

Secondhand Smoke: The Science

- The 2006 U.S. Surgeon General's Report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke*, concluded that **(1)** secondhand smoke exposure causes disease and premature death in children and adults who do not smoke; **(2)** children exposed to secondhand smoke are at an increased risk for sudden infant death syndrome (SIDS), acute respiratory problems, ear infections, and asthma attacks, and that smoking by parents causes respiratory symptoms and slows lung growth in their children; **(3)** exposure of adults to secondhand smoke has immediate adverse effects on the cardiovascular system and causes coronary heart disease and lung cancer; **(4)** there is no risk-free level of exposure to secondhand smoke; **(5)** establishing smokefree workplaces is the only effective way to ensure that secondhand smoke exposure does not occur in the workplace, because ventilation and other air cleaning technologies cannot completely control for exposure of nonsmokers to secondhand smoke; and **(6)** evidence from peer-reviewed studies shows that smokefree policies and laws do not have an adverse economic impact on the hospitality industry.¹
- Secondhand smoke is the third leading cause of preventable death in this country, killing 53,000 nonsmokers in the U.S. each year. For every eight smokers the tobacco industry kills, it takes one nonsmoker with them.^{2,3}
- Scientific evidence has firmly established that there is no safe level of exposure to secondhand tobacco smoke, a pollutant that causes serious illness in adults and children. There is also indisputable evidence that implementing 100 percent smokefree environments is the only effective way to protect the population from the harmful effects of exposure to secondhand smoke.⁴
- Low levels of fine particulate exposure from secondhand cigarette smoke are sufficient to induce adverse biological responses, which increase the risk of cardiovascular disease mortality. The exposure-response relationship between cardiovascular disease mortality and fine particulate matter is relatively steep at low levels of exposure and flattens at higher exposures.⁵
- The United States Centers for Disease Control and Prevention (CDC) has determined that the risk of acute myocardial infarction and coronary heart disease associated with exposure to tobacco smoke is non-linear at low doses, increasing rapidly with relatively small doses such as those received from secondhand smoke or actively smoking one or two cigarettes a day, and has warned that all patients at increased risk of coronary heart disease or with known coronary artery disease should avoid all indoor environments that permit smoking.⁶
- Just 30 minutes of exposure to secondhand smoke can cause heart damage similar to that of habitual smokers; nonsmokers' heart arteries show a reduced ability to dilate, diminishing the ability of the heart to get life-sustaining blood. Damage to the endothelial cells of arteries persists for at least 24 hours and interferes with the body's efforts to repair itself. In addition, the same half hour of secondhand smoke exposure activates blood platelets, which can initiate the process of atherosclerosis (blockage of the heart's arteries) that leads to heart attacks. These effects explain other research showing that nonsmokers regularly exposed to SHS suffer death or morbidity rates 30 percent higher than those of unexposed nonsmokers.^{7,8,9}

- Nine published studies have found that laws making indoor workplaces and public places smokefree are associated with sizable, rapid reductions in hospital admissions for heart attacks. In a three year-long study in Pueblo, Colorado, there was a 27 percent decline in hospital heart attack admissions. In Helena, Montana, there was a 40 percent decline for the 6 months the city enforced its clean indoor air ordinance. In New York State, there was an 8 percent decline. Heart attack admissions in neighboring communities and states experienced no similar declines.^{10, 11, 12, 13}
- The California Air Resources Board has determined that secondhand smoke is a toxic air contaminant (TAC) -- an air pollutant which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. Other TACs include diesel exhaust and benzene.¹⁴
- Secondhand smoke is as damaging to a fetus as if the mother were inhaling the smoke directly from a cigarette.¹⁵
- Long-term exposure to secondhand smoke increases the risk of developing breast cancer in younger, primarily premenopausal, women.¹⁶
- Secondhand smoke exposure is a risk for bladder cancer among women who are lifelong nonsmokers. Up to 70 percent of bladder cancer in this group may be attributed to secondhand smoke exposure.¹⁷
- Secondhand smoke is particularly hazardous to elderly people, individuals with cardiovascular disease, and individuals with impaired respiratory function, including asthmatics and those with obstructive airway disease.¹⁸
- The Americans with Disabilities Act, which requires that disabled persons have access to public places and workplaces, deems impaired respiratory function to be a disability.¹⁹
- Nonsmokers exposed to secondhand smoke are more likely to develop colorectal cancer at a younger age than nonsmokers who are not exposed to secondhand smoke. Nonsmokers exposed to substantial amounts of secondhand smoke should get screened for colorectal cancer 5 to 10 years earlier than the recommended 50 years of age.²⁰
- A June 2004 study published in the *British Medical Journal* reaffirmed that there are virtually no health disparities between active and passive smoking. The risks of coronary heart disease (CHD) associated with secondhand smoke are twice what were previously thought and are virtually indistinguishable from those associated with active smoking. The study found higher risks of CHD because, rather than using marriage to a smoker or working in a smoky environment as their measure of exposure, the study's authors used plasma cotinine (metabolized nicotine), a direct biochemical measure of total SHS) exposure. By doing so, they captured SHS's entire exposure effect.²¹
- During periods of active smoking, peak and average outdoor tobacco smoke (OTS) levels measured in outdoor cafes and restaurant and bar patios near smokers rival indoor tobacco smoke concentrations.²²

- There is a link between secondhand smoke and an increased risk of stroke. Regular exposure to secondhand smoke, such as in restaurants, heightens one's chance of stroke by 50 percent.²³
- The 1999 National Cancer Institute Monograph 10, based on the 1997 Cal-EPA (Environmental Protection Agency) review of population-based studies, confirmed that SHS is fatal and has numerous non-fatal health effects. SHS chemicals include irritants and systemic toxicants, mutagens, and carcinogens, and reproductive and developmental toxicants. More than 50 compounds in tobacco smoke are known carcinogens. SHS exposure causes lung and nasal sinus cancer, heart disease, and Sudden Infant Death Syndrome. Serious impacts of SHS on children include asthma induction and exacerbation, bronchitis and pneumonia, middle ear infection, chronic respiratory symptoms, and low birth weight.^{24,25}
- SHS is a major source of pollution - and is a risk factor for pulmonary disease, asthma, and lung cancer. Three cigarettes smoldering in a room emit up to 10-fold more particulate matter (PM) pollution than an ecodiesel engine. High levels of PM exposure from SHS may account for frequent episodes of short term respiratory damage in nonsmokers.²⁶
- Secondhand smoke exposure during childhood has been associated with an increased risk of spinal pain, such as neck pain and back pain, in adult life. Researchers suggest this may be due to the negative effects of smoke exposure during childhood on the developing spine.²⁷
- Secondhand smoke exposure impairs a child's ability to learn. It is neurotoxic even at extremely low levels. More than 21.9 million children are estimated to be at risk of reading deficits because of secondhand smoke. Higher levels of exposure to secondhand smoke are also associated with greater deficits in math and visuospatial reasoning.²⁸
- The 1986 *Report of the Surgeon General*; the 1986 National Research Council report, *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects*; and the 1992 U.S. Environmental Protection Agency report, *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*, established that SHS exposure causes lung cancer.^{29,30}
- The 2002 Environmental Health Information Service's *10th Report on Carcinogens* classifies SHS as a Group A (Human) Carcinogen - a substance known to cause cancer in humans. There is no safe level of exposure for Group A toxins. In addition, the 2002 World Health Organization International Agency's (IARC) *Monograph on Tobacco Smoking, Both Active and Passive* concluded that nonsmokers are exposed to the same carcinogens as active smokers.^{31,32}
- In 1991, data showed that nearly 90 percent of the U.S. population had measurable levels of serum cotinine in their blood. In 2002, the Centers for Disease Control and Prevention's National Report on Human Exposure to Environmental Chemicals found more than a 75 percent decrease in median cotinine levels for nonsmokers in the U.S. since 1991- an indication that smokefree environments significantly reduce exposure to SHS.^{33,34}
- Residual tobacco contamination, or "thirdhand smoke," from cigarettes, cigars, and other tobacco products is left behind after smoking occurs and builds up on surfaces and furnishings. This residue can linger in spaces long after smoking has ceased and continue to expose people to tobacco toxins. Sticky, highly toxic particulate matter, including nicotine, can cling to walls and

ceilings. Gases can be absorbed into carpets, draperies, and other upholsteries, and then be reemitted (off-gassed) back into the air and recombine to form harmful compounds.³⁵

- Tobacco residue is noticeably present in dust throughout places where smoking has occurred.³⁶

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