

## **Excessive Heat - Another Underrated Problem**

Many people do not realize how deadly a heat wave can be. In contrast to the visible, destructive, and violent nature of floods, hurricanes, and tornadoes, a heat wave is a "silent killer". In 1995 alone, 1021 Americans perished in heat waves, including 633 in Illinois and 57 in Missouri.

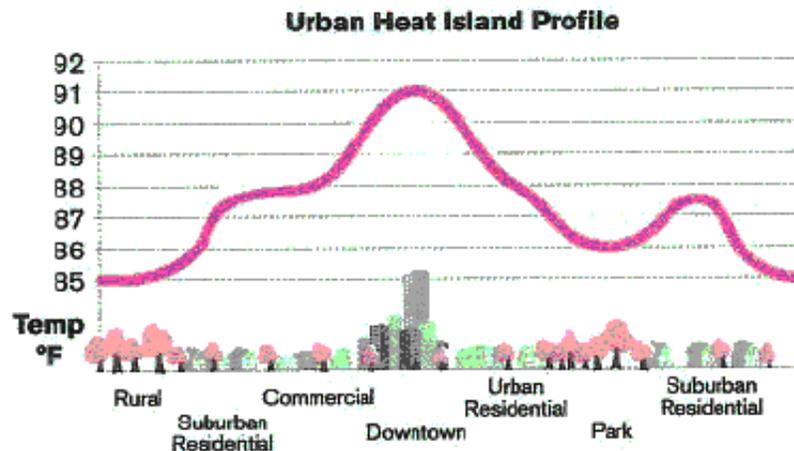
The Centers for Disease Control and Prevention (CDC) reports that for the period 1979 - 2003, excessive heat exposure caused 8015 deaths in the United States. That produces an average of 276 deaths a year from excessive heat. During this period, more people in this country died from extreme heat than from hurricanes, lightning, tornadoes, floods, and earthquakes combined. In 2001, 300 deaths were caused by excessive heat exposure. Currently CDC estimates that 400 people a year die from exposure to excessive heat.

### **What is a Heat Wave?**

A heat wave is a period of excessive heat lasting two days or more that leads to illnesses and other stresses on people with prolonged exposure to these conditions. High humidity, which often accompanies heat in Missouri, can make the effects of heat even more harmful. While heat related illness and death can occur due to exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. Consequently, persistence of a heat wave increases the threat to public health.

### **The Urban Heat Problem**

Most heat-related deaths occur in cities. Brick and mortar buildings, asphalt streets, and tar roofs absorb daytime heat and slowly release it at night. Consequently, temperatures in urban areas can be warmer than rural areas by several degrees both day and night. Some basic comparisons done by the staff at the NWS St. Louis has found that the temperature in the City of St. Louis often averages about 2 - 5 degrees higher than the temperature at Lambert St. Louis International Airport. This is commonly called the urban "heat island" effect. In addition to the burden of heat, stagnant conditions often develop during heat waves, with pollutants increasing in concentration near the ground and contributing further to public health problems during heat waves.



Socioeconomic factors also place urban residents under extra risk. Some people in cities do not have air conditioning, while people in high crime areas may be afraid to open their windows or venture out to cooler public buildings.

## Who is Most Vulnerable During a Heat Wave?

The elderly population segment is the most vulnerable to the dangers of heat. Of the 522 deaths that occurred in Chicago during the July 12-16, 1995 heat wave, 371 (73 percent) were age 65 or older. The elderly suffer due to the diminished ability to perspire. Since the function of perspiration is to provide evaporation, which in turn provides cooling, the elderly have a reduced capacity to release heat from the body.

In addition to the elderly, infants, young children, and people with chronic health problems (especially pre-existing heart disease) or disabilities are more vulnerable to the effects of heat waves. People who are not acclimated to hot weather, overexert themselves, are obese, or use alcohol or drugs (including drugs such as antipsychotics, tranquilizers, antidepressants, certain types of sleeping pills, and drugs for Parkinson's disease) are at great risk. (Source: Centers for Disease Control and Prevention-Morbidity and Mortality Weekly Report)

## Measuring the Combined Effects of Heat and Humidity

The National Weather Service uses the Heat Index (HI) to compute the "apparent temperature," which is a measure of how hot it feels to people at a certain combination of temperature and humidity. The heat index values used in

forecasts, advisories, and warnings assume an average size adult, with light clothing, in the shade, with a 5 mile per hour wind. Being in full sun, or in an area with little air movement, can increase the apparent temperature, and thus increase the risk for adverse effects from the heat and humidity. Winds greater than 5 miles per hour usually enhance evaporative cooling and decrease the apparent temperature and the health threat from the heat. As noted, the impacts of heat are cumulative over time. The greatest number of heat-induced illnesses and fatalities usually peak two days after the maximum heat index values occurred.

## Heat Index

The Heat Index (Apparent Temperature) can be found by taking the temperature (number on the left) and relative humidity value (number at the top) and matching them on this table. For example, a temperature of 90 degrees Fahrenheit and a relative humidity of 45 percent gives you a heat index of 93 degrees. NWS St. Louis Excessive Heat Advisory/Warning criteria. Note: Heat Index = HI

**Excessive Heat Advisory:** The HI is expected to reach 105 degrees F, or the HI will range from 100 to 104 for at least 4 consecutive days.

**Excessive Heat Warning:** The HI is expected to reach 110 degrees F for 2 consecutive days, or will be around 105 for at least 4 consecutive days.

An Excessive Heat Watch will be issued if it appears warning criteria may be met in the near future. The 4 consecutive day criteria takes into account the duration of an event which can be just as dangerous as a single very hot day.

		Relative Humidity (%)													
°F		40	45	50	55	60	65	70	75	80	85	90	95	100	
Air Temperature	110	136													
	108	130	137												
	106	124	130	137											
	104	119	124	131	137										
	102	114	119	124	130	137									
	100	109	114	118	124	129	136								
	98	105	109	113	117	123	128	134							
	96	101	104	108	112	116	121	126	132						
	94	97	100	103	106	110	114	119	124	129	135				
	92	94	96	99	101	105	108	112	116	121	126	131			
	90	91	93	95	97	100	103	106	109	113	117	122	127	132	
	88	88	89	91	93	95	98	100	103	106	110	113	117	121	
	86	85	87	88	89	91	93	95	97	100	102	105	108	112	
	84	83	84	85	86	88	89	90	92	94	96	98	100	103	
	82	81	82	83	84	84	85	86	88	89	90	91	93	95	
	80	80	80	81	81	82	82	83	84	84	85	86	86	87	

Heat Index  
(Apparent  
Temperature)

With Prolonged Exposure  
and/or Physical Activity

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