

Secondhand Smoking and its Impact on Our Health



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Secondhand smoking, which is also referred to as passive smoking, involuntary smoking, or environmental tobacco smoking, is the inhalation of mainstream smoke that smokers exhale and the side-stream smoke that is generated from lighted ends of burning tobacco products or tobacco-independent products such as the charcoal placed on the head of a water pipe (Shisha) and the head itself. The key environmental sites where most of the non-smokers are exposed to passive smoke are homes, workplaces, vehicles and public places such as restaurants, buildings, schools, bars, malls, etc. The attempts of separating smokers from nonsmokers in public places cannot eliminate exposures to secondhand smoke, and the usage of ventilating, air cleaning and heating systems also don't control the exposure to particulate matters emitted in the airspace, they rather help it distribute more.

Passive smoking has become a serious health hazard. There is no risk-free level of secondhand smoke and even very brief exposures have immediate harmful effect. According to the World Health Organization, it causes more than 1.2 million premature deaths each year and 65,000 deaths among children from smoking related- illnesses [1]. Exposure to secondhand tobacco smoke has been causally linked to cancer, respiratory, and cardiovascular diseases, and to adverse effects on the health of infants and children (Figure 1) [2].

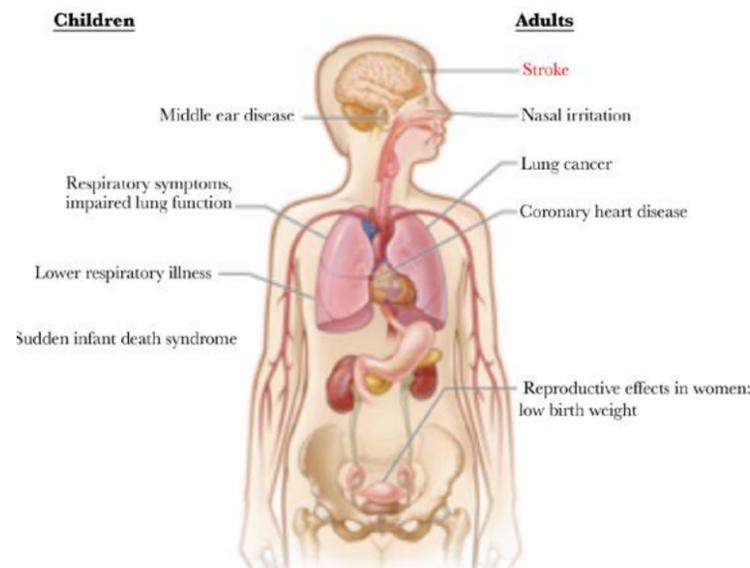


Figure 1: The health consequence casually linked to secondhand smoke.

Cancer: Burning tobacco produces a complex chemical mixture of more than 7,000 compounds affecting every human cell and organ. This mixture that is very similar to that inhaled by the active smokers contains at least 69 carcinogens (cancer-caused substances) such as benzene, polycyclic aromatic hydrocarbons and nitrosamine, thus the incidence of cancer development is certainly not surprising. Lung cancer is the first deadly smoke-attributed disease. Involuntary smokers who live with active smokers are at 20 to 30% higher risk of developing lung cancer. The association between involuntary smoke exposure and other cancers such as breast and cervical cancer is found to be weak.

The scheme below shows the mechanism of cancer induction by the carcinogens present in secondhand smoke (Figure 2).

Cardiovascular diseases: Exposure to secondhand smoke causes significantly more deaths due to cardiovascular

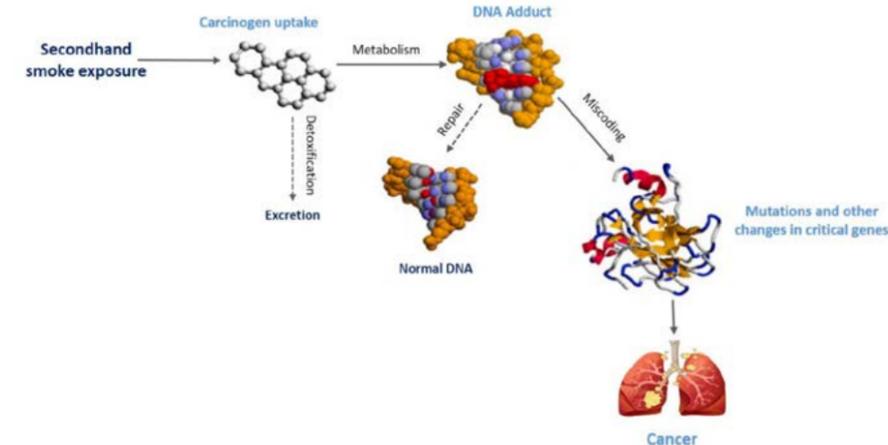


Figure 2: The mechanism of cancer induction by carcinogens present in tobacco smoke.

disease than due to lung cancer. Nonsmokers exposed to secondhand smoke increase their risk of developing heart disease by 25% to 30%. Secondhand smoke causes stroke and is associated with increased risks of coronary heart disease morbidity and mortality among both men and women.

Respiratory tract: An atmosphere contaminated with air pollutants emitted from tobacco and non-tobacco products such as "Carbon monoxide" contribute to the discomfort of exposed individuals, however the scientific evidence is insufficient to conclude a causal relationship between secondhand smoke and respiratory diseases in adults. Secondhand smoke exposure causes odor annoyance and nasal irritation. Persons with nasal allergies or a history of respiratory illnesses can be more susceptible to developing nasal irritation from secondhand smoke exposure. Similarly, persons with asthma are at risk of acute decline in lung function.

The effect of smoke exposure on children: Exposure to paternal smoke causes middle ear disease in children, including acute and recurrent otitis media and chronic middle ear effusion. Paternal smoking also lower child's lung function and causes cough, phlegm, wheeze, breathlessness and even asthma in children.

Infant health and Reproductive outcomes: It has long

been recognized that maternal smoking during pregnancy poses significant adverse effects on fetal growth and reproductive outcomes. One of these effects is ectopic pregnancy in which the embryo implants in the Fallopian tube or elsewhere outside the uterus. This is a potentially fatal condition for the mother.

Early prenatal exposure to nicotine and tobacco smoke activates multiple biologic pathways that are related to fetal development, immune system, the cardiovascular system, the central nervous system, and carcinogenesis. It causes orofacial clefts in infants and persistent adverse effects on lung function across childhood. It could also cause other smoke-related illness including dysfunctional and/or immature organs and/or arousal systems which eventually leads to sudden infant death syndrome (SIDS). Nicotine is shown to be a critical window to the brain and has lasting detrimental consequences on infants' brain development and their mental health outcomes in childhood including disruptive behavioral disorders, and attention deficit hyperactivity disorder (ADHD).

Despite wider adoption of smoking restrictions at work and public places to control involuntary exposures to tobacco smoke, exposures still persist. It is clear that banning indoor smoking is the only effective way, especially at home which remains the most serious venue for secondhand smoke exposure.



[1]. World Health Organization- News room: Tobacco, July 2019. <https://www.who.int/news-room/fact-sheets/detail/tobacco>
[2]. Executive Summary- The health consequence of smoking: A report of Surgeon General, U.S. Department of Health and Human Service, 2014.