



### Impact of smoke-free legislation on population health

Two population-based studies record small but significant reductions in the incidence of both preterm birth and emergency hospital admissions for asthma after the introduction of smoke-free legislation.

**Overview:** In 2004, more than a third of non-smoking adults worldwide (33% of male non-smokers and 35% of female non-smokers), and 40% of children, were exposed to second-hand smoke. This exposure is estimated to have caused 379,000 deaths from ischaemic heart disease, 165,000 from lower respiratory infections, 36,900 from asthma and 21,400 from lung cancer ([Öberg et al. 2011](#)). Passive smoking can also affect fetal health, increasing the risk of low birth weight and premature birth if the mother is exposed to second-hand smoke during pregnancy ([Crane et al. 2011](#)).



By July 2007, smoking in enclosed public spaces, such as pubs and restaurants, and in workplaces had been banned throughout the UK. Similar legislation in Scotland resulted in a large reduction in exposure to second-hand smoke, which has been greatest in non-smokers living in non-smoking households ([Haw and Gruer 2007](#)). Early evidence suggests that the introduction of regional and national legislation banning smoking in public places around the world has reduced the incidence of diseases associated with second-hand smoke ([Tan et al. 2012](#)).

**Current advice:** The NICE public health guidance on [tobacco and harm-reduction approaches to smoking](#) and the associated NICE [Pathway](#) discuss the risks of exposure to second-hand smoke.

NICE guidance on [quitting smoking in pregnancy and following childbirth](#) recommends that healthcare professionals should in their first consultation with a pregnant woman discuss her smoking status and measure her carbon monoxide levels. Women who don't smoke but have high levels as a result of exposure to second-hand smoke should be provided with information about the hazards of passive smoking.

**New evidence:** [Cox et al. \(2013\)](#) assessed whether bans on smoking in Belgium introduced successively in public spaces and workplaces (January 2006), restaurants (January 2007) and bars serving food (January 2010) affected the risk of preterm birth. The authors undertook logistic regression analysis of all live-born singleton births delivered at 24–44 weeks' gestation in the Flanders region (n=606,877), adjusting for various infant, maternal and environmental factors.

Of the 448,520 spontaneous births that took place between January 2002 and December 2011, 32,123 (7.2%) occurred before gestational age of 37 weeks. The three types of smoking ban introduced were all associated with an immediate and sustained reduction in the risk of spontaneous preterm delivery ( $p < 0.05$  for all). The reduction was greatest for the ban on smoking in restaurants (step change  $-3.13\%$ , 95% confidence interval [CI]  $-4.37$  to  $-1.87\%$ ,  $p < 0.01$ ) and then the ban on smoking in bars serving food (annual slope change  $-2.65\%$ , 95% CI  $-5.11$  to  $-0.13\%$ ,  $p = 0.04$ ). The risk of all types of preterm birth also showed a step decrease after 2007 ( $-3.18\%$ , 95% CI  $-5.38$  to  $-0.94\%$ ,  $p < 0.01$ ) and gradual drop after 2010 ( $-3.50\%$ , 95% CI  $-6.35$  to  $-0.57\%$ ,  $p = 0.02$  respectively).

However, none of the smoke-free legislation had any effect on the risk of low birth weight (<2500 g), small for gestational age deliveries (birth weight below the 10th centile for the gestational age and sex of the baby) or average birth weight.

[Sims et al. \(2013\)](#) assessed whether emergency admissions for adults with asthma were affected by the introduction of legislation banning smoking in enclosed public spaces and workplaces in England. Hospital Episode Statistics were used to identify 502,000 emergency admissions for asthma in people aged 16 and over between 1997 and 2010. After adjusting for season, variation in population size and long-term trends in admissions, the introduction of smoke-free legislation in 2007 was associated with a 4.9% (95% CI 0.6% to 9.0%) drop in emergency admissions for asthma. The authors estimated that the legislation prevented approximately 1900 emergency admissions for asthma in the first year after implementation, and avoided a similar number of cases in the second and third years after introduction.

**Commentary:** “Both of these studies add to the growing evidence that smoke-free legislation is effective at reducing poor health. Cox et al. (2013) reported reductions in preterm deliveries following the phased introduction of legislation in Belgium, in line with the findings of previous studies conducted in Scotland and USA. Although Cox et al. (2013)’s findings are not novel, they add to the relatively small evidence base and reinforce the existing NICE guidance that pregnant women should be advised of the hazards of exposure to second-hand smoke. Antenatal visits usually start around the end of the first trimester of pregnancy, so this advice could be extended to women planning pregnancies.

“Sims et al. (2013) reported a reduction in emergency admissions for asthma in adults after introduction of smoke-free legislation in England. [Millett et al. \(2013\)](#) have recently reported reductions in childhood asthma in England after implementation of the legislation. These studies corroborate findings from other jurisdictions – including Scotland, the USA, Canada and Ireland – and demonstrate the effectiveness of existing UK legislation protecting from exposure in enclosed public places. More legislation is needed to encompass places not currently covered by English law, in particular private vehicles.” – **Professor Jill Pell, Henry Mechan Professor of Public Health, University of Glasgow**

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