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Legislation on smoking in enclosed public places in Scotland: how will we evaluate the impact?

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Abstract

Background From 26 March 2006, smoking will be prohibited in *wholly* and *substantially enclosed public places* in Scotland, and it will be an offence to permit smoking or to smoke in no-smoking premises. We anticipate that implementation of the smoke-free legislation will result in significant health gains associated with reductions in exposure to both environmental tobacco smoke (ETS) and personal tobacco consumption as well as other social and economic impacts.

Methods Health Scotland in conjunction with the Information Services Division (ISD) Scotland and the Scottish Executive have developed a comprehensive evaluation strategy to assess the expected short-term, intermediate and long-term outcomes. Using routine health, behavioural and economic data and commissioned research, we will assess the impact of the smoke-free legislation in eight key outcome areas – knowledge and attitudes, ETS exposure, compliance, culture, smoking prevalence and tobacco consumption, tobacco-related morbidity and mortality, economic impacts on the hospitality sector and health inequalities.

Conclusion The findings from this evaluation will make a significant contribution to the international understanding of the health effects of exposure to ETS and the broader social, cultural and economic impacts of smoke-free legislation.

Keywords: air pollution, public health, tobacco

Introduction

The recent disagreement in the UK Government that preceded the publication of the Health Bill[1] contrasts sharply with the political consensus in Scotland a year ago that accompanied the publication of the Smoking, Health and Social Care (Scotland) Bill (2005) and its subsequent smooth passage through the Scottish Parliament. While similar arguments were made for and against a comprehensive ban both north and south of the border, the view in Scotland was that everyone should be protected from exposure to environmental tobacco smoke (ETS) in public places. This led to the conclusion that a comprehensive ban was the only possible solution. Evidence from the Republic of Ireland that this was a workable approach was very influential.

From 26 March 2006, smoking will be banned in *wholly* and *substantially enclosed public places* in Scotland, and it will be an offence to permit smoking or to smoke in no-smoking premises.

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Unlike the planned legislation for England, the Scottish legislation[2] will cover all workplaces including pubs, restaurants and private members clubs. There will only be a small number of exemptions such as residential accommodation and designated rooms in adult care homes and psychiatric units.

The Health Bill[1] proposed only a partial ban for England, but in February 2006 the House of Commons voted to include both *pubs that do not sell food* and *private members clubs* within the legislation. Both the Assembly for Wales and the Northern Ireland Office have already announced their intention to implement a comprehensive ban. Therefore, if the amendments to the Health Bill are passed by the House of Lords, a comprehensive ban on smoking in enclosed public places will be in place across the UK by the summer of 2007.

This legislation has the potential to have a major impact on public health across the UK. The aim of this article is to present the logic model of expected outcomes that provides the framework for the evaluation strategy and to describe the extensive set of interrelated research studies that have been commissioned to evaluate the impacts of the forthcoming comprehensive ban on smoking in public places in Scotland.

Health impacts of smoke-free legislation

We anticipate that introduction of the smoke-free legislation in Scotland will result in health gains associated with reductions in both exposure to ETS and personal tobacco consumption. The associations between exposure to ETS and lung cancer,[3,4] coronary heart disease (CHD),[5,6] respiratory disease[7,8] and stroke[5,9] are well established. A recent study has estimated that the elimination of ETS from public places could result in a reduction of about 400 deaths per annum in Scotland by 2024.[10]

Health gains because of the Scottish law may be realized much more quickly in some groups, particularly those who are currently heavily exposed to ETS or at high risk of CHD. A study of bar workers in the Republic of Ireland[11] has recently confirmed earlier US findings of an improvement in respiratory symptoms following the implementation of a ban on smoking.[12] An analysis of routine hospital admission data from Helena, Montana found a dramatic reduction in the incidence of acute myocardial infarction following the introduction of smoke-free legislation.[13] While this study has been criticized for its weak design, the findings are consistent with predictions based on research findings on the adverse physiological impact of tobacco smoke.[14]

Workplace studies indicate that smoking bans and restrictions lead to a reduction in the number of cigarettes smoked by continuing smokers and an increase in quit attempts and successful quitting. Complete bans are associated with a greater reduction in active smoking.[15,16] We anticipate that the health gains from reduced personal tobacco consumption following the introduction of the legislation will match or exceed those resulting from reduced exposure to ETS.[17]

Other impacts of smoke-free legislation

One obstacle to the introduction of a comprehensive ban in England appears to have been a concern about public opinion. New data from Ireland indicate that support among smokers for a comprehensive ban rose after legislation was introduced.[18] Support among smokers before and after the ban rose from 43 to 67 per cent, from 45 to 77 per cent and from 13 to 46 per cent for bans in workplaces, restaurants and pubs, respectively. After the ban was implemented, 83 per cent of Irish smokers also said that the legislation was a 'good' or 'very good' thing.

A second concern has been the potential negative economic impact on the hospitality industry, particularly pubs and bars. The evidence here is not as robust as for the health impacts. Overall studies demonstrate a small positive effect on profit,[19] but the possibility remains of a negative impact on the hospitality industry for some types of businesses or for businesses in particular geographical areas.

Evaluation framework and strategy

Logic model

Health Scotland in conjunction with Information Services Division (ISD) Scotland and the Scottish Executive have developed an evaluation framework to describe the expected short-term (up to 2 months), intermediate (>2–12 months) and long-term (>12 months) health-related, attitudinal and cultural and economic outcomes. The framework is presented as a logic model (Fig. 1) and has been adapted from one developed by the US Centers for Disease Control and Prevention.[20] Our evaluation focuses on eight of the 12 key outcome areas identified in the framework – knowledge and attitudes, ETS exposure, compliance, culture, smoking prevalence and tobacco consumption, tobacco-related morbidity and mortality, economic impacts on the hospitality sector and health inequalities. Assessment of each outcome will be based on a combination of secondary analysis of routine health, behavioural and economic data as well as research commissioned to address specific questions. The research will focus on intermediate impacts up to one year after implementation of the legislation, while the routine data will permit changes to be monitored over a much longer period – 3 years in the first instance.

Routine health and behavioural data

Several useful routine health and behaviour data sets are available in Scotland. The Scottish Morbidity Record (SMR) provides discharge diagnoses on all Scottish hospital admissions and is linked to death data from the General Register Office for Scotland (GROS). Diagnostic accuracy of SMR data is estimated to be 97 per cent compared with case notes.[21] Initial analyses will focus on temporal trends in hospital admissions (SMR01) for CHD and asthma and CHD deaths.

ISD Scotland's Practice Team Information (PTI) provides data on all consultations from a representative sample of

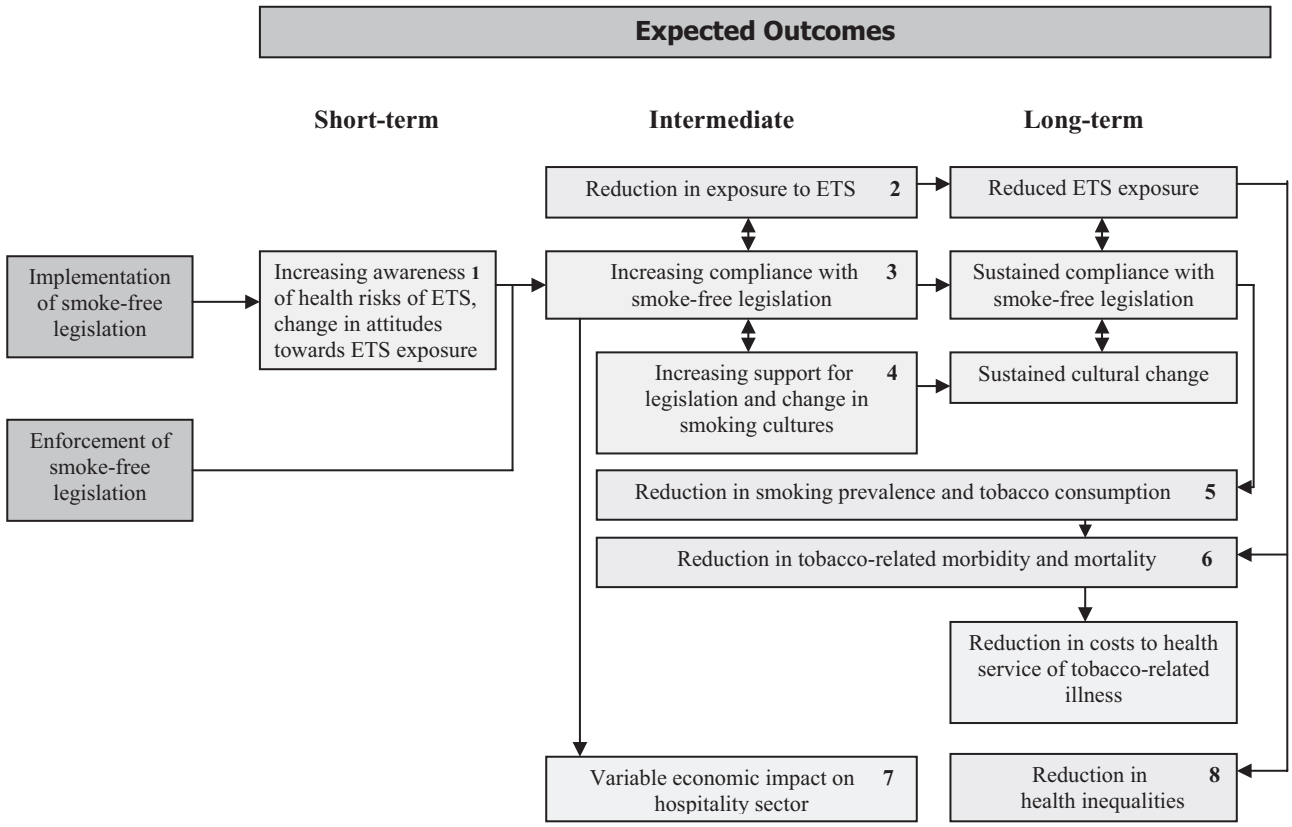

Figure 1 Logic model of expected outcomes associated with smoke-free legislation.

45 Scottish practices, which include about 6 per cent of the Scottish population. Analyses will focus on trends in consultations for CHD, chronic obstructive pulmonary disease (COPD) and asthma.

The Scottish Household Survey,[22] an annual population sample survey, will provide data on smoking prevalence. More detailed data on quit attempts and levels of tobacco consumption before and after the implementation will be available from the 2003 and subsequent Scottish Health Surveys.[23]

Routine economic data on the hospitality sector

A number of indicators of performance – employment, turnover, profitability and openings and closures – will provide a detailed picture of trends in the performance of the hospitality sector. The Labour Force Survey (LFS)[24] will allow comparisons of employment levels before and after the legislation, and gross domestic product (GDP)[25] data will provide an indication of trends in turnover in the sector.

In the longer term, the Office of National Statistics (ONS) Inter-Departmental Business Register (IDBR)[26] and Annual Business Inquiry (ABI)[27] will provide more detailed data on employment, turnover and profitability. Along with Liquor Licensing Statistics,[28] these sources will also track openings and closures in the hospitality sector.

Primary research

Seven studies have been commissioned to address specific research questions. All employ a before and after design. A summary of study designs is given in Table 1.

The changes in CHild Exposure to ETS (CHETS) study and the Health Education Population Study (HEPS) will measure changes in child and adult exposure to ETS. Both HEPS and CHETS will assess population level changes in ETS exposure from any source. In addition, CHETS will also determine whether there is any evidence of displacement of smoking into the homes of children who live with smokers. Both studies employ a repeat cross-sectional study design and will collect detailed data on awareness of health risks associated with ETS exposure, self-reported ETS exposure as well as salivary cotinine, a biomarker of ETS exposure. HEPS will also collect data on attitudes towards the legislation.

The primary focus of both the STudy Of Public place Intervention on Tobacco exposure (STOPIT) and the study of Bar-workers' Health and ETS Exposure (BHETSE) is on health gains achieved within one year of implementation of the legislation. STOPIT is a prospective study designed to test the hypothesis raised by the Montana study[13] that a reduction in ETS exposure is accompanied by a rapid reduction in the incidence of acute coronary syndrome (ACS). STOPIT's prospective design allows

Table 1 Summary of commissioned research

Study	Aim, design and data collection
Changes in CHild Exposure to Environmental Tobacco Smoke (CHETS)	Aim: To determine change in childhood exposure to ETS, including exposure in the home Design: Repeat cross-sectional survey of probability sample of Scottish Primary 7 children (11 years) Data collection: Baseline, January–February 2006; follow-up, January–February 2007. Self-complete questionnaire on smoking status and self-reported exposure; saliva sample (for cotinine assay)
Health Education Population Study (HEPS)	Aim: To determine change in adult exposure (non-smokers) to ETS in the home and public places and changes in tobacco consumption (smokers) Design: Repeat cross-sectional in-home survey of probability sample of Scottish adults (16–74 years) Data collection: Baseline, September–October 2005/February–March 2006; follow-up, September–October 2006/February–March 2007. Interviewer-administered questionnaire on smoking status, self-reported exposure and attitudes towards smoking and legislation; saliva sample (for cotinine assay)
STudy Of Public place Intervention on Tobacco exposure (STOPIT)	Aim: To determine change in the incidence of acute coronary syndrome Design: Multi-centre prospective study of hospital admissions for acute coronary syndrome. Entry criteria: chest pain + raised troponin on admission/within 12 h. Data collection: Continuous May 2005–April 2007. Research nurse-administered questionnaire on smoking status and self-reported exposure; admission blood sample (for cotinine assay)
Bar-workers' Health and Environmental Tobacco Smoke Exposure (BHETSE)	Aim: To determine change in respiratory health of bar workers Design: Prospective cohort study of bar workers from five urban and rural areas in Scotland Data collection: Baseline, January–February 2006; follow-up, June–July 2006 and January–February 2007. Interviewer-administered questionnaire on smoking status, self-reported exposure and attitudes towards smoking and legislation; lung function [forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC)]; saliva sample (for cotinine assay). Air sampling for PM2.5 in selected premises
Qualitative Bar Study	Aim: To determine changes in attitudes and behaviour in relation to smoking, smoking restrictions and the cultural contexts in which smoking and drinking take place Design: Qualitative pre- and post-study of bars and their customers in three communities Data collection: In-depth and paired interviews, direct observation, air sampling for PM2.5
Qualitative Community Study	Aim: To determine impact of legislation on attitudes, behaviours and experiences of individuals, families and communities Design: Qualitative pre- and post-study of four contrasting communities. Nested case study approach Data collection: Baseline, September 2005–March 2006; follow-up, April–December 2006. In-depth interviews, focus groups, direct observation of enclosed and outdoor spaces
International Tobacco Control (ITC) Ireland/UK Scotland Extension	Aim: To determine changes in smokers and non-smokers attitudinal and behavioural response to smoke-free laws Design: Quasi-experimental prospective cohort survey of probability samples of smoking and non-smoking adults in Scotland, the rest of the UK and Ireland Data collection: Baseline, February–March 2006; follow-up, February–March 2007. Telephone survey on smoking status; quit attempts in smokers; attitudes towards and compliance with legislation; social norms about smoking, smoking behaviour in public and private venues

patients' smoking status and levels of ETS exposure to be determined thus overcoming some of the methodological problems associated with the Montana study. Specifically, it will be possible to determine the extent to which any overall reduction in incidence of ACS is due to reductions in incidence among smokers and non-smokers. The findings from STOPIT will be interpreted within the context of temporal trends in CHD hospital admissions and CHD deaths determined by analyses of the routine health data sets.

The BHETSE study will follow a cohort of bar workers and assess changes in their ETS exposure and self-reported respiratory symptoms 2 and 9 months after the implementation of the smoking ban. Measures of particulate matter of less than 2.5 microns (PM2.5), an air-marker of ETS exposure, will also be taken in selected premises. Unlike the Irish[11] and US[12] bar worker studies, BHETSE will also test associations between reduced ETS exposure and objective measurements of lung function – forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC).

Two qualitative studies have been commissioned to assess the impact of the legislation on smoking behaviour and smoking cultures. Both will use a range of qualitative methods including in-depth interviews, focus group discussions and observation in enclosed and outdoor public places. The Bar Study will examine changes in attitudes and smoking behaviour among bar customers from selected bars and changes in the cultural contexts in which smoking and drinking takes place. It will study three contrasting (high, medium and low affluence) but geographically related communities located around a single urban centre. The Community Study will examine the broader impact of the legislation at individual, family and community levels in two contrasting local authority areas, one urban and one semi-rural. In each local authority, two communities, one of high and one of low affluence, have been selected for study.

Finally, the International Tobacco Control (ITC) Ireland/UK Scotland extension will use a quasi-experimental prospective cohort design to compare changes in attitudes towards legislation on smoking in public places in Scotland, England (control) and Republic of Ireland. It will also compare social norms about smoking, self-reported smoking behaviour in both public and private venues and self-reported smoking cessation and quit attempts. Data will be collected by telephone interview from nationally representative samples of smokers and non-smokers.

The outcome areas, outcome measures and data sources are summarized in Table 2. Baseline data collection are now under way in all seven studies to enable before and after comparisons to be made.

National and cross-national collaboration

The findings from individual studies will begin to be available about one year after the implementation of the legislation. The CLEAN Collaboration (see *Members of the CLEAN Collaboration* for members) will then combine these and the routine monitoring data to create an integrated overview. We anticipate that the findings will make a significant contribution to the international understanding of the health effects of exposure to ETS and the broader social, cultural and economic impacts of smoke-free legislation.

The plans for a comprehensive ban on somking in public place across the UK provide further opportunity to build on the Scottish evaluation. We are thus in discussion with colleagues to develop a UK-wide evaluation strategy in preparation for this eventuality.

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Contributors

All authors reviewed and approved the final draft of the article. SH and LG developed the evaluation framework and are responsible for the overall co-ordination of the evaluation. CF and CS developed the specifications for the analysis of the routine health and economic data sets. AA, CC, GF, GH, SM, JP and SS designed and are supervising the primary research. Other members of the CLEAN collaboration contributed to the design and supervision of their respective studies. SH also contributed to study designs and is guarantor for the article.

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Table 2 Summary of outcome areas, outcomes and data sources

Outcome areas		Data Sources																	
		Primary research							Routine health and behavioural data					Routine economic data				
	Outcomes	CHETS	HEPS	STOPIT	BHETSE	BAR	COMMUN	ITC	SMR01	PTI	GROS	SHoS	SHeS	LFS	GDP	IDPR	ABI	LIQUOR
Knowledge and attitudes	Knowledge of health risks ETS	x	x		x	x	x	x										
	Attitude to ETS exposure		x		x	x	x	x										
	Smoking rules in home and cars		x															
ETS exposure	Self-reported ETS exposure	x	x	x	x			x										
	Biomarker of ETS exposure	x	x	x	x													
	Air-markers of ETS exposure				x	x		x										
Compliance	Reported smoking in public places	x	x		x	x	x	x										
Cultural change	Support for legislation		x		x	x	x	x										
	Changing social/cultural norms					x	x	x										
Smoking prevalence	Smoking prevalence	x	x	x	x			x				x	x					
	Tobacco consumption	x	x	x	x	x	x	x					x					
	Quit attempts/motivation to quit		x	x	x	x	x	x					x					
Tobacco-related morbidity and mortality	Tobacco-related hospital admissions								x									
	Tobacco-related CHD deaths										x							
	Tobacco-related consultations									x			x					
	Incidence acute coronary syndrome			x														
	Respiratory symptoms	x			x								x					
	Lung function measures				x								x					
Economic impacts	Employment													x		x	x	
	Turnover														x	x	x	
	Profitability															x	x	
	Business openings and closures																x	x
Health inequalities	Deprivation indices (derived from post code)	x	x	x	x			x	x	x	x	x	x	x		x	x	x
	Occupational data	x	x		x													
	Income							x										
	Family Affluence Scale (AFS)	x																
	Level of education		x					x										
	Communities selection based on assessment of high/low affluence					x	x											

ABI, Annual Business Inquiry; BAR, Qualitative Bar Study; BHETSE, Bar-workers' Health and Environmental Tobacco Smoke Exposure; CHETS, Changes in CHild Exposure to Environmental Tobacco Smoke; COMMUN, Qualitative Community Study; GDP, Gross Domestic Product; GROS, General Registrar Office Scotland; HEPS, Health Education Population Study; IDPR, Office of National Statistics (ONS) Inter-Departmental Business Register; ITC, International Tobacco Control Ireland/UK Scotland extension; LFS, Labour Force Survey; LIQUOR, Liquor Licensing Statistics; PTI, Practice Team Information; SHeS, Scottish Health Survey; SHoS, Scottish Household Survey; SMR01, Scottish Morbidity Record; STOPIT, Study of Public place Intervention on Tobacco exposure.

Copyright declaration

Competing interests

All authors declare that the answer to the questions in your conflict of interests form at http://www.oxfordjournals.org/our_journals/pubmed/for_authors/conflict%20of%20interest.pdf are all No and, therefore, have nothing to declare.

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