Impact of national and regional smoking bans on hospital admission for acute coronary syndromes

The evidence that active smoking is a risk factor for cardiovascular disease (CVD) and the leading cause of preventable death is overwhelming. In recent years interest has turned to the role of secondhand smoke (SHS) exposure in the causation of cardiovascular disease, and evidence now suggests a causal relationship [1]. Interestingly, the magnitude of the increased risk associated with exposure to SHS has been estimated at about ⅓ that for active smokers, even though actual exposure to tobacco smoke is much lower [2, 3]. There are a number of mechanisms that could account for this disproportionate effect, including effects on inflammation, platelet aggregation and endothelial dysfunction [4]. On the basis of this research many countries have enacted legislation prohibiting smoking in public places, which include bars and restaurants. Smoking restrictions at the workplace have already been implemented in several European countries, and a recent report illustrates the policies adopted for ETS (exposure to tobacco smoke) prevention around the world [5]. Evidence is mounting that smoking bans reduce ETS exposure and respiratory symptoms among service industry workers, and that they reduce hospitalisations for acute myocardial infarction in the general population.

In this issue Lukas D. Trachsel and coworkers report a reduced incidence of acute myocardial infarction in the first year after implementation of a public smoking ban in Graubünden, Switzerland [6], with a 22% fall in the number of AMI patients in the 12 months after a public smoking ban was introduced. This reduction was driven by a significant decrease in AMI incidence in men, nonsmokers and individuals with established coronary artery disease, including those with prior AMI or prior percutaneous coronary interventions. These findings are in line with previous results in nine studies where it has been shown that the number of hospital admissions for AMI decreases after the enactment of such legislation [7]. A recent meta-analysis including all of the currently published peer-reviewed original articles on the impact of public smoking bans on the incidence of ACS concluded that such bans are associated with an overall 17% reduction in the risk of AMI [8]. Another recent meta-analysis on the same topic found a 15% drop in AMI incidence during the first year after implementation of smoke-free legislation and a continuing exponential decline attaining ~36% after 3 years [9]. Up to 67% of the decrease in the number of hospital admissions for ACS involved nonsmokers, while fewer admissions among smokers contributed to the overall reduction.

Several problems arise in evaluating the effect of a smoking ban on the occurrence of AMI in the general population, and interpretation of individual "before-and-after" studies is hampered by several limitations. National smoking bans, as enacted in most European countries, leave no control population unaffected by the ban. Time trends of coronary events may be related to factors other than ETS exposure, such as long-term trends, air pollution, temperature, influenza epidemics, changes in diagnostic behaviour and changes in preventive treatment. Nevertheless, passive smokers appear to have disproportionately increased levels of 2 biomarkers of cardiovascular disease risk, fibrinogen and homocysteine [10]. This finding provides further evidence to suggest that low-level exposure to SHS has a marked clinical effect on susceptibility to cardiovascular disease. Furthermore, the scale of a statistically significant reduction in ACS in the adult population in Italy after a smoking ban was consistent with the reduction in pollution observed in indoor public places and with the known health effects of passive smoking [11].

In conclusion, there is overwhelming scientific evidence that a smoking ban in public places reduces the incidence of ACS in the adult population. Further studies are required to determine whether the early improvements are maintained. Nevertheless, a ban on smoking in public places seems to be the most effective means of reducing hospital admission for ACS to have emerged in recent years. Even if this reduction in the incidence of ACS may be relatively minor, it has a major impact on public health. It is the responsibility not only of the political community but also of the medical community to endorse smoking bans in public places, thus bringing about a further reduction in the burden of cardiovascular disease and improvement in public health.

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References

1 US Department of Health and Human Services. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report by the Surgeon General. Atlanta, Ga: US Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006.

2 Law MR, Wald NJ. Environmental tobacco smoke and ischemic heart disease. Prog Cardiovasc Dis. 2003;46:31–8.

3 Barnoya J, Glantz SA. Secondhand smoke: the evidence of danger keeps growing. Am J Med. 2004;116:201–2.

4 Barnoya J, Glantz SA. Cardiovascular effects of secondhand smoke: nearly as large as smoking. Circulation. 2005;111:2684–98.

5 Koh HK, Joossens LX, Connolly GN. Making smoking history worldwide. N Engl J Med. 2007;356:1496–8.

6 Trachsel LD, Kuhn MU, Reinhart WH, Schulzki T, Bonetti PO. Reduced incidence of acute myocardial infarction in the first year after implementation of a public smoking ban in Graubuenden, Switzerland. Swiss Med Wkly. 2010;140 (9–10):133–8.

7 Pell JP, Haw S, Cobbe S, Newby DE, Pell AC, Fischbacher C, et al. Smoke-free legislation and hospitalizations for acute coronary syndrome. N Engl J Med. 2008;359(5):482–91.

8 Meyers DG, Neuberger JS, HE J. Cardiovascular effect of bans on smoking in public places. J Am Coll Cardiol. 2009;54 (14):1249–55.

9 Lightwood JM, Glantz SA. Declines in acute myocardial infarction after smoke-free laws and individual risk attributable to secondhand smoke. Circulation. 2009;120(14):1373–9.

10 Venn A, Britton J. Exposure to secondhand smoke and biomarkers of cardiovascular disease risk in never-smoking adults. Circulation. 2007;115(8):990–5.

11 Cesaroni G, Forastiere F, Agabiti N, Valente P, Zuccaro P, Perucci CA. Effect of the Italian smoking ban on population rates of acute coronary events. Circulation. 2008;117(9):1183–8.