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Smoke-free legislation and acute coronary syndromes

Smoking has been prohibited in all enclosed public places and workplaces in Scotland by law since the end of March 2006. Smoke-free legislation aims to protect nonsmokers from secondhand smoke, but it may also reduce the risk among smokers because of reduced smoking or increased smoking cessation. Several studies have shown reduced numbers of hospital admissions for acute coronary syndrome (ACS) after the enactment of such legislation (eg, [1, 2]). These studies were limited by retrospective data collection, confounding by seasonal variations, and small numbers of patients. None of the previous studies included information on exposure to secondhand smoke.

Pell et al.[3] collected information prospectively on smoking status and exposure to secondhand smoke by means of questionnaires and biochemical data (cotinine analysis) from all patients admitted with ACS to nine Scottish hospitals during the 10 months preceding the passage of the legislation (from June 2005 until March 2006) and also during the same 10 months the next year. Scotland has a population of 5.1 million. The nine Scottish hospitals accounted for 64% of all admissions for ACS in Scotland.

Overall, the number of admissions for ACS decreased from 3235 to 2684—a 17% reduction (95% CI 16 to 18). In England, which has no such legislation, the number of ACS decreased by only 4% during the same period. In the 10 months after the implementation of the legislation, there was a 14% reduction in the number of admissions for ACS among smokers, a 19% reduction among former smokers, and a 21% reduction among those who never smoked. Therefore, 67% of the admissions prevented after the enactment of the legislation involved nonsmokers. Persons who had never smoked and former smokers reported a decrease in the weekly duration of exposure to secondhand smoke ($P<0.001$ by the chi-square test for trend); this was confirmed by a reduction in the mean serum cotinine concentrations (from 0.68 to 0.56 ng per milliliter, $P<0.001$ for the *t*-test in nonsmokers and from 0.71 to 0.57 mg per mL, $P<0.001$ in former smokers). The *Table* shows the relative risk reduction after smoking-ban legislation.

Table. Relative risk reduction after smoking-ban legislation.

Relative reduction in ACS, %	Current smokers (95% CI)	Former smokers (95% CI)	People who never smoked (95% CI)
In men <55 years and women <65 years	9 (6-12)	7 (2-12)	8 (3-13)
In men >55 years and women >65 years	18 (15-21)	21 (18-24)	23 (20-26)
In all patients	14 (12-16)	19 (17-21)	21 (18-24)

The reduction in the number of hospital admissions for ACS was not due to an increase in the number of deaths of patients with ACS who were not admitted to the hospitals; this latter number decreased by 6%. The ban not only protects nonsmokers, but it also appears to be causing existing smokers to quit or reduce smoking. Concerns about displacement of smoking from public places into homes have not been realized. The results of cotinine assays in schoolchildren[4] and adults who are nonsmokers[5] have confirmed a reduced overall exposure to smoke. The excess risk of ACS associated with smoking decreases within days after smoking cessation, and it is reduced by 50% at 1 year.[6]

Further studies are required to determine whether this early improvement will be sustained. Smokers who quit may subsequently relapse. However, the changing social attitudes may discourage young people from beginning to smoke, which would mean an additional benefit.

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