

Health Effects of Passive Smoking on Children and Pregnant Women: A Literature Review

Key Messages

- No safe exposure: Passive smoke poses serious risks to both children and pregnant women, even at low levels.
- Severe developmental and health impacts: Exposure is linked to asthma, infections, dental caries, growth delays, and complications such as low birth weight and preterm birth.
- Psychological consequences: Passive smoke increases the likelihood of emotional distress, behavioural problems, and later psychosocial difficulties.
- Persistent exposure in homes: Despite public smoking bans, private households remain major sources of risk, especially in low-income and rural families.
- Urgent action required: Smoke-free housing, parental cessation programmes, and awareness campaigns are essential to protect maternal and child health.

Introduction

Environmental Tobacco Smoke (ETS), commonly known as secondhand smoke, is a toxic mixture of two components: mainstream smoke, which is inhaled and exhaled by the smoker, and sidestream smoke, which comes directly from the burning cigarette and constitutes the majority of ETS (Tager, 1989). Despite smoke-free legislation in public spaces, exposure to ETS indoors remains widespread, with severe consequences for children and pregnant women. This review summarises key scientific findings on the effects of passive smoking in these populations and outlines resulting public health challenges.

Health Effects on Children

Respiratory and Immune Effects

Children are particularly sensitive to passive smoke because of their higher breathing rates and their still-developing lungs and immune systems (Boldo et al., 2010; Longman

& Passey, 2013). Prenatal exposure can impair lung function and significantly increase the risk of asthma. After birth, passive smoke contributes to respiratory symptoms such as wheezing, coughing, and asthma attacks — especially during the first two years of life (Janson, 2004; Tager, 1989).

It is also associated with a higher incidence of acute respiratory diseases like bronchitis, pneumonia, and laryngitis, as well as reduced lung growth and more severe asthma symptoms in children and adolescents (Jing et al., 2019; Merianos et al., 2019). Exposed children more often require medication, experience stronger symptoms, and need more frequent medical care (Fedele et al., 2016).

These findings underline the urgent need to prioritise protection measures for children. Targeted smoking cessation programmes for pregnant women and parents of hospitalised children have already shown promising results in countries such as Sweden (Janson, 2004).

Other Physical Health Risks

Beyond respiratory issues, children exposed to passive smoke face additional physical health risks. Prenatal exposure has been linked to a higher risk of dental caries, often more pronounced than in children exposed only after birth (Williams, Kwan & Parsons, 2000). Early prevention and parental education can substantially reduce this risk (Uthayakumar et al., 2023).

Passive smoking also increases susceptibility to bacterial infections such as streptococcus and can favour the occurrence of “modified measles” despite vaccination (Fujita et al., 2019; Suzuki et al., 2015). ENT-related problems are more frequent as well: exposed children more often develop voice disorders (Tahir et al., 2020) and allergic symptoms such as wheezing, rhinitis, and eczema (Kim et al., 2019).

Psychological and Behavioural Effects

Exposure to ETS affects not only physical but also mental health and behaviour. Studies show a clear association between passive smoking and a higher likelihood of emotional distress, ADHD symptoms, social withdrawal, and depressive mood (Padrón et al., 2016; Wang et al., 2019; Wellman et al., 2020).

During adolescence, such symptoms tend to intensify, with increased reports of suicidal thoughts, stress, depression, and aggression (Bang et al., 2017; Huang et al., 2018; Kim et al., 2016). These problems can disrupt psychosocial development and school integration.

Alarmingly, early childhood exposure has also been linked to later delinquent behaviour, academic difficulties, and gang involvement (Pagani et al., 2017). These findings illustrate the long-term psychosocial consequences of passive smoke exposure and highlight the need for preventive action at home and in public settings.

Effects on Pregnancy and the Fetus

Exposure to passive smoke during pregnancy is associated with a range of severe risks for both the fetus and pregnancy outcomes. Even low levels of exposure significantly increase the risk of complications such as low birth weight, intrauterine growth restriction (IUGR), stillbirth, and preterm birth. Placental complications such as placenta praevia and placental abruption are also more common (Tager, 1989; Dulęba & Kozakiewicz, 2022).

Combined risk factors further aggravate outcomes: for example, maternal vitamin D deficiency coupled with passive smoke exposure has been linked to a higher risk of miscarriage (Lin et al., 2022). These results emphasise the need to ensure smoke-free environments from the earliest stages of pregnancy.

Public Health Implications

The overall health burden caused by passive smoke exposure is substantial and contributes significantly to global morbidity and mortality (Carreras et al., 2019; Öberg et al., 2011). While many countries have implemented smoke-free laws for public spaces, private households remain a major source of exposure — especially in low-income and rural families, where protection measures are often inconsistently applied (Longman & Passey, 2013).

Evidence shows that targeted cessation programmes for pregnant women and parents of hospitalised children can effectively reduce passive smoke exposure (Janson, 2004). To better protect vulnerable groups and reduce health inequalities linked to tobacco, stronger public awareness and consistent enforcement of smoke-free rules are essential.

Conclusion

This review clearly demonstrates that passive smoking poses serious health risks for children and pregnant women. Because of their physiological development, children are especially vulnerable. Studies have established associations with respiratory diseases, infections, dental caries, growth retardation, and mental and behavioural disorders. For unborn children, passive smoke can cause complications such as low birth weight, preterm birth, and miscarriage.

Although smoke-free regulations have improved public spaces, exposure in private households remains high — particularly among low-income or rural families. Interventions such as parental cessation programmes, smoke-free housing, and education campaigns can help reduce this burden.

Protecting children and pregnant women from passive smoke is therefore not only a health priority but also a social responsibility requiring clear rules, reliable information, and targeted support for those at greatest risk.

References

- Bang, I., Jeong, Y., Park, Y., Moon, N., Lee, J., & Jeon, T. (2017). Secondhand smoking is associated with poor mental health in Korean adolescents. *Tohoku Journal of Experimental Medicine*, 242(4), 317–326. <https://doi.org/10.1620/tjem.242.317>
- Boldo, E., Medina, S., Öberg, M., Puklová, V., Mekel, O., Patja, K., Dalbokova, D., Krzyzanowski, M., & Posada, M. (2010). Health impact assessment of environmental tobacco smoke in European children: Sudden infant death syndrome and asthma episodes. *Public Health Reports*, 125(3), 478–487. <https://doi.org/10.1177/003335491012500317>
- Carreras, G., Lugo, A., Gallus, S., Cortini, B., Fernández, E., López, M. J., Soriano, J. B., López-Nicolás, A., Semple, S., Gorini, G., & the TackSHS Project Investigators. (2019). Burden of disease attributable to second-hand smoke exposure: A systematic review. *Preventive Medicine*, 129, 105833. <https://doi.org/10.1016/j.ypmed.2019.105833>
- Dulęba, M., & Kozakiewicz, B. (2022). Cotinine as an indicator of fetal exposure to active and passive smoking in pregnant women. *Advances in Hygiene and Experimental Medicine*, 76(1), 358–368. <https://doi.org/10.2478/ahem-2022-0037>
- Fedele, D. A., Tooley, E., Busch, A., McQuaid, E. L., Hammond, S. K., & Borrelli, B. (2016). Comparison of secondhand smoke exposure in minority and nonminority children with asthma. *Health Psychology*, 35(2), 115–122. <https://doi.org/10.1037/hea0000262>
- Fujita, T., Babazono, A., Harano, Y., & Jiang, P. (2019, June). Secondhand smoke and streptococcal infection in young children under Japan's voluntary tobacco-free policy. *Population Health Management*, 22(3), 272–277. <https://doi.org/10.1089/pop.2018.0100>
- Huang, J., Xu, B., Guo, D., Jiang, T., Huang, W., Liu, G., & Ye, X. (2018, May). Relationships between secondhand smoke exposure and depressive symptoms among adolescents in Guangzhou, China. *International Journal of Environmental Research and Public Health*, 15(5), Article 930. <https://doi.org/10.3390/ijerph15050930>
- Janson, C. (2004). The effect of passive smoking on respiratory health in children and adults [State of the art]. *The International Journal of Tuberculosis and Lung Disease*, 8(5), 510–516.
- Jing, W., Wang, W., & Liu, Q. (2019). Passive smoking induces pediatric asthma by affecting the balance of Treg/Th17 cells. *Pediatric Research*, 85(4), 469–476. <https://doi.org/10.1038/s41390-018-0271-5>
- Kim, J., Lee, E., Lee, K., & Kim, K. (2019). Relationships between secondhand smoke incursion and wheeze, rhinitis, and eczema symptoms in children living in homes

- without smokers in multi-unit housing. *Nicotine & Tobacco Research*, 21(4), 424–429. <https://doi.org/10.1093/ntr/nty005>
- Kim, N. H., Park, J. H., Choi, D. P., Lee, J. Y., & Kim, H. C. (2016, December). Secondhand smoke exposure and depressive symptoms among Korean adolescents: JS High School Study. *PLOS ONE*, 11(12), e0168750. <https://doi.org/10.1371/journal.pone.0168750>
- Lin, S., Li, J., Zhang, Y., Song, X., Chen, G., & Pei, L. (2022). Maternal Passive Smoking, Vitamin D Deficiency and Risk of Spontaneous Abortion. *Nutrients*, 14(18), 3674. <https://doi.org/10.3390/nu14183674>
- Longman, J. M., & Passey, M. E. (2013). Children, smoking households and exposure to second-hand smoke in the home in rural Australia: Analysis of a national cross-sectional survey. *BMJ Open*, 3(1), e003128. <https://doi.org/10.1136/bmjopen-2013-003128>
- Merianos, A. L., Jandarov, R. A., & Mahabee-Gittens, E. M. (2019). Association of secondhand smoke exposure with asthma symptoms, medication use, and healthcare utilization among asthmatic adolescents. *Journal of Asthma*, 56(4), 369–379. <https://doi.org/10.1080/02770903.2018.1466322>
- Öberg, M., Jaakkola, M. S., Woodward, A., Peruga, A., & Prüss-Ustün, A. (2011). Worldwide burden of disease from exposure to second-hand smoke: A retrospective analysis of data from 192 countries. *The Lancet*, 377(9760), 139–146. [https://doi.org/10.1016/S0140-6736\(10\)61388-8](https://doi.org/10.1016/S0140-6736(10)61388-8)
- Padrón, A., Galán, I., García-Esquinas, E., Esteve Fernández, Ballbè, M., & Rodríguez-Artalejo, F. (2016). Exposure to secondhand smoke in the home and mental health in children: A population-based study. *Tobacco Control*, 25(3), 307–312. <https://doi.org/10.1136/tobaccocontrol-2014-05207>
- Pagani, L. S., Lévesque-Seck, F., Archambault, I., & Janosz, M. (2017). Prospective longitudinal associations between household smoke exposure in early childhood and antisocial behavior at age 12. *Indoor Air*, 27(3), 622–630. <https://doi.org/10.1111/ina.12337>
- Suzuki, S., Sato, K., Watanabe, H., Nezu, Y., & Nishimuta, T. (2015). Environmental tobacco exposure is associated with vaccine-modified measles in junior high school students. *Journal of Medical Virology*, 87(11), 1853–1859. <https://doi.org/10.1002/jmv.24243>
- Tager, I. B. (1989). Health effects of “passive smoking” in children. *Chest*, 96(5), 1161–1164. <https://doi.org/10.1378/chest.96.5.1161>
- Tahir, E., Kavaz, E., & Yaşar, O. C. (2020, March). The effect of parental smoking on voice-related quality of life in the pediatric population. *Journal of Voice*, 36(6), 943.e1–943.e6. <https://doi.org/10.1016/j.jvoice.2020.03.006>

- Uthayakumar, T., Bennett, J. X., Cartas, H. L., Brunet, M., Vo, K. L., & Kroon, J. (2023). Passive smoking and oral health of infants, preschoolers, and children: A systematic review. *Nicotine & Tobacco Research*, 25(10), 1625–1632. <https://doi.org/10.1093/ntr/ntad093>
- Wang, H., Li, F., Zhang, Y., Jiang, F., & Zhang, J. (2019). The association between exposure to secondhand smoke and psychological symptoms among Chinese children. *BMC Public Health*, 19(1), 923. <https://doi.org/10.1186/s12889-019-7272-2>
- Wellman, R. J., Wilson, K. M., O'Loughlin, E. K., Dugas, E. N., Montreuil, A., & O'Loughlin, J. (2020, January 27). Secondhand smoke exposure and depressive symptoms in children: A longitudinal study. *Nicotine & Tobacco Research*, 22(1), 32–39. <https://doi.org/10.1093/ntr/nty224>
- Williams, S. A., Kwan, S. Y. L., & Parsons, S. (2000). Parental smoking practices and caries experience in pre-school children. *Caries Research*, 34(2), 117–122. <https://doi.org/10.1159/000016584>