August 2009

Fact Sheet

Environmental Hazards Weigh Heavy on the Heart

Information for Older Adults and Their Caregivers

Environmental hazards can contribute to heart disease and stroke. Older adults should minimize exposure to environmental hazards such as air pollution, arsenic, lead, and excessive heat.

Did you know that environmental hazards can contribute to heart disease and stroke? This fact sheet summarizes environmental factors and how they can affect the health of older adults. It also suggests how older adults can minimize their exposure to air and water pollutants that contribute to heart disease and stroke or worsen their symptoms.

Heart disease, the leading cause of death in the United States, and stroke, the third most frequent cause of death, cost the nation hundreds of billions of dollars each year. According to the CDC, in 2005, heart disease killed 652,091 people, which represented 27.1% of all deaths in the U.S.[1]

Environmental Factors Contribute to Heart Disease and Stroke

Indoor Air Pollution

People who spend long periods of time indoors are often the most susceptible to the effects of indoor air pollution. Studies suggest that older adults spend up to 90% of their time indoors. Indoor air is comprised of a mixture of contaminants penetrating from the outdoors and those generated indoors. Indoor air can contain secondhand smoke, fumes from household cleaning products, and even carbon monoxide. These indoor contaminants can be dangerously toxic, especially to those at risk of stroke and heart disease.

Smoke: Secondhand smoke is one of the worst indoor air pollutants. Smoking is known to contribute to heart disease and stroke, but inhaling the same dose of secondhand smoke and smoke from active smoking is equally detrimental.

Wood burning stoves and fireplaces can generate smoke containing fine carbon particles. These particles may trigger chest pain and palpitations, shortness of breath, and fatigue, especially in older adults with heart disease.[2]

Household Products: When used improperly, some household products can be very dangerous for people with heart conditions. Vapors from cleaning products, paint solvents, and pesticides require proper ventilation and limited exposure to minimize detrimental effects.

Fumes from paint solvents, such as mineral spirits, turpentine, methanol, and xylene, stress the lungs and heart, contributing to irregular heartbeat. Although lead-based paints are now banned, many homes built before 1978 used lead-containing paints. Take appropriate precautions during renovations to minimize paint chips or dust generated that pose serious health hazards, including high blood pressure.

Pesticide poisonings often result from exposure to toxic fumigants or insecticides. Symptoms of this type of poisoning include arrhythmia or a very slow pulse.[3] In severe cases, exposure can contribute to a heart attack or even death.

Carbon Monoxide: Carbon monoxide (CO), an invisible and odorless gas, is a dangerous pollutant because it is difficult to detect. It is particularly

harmful to people with heart disease, clogged arteries, or congestive heart failure because it significantly limits the blood's ability to carry oxygen. For a person with heart disease, exposure to even low levels of CO may cause chest pain, increased heart rhythm irregularities and make it difficult to exercise.[4] Sources of CO include fumes from furnaces, gas water heaters, ranges, dryers, space heaters, fireplaces, wood stoves, and exhaust from cars idling in enclosed garages.

Outdoor Air Pollution

Older adults who are at risk for heart disease and stroke may benefit from lowering their contact with air polluted with particulates and vehicular exhaust.

Particle Pollution: Small soot particles found in outdoor air can be hazardous and the risk is greatest among people with heart disease, chronic obstructive lung disease and asthma. Particles originate from a variety of sources including vehicles, power plants, industrial smokestacks, and fires. Some particles are emitted into the air directly, but others form as a result of complicated chemical reactions in the atmosphere. Particles can travel hundreds to thousands of miles downwind, affecting people far from the sources.

Traffic: Time spent in traffic has also been associated with the onset of a heart attack.[5] It is not known whether this is due to traffic-related air pollution (e.g., particle pollution, CO), the stress of being caught in traffic, or some other risk factor.

Pollutant Gases: Ozone, sulfur dioxide, and nitrogen dioxide are also important components of air pollution and are associated with adverse health effects. Ozone is a strong irritant to the lungs and airways and can cause chest pain that can be mistaken for a heart attack.

Drinking Water

There is evidence that several metals found in drinking water may contribute to heart disease or aggravate its symptoms.

Lead: Exposure to lead can increase blood pressure. While people are primarily exposed to lead through paint dust, drinking water is another source of lead exposure. While water from a community's public water supply must meet EPA standards for lead, tap water may still contain lead exceeding the allowable levels due to the presence of older lead-containing plumbing materials.

Arsenic: Long-term exposure to high levels of arsenic, a natural element found in drinking water in some areas of the country, can harm the heart. EPA has a drinking water standard for public drinking water systems to ensure that people are not exposed to high levels of arsenic. If you obtain your water from a private well or small water system, see the "Steps You Can Take" section for more information about actions to limit your exposure.

Excessive Heat Events

Heat events are described as prolonged periods when temperatures reach at least 10º F. (5.5ºC.) above a region's average high temperature. Heat stroke is the most serious of a range of health effects associated with excessive heat exposure. It occurs when the body's temperature control system fails causing a rapid rise in core body temperature. Heat stroke is characterized by hot, dry, and red skin, and a lack of perspiration. Other warning signs are confusion and hallucinations. Heat stroke is a serious condition requiring immediate medical attention (call 911 or take the person to an emergency room). Left untreated, heat stroke can cause severe and permanent damage to vital organs, permanent disability, or death.

Persons with heart disease and stroke have impaired cooling mechanisms and are more vulnerable during heat events. The use of some medications can make individuals more susceptible to heat events for example, anti-depressants and some circulatory medications.

During heat events, air-conditioning is the best protection against heat-related illness and death. Even a few hours a day in air-conditioning can greatly reduce the risk. Research indicates electric fans are only effective if the ambient temperature is lower than the body temperature. Electric fans may provide comfort, but when temperatures are in the high 90s, fans do not prevent heat-related illness and could actually be harmful.

Encourage Your Local Government to Take Action

Local governments should take these simple steps to reduce hazards and publicize precautions older adults can take.

- **Promote smoke-free policies in public places:** By keeping public places (restaurants, bars, and parks) smoke-free, communities can limit exposure to secondhand smoke.

Steps You Can Take to Help Control Heart Disease and Stroke

A healthy lifestyle is the best way to prevent heart disease and stroke. In addition, older adults should limit their contact with environmental risk factors and encourage local governments to take action to reduce environmental hazards.

Limit Contact With Environmental Factors

- **Keep smoke out of indoor spaces:** Avoid smoke from tobacco. Encourage smokers to smoke outdoors. Avoid restaurants, bars, and other public places where people smoke. Do not use, or limit use of, wood-burning stoves and fireplaces.
- **Use caution when working around the house:** Improve ventilation when painting by scheduling indoor painting for times when windows can be left open and by using fans. Take frequent fresh air breaks when painting; avoid painted rooms for several days.

  Before renovating a home built before 1978, take precautions to avoid lead paint exposure. Do not use a belt-sander, propane torch, heat gun, dry scraper, or dry sandpaper to remove lead-based paint because these actions generate unacceptable amounts of lead dust and fumes.

  If you must use pesticides, always read labels first and follow all precautions and restrictions. When handling pesticides, take protective measures; follow directions and wear impermeable gloves, long pants, and long-sleeved shirts. Change clothes and wash your hands immediately after applying pesticides. Wash clothes exposed to pesticides separately.
- **Avoid carbon monoxide poisoning:** Never leave a car running in a garage, even with the garage door open. Keep gas appliances properly adjusted. Install and use exhaust fans. Have a trained professional inspect, clean, and tune-up your central heating system (furnaces, flues, and chimneys) every fall. Install carbon monoxide detectors throughout your home.
- **Reduce exposure to traffic and outdoor air pollution:** Pay attention to Air Quality Index (AQI) forecasts to know when the air is unhealthy for sensitive groups. Check with your physician about lowering your activity level when the AQI is high. Put air conditioning on the re-circulate mode and keep windows closed during smoke events from fires in buildings or forests. Reduce your time in traffic. Avoid physical activity and limit exercise near busy roads.
- **Prevent heat stress:** Use your air-conditioner or go to air-conditioned buildings in your community. Take a cool shower or bath. Wear lightweight, light-colored, and loose-fitting clothing. Ask your doctor if your medications increase your susceptibility to heat-related illness.

  Drink lots of fluids, but avoid beverages containing caffeine, alcohol, or large amounts of sugar. These drinks cause dehydration. If a doctor limits your fluid intake, be sure to ask how much to drink when it's hot.
- **Drink clean water:** To limit your exposure to lead through your water, run cold water for at least 30 seconds, preferably 2 to 3 minutes before drinking. Testing for lead also may be advisable for people who get their water from municipal sources and live in older homes with lead service lines. If you receive your water from a municipal system, you should first request information from your municipal system for results of federally mandated testing for lead and copper, particularly in homes from the area where you live.

  EPA's arsenic standard exempts small water systems that annually provide fewer than 15 "hook-ups" or serve fewer than 25 people. If your water supply is from a private well or a small system that is exempted from testing and you live in an area where high levels of arsenic have been reported in the ground water, you may want to have your water tested for arsenic.

  The best source of specific information about your drinking water is your water supplier. Water suppliers that serve the same people year-round are required to send their customers an annual water quality report (sometimes called a consumer confidence report). Contact your water supplier to get a copy.

- **Promote Active Heat Health Watch/Warning Systems:** These systems can help identify when a heat-related threat is likely, alert residents, and provide assistance to at-risk individuals.
- **Ensure that Air Quality Index forecasts are publicized and followed:** EPA's Air Quality Index is an index for reporting daily air quality. See www.epa.gov/airnow.
- **Promote public transit options that reduce traffic and air pollution:** Public transit is the best way to alleviate road congestion, air pollution, and stress.
- **Locate parks, bike paths, and trails away from major roads:** Physical activity is one of the best ways to lower your risk for heart disease and stroke. Exercise away from roads and traffic pollution.

Control Your Major Risk Factors for Heart Disease and Stroke

The environment is just one factor that influences a person's susceptibility to heart disease and stroke. The most important steps you can take to reduce risk factors for heart disease and stroke include:

- **Avoid smoke from tobacco**
- **Schedule time for regular physical activity 30 minutes per day at least 5 days a week**
- **Follow the 2005 Dietary Guidelines for Americans**
- **See your health care provider regularly to screen for and treat high blood pressure, diabetes, and hyperlipidemia (elevated levels of lipids in the bloodstream)**

Resources

Environmental Protection Agency
Air Quality Index: http://airnow.gov/

Indoor Air Quality: http://www.epa.gov/iaq/

Lead: http://www.epa.gov/lead/

Painting: http://www.epa.gov/iaq/homes/hip-painting.html

Pesticides: http://www.epa.gov/pesticides/

Smoke Free Homes and Cars: http://www.epa.gov/smokefree/

Health and Human Services
Dietary Guidelines: http://www.health.gov/DietaryGuidelines/

Centers for Disease Control and Prevention
Heart Disease: http://www.cdc.gov/HeartDisease/

Physical Fitness Guidelines:
http://www.cdc.gov/physicalactivity/everyone/guidelines/olderadults.html

Federal Emergency Management Administration:
Extreme Heat: http://www.fema.gov/hazard/heat/index.shtm

National Weather Service
http://www.nws.noaa.gov/om/brochures/heat_wave.shtml

American Heart Association
http://www.americanheart.org/

Health Effects Institute
http://www.healtheffects.org/about.htm

Learn More

The EPA Aging Initiative works to protect the health of older adults through the coordination of research, prevention strategies, and public education on environmental factors. For more information, or to join the EPA Aging Initiative listserv, visit: **www.epa.gov/aging**.

Endnotes

1 Kung HC, Hoyert DL, Xu J, Murphy SL. Deaths: final data for 2005. National Vital Statistics Reports. 2008;56(10).

2 U.S. Environmental Protection Agency. Air Quality Guide for Particle Pollution. http://www.epa.gov/airnow//aqi_cl.pdf

3 U.S. Environmental Protection Agency. Regulation and Management of Pesticide Poisonings. 1999. http://www.epa.gov/pesticides/safety/healthcare/handbook/Index1.pdf

4 U.S. Environmental Protection Agency. Air Quality Criteria for Carbon Monoxide, EPA 600-P-99-001F. Research Triangle Park, NC: U.S. Environmental Protection Agency, Office Research and Development, National Center for Environmental Assessment. June 2000.

5 Peters, A., S. von Klot, M. Heier, I. Trentinaglia, H. Ines, A. Hormann, H.E. Erich, H. Lowel. "Exposure to Traffic and the Onset of Myocardial Infarction." The New England Journal of Medicine. Oct 21, 2004. 351 (17): 1721-30.

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