World Health Organization
REGIONAL OFFICE FOR Europe

EVIDENCE BRIEF

How can we best protect non-smokers from exposure to tobacco smoke?

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Abstract

Research clearly shows that there is no safe level of exposure to second-hand smoke. Comprehensive smoke-free laws are the only effective means of eliminating the risks associated with smoking. Article 8 of the WHO Framework Convention on Tobacco Control forms the basis of international action to reduce the burden of disease attributable to second-hand smoke. Smoke-free legislation works, but it is of key importance that certain indicators are not measured prematurely. Doing so would raise the risk of incorrectly portraying low levels of impact and, thus, of jeopardizing political support of the policy. The regional evidence showing the impact of smoke-free legislation for the nine countries in the WHO European Region that meet the eligibility criteria for inclusion in this brief is presented in light of statements commonly made in connection with the proposed introduction of smoke-free legislation.

Keywords

Health legislation
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Second-hand smoke
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Article 8 of the WHO Framework Convention on Tobacco Control: protection from exposure to tobacco smoke

Smoke-free legislation works. Second-hand smoke causes premature death and illness in those it doesn't kill. It contributes to inequality and imposes a large economic burden on the individual and society. Research clearly shows that there is no safe level of exposure to second-hand smoke. Comprehensive smoke-free laws are the only effective means of eliminating the risks associated with smoking. The primary purpose of establishing smoke-free places is to protect the health of non-smokers, also at the workplace. Ventilation and smoking rooms are not effective *(1)*.

What is the problem?

Second-hand smoke causes premature death. Second-hand tobacco smoke is estimated to cause about 600 000 premature deaths per year worldwide, 31% occurring among children and 64% among women. In the European Union, 19 000 non-smokers die each year due to the impact of second-hand smoke.

Second-hand smoke causes illness in those it doesn't kill. Exposure to second-hand tobacco smoke increases the risk of non-smokers developing coronary heart disease and lung cancer by 25–30%. Children exposed to second-hand tobacco smoke have a 50–100% higher risk of developing acute respiratory illness, the incidence of ear infection among them and the likelihood of their having developmental disabilities and behavioural problems also being higher.

Second-hand smoke contributes to inequality. Global evidence demonstrates that the use of tobacco and exposure to second-hand smoke consistently and disproportionately cripple the most socially deprived groups in society.

Second-hand smoke imposes a large economic burden on the individual and society. In the United States of America alone, an estimated US$ 5 billion in direct medical costs can be attributed to exposure to second-hand tobacco smoke, as well as another US$ 5 billion in indirect costs associated with productivity (and income) losses resulting from related disability and premature death.

Methodology

An increasing number of countries in the Region are taking steps to protect their populations from the harmful effects of tobacco smoke and it is of paramount importance to document their successes

to inform and assist the efforts of other countries.

This brief draws on evidence gained through a WHO evaluation *(2)* of the experiences of Parties to the *WHO Framework Convention on Tobacco Control* (WHO FCTC) *(3)* in the European Region that had implemented effective measures to reduce exposure to tobacco smoke. As of 2014, nine countries[1] in the Region have introduced comprehensive smoke-free legislation and the momentum is growing.

The main eligibility criteria for inclusion in this evidence brief were that the countries: (1) had been implementing smoke-free legislation for at least two years; (2) had compliance rates assessed as high; and (3) had been monitoring and evaluating[2] the implementation of smoke-free legislation and had produced an analysis of the results in English. Of the nine countries that had introduced comprehensive smoke-free legislation at the time of the evaluation *(2)*, Ireland, Spain, Turkey and the United Kingdom fulfilled these criteria.

Proper evaluation of the impact of smoke-free policies

It is of key importance that certain indicators are not measured prematurely. Doing so would raise the risk of incorrectly portraying low levels of impact and, thus, of jeopardizing political support of the policy.

During the early stage[3] of implementing smoke-free policy, the main variables of interest are:

- knowledge of the general population – and, possibly, specific groups (e.g. bar workers) – about smoke-free policy, and their attitudes to and support of it;
- enforcement of and compliance with smoke-free policy;
- a reduction in the exposure of employees to second-hand tobacco smoke at workplaces and in public places;
- a reduction in the content of second-hand tobacco smoke in the air of workplaces (particularly restaurants) and public places;
- a reduction in exposure to second-hand tobacco smoke in private homes.

[1] Albania (2006), Bulgaria (2012), Greece (2010), Ireland (2004), Malta (2010), Spain (2011), Turkey (2008 and 2009), Turkmenistan (2000) and the United Kingdom (England: 2007; Scotland: 2006).

[2] Monitoring and evaluating the impact of smoke-free legislation on public health are important to maximizing its impact and to increasing political and public support not only of maintaining the legislation but also of strengthening and expanding its provisions.

[3] Some countries choose to implement smoke-free legislation in a single phase with early (or introductory) and later stages whereas others, like Turkey, take a two-phase approach with two dates of implementation: in the first phase, only certain public places (for example, all public places excluding the hospitality sector) are affected; in the second phase, the legislation is extended to all public places.

After the introductory stage, although the above variables continue to be of interest, the impact of smoke-free policy on health and the economy is of particular importance, namely, the degree to which it has resulted in:

- a reduction in mortality and morbidity from exposure to second-hand tobacco smoke;
- changes in smoking prevalence and smoking-related behaviour;
- an economic impact directly related to health;
- an economic impact related to government revenue, for example, from tobacco taxes, tourism and business.

Caution should be exercised in interpreting the impact of the legislation. It is necessary to understand the nature of, and areas covered by, the policies and to note any exemptions or loopholes that could affect compliance with the legislation. Such shortfalls could negatively affect the way in which the effectiveness of smoke-free legislation is perceived. It is important to recognize this.

What can be done?

Research clearly shows that there is no safe level of exposure to second-hand smoke. Ventilation and smoking rooms are not effective. The introduction of comprehensive smoke-free laws is the only effective means of eliminating the risks associated with smoking. The primary purpose of establishing smoke-free places, including the workplace, is to protect the health of non-smokers.

Article 8 of the WHO FCTC *(3)* forms the basis of international action to reduce the burden of disease attributable to second-hand smoke. Most importantly, Parties to WHO FCTC *(3)* are legally bound to take action.

Smoke-free legislation works. It is, however, important that it is in line with WHO FCTC Article 8, which requires the adoption of effective measures to protect people from exposure to tobacco smoke: (1) in indoor workplaces; (2) in indoor public places; (3) on public transport; and (4) "as appropriate" in "other public places" *(3)*. The guidelines on implementing Article 8 of the WHO FCTC *(4)* describe the terms and principles of the Convention *(3)* and list recommendations on meeting its legal obligations. Nevertheless, smoke-free legislation still varies from country to country and does not always comply with Article 8 *(3)*.

What is the regional evidence?

The following evidence is presented in the light of statements commonly made in connection with the proposed introduction of smoke-free legislation.

The general public strongly supports comprehensive smoke-free policy

According to a survey carried out in **Ireland** within the first year after the introduction of a comprehensive smoke-

free law, 83.0% of smokers reported that they considered the law to be a good or very good thing *(5).*

In **Turkey**, many studies have been conducted on the reaction of the community towards the Law on Prevention and Control of Hazards of Tobacco Products (Law No. 4207, title as amended by Law No. 5727 of 2008) *(6)*, particularly since the community accepts smoking indoors as the norm. One study conducted in 2009, 22 months after the second phase of implementation of the Law, demonstrated that the majority of the population (92%) supported it and that even among daily smokers support was high (77%) *(7)*. Two other studies conducted one month after the second phase of implementation and then one year later showed a positive trend towards even greater acceptance of the Law. The first study illustrated that 96.1% of non-smokers and 76.3% of smokers were happy with the smoke-free environment *(7)*. The second indicated a rise to 87.7% in the proportion of smokers who were happy with the smoke-free environment and, in connection with lifestyle changes, the majority (79%) reported that they either visited restaurants, bars and tea houses more often or that their habits had remained the same *(7)*.

In the **United Kingdom (England),** both the general public and businesses strongly supported the introduction of smoke-free legislation (2007) and adapted to it quickly: 76% of the population were in support of smoke-free workplaces and public places, and 70% considered that creating smoke-free environments had had a positive impact on people's health; 81% of business decision-makers felt that the law was a good idea and 87% that its implementation had gone well or very well *(8)*.

In the **United Kingdom (Scotland),** 84% of 18–24 year olds surveyed in a public opinion poll conducted in March 2006, right after the ban came into effect, felt that a smoke-free Scotland would be something to be proud of *(9).* Furthermore, an opinion poll conducted by Cancer Research UK six months after the introduction of the legislation revealed that 92% of the staff in Scottish bars considered that their workplaces had become healthier after the smoking ban came into effect and more than 75% believed that the legislation would benefit their health in the long term *(9)*.

A repeat cross-sectional survey of Scottish adults aged 16–74 years in September–December 2005 and September–December 2006 found that, over the year, support for the legislation had risen from 88% to 93% among non-smokers and from 53% to 65% among smokers *(10)*.

Strong public support leads to high-level enforcement of and compliance with comprehensive smoke-free policies

In **Turkey**, according to public opinion polls, 87% of those interviewed believed that the law was being enforced effectively in indoor public areas and workplaces, and 86% believed this to be the case in hospitality venues *(11)*. A report of the Ministry of Health of Turkey on compliance shows that approximately 3.4% of the audits carried out within a

little more than a year after the law came into effect had resulted in reports/penalties by the enforcement authorities *(11)*.

In the **United Kingdom (England),** compliance with smoke-free legislation was consistently high from the start. Inspections carried out between July 2007 (when the law was introduced) and March 2008 (8 months after introduction of the law) revealed that 98% of all premises and vehicles were smoke-free, thus fulfilling the requirements of the law. Compliance with respect to the display of no-smoking signs in premises and vehicles was 87% *(8)*.

In the **United Kingdom (Scotland),** more than 3900 inspections of premises conducted by the enforcement authorities between March and May 2006 revealed that over 99.4% were smoke free. Nationwide, only three businesses and three individual smokers were fined for breaking the law in that period *(12)*.

Comprehensive smoke-free policies protect employees by reducing exposure to second-hand tobacco smoke in workplaces and public places

In **Turkey**, a study to investigate levels of carbon monoxide in the breath of both smokers and non-smokers before and after implementation of smoke-free legislation showed a 36% reduction among smokers and a 50% reduction among non-smokers *(11)*.

In the **United Kingdom (England),** there has been a vast reduction in the exposure of bar workers to second-hand smoke. Before the introduction of the law, survey results indicated that non-smoking bar workers were inhaling 4 to 6 times more cigarette smoke than the average non-smoking adult *(8).* After the introduction of smoking restrictions, the levels of cotinine in non-smoking bar workers fell on average by about 76% *(8).*

In the **United Kingdom (Scotland),** the largest-ever study to compare the quality of air before the introduction of smoke-free legislation in 2005 and after its implementation in 2006 revealed a reduction of 86% in exposure to second-hand smoke in general and a 39% reduction among non-smoking adults and children *(13)*.

Comprehensive smoke-free policies protect employees by reducing the content of second-hand smoke in the air in workplaces (particularly restaurants) and public places

In **Spain**, as part of an evaluation of the impact of smoke-free legislation, nicotine concentrations in the air were measured as an indicator of second-hand smoke in late 2005 before implementation of the law, and again 12 months after its implementation. A major reduction was observed in private workplaces (97.4%) and in restaurants and bars (96.7%) that had become smoke-free, but not in restaurants and bars that had not adopted the ban *(14)*. In addition, a reduction of 64% in cotinine levels was observed in non-smoking employees of smoke-free bars *(15)*. Since the extension of the ban in 2011 to all bars and restaurants, both nicotine and fine particle (PM2.5) concentrations in the air have decreased by more than 90% *(16)*.

In **Turkey**, a group of studies revealed that, already after the first phase of implementation, there was a 97% reduction of particles in public buildings *(11)*. Since the introduction of smoke-free legislation, the Society of Public Health Specialists (HASUDER) has conducted several studies to evaluate indoor air quality in terms of particle measurement in ambient air. Although the levels measured were still above the permissible limit, improvement in air quality was well documented *(11)*.

In the **United Kingdom (England),** prior to 1 July 2007 when the smoking ban came into effect, air quality in pubs was rated as "unhealthy". It has since improved to such a degree that the current level of air quality in pubs is equivalent to "smoke free" and comparable to that of outdoor air *(8)*.

In the **United Kingdom (Scotland),** a study carried out in 2006 to compare air quality in bars 8 weeks before and 8 weeks after implementation of the ban revealed an 86% improvement *(13)*.

Comprehensive smoke-free policies can cause a shift in beliefs and personal choices relating to rules about smoking in private places

A study conducted in 1995 in **Turkey** revealed that approximately 90% of smokers in various occupational groups smoked at home *(7)*. The 2008 Global Adult Tobacco Survey (GATS) found that after the first phase of implementing smoke-free legislation, 56.3% of adults were exposed to tobacco smoke at home *(17)*. According to GATS 2012, 38.3% of adults were exposed to tobacco smoke at home *(17)* and 26.4% of adults were exposed to tobacco smoke in their cars *(18)*. These results illustrate how a complete ban on smoking can alter perceptions about, and tolerance of, smoking in private places.

Comprehensive smoke-free policies can result in lowering the prevalence of smoking and smoking-related behaviour

In **Turkey,** data from the Tobacco Products and Alcoholic Beverages Market Regulatory Authority (TAPDK) on cigarette sales showed a 2.26-fold increase in annual per capita cigarette consumption between 1935 and 2000, and a 22.8% decrease between 2000 and 2010 (during which period the first phase of implementing smoke-free legislation took place, starting in May 2008). The second phase of implementation (starting in July 2009) saw a decrease in tobacco sales to the lowest in 15 years, that is, from 107.6 billion in 1995 to 93.5 billion in 2009–2010 *(7)*. It is likely, however, that an increase in tobacco taxes introduced in January 2010 had an effect on demand.

The results of small-scale studies carried out in 2010 on the prevalence of smoking among employees revealed that 3.9% had quit after the introduction of smoke-free legislation while 60.8% were smoking less *(19)*. Before the law came into force, the mean number of cigarettes smoked per day was 23.24 whereas, three months after it came into force, the mean number was significantly lower at 16.48. In addition, the proportion of employees who expressed their

willingness to quit smoking increased from 57.5% to 66.7% *(19)*.

In the **United Kingdom (England),** local National Health Service stop-smoking services experienced an increase in demand of over 20% as a result of an environment that is more supportive of smokers wishing to quit *(8)*.

In one region of the **United Kingdom (Scotland),** the stop-smoking services saw a four-fold increase in demand within the three months prior to introduction of the law *(9)*.

Comprehensive smoke-free legislation can reduce mortality and morbidity from exposure to second-hand tobacco smoke within a few months of implementation

Although the primary objective of smoke-free legislation is to protect the health of non-smokers, another positive result would be to reduce cigarette consumption. The health effect of smoke-free legislation is enormous, and becomes evident within only a few months of its entry into force. This is exemplified in the scientific literature by a 20–40% decrease in hospitalization for myocardial infarctions, depending on the country.

In **Spain**, hospitalization *(20)* and mortality *(21)* from myocardial infarction both decreased by 10% after the legislation came into force. Hospitalization for asthma in children and young people (0–14 years) also decreased by 21% *(22)*.

In January–May 2009 and January–May 2010, investigations were made of the numbers of patients admitted to the emergency departments of ten large hospitals in Istanbul, **Turkey**, with diseases related to smoking and exposure to second-hand smoke. A substantial decrease in admissions (24.2%) was observed in the second period: 16.0% for acute nasopharynitis; 32.9% for pneumonia; 18.8% for acute bronchitis; 59.2% for allergenic rhinitis; 61.3% for acute respiratory diseases; 21.4% for chronic lung diseases; and 33.6% for myocardial infarction *(7)*.

In the **United Kingdom (England)**, within the first year after implementation of smoke-free legislation, there were 1600 fewer emergency admissions for myocardial infarction, a small but significant reduction *(23)*.

Studies carried out in the **United Kingdom (Scotland)** six months after implementation of the smoking ban showed a 25% reduction in admissions to major hospitals for heart attack, the average reduction for such admissions in the ten years leading up to the ban being 3.8% *(10)*. In addition, bar workers had fewer respiratory symptoms and more than nine out of ten of them were of the opinion that their workplaces were healthier because of the law.

Comprehensive smoke-free policies have a positive impact on the economy of the health system

As illustrated above, reductions in morbidity occur within months of implementing smoke-free legislation. This translates into considerable cost savings for the health system. In **Turkey**, for example, it is estimated that these would be at least

US$ 10–12 billion annually, representing the amount spent on the diagnosis and treatment of patients suffering from smoking-related diseases *(11)*.

Comprehensive smoke-free policies do not result in economic loss and revenues from tobacco taxes can be maintained or even increased

Despite clear evidence that comprehensive smoke-free legislation has a positive health effect and benefits the economy of the health system relatively quickly, a common argument against introducing a total ban is that government revenue from tobacco excise taxes would be greatly reduced. However, governments can maintain or even augment this revenue by increasing excise tax on tobacco products.

Comprehensive smoke-free policy does not deter tourism

Another common argument against comprehensive smoke-free legislation is that it will keep the tourists away. There are few studies on this subject and these are mainly pertinent to the United States. Nevertheless, according to the World Tourism Organization, four of the top five (and, thus, the top ten) tourist destinations in 2012 were countries with strong or comprehensive smoke-free legislation (Table 1) *(24)*.

It cannot be concluded that the implementation of smoke-free legislation in these countries was conducive to the decrease observed in tourist arrivals. For example, after the law came into force in the **United Kingdom** in 2007, tourist arrivals decreased slightly. However, in China and Germany, arrivals also

Table 1. Top ten international tourist arrivals, in millions, by country, 2011 and 2012

Country	2011 (in millions)	2012 (in millions)
France	81.6	83.0
United States	62.7	67.0
China	57.6	57.7
Spain	56.2	57.7
Italy	46.1	46.4
Turkey	34.7	35.7
Germany	28.4	30.4
United Kingdom	29.3	29.3
Russian Federation	22.7	25.7
Malaysia	24.7	25.0

Source: UNWTO Tourism Highlights. 2013 edition *(24)*.

decreased slightly in the same period and these countries had not introduced comprehensive smoke-free legislation. In **Spain**, where smoke-free legislation was implemented on 2 January 2011, a comparison between the numbers of visitors using hotels in January 2010 (3 767 159) and January 2011 (3 929 632) revealed a slight increase (4.3%) *(25)*.

Comprehensive smoke-free legislation has a neutral or positive impact on business economy

The central issue of debate is often whether or not smoke-free policy will affect business economy. A recent review of the literature indicates that it can do so in many positive ways, from improving the health and productivity of employees to reducing costs for insurance, cleaning, maintenance and potential litigation *(5)*. Objective ways of measuring the impact of smoke-free policy on business economy could include collecting employment statistics and information about taxable sales but caution should be exercised in interpreting the results of self-reported measures taken by businesses. Virtually all studies of such data suggest bias since, although the businesses involved often claim losses, objective reviews of employment and taxable-sales data do not always indicate economic downturn *(5)*.

Similarly, in **Spain**, the hospitality sector, which witnessed a decrease in revenue of only 23% (even less than in other sectors) as a result of the economic crisis, saw a slight increase in employment one month after smoke-free legislation entered into force despite a decrease in employment in other sectors *(26)*. In addition, a time-series analysis (2006–2012) showed no reductions in household expenditure on restaurants, bars or cafeteria services *(27)*.

Data show that the introduction of smoke-free legislation in **Turkey** did not have a negative effect on the hospitality sector; on the contrary. According to the Central Bank of Turkey, between 2008 and 2009, the gross national product (GNP) fell by 3.3%, while the income of hospitality workplaces increased by 5.2%. Furthermore, between the beginning and the end of 2009, the number of hospitality workplaces increased by 2.7%, while the numbers of food-sector workplaces and workplaces serving alcoholic drinks increased by 3.5% and 3.0%, respectively. In addition, the amount of value added tax (VAT) from the hospitality industry increased by more than 20% between January and October 2009 *(11)*. These data are consistent with the results of public polls in the same year, which demonstrated that most people had not changed their lifestyles after implementation of the legislation: 79% stated that they visited restaurants, bars and teahouses either more often, or to the same degree as before *(11)*.

In the **United Kingdom (England)**, 40% of businesses reported that smoke-free legislation had had a positive effect, while only 3% reported the contrary *(8)*.

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