

Health Effects of Living in a Hot Home

Heat waves are already the most deadly weather-related exposure in the U.S. and account for more deaths annually than hurricanes, tornadoes, floods, and earthquakes combined. Lower income older adults and children are at greater risk from heat. Other risk factors for heat-related death include living alone, medical conditions, respiratory problems, and use of certain medications.

Climate Change

Climate change will bring more heat waves to the U.S. Growing numbers of people living in cities, as well as a population aging, will further increase heat-related health risks. Studies suggest that, if current emissions hold steady, excess heat-related deaths in the U.S. could climb from an average of about 700 each year currently, to between 3,000 and 5,000 per year by 2050. Heat waves are expected to become more regular, last longer, and be more intense as we move deeper into climate change.

Urban Heat Island Effects: Cities and climate are co-evolving in a manner that will certainly amplify both the health effects of heat and the vulnerability of urban populations to heat-related deaths by magnifying the increased temperatures caused by climate change as compared to adjacent rural and suburban locales.

High concentrations of buildings in urban areas generate as well as absorb and then release heat, resulting in urban centers that are several degrees warmer than surrounding areas.

Cutting down trees has been a big factor in the heat island effect. Pavement also stores heat during the day and makes cities hotter at night. And as cities heat up, air conditioners run harder. Their exhaust heat also pushes up the temperature.

Not only are most cities heating up more rapidly than the planet, they tend to be heating up at double the rate. If this trend continues and the planet heats up 4 degrees in the coming decades, cities will heat up a blistering 8 degrees.

Heat island effects could be significantly reduced if buildings were adapted for climate change through better ventilation, thicker walls, and shading. With these measures, deaths could be cut from one third to two-thirds. There are no current building regulations to guide future building design on the risks of overheating. Air conditioning

Air conditioning is not the answer as this cooling system merely pushes warm air outside the building and causes the overall heat levels to rise. Air conditioning also uses more energy and adds to carbon emissions.

High overnight temperatures: In recent years, scientists have learned that a day's highest temperature is not the best measure of the danger of heat waves. Unrelenting heat that doesn't allow people to rest at night is responsible for the deaths of many elderly and ill people. Unfortunately, the urban heat island effect affects nighttime temperatures the most: that's when all the heat absorbed by the roads and buildings is re-released.

Air Pollution: The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add the stresses of severe pollution to the already dangerous stresses of hot weather, creating a health problem of undiscovered dimensions. A map of heat-related deaths in St. Louis during 1966, for example, shows a heavier concentration in the crowded alleys and towers of the inner city, where air quality would also be poor during a heat wave.

Health Effects of High Temperatures

Under conditions of high temperature (above 90 degrees) and high relative humidity, the body does everything it can to maintain 98.6 degrees inside. Human bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and-as the last extremity is reached-by panting, when blood is heated above 98.6 degrees.

Body's natural cooling methods: The skin handles about 90 percent of the body's heat dissipating function. When the body overheats, the heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries threading through the upper layers of skin are put into operation. The body's blood is circulated closer to the skin's surface, and excess heat drains off into the cooler atmosphere.

At the same time, water diffuses through the skin as perspiration. Sweating, by itself, does nothing to cool the body, unless the water is removed by evaporation-and high relative humidity retards evaporation. The evaporation process itself works this way: the heat energy required to evaporate the sweat is extracted from the body, thereby cooling it.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop.

High temperatures can lead to dehydration, heat exhaustion, and deadly heatstroke. Very hot weather can also aggravate existing medical conditions, such as diabetes, respiratory disease, kidney disease, and heart disease. Urban residents, the elderly, children, outdoor workers, and people with impaired health and limited mobility are particularly susceptible to heat-related illness and death.

Health effects of air pollution: Air pollutants such as ozone and particulate matter work in concert with heat, exacerbating its health effects. Heat also increases ground-level ozone concentrations, causing direct lung injury and increasing the severity of respiratory diseases such as asthma and chronic obstructive pulmonary disease. Higher temperatures and heat waves increase demand for electricity and thus combustion of fossil fuels, generating airborne particulates and indirectly leading to increased respiratory disease.

Vulnerable Populations

Lower-income: Heat waves are felt with more force in distressed communities where shade trees and air conditioners are scarce. Socioeconomic factors also determine vulnerability; economically disadvantaged and socially isolated people face higher burdens of death from heat. Those with less income often find air conditioning unaffordable. Research on deaths from heat waves suggests that some elderly people on fixed incomes, many of them in buildings that could not be ventilated without air conditioning, found the cost too high, turned off their units, and ultimately succumbed to the stresses of heat.

Young and Old: Studies indicate that, other things being equal, the severity of heat disorders tend to increase with age-heat cramps in a 17-year-old may be heat exhaustion in someone 40, and heat stroke in a person over 60. Elderly persons, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anti-cholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails. And when you overlay socio-economic factors, heat waves affect a targeted population.

Most people who die from hyperthermia each year are over 50 years old. A number of factors can put the elderly at higher risk of overheating, such as decreased blood circulation and inefficient sweat glands. In the United States, the number of individuals 65 years of age and older (who are more susceptible to heat effects) is expected to increase from 12.4% in 2000 to 20% in 2060.

Children have a larger skin surface relative to their small bodies, so they absorb more heat from the sun and air. When they exercise, they produce more heat. And because they do not sweat as much, their bodies do not cool off as well. They get so focused on playing that they are not aware that they need to rest, cool off and drink liquids. Children with certain medical conditions, including obesity, diabetes, heart disease, cystic fibrosis and mental retardation are at even greater risk for overheating and dehydration.