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## **Factsheet: Second-hand smoke and ventilation**

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# Factsheet: Second-hand smoke and ventilation

## What is second-hand smoke?

Second-hand smoke is the term used to describe the gases and particles in the air that result from smoking tobacco. Second-hand smoke carries significant health risks (see the factsheet *The health risks of second-hand smoke* for details).

The World Health Organization's International Agency for Research on Cancer (IARC) has classified second-hand smoke as a Group 1 human carcinogen. Other Group 1 carcinogens include asbestos, arsenic, benzene and radon gas.<sup>1</sup>

Recent debate has raised the question of whether ventilation can effectively reduce exposure to this carcinogen.

## What are the current standards for air pollution?

The WHO has stated that under the principle of the human right to health, everyone has the right to breathe healthy indoor air.<sup>2</sup>

The US Control of Substances Hazardous to Health (COSHH) Regulations, 2002, state that employers should prevent exposure of their employees to substances hazardous to health or, where this is not reasonably practicable, ensure that exposures are adequately controlled.<sup>3</sup>

The Health and Safety at Work (Northern Ireland) Order 1978 states that employers have a duty to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all their employees. In addition, employers have a similar responsibility towards other people who may be affected by the way they run their business.

Each year, the UK Health and Safety Executive publishes workplace exposure limits for pollutants, which apply to workplaces in Northern Ireland.<sup>4</sup> However, second-hand smoke is not currently included because so far no authority with relevant expertise has defined a safe level of exposure to second-hand smoke. This is due to the complex nature of second-hand smoke, the multiple health and irritation hazards, and varying individual susceptibility to it.

## Ventilation/filtration systems

There are two main methods of air treatment used to reduce indoor air pollution: ventilation and filtration.

**Dilution ventilation systems** usually recirculate around 80-90% of the air, bringing in 10-20% fresh air from outside (and expelling 10-20% of the stale air). These are used in virtually all mechanically ventilated buildings.<sup>5</sup> **Positive output ventilation systems** exhausts air from an enclosed space at a rate that completely replaces the air in the room.

**Filtration systems** (sometimes called air cleaners) pump the air through very fine filters to remove particles of smoke and dust before the air is recirculated.<sup>5</sup>

## Are ventilation/filtration systems effective in reducing the health risks of second-hand smoke?

No engineering approaches, including current and advanced dilution ventilation or air cleaning technologies, have been demonstrated or should be relied upon to control health risks from second-hand smoke exposure in spaces where smoking occurs. Some engineering measures may reduce that exposure and the corresponding risk to some degree while also addressing to some extent the comfort issues of odour and some forms of irritation.<sup>6</sup>

However, ventilation rates would have to be increased more than a thousand-fold to reduce the cancer risk associated with second-hand smoke to an acceptable level. Such a ventilation rate is impractical since it would result in a virtual windstorm indoors.<sup>7</sup>

Filtration systems only remove particles, therefore they have no impact on reducing the health risks associated with the toxic gases present in second-hand smoke.

Implementation and optimal performance of advanced technology solutions requires regular effective maintenance. The costs of maintaining and cleaning such systems are such that reports have shown many proprietors leave their ventilation systems switched off, as they find the running costs too high.<sup>8</sup>

## Conclusion

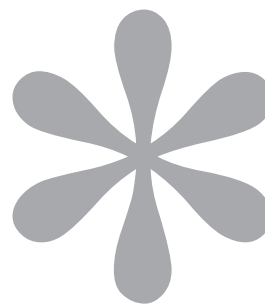
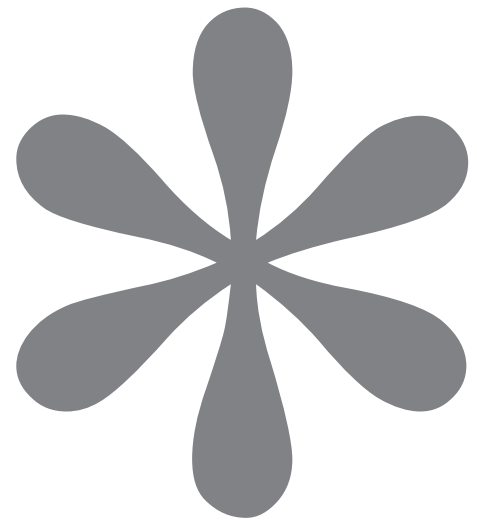
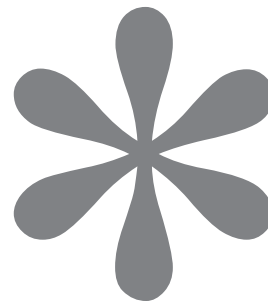
An essential requirement for assessing ventilation solutions will be the development of a consensus guideline or standard value for second-hand smoke that ventilations systems must achieve.<sup>9</sup>

Nevertheless, ventilation systems are unlikely to provide the basic human right of good quality indoor air. There is no acceptable level of exposure to human carcinogens; therefore even the most ideal ventilation system puts workers at an unacceptable risk.<sup>10</sup> As an example, the estimated 90% reduction in risk under ideal ventilation systems still places the estimated risks of second-hand smoke at 1.5 to 2.5 times higher than the Occupational Safety and Health Administration's 'significant risk level'.

At present, the only proven means of effectively eliminating the health risks associated with indoor exposure to second-hand smoke is to eliminate smoking activity.<sup>6</sup>

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