

Exposure to smoke from fires: By Pat Jenkins, MSN, Illinois Valley Wellness Resources

Fourth of July is here and that means the start of summer and the potential start of fire season in the Illinois Valley. The glorious rain we had in June was a blessing, but with the forecast of higher temperatures, it may not be enough to forestall fire. We need to plan now to protect our beautiful valley and to educate ourselves in the hazards of smoke inhalation.

The smoke released by any type of fire (forest, brush, crop, structure, tires, waste or wood burning) is a mixture of particles and chemicals produced by incomplete burning of carbon-containing materials. All smoke contains carbon monoxide, carbon dioxide and particulate matter (PM or soot). Smoke can contain many different chemicals. The type and amount of particles and chemicals in smoke varies depending on what is burning, how much oxygen is available, and the burn temperature.

The burning materials, chemicals, and the gases created by them, can cause smoke inhalation by simple asphyxiation (lack of oxygen), chemical irritation, chemical asphyxiation, or a combination of them.

*Simple asphyxiates deprive you of oxygen. Fire uses up the oxygen around it and leaves you without oxygen to breathe. Smoke also contains products, such as carbon dioxide, that cause harm by further limiting the amount of oxygen in the air.

*Irritant compounds from burning can cause chemicals to form that injure your skin and mucous membranes. These chemicals can damage your respiratory tract and

cause swelling and airway collapse.

*Chemical asphyxiates are compounds produced in fires that can cause cell damage in your body by interfering with the delivery or use of oxygen. Carbon monoxide, which is the leading cause of death in smoke inhalation, is one of those compounds.

Inhalation injuries can worsen cardiovascular disease and lung conditions, such as: chronic obstructive pulmonary disease (COPD), asthma, emphysema, and chronic bronchitis. The risk for permanent damage from smoke inhalation is greater if you have any of these conditions. Exposure to high levels of smoke should be avoided. Individuals are advised to limit their physical exertion if exposure to high levels of smoke cannot be avoided. When it is necessary to work in heavy smoke, use appropriate respiratory protection to reduce exposure to the particles and gases in smoke. Individuals with cardiovascular or respiratory conditions (e.g., asthma), fetuses, infants, young children, and the elderly may be more vulnerable to the health effects of smoke exposure.

The effects of smoke inhalation can be immediate and cause irritation to the eyes, nose, and throat. Chemicals may irritate and injure your vocal chords resulting in hoarseness or noisy breathing and cause swelling and tightening of the upper airways. Fluids may collect in the upper airway and result in a blockage. The odor may be nauseating and cause vomiting. Some people have a temporary change in lung function making it difficult to breathe.

Two of the major agents in smoke that can cause health effects are

carbon monoxide gas and very small particles. These particles are two and one half (2.5) microns or less in size (25,400 microns equal an inch) and individual particles are too small to be seen with the naked eye. Inhalation of carbon monoxide decreases the body's oxygen supply and can cause headaches, confusion, fainting, and decreased alertness. Seizures and coma are also possible after smoke inhalation.

The size of particles is directly linked to their potential for causing health problems. Fine particles are able to travel deeply into the respiratory tract, reaching the lungs. Inhaling fine particles can cause a variety of health effects, including respiratory irritation and shortness of breath, and can worsen medical conditions such as asthma and heart disease. Some may even get into your bloodstream. People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.

During increased physical exertion, cardiovascular effects can be worsened by exposure to carbon monoxide and particulate matter. Chest pain can be caused by irritation in your respiratory tract. Chest pain can be a result of low oxygen flow to the heart. Excessive coughing can also cause chest pain. Heart and lung conditions can be made worse by smoke inhalation and can cause chest pain.

Once exposure stops, symptoms from inhaling carbon monoxide or fine particles generally diminish, but may last for a couple of days. There is also the potential for chronic health effects from exposure to the components

of smoke. Long term exposure to ambient air containing fine particles has been associated with increases in cardiovascular disease and mortality in populations living in areas with higher fine particulate air pollution. Frequent exposure to smoke for brief periods may also cause long-term health effects.

Tips for Protecting Yourself from Breathing Wildfire Smoke

- As already mentioned, limit your exposure to smoke. Pay attention to local air quality reports and the U.S. Air Quality Index External. When a wildfire occurs in your area, watch for news or health warnings about smoke. Pay attention to public health messages and take extra safety measures such as avoiding spending time outdoors.

- If you are told to stay indoors, stay indoors and keep your indoor air as clean as possible. Keep windows and doors closed unless it is very hot outside. Run an air conditioner if you have one, but keep the fresh-air intake closed and the filter clean to prevent outdoor smoke from getting inside. Seek shelter elsewhere if you do not have an air conditioner and it is too warm to stay inside with the windows closed.

- Use an air filter. Use a freestanding indoor air filter with particle removal to help protect people with heart disease, asthma or other respiratory conditions and the elderly and children from the effects of wildfire smoke. Follow the manufacturer's instructions on filter replacement and where to place the device.

- Do not add to indoor pollution. When smoke levels are high, do



(Photo by Laura Mancuso, Illinois Valley News)

Laura Mancuso Sept. 10, 2020 during Slater Fire in rural CJ.

not use anything that burns, such as candles and fireplaces. Do not vacuum, because vacuuming stirs up particles already inside your home. Do not smoke tobacco or other products, because smoking puts even more pollution into the air.

- Follow your doctor's advice about medicines and about your respiratory management plan if you have asthma or another lung disease or cardiovascular disease. Call your doctor if your symptoms worsen.

- Do not rely on dust masks for protection. Paper "comfort" or "dust" masks commonly found at hardware stores trap large particles, such as sawdust. These masks will not protect your lungs from smoke. An "N95" mask, properly worn, will offer some protection.



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