules 30-1-8 and 35-1-1 address required heat acclimatization rules for **all KSHSAA Fall sports**. Below are the components of these rules.

KSHSAA Preseason Heat Acclimatization Components KSHSAA Handbook Rule 30-1-8		
	Practice Days 1-5	Practice Days 6+
# Practices permitted per day	1	• 2 permitted every other day • Double practice days must be separated by a single practice or rest day
Length of practice allowed*	3 hours	• 3 hours single practice • 5 hours combined (double practice days)
Extra walkthrough time	1 hour (but must be separated from practice by at least 3 hours)	
*Warm-up, stretching, conditioning and weight-room activities are included as part of practice time		

Preseason Football equipment/contact progression (Rule 35-1-1):

- Days 1 & 2 of practice: Helmets only (Air and Bags only are permitted)
- Days 3 & 4 of practice: Helmets and shoulder pads are permitted (Day 3: Control permitted; Day 4: Thud permitted).
- Day 5 through Saturday of SCW #9 of practice: Full Contact (Air, Bags, Control, Thud and Live Action are permitted) may begin with the following guidelines: On any day involving multiple practices, only one practice may involve Thud and/or Live Action.

HYDRATION

In addition to acclimatization, proper hydration is another critical component to prevent heat illness.

1. **How do you know if your athlete is hydrated? There are several methods to measure an athlete's hydration level:**

   a. Urine color
   The volume and color of your urine is an excellent way of determining if you're well hydrated. Small amounts of dark urine mean that you need to drink more, while a "regular" amount of light-colored or nearly clear urine generally means you are well hydrated. (See urine chart-next page)

   b. Weigh-in before and after practice
   Athletes should be weighed before and after warm weather practices in dry clothes. They should drink appropriate amounts of fluid for the amount of weight lost. An athlete should not be allowed to participate if they are at a 2% or greater weight deficit from the beginning of their previous practice.

   c. Sweat rate
   You can calculate our own sweat rate. Knowing how much an athlete sweats per hour can help you calculate how much fluid to drink to replace your sweat loss and stay hydrated. See how to calculate an athlete's sweat rate on the Korey Stringer Institute website at http://ksi.uconn.edu/wp-content/uploads/sites/1222/2015/04/Sweat-Rate-Calculator.pdf.

2. **There are many strategies to maintain proper hydration. The following are some basic hydration principles to follow:**

- Appropriate hydration before, during and after exercise is important for maintaining peak athletic performance. Fluid losses of as little as 2% of body weight (less than 4 pounds in a 200-pound athlete) can impair performance by increasing fatigue. This is important because it's common for some athletes to lose between 5-8 pounds of sweat during a game or intense practice. So it's easy for athletes to become dehydrated if they don't drink enough to replace what is lost in sweat.
- Recognize and respond to early warning signs of dehydration.
- DRINK EARLY and DRINK OFTEN during activity. Do not let athletes rely on thirst. Schedule frequent fluid breaks for re-hydrating. If athletes wait until they are thirsty it may be too late.
- Encourage GOOD hydration choices: water, sport drinks with low sodium and carbohydrate levels, AVOID: energy drinks, soda, fruit juices, carbonated beverage, and caffeine.
- Encourage drinking fluids, not pouring them. Dumping fluid over the head won't help restore body fluids or lower body temperature.
- Provide easily accessible fluids during practice and games.

3. **Hyponatremia Risk**

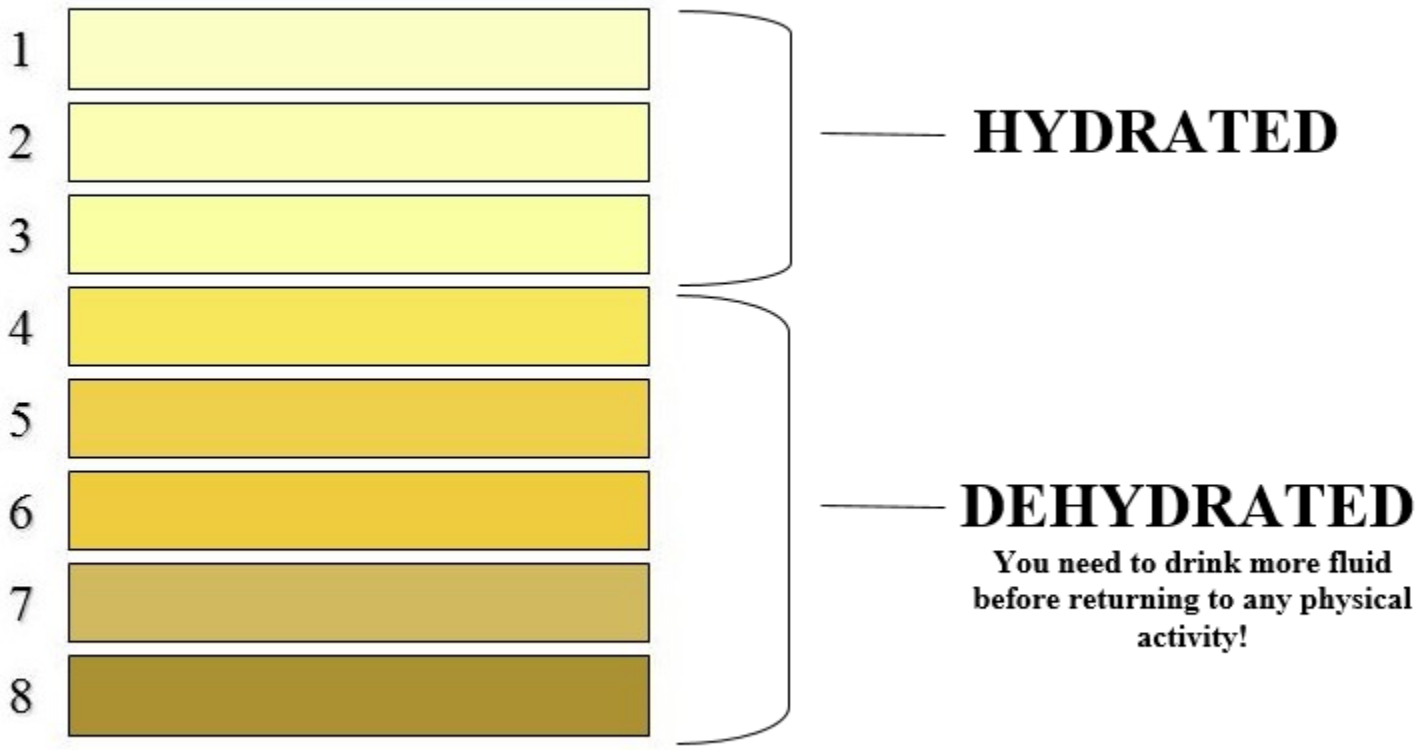
Hyponatremia is a rare, but potentially deadly disorder resulting from the over-consumption of water or other low sodium fluid (including most sports drinks). It is most commonly seen during endurance events, such as marathons, when participants consume large amounts of water or other beverages over several hours, far exceeding fluid lost through sweating. The water in the blood and the sodium content of the blood is consequently diluted to dangerous levels. Affected individuals may exhibit disorientation, altered mental status, headache, lethargy and seizures. A confirmed diagnosis can only be made by testing blood sodium levels. Suspected hyponatremia is a medical emergency and EMS (Emergency Medical Services) must be activated. It is treated by administering intravenous fluids containing high levels of sodium.

HYDRATION RECOMMENDATIONS

Before Exercise	Drink 16 oz. of fluid before activity/exercise (2 hours) Drink another 8-16 oz. of fluid 10-15 minutes before exercise
During Exercise	Drink 4 - 8 oz. of fluid every 15-20 minutes
After Exercise	Drink 16-20 oz. of fluid for every (one) pound lost during exercise to achieve normal fluid state and not begin the next practice dehydrated. Rehydration should take place over a safe and comfortable period of time. Excessive fluid intake over a short amount of time can be dangerous (see hyponatremia information below).
Fluid counter	 24 oz. of fluid = 1 ½ of water bottle 16 oz. of fluid = 1 full water bottle 7 oz. of fluid = ½ full water bottle or 10 BIG gulps of water 4 oz. of fluid – ¼ full water bottle or 5 BIG gulps of water

URINE COLOR CHART

This urine color chart is a simple tool you can use to assess if you are drinking enough fluids throughout the day to stay hydrated.



Be Aware! If you are taking vitamin supplements they can change the color of your urine for a few hours, making it bright yellow or discolored.

HEAT ILLNESS RECOGNITION AND MANAGEMENT

There are four main types of exertional heat illness, but it's important to recognize these don't necessarily run on a continuum. A person could suffer from heat stroke without showing less severe heat illness conditions such as heat cramps. Below are the different types of heat illness, special risk factors, symptoms and management strategies.

HEAT CRAMPS

Typically painful, involuntary muscle contractions of active muscles. These can occur in muscles throughout the body including those in the lower extremities, upper extremities and abdomen. Muscle cramps can be caused by dehydration or electrolyte imbalances.

SPECIAL RISK FACTORS

Sickle cell trait – Heat cramps and exertional sickling can mimic each other. Be aware if an athlete has sickle cell trait.

SIGNS & SYMPTOMS

- Painful muscle cramps that can limit mobility
- Tightness in the muscle can typically be felt by another person
- Most common in abdominals and legs
- Usually last a brief amount of time and are self-limiting

MANAGEMENT

- ► Remove athlete from play
- ► Can provide food high in salt or salt replacement solution (1/2 teaspoon salt dissolved in 16-20 oz. water)
- ► Stretch and massage the muscle
- ► Drink **WATER** or a sports drink
- ► Athlete can typically return to play when the muscle cramp stops

HEAT SYNCOPE

A fainting episode associated with high heat and humidity. This typically occurs because adequate blood flow does not return to the brain and will cause a loss of consciousness.

SPECIAL RISK FACTORS

Prolonged standing in high temperature and humidity can increase the risk of heat syncope.

SIGNS & SYMPTOMS

- Loss of consciousness or fainting
- Lightheadedness
- Weakness and fatigue
- Pale, clammy skin

MANAGEMENT

- ► Move athlete to a cool area/shade
- ► Have athlete lie down/elevate legs
- ► Instruct athlete to drink WATER or a sports drink.
- ► Monitor and maintain airway, breathing and circulation. If any concern about ABC's, call 911.
- ► Athlete can return to play once evaluated by a medical professional and other complications and medical conditions have been ruled out.

HEAT ILLNESS RECOGNITION AND MANAGEMENT

HEAT EXHAUSTION

Occurs when an athlete cannot effectively exercise in high heat and humidity conditions due to an elevated core body temperature. It can cause heavy sweating, rapid pulse and the athlete may feel tired and be unable to perform athletically.

SPECIAL RISK FACTORS

Risk factors are the same as those listed for general heat illness. These include lack of acclimatization, dehydration, obesity, illness, certain medications and low fitness levels.

SIGNS & SYMPTOMS

- Heavy sweating
- Cool/clammy skin
- Poor performance
- Fast and weak pulse
- Dizziness/lightheadedness
- Headache/nausea/vomiting
- Fatigue/weakness

MANAGEMENT

- ► Remove excess clothing/equipment
- ► If conscious give WATER or a sports drink slowly.
- ► Based on symptoms it may be recommended the athlete waits 24-48 hours before returning to play.
- ► Move to a cool shaded area
- ► Cover the extremities and trunk with ice towels or ice bags
- ► If medical professionals are onsite, core body temperature should be obtained with a rectal thermometer (only accurate method). The lack of an accurate core body temperature can lead to poor treatment decisions.

It can sometimes be difficult to tell the difference between heat exhaustion and heat stroke. If there is any concern for heat stroke, a medical professional should check the core body temperature with a rectal thermometer (only accurate method.). If a medical professional is not available onsite, cold tub immersion (35-58 deg.) should be initiated and the heat stroke treatment protocol should be followed until medical professionals arrive and can determine the appropriate treatment steps.

HEAT STROKE

A life threatening condition with two main components – core body temperature greater than 104 degrees (measured by rectal thermometer) and central nervous system dysfunction which usually presents in behavior changes and altered levels of consciousness. Heat stroke can result in death so it is critical to recognize and manage this condition immediately. **Death from heat stroke is 100% preventable when proper cooling is initiated within 10 minutes of collapse.**

SPECIAL RISK FACTORS

Risk factors are the same as those listed for general heat illness. These include lack of acclimatization, dehydration, obesity, illness, certain medications and low fitness levels. It is important to note that heat stroke can occur even when temperature and humidity are not elevated.

SIGNS & SYMPTOMS

- Rectal temperature > 104 deg.
- Altered level or loss of consciousness
- Profuse sweating or hot,red,dry skin
- Dry mouth
- Irritability/emotional instability
- Dizzy
- Stagger/inability to walk
- Poor performance
- Nausea/vomiting/diarrhea
- Headache
- Fast pulse, quick breathing, low blood pressure

MANAGEMENT

- ► Heatstroke is ***life-threatening***, activate EMS, call 911 and maintain the ABC's (airway, breathing and circulation). Continue to monitor vital signs.
- ► Remove excess clothing/equipment
- ► If medical professionals are onsite, core body temperature should be obtained with a rectal thermometer (most accurate method). The lack of an accurate core body temperature can lead to poor treatment decisions.
- ► **COOL FIRST, TRANSPORT SECOND**. Move athlete to the cooling area and immerse in cold tub (35-58 deg.) until core (rectal) temperature is 101-102 degrees. If a cold tub is not available rotate wet ice towels over the entire body, douse with cold water or move to a cold shower.

HEAT STROKE HAS A 100% SURVIVAL RATE
IF PROPER COOLING IS INITIATED WITHIN 10 MINUTES OF COLLAPSE.

KSHSAA RECOMMENDED EXCESSIVE HEAT/HUMIDITYACTIVITY MODIFICATION POLICY

The modifications below should be applied to any sport/activity taking place outdoors OR in un-air conditioned facilities.

HEAT INDEX	HEAT ILLNESS RISK WITH PHYSICAL ACTIVITY AND/OR PROLONGED EXPOSURE **These heat index zones are general guidelines only. Heat illness, INCLUDING HEAT STROKE, can occur in any zone depending on an individual's reaction to the environment.**
80°-89° Zone 1	– Fatigue possible with prolonged exposure and/or physical activity – Monitor at-risk athletes closely – MINIMUM 3 rest/hydration breaks per hour / Break length MINIMUM 4 minutes – Cold tubs prepared and ready (recommended)
90°- 103° Zone 2	– Heat cramps or heat exhaustion possible – 2 HOUR MAXIMUM length of practice – Football: Helmets & shoulder pads only / No protective equipment when conditioning – MINIMUM 4 rest/hydration breaks per hour / Break length MINIMUM 4 minutes – Cold tubs prepared and ready
103°- 124° Zone 3	– Heat cramps or heat exhaustion likely, heatstroke possible – 1 HOUR MAXIMUM length of practice – No protective equipment to be worn – No conditioning – Rest/hydration breaks MUST total 20 minutes – Cold tubs prepared and ready
>124°	– Heatstroke highly likely – No outdoor practices or practices in un-air conditioned facilities should be permitted
– Participants should ALWAYS have unrestricted access to fluids. – If the heat index value at your location is on the border between two levels, follow the guidelines for the more conservative level. – Heat index values should be rechecked every 30 minutes.	

HEAT INDEX CHART

Use the chart below to find the heat index based on air temperature and relative humidity at your site. Make every effort to obtain temperature and humidity levels at your site. Factors such as surface (artificial turf vs. natural grass) will affect air temperature readings. Find your air temperature value across the top of the chart and go down until you find your site's relative humidity value. **THIS IS THE HEAT INDEX based on the values you obtained.** It is an index of the body's sensation of heat caused by the temperature and humidity (the reverse of the "wind chill factor").

	Environmental temperature (F°)															
	80°	82°	84°	86°	88°	90°	92°	94°	96°	98°	100°	102°	104°	106°	108°	110°
Relative Humidity	**Heat Index (Apparent Temperature)** **The body's sensation of heat based on air temperature and humidity**															
5%	77°	79°	80°	81°	83°	84°	86°	87°	89°	91°	93°	94°	96°	98°	100°	101°
10%	78°	79°	81°	82°	84°	85°	87°	89°	90°	92°	94°	96°	98°	100°	102°	104°
15%	78°	80°	81°	83°	84°	86°	88°	90°	92°	94°	96°	98°	100°	103°	105°	108°
20%	79°	80°	81°	83°	85°	86°	88°	90°	93°	95°	97°	100°	103°	106°	109°	112°
25%	79°	80°	82°	83°	85°	87°	89°	91°	94°	97°	100°	103°	106°	109°	113°	117°
30%	79°	80°	82°	84°	86°	88°	90°	93°	96°	99°	102°	106°	110°	114°	118°	122°
35%	80°	81°	83°	85°	87°	89°	92°	95°	98°	102°	106°	110°	114°	119°	123°	129°
40%	80°	81°	83°	85°	88°	91°	94°	97°	101°	105°	109°	114°	119°	124°	130°	136°
45%	80°	82°	84°	87°	89°	93°	96°	100°	104°	109°	114°	119°	124°	130°	137°	
50%	81°	83°	85°	88°	91°	95°	99°	103°	108°	113°	118°	124°	131°	137°		
55%	81°	84°	86°	89°	93°	97°	101°	106°	112°	117°	124°	130°	137°			
60%	82°	84°	88°	91°	95°	100°	105°	110°	116°	123°	129°	137°				
65%	82°	85°	89°	93°	98°	103°	108°	114°	121°	128°	136°					
70%	83°	86°	90°	95°	100°	105°	112°	119°	126°	134°						
75%	84°	88°	92°	97°	103°	109°	116°	124°	132°							
80%	84°	89°	94°	100°	106°	113°	121°	129°								
85%	85°	90°	96°	102°	110°	117°	126°	135°								
90%	86°	91°	98°	105°	113°	122°	131°									
95%	86°	93°	100°	108°	117°	127°										
100%	87°	95°	103°	112°	121°	132°										

Chart reproduced from the National Weather Service.

Sources where temperature, relative humidity and heat index information can be obtained:

Use of a heat index monitor or sling psychrometer
KSHSAA website (www.kshsaa.org)
National Weather Service website (www.weather.gov)
Various weather websites and mobile applications

The wet bulb globe temperature is the gold standard to measure environmental conditions during exercise, but does require a specific monitor that will measure the WBGT at your local practice site. If you are not using WBGT to monitor conditions, using the heat index is an acceptable option.

EMERGENCY ACTION PLAN

SPORT & VENUE: **PRIMARY PHONE:**

VENUE ADDRESS:

AMBULANCE ACCESS TO VENUE:

AED ONSITE & AVAILABLE FOR IMMEDIATE ACCESS ☐ **AED LOCATION:**

STORM SHELTER LOCATION FOR ATHLETES & COACHES:

EMERGENCY RESPONSE PERSONNEL/CONTACTS

Identify personnel who will be involved in an emergency medical response. **The person present with the highest level of medical training should be designated to lead and coordinate the emergency response until emergency medical personnel arrive on the scene.**

	NAME	**PHONE**
EMS		**911 or**
Athletic Trainer		
Team Physician		
Coach		
Coach		
Principal		
Athletic Director		
Other		
Hospital		

1. Person(s) responsible to activate EMS (call 911):

_____ _____

PERSON CALLING SHOULD:

- Explain the type of emergency
- Provide exact location of emergency
- Provide exact location of where ambulance can access the facility
- Provide condition of patient and type of care being administered
- Provide caller name and contact information
- DO NOT HANG UP until instructed by dispatcher

2. Person(s) responsible to retrieve any emergency medical equipment:

_____ _____

Location of emergency/first aid equipment: _____

Location of the nearest AED: _____

Person(s) responsible to prepare cold tub: _____

3. Person(s) responsible to meet/escort EMS to the scene:

_____ _____

PERSON MEETING AMBULANCE SHOULD:

- Meet the emergency personnel as they arrive at the site
- Have keys to any potentially locked doors, gates etc.

Emergency Action Plan updated on:

EMERGENCY ACTION PLANS SHOULD BE REVIEWED & REHEARSED ANNUALLY

REFERENCES

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National Federation of State High School Associations Sports Medicine Advisory Committee. Heat acclimatization and heat illness prevention position statement. April 2015.

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The information in this document is provided by the Kansas State High School Activities Association's Sports Medicine Advisory Committee. The information is meant to provide general information and guidelines for schools to consider when creating or updating their school's heat/hydration policy.

Disclaimer: ***The information provided by the Kansas State High School Activities Association regarding heat illness and hydration is not intended to be exhaustive or all of the relevant information on the subjects. The KSHSAA feels that the sources of the information provided above are very reputable and therefore will provide valuable source material to member schools. At the same time, schools may want to consider other available sources of relevant information and are encouraged to consult with health care professionals regarding these topics.***

UPDATED & APPROVED KSHSAA SMAC, OCTOBER 2017; APPROVED KSHSAA EXECUTIVE BOARD, NOVEMBER 2017

APPROVED KSHSAA SMAC, MAY 2015

Appendix C: Extreme Heat Response Emergency Operations Guide

Introduction

The purpose of this Emergency Operations Guide (EOG) is to provide specific actions and activities to XX County to utilize in preparation and response to an Extreme Heat emergency. This EOG is arranged by functional areas needed in response to an Extreme Heat emergency and may be implemented either in total or as needed based on the emergency situation.

Situation

XX County may be notified of extreme heat situations via the National Weather Service YY Office or by other local media outlets. XX County Emergency Management will forward all heat related messages to all emergency response and support agencies within the county. See Annex D-4 for contact information.

Recommend Health-Related Protective Actions

XX County Public Information Officer (PIO) will coordinate extreme heat messaging with response partners to help assure accuracy of message and prior notification to information release. In general, the information to be released will be consistent with the following table. Guidelines for media releases may be located in the XX County Public Information & Communication (PIC) SOG.

NWS heat-related product	Forecast time	Description	Information release location	Release method	Preparedness Level
Excessive Heat Outlook	3-7 days	Potential exists for an excessive heat event	Excessive Heat Outlook	Web only	Prevention
Excessive Heat Watch	12-48 hours	Probability of a heat wave has increased but occurrence timing is still uncertain	Excessive Heat Watch	Web only	Mitigation
Excessive Heat Advisory	<36 hours	Conditions that cause significant discomfort and could lead to a threat to life or property if caution is not taken	Excessive Heat Advisory	Media release and web	Response

Excessive Heat Warning	<36 hours	Occurring or imminent event posing a threat to life or property	Excessive Heat Warning	Media release and web	Response

Communication to At-Risk Populations

Communication with At-Risk Populations is generally addressed in the PIC SOG. For the purposes of Heat Emergencies, the following groups may also be considered as at-risk populations.

Agricultural Community and Farmers

School and School Sports
The XX County Emergency Manager will forward all heat related messages to school districts and school district athletic directors within XX County. School districts, athletic directors and coaches will be responsible for determining if modifications need to be made to schedules.

Parents and Care Givers

Outdoor Laborers

Elderly

*Below is a fillable checklist with potential individuals to contact in the event of a heat emergency.

Entities	Exist in your community?		Contact Information (enter below)
	Yes	No	
Agricultural Community/Farmers			
School District/Educators			
School Sports Directors			
Recreational Directors			
Local Coaches			
Parent Organizations			
Childcare Providers			
Hospitals			
OutdoorLaborers/Unions			
Elderly Caregivers			
Organizations for the mentally ill			
Animal/Pet Organizations			
Law Enforcement			
Hospitals			
Business Owners			
Media			

Cooling Centers

A majority of cooling centers in XX County are voluntarily set up and operated by the facility owner. The county has the following locations that can serve as cooling centers during a heat emergency.

Name	Location	Point of Contact	Number	Opening Criteria
Public Library	**111 Main, My Town**	**Jeff Coolhead**	999-999-9999	**During days of Excessive Heat Advisory**

Identification of Cooling Centers

- XX County Emergency Management will review local media information from the previous summer to identify facilities previously used as cooling centers.
- XX County Emergency Management will contact by phone each of those facilities and inquire about their availability of continuing to become cooling centers in the future.
- XX County Emergency Management will list facilities interested in continuing cooling center activities in the matrix above.
- XX County Emergency Management will

Opening of Cooling Centers

During an Excessive Heat Advisory or Excessive Heat Warning XX County Emergency Management will call identified cooling centers to determine if they have chosen to open, hours of operations, and any restrictions that may be in place.

Open cooling center information will be shared with emergency response and support agencies within the county to promote situational awareness. See Annex D-4 for contact information.

Publication of Cooling Center Information

XX County Emergency Management will release the list of available cooling centers, location, and hours of operation daily to local media outlets as outlined in the PIC SOG.

Requested Reporting of Cooling Centers

Active cooling centers in XX County will be asked to report daily to 999-999-9999 or hot@coolingcenter.gov, at 4 p.m., the following information:

- Number of visitors for cooling center purposes
- Hours of operation as a cooling center
- Any incidents of concern among cooling center visitors o People reporting not feeling well
- People referred to hospital, physicians or other medical assistance

Heat Injury Surveillance

The objectives of the surveillance activities are as follows:

- To assess the impact of the event,
- To collect data capable of helping with prediction of negative health outcomes among the population,
- To assess the efficacy and efficiency of health interventions.

Collaboration between local health facilities, health care providers, governmental and nongovernmental relief agencies, religious and civic groups, businesses, and schools among others, is recommended to facilitate the data collection and data sharing. Support to summarize and analyze the data collected is available at the state health department.

Additionally, hospitals and local health departments will receive regular feedback from the state surveillance system during extreme heat events. Additional data may be available to hospitals upon request to the state health department.

County Health Department

XX County Health Department will engage surveillance activities during Excessive Heat Events; especially during Excessive Heat Advisories and Excessive Heat Warnings. XX County Health Department is enrolled in BioSense and has the ability to review the data for their county as part of overall heat injury surveillance activity.

These data may be collected on a daily basis and may include: (see form samples in appendix)

- Number of heat-related emergency room visits
- Number of heat-related hospitalizations
- Number of heat-related deaths
- Number of athletes treated for heat-related illnesses
- Number and type of mass media communications issued relative to the event
- Number and type of health interventions (for example number of cooling centers opened)
- Number of service users by category of services.
- Number of large outdoor events held during heat event
- Daily temperature maximum and minimum as well as heat index or dew point for the area

Hospital

[Hospital(s)] related heat injury data is reported primarily in BioSense.

Hospital(s) will be requested to report the following information daily to the XX County Health Department.

- Number of heat-related emergency room visits
- Number of heat-related hospitalizations
- Number of heat-related deaths

Emergency Medical Services

During a declared excessive heat event, emergency medical services are expected to share with the county health department the following information for each individual treated for heat-related illness.

- Name, age, sex, location (address), date, health condition, and disposition

Schools and School Sports

During a declared excessive heat event, the school and sports teams will report to the local health department the following data requests:

- Administration will report any significant administrative measures taken with regards to a declared excessive heat event; including school cancellation and schedule changes.
- School Nurses will report the number of students seen for heat-related health conditions.
- The school sport department will report any heat-related health incident* among players to the school administration even if medical treatment was not provided at the time of the incident.
- The school administration will share this information with the local health department.

*For a list of heat-related medical conditions, please see the guidelines by the Kansas State High School Activities Association in appendix.

American Red Cross

During a declared excessive heat event, American Red Cross and any other relief/shelter agency will keep a log of sheltered individuals and services provided. Summary information from the log will be shared with the county emergency management.

Media Release Templates

Excessive Heat Advisory

The National Weather Service has issued a Heat Advisory for XX County. 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. NOAA's 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.

All residents should be informed of local weather conditions during the Heat Advisory period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Residents are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit KDHE's website at http://www.kdheks.gov/beh/extreme_heat.htm.

Even short periods of high temperatures can cause serious health problems or heat-related injuries. Kansans 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. The following are definitions, symptoms and treatments of common heat-related injuries that Kansans should be aware of for this Heat Advisory.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

What to Do

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort.

Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

What to Do

Consult a doctor if the sunburn affects an infant younger than one year of age or if these symptoms are present:

- Fever
- Fluid-filled blisters
- Severe pain

Also, remember these tips when treating sunburn:

- Avoid repeated sun exposure.
- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in one hour.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating

- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than one hour.

What to Do

Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages
- Rest
- Cool shower, bath, or sponge bath
- An air-conditioned environment
- Lightweight clothing

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally)
- Red, hot and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following: Get the victim to a shady area.

- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.

- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

Excessive Heat Outlook

The National Weather Service has issued an Excessive Heat Outlook for XX County. An Excessive Heat Outlook is issued when the potential exists for an excessive heat event in the next 3-7 days. NOAA's 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.

All residents should be informed of local weather conditions during the Excessive Heat Outlook period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Residents are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit KDHE's website at http://www.kdheks.gov/beh/extreme_heat.htm.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions of common heat related injuries that Kansans should be aware of for this Excessive Heat Outlook.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, more severe sunburn may require medical attention.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Excessive Heat Warning

The National Weather Service has issued an Excessive Heat Warning for XX County. An Excessive Heat Warning is issued when an excessive heat event is occurring or imminent and will pose a threat to life or property. NOAA's 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.

All residents should be informed of local weather conditions during the Excessive Heat Warning period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Residents are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit KDHE's website at https://keap.kdhe.state.ks.us/Ephtm/PortalPages/ContentData?CID=77.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions, symptoms and treatments of common heat related injuries that Kansans should be aware of for this Excessive Heat Warning.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

What to Do

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort.

Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

What to Do

Consult a doctor if the sunburn affects an infant younger than 1 year of age or if these symptoms are present:

- Fever
- Fluid-filled blisters
- Severe pain
- Also, remember these tips when treating sunburn:
- Avoid repeated sun exposure.
- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in 1 hour.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than 1 hour.

What to Do

Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages
- Rest
- Cool shower, bath, or sponge bath
- An air-conditioned environment
- Lightweight clothing

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body

temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally);
- Red, hot, and dry skin (no sweating);
- Rapid, strong pulse;
- Throbbing headache;
- Dizziness;
- Nausea;
- Confusion;
- Unconsciousness

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following: Get the victim to a shady area.

- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101-102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

Excessive Heat Watch

The National Weather Service has issued an Excessive Heat Watch for XX County. An Excessive Heat Watch is issued when the probability of a heat wave has increased but the occurrence and timing is still uncertain. NOAA's 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.

All residents should be informed of local weather conditions during the Excessive Heat Watch period and monitor local news and weather channels. Elderly people, infants and children, and people with chronic medical conditions are more prone to heat related stress and injuries. Residents are encouraged to drink plenty of cool, nonalcoholic beverages regardless of activity level to help prevent heat injuries. Finally, 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 heat-relief shelters in your area. For more information about keeping safe in extreme heat please visit KDHE's website at http://www.kdheks.gov/beh/extreme_heat.htm.

Even short periods of high temperatures can cause serious health problems or heat related injuries. Kansans 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. The following are definitions and symptoms of common heat related injuries that Kansans should be aware of for this Excessive Heat Watch.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles may be the cause of heat cramps. Heat cramps may also be a symptom of heat exhaustion.

Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It 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. *Recognizing Heat Exhaustion*

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness

- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure
- Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than one hour.

Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Warning signs of heat stroke vary but may include the following:

- An extremely high body temperature (above 103°F, orally)
- Red, hot, and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

Appendix D: 60-5401. Immunity for damage to motor vehicle

60-5401. Immunity for damage to motor vehicle. (a) As used in this section:

(1) "Domestic animal" means a dog, cat or other animal that is domesticated and may be kept as a household pet. "Domestic animal" does not include livestock, as defined in K.S.A. 47-1001, and amendments thereto, or other farm animals.

(2) "Motor vehicle" means the same as specified in K.S.A. 8-126, and amendments thereto.

(3) "Vulnerable person" means an adult whose ability to perform the normal activities of daily living or to provide for such adult's own care or protection is impaired or a minor.

(b) A person who enters a motor vehicle, by force or otherwise, for the purpose of removing a vulnerable person or domestic animal is immune from civil liability for damage to the motor vehicle if such person:

(1) Determines the motor vehicle is locked or there is otherwise no reasonable method for the vulnerable person or domestic animal to exit the motor vehicle without assistance;

(2) has a good faith and reasonable belief, based upon known circumstances, that entry into the motor vehicle is necessary because the vulnerable person or domestic animal is in imminent danger of suffering harm;

(3) ensures that law enforcement is notified or calls 911 before entering the motor vehicle or immediately thereafter;

(4) uses no more force to enter the motor vehicle and remove the vulnerable person or domestic animal than is necessary; and

(5) remains with the vulnerable person or domestic animal in a safe location, in reasonable proximity to the motor vehicle, until law enforcement or a first responder arrives.

History: L. 2018, ch. 41, § 1; July 1.