

## Secondhand Smoke: Questions and Answers

### Key Points

- Secondhand smoke (also called environmental tobacco smoke) is the combination of smoke given off by the burning end of a tobacco product and the smoke exhaled by the smoker (see Question 1).
- Of the chemicals identified in secondhand smoke, more than 50 have been found to cause cancer (see Question 3).
- Secondhand smoke causes lung cancer in nonsmokers (see Question 4).
- Secondhand smoke causes heart disease in adults and sudden infant death syndrome (SIDS), ear infections, and asthma attacks in children (see Question 5).
- There is no safe level of exposure to secondhand smoke (see Question 6).

### 1. What is secondhand smoke?

Secondhand smoke (also called environmental tobacco smoke) is the combination of sidestream smoke (the smoke given off by the burning end of a tobacco product) and mainstream smoke (the smoke exhaled by the smoker) (1, 2, 3, 4). Exposure to secondhand smoke is also called involuntary smoking or passive smoking. People are exposed to secondhand smoke in homes, cars, the workplace, and public places such as bars, restaurants, and other recreation settings. In the United States, the source of most secondhand smoke is from cigarettes, followed by pipes, cigars, and other tobacco products (4).

### 2. How is secondhand smoke exposure measured?

Secondhand smoke is measured by testing indoor air for nicotine or other smoke constituents. Exposure to secondhand smoke can be tested by measuring the levels of cotinine (a nicotine by-product in the body) in the nonsmoker's blood, saliva, or urine (1). Nicotine, cotinine, carbon monoxide, and other evidence of secondhand smoke exposure have been found in the body fluids of nonsmokers exposed to secondhand smoke.



### **3. Does secondhand smoke contain harmful chemicals?**

Yes. Of the more than 4,000 chemicals that have been identified in secondhand tobacco smoke, at least 250 are known to be harmful, and 50 of these are known to cause cancer. These chemicals include (1):

- arsenic (a heavy metal toxin)
- benzene (a chemical found in gasoline)
- beryllium (a toxic metal)
- cadmium (a metal used in batteries)
- chromium (a metallic element)
- ethylene oxide (a chemical used to sterilize medical devices)
- nickel (a metallic element)
- polonium-210 (a chemical element that gives off radiation)
- vinyl chloride (a toxic substance used in plastics manufacture)

Many factors affect which chemicals are found in secondhand smoke, including the type of tobacco, the chemicals added to the tobacco, the way the product is smoked, and the paper in which the tobacco is wrapped (1, 3, 4).

### **4. Does exposure to secondhand smoke cause cancer?**

Yes. The U.S. Environmental Protection Agency (EPA), the U.S. National Toxicology Program (NTP), the U.S. Surgeon General, and the International Agency for Research on Cancer (IARC) have classified secondhand smoke as a known human carcinogen (cancer-causing agent) (1, 3, 5).

Inhaling secondhand smoke causes lung cancer in nonsmoking adults (4). Approximately 3,000 lung cancer deaths occur each year among adult nonsmokers in the United States as a result of exposure to secondhand smoke (2). The Surgeon General estimates that living with a smoker increases a nonsmoker's chances of developing lung cancer by 20 to 30 percent (4).

Some research suggests that secondhand smoke may increase the risk of breast cancer, nasal sinus cavity cancer, and nasopharyngeal cancer in adults, and leukemia, lymphoma, and brain tumors in children (4). Additional research is needed to learn whether a link exists between secondhand smoke exposure and these cancers.

### **5. What are the other health effects of exposure to secondhand smoke?**

Secondhand smoke causes disease and premature death in nonsmoking adults and children (4). Exposure to secondhand smoke irritates the airways and has immediate harmful effects on a person's heart and blood vessels. It may increase the risk of heart disease by an estimated 25 to 30 percent (4). In the United

States, secondhand smoke is thought to cause about 46,000 heart disease deaths each year (6). There may also be a link between exposure to secondhand smoke and the risk of stroke and hardening of the arteries; however, additional research is needed to confirm this link.

Children exposed to secondhand smoke are at an increased risk of sudden infant death syndrome (SIDS), ear infections, colds, pneumonia, bronchitis, and more severe asthma. Being exposed to secondhand smoke slows the growth of children's lungs and can cause them to cough, wheeze, and feel breathless (4).

**6. What is a safe level of secondhand smoke?**

There is no safe level of exposure to secondhand smoke. Studies have shown that even low levels of secondhand smoke exposure can be harmful. The only way to fully protect nonsmokers from secondhand smoke exposure is to completely eliminate smoking in indoor spaces. Separating smokers from nonsmokers, cleaning the air, and ventilating buildings cannot completely eliminate secondhand smoke exposure (4).

**7. What is being done to reduce nonsmokers' exposure to secondhand smoke?**

Many state and local governments have passed laws prohibiting smoking in public facilities such as schools, hospitals, airports, and bus terminals. Increasingly, state and local governments are also requiring private workplaces, including restaurants and bars, to be smoke free. To highlight the significant risk from secondhand smoke exposure, the National Cancer Institute, a component of the National Institutes of Health, holds meetings and conferences in states, counties, cities, or towns that are smoke free, unless certain circumstances justify an exception to this policy.

More information about state-level tobacco regulations is available through the Centers for Disease Control and Prevention (CDC) State Tobacco Activities Tracking and Evaluation (STATE) System Web site. The STATE System is a database containing up-to-date and historical state-level data on tobacco use prevention and control. This resource is available at <http://apps.nccd.cdc.gov/statesystem/> on the Internet.

On the national level, several laws restricting smoking in public places have been passed. Federal law bans smoking on domestic airline flights, nearly all flights between the United States and foreign destinations, interstate buses, and most trains. Smoking is also banned in most Federally owned buildings. The Pro-Children Act of 1994 prohibits smoking in facilities that routinely provide Federally funded services to children.

The U.S. Department of Health and Human Services (DHHS) *Healthy People 2010*, a comprehensive, nationwide health promotion and disease prevention

agenda, includes the goal of reducing the proportion of nonsmokers exposed to secondhand smoke from 65 percent to 45 percent by 2010 (7). More information about this program is available on the Healthy People 2010 Web site at <http://www.healthypeople.gov/> on the Internet.

Internationally, several nations, including France, Ireland, New Zealand, Norway, and Uruguay, require all workplaces, including bars and restaurants, to be smoke free.

### **Selected References**

1. National Toxicology Program. *Report on Carcinogens. Eleventh Edition*. U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, 2005.
2. National Cancer Institute. *Cancer Progress Report 2003*. Public Health Service, National Institutes of Health, U.S. Department of Health and Human Services, 2004.
3. International Agency for Research on Cancer. *Tobacco Smoke and Involuntary Smoking*. Lyon, France: 2002.
4. U.S. Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.
5. U.S. Environmental Protection Agency. *Respiratory Health Effects of Passive Smoking (Also Known as Exposure to Secondhand Smoke or Environmental Tobacco Smoke--ETS)*. U.S. Environmental Protection Agency, 1992.
6. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. *Proposed Identification of Environmental Tobacco Smoke as a Toxic Air Contaminant: Part B Health Effects*, 2005.
7. U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office, 2000.

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**Related NCI materials and Web pages:**

- National Cancer Institute Fact Sheet 10.16, *Questions and Answers About Cigar Smoking and Cancer*  
(<http://www.cancer.gov/cancertopics/factsheet/Tobacco/cigars>)
- National Cancer Institute Fact Sheet 10.19, *Quitting Smoking: Why To Quit and How To Get Help*  
(<http://www.cancer.gov/cancertopics/factsheet/Tobacco/cessation>)
- *Smoking and Tobacco Control Monograph 10: Health Effects of Exposure to Environmental Tobacco Smoke*  
(<http://cancercontrol.cancer.gov/tcrb/monographs/10/index.html>)
- NCI's Smoking and Cancer Home Page  
(<http://www.cancer.gov/cancertopics/smoking>)

**For more help, contact:**

**NCI's Cancer Information Service**

Telephone (toll-free): 1-800-4-CANCER (1-800-422-6237)

TTY (toll-free): 1-800-332-8615

*LiveHelp*<sup>®</sup> online chat: <https://cissecure.nci.nih.gov/livehelp/welcome.asp>

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