

OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

IF YOU CAN'T STAND THE HEAT, FIND AN AIR CONDITIONER

Even though it may not seem like it during a cold, rainy spring, the summer reliably brings with it some hot temperatures that are uncomfortable and sometimes dangerous. During 1979–2003, excessive heat exposure caused more deaths in the United States than lightning, tornadoes, floods, and earthquakes combined.<sup>1</sup> On average, during 1999–2003 in the U.S., 633 death certificates per year indicated that deaths were heat-related. Of these, 65% were coded as being due to heat stroke, or otherwise directly related to excessive heat. The remaining 35% indicated that hyperthermia contributed to death from another cause (Figure).<sup>2</sup> However, these figures likely under-estimate the burden of heat-related illness, since clinicians may not recognize or record the role of excessive heat in an acute event due to an underlying chronic condition. Analyses assessing mortality more broadly have therefore been done, and show that Portland has a summertime heat-attributable death rate as high as 1.76 per 100,000, accounting for as many as 32 excess deaths due to heat each summer.<sup>3</sup> Many of these deaths could have been prevented.

This issue of the *CD Summary* looks at the health impact of extreme heat and provides some suggestions on what we can do to keep Oregonians safe when the mercury starts to climb.

**IS IT HOT ENOUGH FOR YOU?**

Extreme Heat Event (EHE) conditions are defined by summertime weather that is substantially hotter and/or more humid than average for a particular location at that time of year.<sup>3</sup> So weather that is scorching hot for the Oregon coast might not qualify as an EHE in other parts of the state. Extreme heat is defined in this region-specific way because people who live in areas that are usually cool often have the highest burden of morbidity

and mortality when the heat and humidity rise.<sup>4</sup> For example, during a 2006 heat wave in California, the rate of emergency department visits for heat-related illness was five times higher in the San Francisco area than it was in hotter climate areas of the state. This was thought to be due to reduced physiologic capacity (acclimatization), decreased awareness of strategies to minimize the risks of heat-related illness, and the lack of air-conditioning among people living in an area that doesn't often experience high heat and humidity.<sup>5</sup>

**WHO'S FEELING HOT, HOT, HOT?**

Certain populations have a particularly difficult time dealing with hot weather. The following factors increase the risks of experiencing adverse health effects as a result of EHEs:<sup>3</sup>

- age >65 years or age <1 year;
- chronic medical conditions;
- homelessness;
- low socioeconomic status;
- social isolation;
- mobility restrictions;
- mental impairment;
- taking certain medications (e.g. diuretics, psychotropics);
- vigorous outdoor activities;
- use of drugs/alcohol.

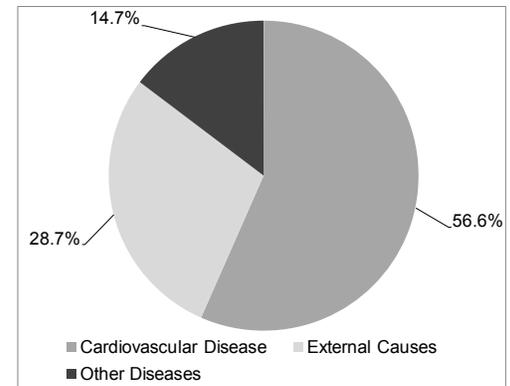
Make sure people-at-risk, along with their families and friends, know how to protect themselves from heat-related illness and how to respond when some fun in the sun takes a dangerous turn.

**WHAT TO WATCH FOR WHEN THE HEAT IS ON**

Advise family and friends to check on at-risk patients frequently when the weather is hot. They should be especially aware that certain signs and symptoms are an indication that patients need to seek medical attention right away. These include heat cramps, heat exhaustion, and heat stroke.

**Heat Cramps** are painful muscle cramps that occur due to loss of electrolytes after engaging in strenuous

Figure. Proportion of deaths with heat as an underlying cause.



activity in the heat. Usually these cramps are in the legs and abdominal muscles and occur after a period of profuse sweating.

**Heat Exhaustion** is characterized by heavy sweating, muscle cramps, and nausea or vomiting. Signs may develop when there is inadequate replacement of fluids and electrolytes after prolonged periods of high temperatures.

**Heat Stroke** is a medical emergency that involves the loss of the body's ability to regulate temperature. The sweating mechanism fails. The body is unable to cool down. Body temperature may rise to 106°F or higher. Signs and symptoms include: hot, dry skin, hallucinations, high body temperature, rapid pulse, throbbing headache, nausea, dizziness and unconsciousness.

When any of these signs or symptoms is present, patients and their families should be advised to:

- seek immediate medical attention
- get to a cooler environment, preferably with air-conditioning
- rehydrate with water, clear juice, or a sports beverage, if possible

Even in the absence of specific symptoms, patients-at-risk and their family and friends should know they can get sick when the temperature soars.

**PRESCRIBING THE CHILL PILL**

**A/C is key.** The most effective strategy for preventing heat-related illness is the use of air conditioning. Spending time

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in air-conditioned spaces has been associated with a 4-fold reduction in heatstroke. In fact, high-risk people benefit from spending just a few hours a day in air-conditioned spaces during EHEs.<sup>4</sup> Recommend that patients with air conditioning at home use it at least during the hottest hours of the day. Be aware of possible obstacles to the use of air conditioning, such as concerns about electric bills, and discuss strategies for working around them. For those who don't have air-conditioning at home, help identify other cool venues they can use during the day, including libraries, movie theaters, shopping malls and senior centers. Some communities designate these and other locations as cooling shelters when an EHE is expected and provide special hours and services while the weather is hot. See if this is an option in your community.

**Don't fan the fire.** Many people without access to air conditioning will make use of electric fans when the mercury climbs. But electric fans can actually fan the flames of heat-related illness if they're not used properly.<sup>3</sup> The cooling effect from fans results from evaporation of sweat from the skin. If the temperature is too hot or if fluids aren't adequately replenished, use of a fan can actually increase the risk for heat-related illness by blowing hot air across hot skin. Advise patients to vent the fan out the window and avoid blowing air directly on their skin when the temperature is above 90°F. Evaporative cooling may be augmented by taking a cool bath or shower, or using a moist towel,

particularly for those who are reluctant to open their windows due to concerns about crime in their neighborhoods.

**Drink up, but please make it virgin.**

Encourage patients to drink fluids regularly during an EHE. Make sure they know that alcoholic beverages aren't a good way to hydrate and should be avoided when the weather is hot.

**ORGANIZE TO BEAT THE HEAT**

Coordinated community efforts have proven themselves effective in places like Philadelphia and Toronto<sup>3</sup>. These strategies include:

- working with forecasters to identify EHE conditions 1-5 days in advance;
- assessing who is at greatest for heat-related illness in their communities and mapping areas of concern;
- agreeing on a predetermined consistent message to be distributed by community partners;
- identifying public and private buildings to be used as cooling shelters;
- suspending utility shutoff;
- checking in on residents known to be high risk for EHE-related illness and ensuring they have needed resources.

Together, community and clinical interventions can go a long way toward protecting those vulnerable to heat-related illness. As stated by Henry Wadsworth Longfellow, "...noble souls, through dust and heat, rise from disaster and defeat the stronger."<sup>6</sup> Let your patients know the risks and what they can do to experience the warmth the season brings (without getting sick in the process).

**FOR MORE INFORMATION**

- MMWR information on heat-related morbidity and mortality: <http://www.bt.cdc.gov/disasters/extremeheat/investigations.asp>

- NOAA information on heat index and high heat alerts: [http://www.nws.noaa.gov/om/brochures/heat\\_wave.shtml](http://www.nws.noaa.gov/om/brochures/heat_wave.shtml)
- And stay tuned, as the Oregon Public Health Department's Preparedness, Surveillance, and Epidemiology Team is collaborating with the Office of Environmental Health to assess morbidity and mortality related to EHEs in Oregon and develop community mitigation measures.

**REFERENCES**

1. Centers for Disease Control and Prevention. 2004. Extreme heat: a prevention guide to promote your personal health and safety. See: [www.bt.cdc.gov/disasters/extremeheat/heat\\_guide.asp](http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp) (Accessed: 11 May, 2011).
2. Centers for Disease Control and Prevention. Heat Related Deaths—United States, 1999–2003. *MMWR* 2006;55:796–8.
3. Environmental Protection Agency. Excessive Heat Events Guidebook. June 2006. See: [www.epa.gov/heatisd/about/pdf/EHE-guide\\_final.pdf](http://www.epa.gov/heatisd/about/pdf/EHE-guide_final.pdf) (Accessed: 11 May 2011).
4. Kilbourne EH. Heat Waves and Hot Environments. In Noji E, ed. *The Public Health Consequences of Disasters*. New York, NY: Oxford University Press;1997; 245–69.
5. Knowlton K, Rotkin-Ellman M, King G, Margolis HG, Smith D, Solomon G, et al. The 2006 California heat wave: Impacts on hospitalizations and emergency department visits. *Environ Health Perspect* 2009;117:61–7.
6. The Maine Historical Society Website. Henry Wadsworth Longfellow: The Sifting of Peter. See: [http://www.hwlongfellow.org/poems\\_poem.php?pid=312](http://www.hwlongfellow.org/poems_poem.php?pid=312). (Accessed: 11 May 2011).