

Ventilation and Air Filtration: The Science

- The **2006 U.S. Surgeon General's Report**, "[*The Health Consequences of Involuntary Exposure to Secondhand Smoke*](#)," has concluded that separating smokers from nonsmokers, air cleaning technologies, and ventilating buildings cannot eliminate secondhand smoke exposure, stating that conventional air cleaning systems cannot remove all the poisons, toxins, gases, and particles found in secondhand smoke. Additionally, heating, ventilation, and air conditioning systems can distribute secondhand smoke throughout a building.¹
- The **2010 U.S. Surgeon General's Report**, "[*How Tobacco Smoke Causes Disease*](#)," confirmed that "Low levels of smoke exposure, including exposures to secondhand tobacco smoke, lead to a rapid and sharp increase in dysfunction and inflammation of the lining of the blood vessels, which are implicated in heart attacks and stroke. ... Damage from tobacco smoke is immediate."²
- The **American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)** adopted a [position document](#) that states: "At present, the only means of effectively eliminating health risks associated with indoor exposure is to ban smoking activity... No other engineering approaches, including current and advanced dilution ventilation or air cleaning technologies, have demonstrated or should be relied upon to control health risks from ETS [environmental tobacco smoke] exposure in spaces where smoking occurs... Because of ASHRAE's mission to act for the benefit of the public, it encourages elimination of smoking in the indoor environment as the optimal way to minimize ETS exposure."³
- The **World Health Organization's Framework Convention on Tobacco Control (FCTC) Article 8 Implementing Guidelines Principle 1** states: "There is no safe level of exposure to tobacco smoke, and notions such as a threshold value for toxicity from second-hand smoke should be rejected, as they are contradicted by scientific evidence. Approaches other than 100% smoke free environments, including ventilation, air filtration and the use of designated smoking areas (whether with separate ventilation systems or not), have repeatedly been shown to be ineffective and there is conclusive evidence, scientific and otherwise, that engineering approaches do not protect against exposure to tobacco smoke."⁴
- The **Centers for Disease Control and Prevention (CDC)** states that "[Ventilation does not effectively protect nonsmokers from secondhand smoke](#)."⁵

- The [NIOSH Science Blog](#) stated, "Any exposure to secondhand smoke increases the risk of lung cancer, other respiratory diseases, and heart disease. 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."⁶
- The **Asthma and Allergy Foundation of America** adopted a disclaimer that states: "Some air cleaners may help to reduce secondhand smoke to a limited degree, but no air filtration or air purification system can completely eliminate all the harmful constituents of secondhand smoke. The U.S. Surgeon General has determined secondhand smoke to cause heart disease, lung cancer, and respiratory illness. Also, a simple reduction of secondhand smoke does not protect against the disease and death caused by exposure to secondhand smoke."⁷
- The **European Commission Joint Research Centre** has determined that "changes in ventilation rates during smoking do not have a significant influence on the air concentrations of tobacco components. This means, in effect, that efforts to reduce indoor air pollution through higher ventilation rates in buildings and homes would hardly lead to a measurable improvement of indoor air quality."⁸
- A study published in the September 2004 edition of the *Journal of Occupational and Environmental Medicine* compared the indoor air quality of a casino, six bars, and a pool hall in Wilmington, Delaware, before and after the implementation of a smokefree law. The study found that the ventilation technology installed in these establishments did not protect the workers and the public, as secondhand smoke contributed 85-95% of the carcinogen PPAH, and 90-95% of the respirable particulate air pollution into the air. These contamination levels greatly exceed those encountered on major truck highways and polluted city streets.⁹
- In [less than two hours after New York's smokefree law went into effect and smoking stopped](#), the level of respirable particulate matter (PM) dropped to 15% of the level on a smoking night in restaurants and bars. Three months after the law became effective, the level of PM dropped by 90% in these venues. Prior to the smokefree law's implementation, New York hospitality employees working an eight hour shift, 250 days a year, were exposed to particulate matter levels seven times greater than the maximum level deemed as acceptable by the U.S. Environmental Protection Agency. In addition, PM dropped an average of 77 percent after the law went into effect in bowling alleys, pool halls, and bingo halls.¹⁰
- The **2002 Environmental Health Information Service's 10th Report on Carcinogens** classifies secondhand smoke 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.

Reducing or diluting the level of smoke through ventilation does not equate to protection from the health hazards of secondhand smoke.¹¹

- "[T]o be at all effective in reducing the concentration of smoke in a space, any air cleaner must process many room air volumes per hour.... [E]ven large, expensive air cleaners with efficiencies for captured particles are capable of reducing, but not eliminating the environmental tobacco smoke tar particles in room air, and are not at all effective for gases, which contain most of the irritants.... [E]ven expensive particulate air cleaners cannot remove enough tar particles in room air to eliminate the cancer risk from environmental tobacco smoke. In general, filtration of indoor air to remove environmental tobacco smoke contaminants is futile - like trying to filter a lake to control water pollution."¹²
- In managing workplace [secondhand smoke] risks, smoking policies such as separating smokers from nonsmokers in the same space or on the same ventilation system expose nonsmokers to unacceptable risk.¹³

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