Clearing the Air: The Facts About Ventilation

Secondhand smoke is a public health hazard. Ventilation technologies do not sufficiently protect individuals from the harmful effects of breathing in secondhand smoke. Environmental, occupational, and public health authorities in the United States have all identified secondhand smoke as a health hazard.[1, 2, 3, 4, 5, 6, 7] While ventilation or air purification systems are sometimes touted as a solution to the secondhand smoke problem, ventilation cannot purify the air at rates fast enough to protect people from secondhand smoke exposure. **The "most direct and effective method" for eliminating secondhand smoke is to exclude smoking from the workplace.[8]** The American Cancer Society supports local, state, and federal initiatives to stop public exposure to secondhand smoke. However, the Society does not support ventilation, even as a compromise to secure smoke-free ordinances.

What is Ventilation?

Ventilation uses controlled airflow to control airborne contaminants.[9] The tobacco industry has attempted to promote ventilation as a method to accommodate both smokers and non-smokers. There are two types of ventilation that are commonly used in commercial and industrial buildings.[10]

- **Local exhaust ventilation** attempts to trap pollutants at or near their source. It is geared toward environments with high pollution levels and requires low levels of air circulation. The theory is that pollutants are trapped at their source and are not diffused throughout the air.[11] Ventilated ashtrays are one example of local exhaust technology. Once a cigarette is placed into an ashtray, a filter would isolate any pollutants emitted from the burning tip. Canopy hoods are another example and work by filtering out any smoke that is exhaled directly above restaurant and gaming tables. In practice, local exhaust ventilation requires substantial maintenance, making the technology inefficient and costly for businesses to operate.
- **Dilution ventilation,** also known as general ventilation, involves saturating a room with clean, unpolluted air in an attempt to dilute airborne contaminants—in this case tobacco smoke—to safe and comfortable levels. The process requires high levels of air circulation and works best in environments with low pollution levels spread over a large area. However, exposure to secondhand smoke, at any level, is neither safe nor acceptable; the health consequences are immediate and can be life-threatening.* Because dilution ventilation allows tobacco smoke to travel throughout a room, it offers little protection from secondhand smoke exposure, [12, 13, 14] and like local exhaust, it may be costly for businesses to install.

The Facts on Secondhand Smoke and Air Quality

Secondhand smoke is a major source of particulate matter, a type of air pollution. Particulate matter, of the size found in cigarette smoke, is easily and deeply inhaled into the lungs and can lead to death from heart disease and lung cancer.

- Between 90 and 95 percent of airborne pollution in Delaware hospitality venues was caused by smoking before the state's smoking ban went into effect.[15]
- The pollution generated from three lit cigarettes in a room of 197 cubic feet was higher than the pollution generated from a diesel engine in a closed private garage.[16]
- Levels of cancer-causing pollutants were found to be 4 times greater than National Ambient Air Quality Standards (NAAQS) outdoor requirements in six Delaware bars, one casino, and one pool hall before implementation of a statewide smoking ban.[17, 18]
- Pollution levels decreased 84 percent among 20 hospitality venues in western New York after the state's smoke-free law was implemented on July 24, 2003.[19]

- Lexington, Kentucky experienced a 91 percent drop in cancer-causing pollution in nine hospitality establishments (three restaurants, three bars, two music clubs, one bowling alley, and one coffee house) after Lexington-Fayette County's smoke-free ordinance was implemented.[20]
- Pollution levels in seven hospitality venues in Bloomington, Indiana decreased 89 percent after the city's smoke-free ordinance was enacted.[21]

Ventilation is Ineffective and Costly

- No U.S. science agency has found that ventilation systems reduce occupational exposure to secondhand smoke to an acceptable level.[22, 23, 24]
    - Local exhaust technologies, such as ventilated ashtrays or canopy hoods over restaurant and gaming tables, are ineffective, according to the Occupational Safety and Health Administration and American Conference of Governmental Industrial Hygienists (ACGIH) experts.[25]
    - In theory, "smokeless" ashtrays may have the most potential to reduce levels of sidestream smoke—smoke exhaled from the lungs of tobacco users; however, government and industry experts believe the placement and maintenance required by local exhaust systems would pose operational challenges to the hospitality industry largely due to recurrent cleaning requirements of internal filters, ducts, and hoods.[26]
- "[T]ornado-like levels of ventilation" would be needed in restaurants, bars, and gaming establishments to protect hospitality workers from secondhand smoke.[27]
    - Before Delaware's smoking ban, it was estimated that a hospitality worker in a *ventilated*, full occupancy space where smoking was permitted was still exposed to cancer-causing pollutants at 2.6 times above the NAAQS outdoor requirements – despite the ventilation.[28]
    - A ventilation system in a smoky Delaware bar would need to circulate air at an unrealistic ventilation rate – 4.4 times greater than recommended standards for outdoor air quality.[29]
    - Ventilation was unable to control deadly cancer-causing pollution in seven hospitality venues that were surveyed in Boston, Massachusetts, prior to the city's smoke-free ordinance. Indoor air pollution levels were four times higher than NAAQS outdoor requirements.[30]
    - Placing hoods over gaming, restaurant and bar tables to filter secondhand smoke would require "impracticably high" minimum airflows in excess of 300 cubic feet per minute per hood. (cfm/hood).[31]
- Manufacturers and sellers of air filtration technologies admit that their products do not protect consumers from the health risks imposed by secondhand smoke.[32]
    - The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) in a recent position statement recommends that "the only means of effectively eliminating health risk associated with indoor exposure is to ban smoking activity." ASHRAE acknowledges that no current engineering approaches can control health risks from secondhand smoke exposure.[33]
    - Wein Products, Inc. states, "No air filtration or air purification system has been designed that can eliminate all the harmful constituents of secondhand smoke."[34]
    - Allergy Control Products, Inc. "does not claim that air cleaners offered in [their] catalog will protect people from potential health risks associated with secondhand smoke."[35]
- Even the tobacco industry has known that ventilation and air filtration technologies are ineffective at removing secondhand smoke.
    - British American Tobacco (BAT) acknowledged that its Colt air filtration unit was only 34 percent efficient at removing particulate matter from tobacco smoke. The unit failed to eliminate carbon monoxide and other volatile organic compounds found in cigarette smoke.[36]
    - The Colt unit only reduced "haze, tobacco-smoke aroma and total perceived smoke," thus making the air more comfortable to breath, but not less harmful.[37]
- Ventilation is expensive.
    - The Dover, New Hampshire Health Board found from contractors that creating dual ventilation systems to separate smoking areas would cost from $30,000 to $50,000.[38]

- Estimates for air cleaning or air dilution construction costs start at $25 per square foot while a displacement design utilizing isolation and exhaust techniques starts at $20 per square foot.[39]
- The U.S. Surgeon General determined that cost-effective technologies for filtrating tobacco smoke from the air are currently unavailable.[40]
- Cost pressures and lax enforcement may be responsible for businesses under-ventilating their buildings.[41]

Conclusion:

Ventilation systems would need to simulate windstorm conditions in order to meet air quality levels that are acceptable to federal regulatory agencies. Smoke-free laws are "the most cost-effective, easiest-to-enforce, and lowest risk alternative" for reducing secondhand smoke exposure.[42] The Society is committed to saving lives and reducing the death and disease caused by tobacco. The Society opposes preemptive state legislation that restricts local authorities from regulating clean indoor air. Therefore, the American Cancer Society stands ready to work with our partners, both private and public, to implement legislative and regulatory measures that limit smoking in public places and work environments.

Policy
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*For more information on secondhand smoke, please see the American Cancer Society's factsheet "The Facts About Secondhand Smoke."

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