HEAT WAVES

Lightning, hail, and tornados are all severe weather killers which claim dozens of lives annually. Severe thunderstorms also injure hundreds each year, but the deadliest weather in the United States arrives every summer and has killed, on average, 235 people per year for the last 10 years. This deadly weather comes in the form of long periods of excessive heat and humidity, or heat waves. In the summer of 1995, a heat wave killed over 700 people in Chicago. In 2003, The Earth Policy Institute reported over 35,000 deaths in Europe, with 14,802 deaths in France alone, during a two week heat wave with high temperatures soaring to 104º Fahrenheit.

Heat waves are ruthless killers that prey on the elderly, the very young, and those who fail to heed the excessive heat warnings and the symptoms of heat-related trauma. With increased awareness of this deceptive killer at both personal and governmental levels, heat-related deaths can be prevented.

South Carolina suffers from searing summer temperatures courtesy of its sub-tropical geography and the orientation of the Sub-Tropical High pressure system centered over the southwestern Atlantic. The Sub-Tropical High, or Bermuda High, is quasi-stationary during the summer months, forcing very warm, moist tropical air north from the tropical Atlantic and the Gulf of Mexico over South Carolina and the southeast United States. The Bermuda High also forces air to sink in the atmosphere. This downward motion causes the atmosphere to heat up and suppress cloud formation. Clouds help shade the ground and moderate surface temperatures. The Bermuda High also adds to the summer heat wave misery by trapping ozone, smoke and other pollutants in the lower atmosphere. Cities further increase heat wave intensity as the concrete and asphalt canyons trap and store excess heat, raising temperatures 5-10 degrees higher in these areas than in the surrounding suburbs that have more natural surfaces, vegetation and bodies of water.

Heat alone is enough to cause death, particularly among the elderly, but coupled with tropical levels of humidity, heat waves become insidious killers. The body’s protective response to heat is sweating. Sweat helps transport heat from the body and acts to cool the skin when it evaporates, absorbing excessive body heat. Increased humidity saturates the surrounding air and reduces the evaporation of sweat. With the reduction of the body’s cooling mechanism, the internal body core temperature increases, causing dizziness, dehydration, unconsciousness and ultimately coma and death without medical attention.

The National Weather Service has devised a heat index scale based upon both temperature and dew point. Heat index values more accurately portray how the humid summer air feels to a person in a shaded location. Heat index values can only be calculated for temperatures above 80º Fahrenheit and dew point values above 65%. On a sunny, humid summer day the temperature rises to 95º Fahrenheit and the dew point is a steamy 70º, the calculated heat index value would be 103º. Direct sunlight can increase heat index values by 15º Fahrenheit.

Heat index values of 80-90º Fahrenheit will cause fatigue and muscle cramps with prolonged exposure and without adequate hydration. Heat index values of 90-105º Fahrenheit will bring on heat exhaustion with the following symptoms: heavy sweating, paleness, dizziness, nausea and fainting. Hydration and avoiding excessive exertion is crucial to preventing heat exhaustion. Heat stroke or hyperthermia is the most serious heat induced illness and can be lethal. Heat index values above 105º Fahrenheit will put a person at risk for heat stroke. Heat stroke, also known as sunstroke, occurs when the heat index rises above 130º Fahrenheit. A person has heat stroke when their body temperature rises above 106º Fahrenheit and exhibits: flushed skin, rapid pulse, no sweating, hallucinations, seizures and coma. Victims of heat stroke require immediate emergency medical treatment and hospitalization since any treatment delay can be fatal. Heat stroke is not just an outdoors danger; it can also occur in indoor environments such as factories, foundries and ship’s engine rooms.

From July 12-16, 1995, Chicago suffered record temperatures and an epidemic of heat stroke. Over 700 people perished from heat-related illness as heat index values hovered between 115-125º Fahrenheit. Nighttime low temperatures only dropped into the low 80s and provided little relief from the week-long killer heat wave. The casualties taxed hospitals and city government as they struggled to deal with the number of victims and the severity of cases of hyperthermia. Since this extreme event, the National Weather Service Hydrometeorological Prediction Center (http://www.hpc.ncep.noaa.gov) issues regular operational heat index forecasts for the continental United State during the summer. Local National Weather Service Forecast Offices will issue a heat advisory whenever the forecast or observed heat index is between 105-114º Fahrenheit for a two hour period. National Weather Service forecasters issue an Excessive Heat Warning when the heat index equals or exceeds 115º Fahrenheit.

Excessive summer heat and heat waves are notorious killers of the unprepared and those who fail to heed the warnings. Fortunately, many South Carolinians know the risk of prolonged heat exposure and overexertion when the heat index climbs above 90º Fahrenheit. Acclimatization is one way to beat the heat along with light, breathable clothing, adequate hydration and heeding heat advisories and warnings. Heat stroke is a killer, more lethal than lightning, tornados, floods and hail.