

TITLE

Effect of smoke-free legislation on perinatal and child health: a systematic review and meta-analysis

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ABSTRACT

Background:

Worldwide, children account for more than a quarter of the estimated 600,000 deaths and more than half of the estimated 10.9 million disability-adjusted-life-years due to second-hand smoke exposure. Children are particularly vulnerable to the adverse effects of second-hand smoke because their lungs and immune system are still undergoing development. The effect of in-utero and early-life exposures on health in childhood and later life is of growing research interest, with major public health implications. Second-hand smoke has been linked to a range of adverse outcomes during early-life including stillbirth, preterm birth, low birthweight, congenital anomalies, neonatal and infant mortality, asthma, and respiratory infections. Furthermore, recent studies implicate childhood secondhand smoke exposure in the development of noncommunicable diseases in later life.

Objective:

Smoke-free legislation has the potential to reduce the substantive disease burden associated with second-hand smoke exposure, particularly in children. We investigated the effect of smoke-free legislation on perinatal and child health.

Methods:

The authors searched 14 online databases from January, 1975 to May, 2013, with no language restrictions, for published studies, and the WHO International Clinical Trials Registry Platform for unpublished studies. Citations and reference lists of articles of interest were screened, and an international expert panel was contacted to identify additional studies. The authors included studies undertaken with designs approved by the Cochrane Effective Practice and Organisation of Care that reported associations between smoking bans in workplaces, public places, or both, and one or more predefined early-life health indicator. The primary outcomes were preterm birth, low birthweight, and hospital attendances for asthma. Effect estimates were pooled with random-effects meta-analysis.

Results:

The authors identified 11 eligible studies (published 2008–13), involving more than 2.5 million births and 247,168 asthma exacerbations. Five North American studies described local bans and six European studies described national bans. Smoke-free legislation was associated with reductions in preterm birth (four studies, 1,366,862 individuals; -10.4% [95% CI -18.8 to -2.0]; $p=0.016$) and hospital attendances for asthma (three studies, 225 753 events: -10.1% [95% CI -15.2 to -5.0]; $p=0.0001$). No significant effect on low birthweight was identified (six studies, >1.9 million individuals: -1.7% [95% CI -5.1 to 1.6]; $p=0.31$).

Conclusion:

Smoke-free legislation is associated with substantial reductions in preterm births and hospital attendance for asthma.

POLICY IMPLICATIONS

Smoke-free legislation has been shown to reduce second-hand smoke exposure in children and increase the proportion of smoke-free homes in several countries, and this particular comprehensive meta-analysis and systematic review of the literature showed that smoke-free legislation is associated with a reduction in preterm births and children's hospital visits for asthma.

In 1997 President Bill Clinton issued Executive Order 13058, which banned smoking in all interior spaces owned, rented, or leased by the Executive Branch of the Federal Government, as well as in any outdoor areas under executive branch control near air intake ducts. In 1998, the U.S. Department of Transportation banned smoking on all commercial passenger flights in the U.S. and/or by American air carriers. However, the U.S. Congress has not enacted a nationwide federal smoking ban in workplaces. Smoking bans in the U.S. are the result of state and local laws. According to the Centers for Disease Control and Prevention, 25 states including the District of Columbia have comprehensive laws that prohibit smoking in indoor areas of worksites, restaurants, and bars. However in several of these states, the laws are regional and not statewide, and no southern state has a comprehensive state smoke-free law in effect that prohibits smoking in all three venues (worksites, restaurants, and bars). As of August, 2013, outdoor smoking bans in the U.S. numbered approximately 2,600, with more in the works.

Despite the fact that by 2010 almost half of the U.S. population was covered by comprehensive state or local smoke-free laws, approximately 88 million U.S. nonsmokers (3 years of age or older) continue to be exposed to secondhand smoke. Children are generally unable to influence their own level of exposure, especially prenatal and early life exposures. Separating smokers from nonsmokers in indoor settings, cleaning the air, and ventilating buildings are practices that do not fully eliminate secondhand smoke. Thus, comprehensive statewide smoke-free laws are needed to protect nonsmokers and their children, with potentially significant public health savings down the road.

REFERENCE

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KEY WORD(S)

[Smoke-free laws](#), [preterm birth](#), [asthma](#)