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Swiss association for tobacco control

Passive Smoke: Health Impacts on the General Population

Key Messages

- No safe exposure: Even brief contact with secondhand smoke harms health.
- Broad health impact: Passive smoke causes respiratory illness, heart disease, cancer, and diabetes.
- Children most at risk: Exposure increases infections, asthma, and long-term harm.
- Hidden danger: Thirdhand smoke on clothes and surfaces remains toxic and persistent.
- Heavy global toll: Over 1.3 million deaths yearly are linked to passive smoke.
- Public health priority: Stronger laws, awareness, and smoke-free spaces are essential to protect everyone.

The Scope of Passive Smoke Exposure

The health consequences of passive smoke exposure are both extensive and well-established. Scientific evidence has consistently shown that no level of exposure to passive smoke is safe, and its effects on health are both severe and far-reaching (Schick & Glantz, 2005). A comprehensive overview by Cao et al. (2015), which summarised findings from 16 meta-analyses encompassing 450 studies, concluded that secondhand smoke (SHS) significantly increases the risk of numerous diseases, including respiratory infections, asthma, food allergies, and invasive meningococcal disease. These findings highlight passive smoking as a critical and ongoing global health threat.

The following sections explore the major health impacts of passive smoke exposure in greater detail, with a focus on respiratory illnesses, allergic conditions, lung cancer, cardiovascular disease, invasive bacterial infections, type 2 diabetes, the risks of thirdhand smoke toxicity, and the broader implications for public health.

Respiratory Infections in Children and Adults

One of the most immediate consequences of passive smoke exposure is its impact on respiratory health. SHS significantly increases the risk of respiratory infections such as bronchitis, tuberculosis, and acute respiratory distress syndrome. Even infants exposed

to household smoke are at heightened risk for developing bronchiolitis and other lower respiratory infections (Jones et al., 2011).

In adults, secondhand smoke has been linked to latent tuberculosis infection and increased vulnerability to severe lung injury (Lindsay et al., 2014; Hsieh et al., 2014). Laboratory studies support these findings, revealing that SHS exposure weakens immune responses and reduces vaccine effectiveness (Bhat et al., 2018). These effects suggest not only greater susceptibility to infections but also poorer disease outcomes and a weakened ability to respond to infection and immunization.

Asthma and Allergic Conditions

In addition to acute respiratory infections, passive smoke plays a significant role in chronic conditions like asthma and allergies. SHS exposure has been linked to an increased risk of asthma, particularly in children and adolescents, with higher exposure levels associated with more severe asthma episodes and emergency visits (Kim et al., 2017; Balan et al., 2023). SHS has also been linked to allergic rhinitis and dermatitis, possibly due to inflammation in the airways and skin. While the connection to food allergies is less definitive, cohort studies suggest a potential link (Saulyte et al., 2014).

Invasive Bacterial Diseases

In a systematic review and meta-analysis, Lee et al. (2010) found a strong association between SHS exposure and the risk of invasive meningococcal disease, which can lead to life-threatening illnesses like meningitis or sepsis. Passive smoke exposure was also linked to increased carriage of Neisseria meningitidis and Streptococcus pneumoniae, bacteria that can colonize the respiratory tract and potentially cause pneumonia, bloodstream infections, or meningitis.

Lung Cancer in Non-Smokers

Beyond infections and allergies, SHS is also a significant carcinogen. Lung cancer in non-smokers has been strongly associated with long-term exposure to passive smoke. A meta-analysis of 55 studies found that never-smoking women married to smokers had a 27% increased risk of developing lung cancer (Taylor et al., 2007). This elevated risk is consistent across geographic regions and study designs, indicating a causal relationship. In China alone, over 22,000 deaths have been attributed to passive smoking-related lung cancer (Gan et al., 2007).

Cardiovascular Disease and Coronary Heart Risk

Next to its many risks to respiratory health, passive smoke also plays a significant role in the development of cardiovascular diseases. A meta-analysis of 18 studies concluded that non-smokers exposed to SHS have a 25% increased risk of developing coronary heart disease compared to unexposed people. This risk appears across sexes, study types, and settings, and shows a clear dose–response relationship (He et al., 1999). Additionally, data from China estimated that nearly 34,000 deaths from ischaemic heart disease in 2002 were attributable to passive smoking, with women being disproportionately affected (Gan et al., 2007).

Type 2 Diabetes Risk

While respiratory and cardiovascular impacts are better known, passive smoke also increases the risk of type 2 diabetes mellitus (T2DM). A 2015 meta-analysis by Wei, Meng, and Yu found a 33% higher risk of T2DM among passive smokers, based on data from over 162,000 participants. These findings are confirmed by Oba et al. (2020), who studied 25,391 never-smoking women and found that higher levels of exposure to spousal or workplace SHS were associated with increased diabetes risk, with evidence of a dose-response pattern.

Thirdhand Smoke and Cumulative Toxic Exposure

While SHS has long been the focus of public health campaigns, thirdhand smoke (THS) (residual pollutants that linger on surfaces such as furniture, walls, and clothing) presents a newer, less understood, health risk. A systematic review of 68 studies found that THS is associated with cytotoxicity (the quality of being toxic to cells), metabolic and structural changes in cells, and adverse effects on organs such as the liver, lungs, and skin in animal models (Díez-Izquierdo et al., 2018). Emerging studies have further linked THS to increased cancer risk, delayed wound healing, lung inflammation, liver dysfunction, and adverse effects on brain development and metabolism.

THS constituents such as TSNAs and ultrafine particles can cause DNA damage, oxidative stress, hormonal disruption, and behavioural changes. Infants and young children are particularly vulnerable due to their frequent contact with contaminated surfaces, and early exposure may increase the likelihood of future nicotine dependence (James et al., 2022).

Despite growing evidence, public awareness of THS remains low, and its long-term impacts on humans require further research (Díez-Izquierdo et al., 2018).

Overall Health Burden and Mortality

The global burden of disease attributable to passive smoke exposure remains alarmingly high. In 2019 alone, secondhand smoke was linked to an estimated 1.3 million deaths and 37 million disability-adjusted life years (DALYs) (Drope & Schluger, 2018). These figures highlight a troubling reality: Despite decades of public health advocacy, passive smoke continues to pose a major global threat. Stronger tobacco control policies, expanded public education, and legislative protections are urgently needed

Conclusion

The scientific evidence is absolute: Passive smoke exposure contributes to a broad spectrum of diseases and remains a critical public health issue worldwide. From early respiratory infections in infants to chronic illnesses and premature death in adults, the effects are both severe and far-reaching. While progress has been made, much remains to be done. Reducing exposure to secondhand and thirdhand smoke is not only a personal responsibility but a public imperative—central to disease prevention, health equity, and long-term global well-being.

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