

OREGON PUBLIC HEALTH DIVISION • DEPARTMENT OF HUMAN SERVICES

PUBLIC HEALTH CONSEQUENCES OF DISASTERS

... 'cause it's sugar for sugar, and it's
Salt for salt,

If you go down in the flood, it's gonna
Be your fault. — Dylan

As public health lyricist Bob Dylan poetically put it, there are steps we can take in advance of disasters that minimize morbidity. In this issue of the *CD Summary*, we look at the health consequences of disasters and some things we can do to mitigate them.

INFECTIOUS DISEASE? – NOT!

... but people with diabetes will still need their insulin.

The first threats that come to many minds in the setting of storms, earthquakes, etc., are outbreaks of communicable disease. Such outbreaks are rare in developed countries, however. Developing countries, on the other hand, may indeed suffer such outbreaks, as seen with the uptick in malaria and dengue associated with increased exposure to mosquitoes in the aftermath of the recent earthquake in Haiti (*CD Summary*, Mar. 30 and May 11, 2010). Enteric diseases cause trouble in settings where insufficient attention has been paid to ensuring potable water and adequate sanitary disposal. Neither does the garden-variety disaster increase the need for tetanus boosters.

Rarely, flooding events have been associated with leptospirosis from direct contact with the organism in contaminated floodwaters. Again, this is the exception rather than the rule.¹

All this said, any event that destroys infrastructure and renders people homeless should prompt an assessment of environmental conditions to prevent or address any contamination of drinking water, breakdown of usual sanitary disposal systems, or heat or cold stresses due to loss of shelter. If the water supply is disrupted or contaminated, public health advisories encouraging people to drink bottled water or to boil or treat their water

until the situation has resolved can prevent illness.

An under-appreciated problem is the disruption caused by evacuations, damage to homes etc. in people's ability to self-manage chronic diseases such as diabetes and cardiovascular disease. Ensure that you have enough of their essential medicines to get them through a seven-day pharmacy hiatus.

HEAT WAVES

Staying hydrated and cool makes a difference; but caveat swimmer!

Heat waves, characterized by high temperatures and exacerbated by increased humidity, pose their own public health issues. Heat-related illness can range from muscle cramps, through heat exhaustion, to life-threatening heat stroke, with a case-fatality rate of 15-40%. (See box.)²

HEAT-RELATED ILLNESS

Heat Stroke – loss of body's ability to regulate temperature. Sweating mechanism fails. Signs and symptoms include hot, dry skin, hallucinations, high body temperature, confusion.

Heat Exhaustion – body's response to excessive loss of water and salt. Signs and symptoms include heavy sweating, weakness, muscle cramps, nausea.

Case series show that infants and the elderly are at increased risk of heat-related death. In infants, this is primarily due to limited capacity to adapt to increased environmental temperatures: they can't disrobe themselves or turn on a fan. In the elderly, decreased ability to respond physiologically to heat stress is compounded by exacerbation of underlying chronic conditions such as cardiovascular, renal, and metabolic disease.² Some simple measures you can recommend to at-risk patients when the mercury is rising:³

- Spend time in places with air conditioning,
- Stay well hydrated,

- Use the tub or a moist towel to stay cool,
- Use a "buddy system" to ensure that the elderly find ways to "beat the heat".

It doesn't take a full-blown heat wave to increase risk of drowning in Oregon. As temperatures rise in May and June, many Oregonians head for lakes, streams, and the ocean. Jumping into cold, deep water puts even the healthiest person at risk for drowning due to the effect of "cold shock" on respiration and muscle fatiguability. (See *CD Summary*, May 15, 2007.) In 2009, 26 Oregonians drowned during May-August, compared with 30 in all other months combined. Discuss this risk with the parents of children and adolescents as summer approaches.

COLD-RELATED ILLNESS

No rocket science here: keep kids and the elderly warm.

Conversely, cold temperatures during the winter increase the risk of hypothermia. Though frostbite may be more of a headline grabber, hypothermia poses the greater risk; it can be a particular problem for youngsters and the elderly during prolonged cold snaps. The problem is not trivial, nor, surprisingly, does it occur only with very cold temperatures. A Scottish survey of 958 consecutive patients age ≥65 years presenting to an emergency department between Oct. 1 and Dec. 31, 1999, found hypothermia in 5% of them.⁴ The World Health Organization recommends a minimum temperature of 20°C (68°F) in rooms occupied by the sedentary elderly or young children.⁵ Those at high risk can avoid hypothermia through use of warm clothing (including a hat) and blankets, avoiding prolonged exposure outside, and by maintaining an adequate temperature in the home. These strategies may seem self-evident, but reviewing their importance, in particular with elderly patients and parents of infants, could keep them out of trouble.



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FLOODING

Using generators indoors is bad news, as are damaged appliances or broken gas lines. . .

Nationwide, flooding causes more deaths in an average year than any natural disaster,⁶ and flooding is also common in Oregon and the Northwest. Deaths primarily occur in the setting of flash floods, caused by sudden, intense rainfall or breaching of a dam. In addition to drownings and injuries that may result from flood-induced landslides or structural damage, several characteristic types of injuries are also seen after flood waters have receded. To prevent them, a few caveats:

- *Don't* use a match, candle, or lighter as your illumination source when going back into a damaged house plumbed with natural gas.
- *Watch out* for downed power lines, exposed wiring, and wet damaged appliances when cleaning up.⁶

Other types of "outbreaks" may be seen in the setting of floods, ice storms, wind storms, or any other event that disrupts electrical power transmission. Carbon monoxide poisoning due to use of fuel-powered generators in poorly ventilated areas is all too common.⁷

TRAUMA

A stitch in time. . .

In the setting of earthquakes, tsunamis, and other events that cause extensive structural damage, deaths may occur due to crush injuries or asphyxiation resulting from building collapse. In one review of mortality data from multiple earthquakes, two-thirds of

deaths were attributable to collapse of un-reinforced masonry structures.⁸ However, most trauma is limited to minor lacerations and contusions, with simple fractures as the next most common injury.⁸ Most of these can readily be cared for on an outpatient basis.

INDUSTRIAL DISASTERS

Effective response is important, but the first step is prevention.

Industrial release of toxic chemicals due to natural events, equipment malfunction, or human error can have a substantial public health impact, depending on the nature of the chemical, the quantity released, and the proximity to population centers. The most notorious example was a 1984 release of 40 tons of methyl isocyanate gas in Bhopal India, which killed more than 4,000 people.⁹ Several strategies can decrease the risk of such releases, including proper training of staff, maintenance and updating of equipment, use of processes involving less toxic substances, and siting of industrial plants away from population centers.

Medical response will vary by the chemical released. Initial steps include identifying the agent involved, protecting those responding to the emergency, removing those affected from the exposure, decontaminating the exposed, supplying an antidote, if one exists, and providing supportive care to address the injuries associated with the exposure.

CONCLUSION

Disasters often strike without warning. Response efforts can help to limit their impact on the health of affected communities. Still, simple steps taken

beforehand, such as putting aside a 3-day supply of food, water, and essential medicines, plus a little friendly advice from the respected health care provider, may prevent the most common problems in the first place.

FOR MORE INFORMATION

See the CDC's Emergency Preparedness and Response web site at <http://emergency.cdc.gov/>.

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