

# SHS exposure of adult non-smokers living with smokers in Northern Ireland

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## Background

On 30th April 2007 legislation was introduced in Northern Ireland to prevent smoking in enclosed public places and workplaces. It is unclear whether this will lead to a displacement of smoking into the home. This study aimed to assess the residential secondhand smoke (SHS) levels for adult non-smokers in Northern Ireland who live with at least one smoker, and to provide a baseline database to determine the impact of the smoke-free legislation.

## Methods

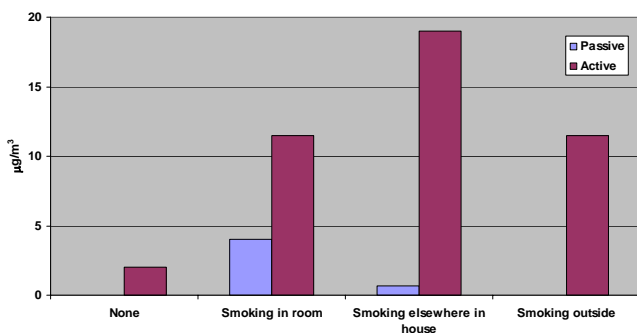
A study of residential SHS exposures was carried out in five areas in Northern Ireland in the weeks prior to the introduction of the legislation. Participants were recruited through telephone surveys, stands at shopping centres and through workplaces. Participants completed a questionnaire or interview and, for a subset of the participants, residential airborne nicotine measurements were carried out. Nicotine measurements were carried out over 24 hours with an active method using XAD absorbent tubes (NIOSH method 2551). In addition in some homes, a passive monitor sampling technique was used (Hammond and Leaderer, 1987). The passive monitors were placed in each house for approximately two weeks.

## Results

In total 93 nicotine measurements in 83 different households were carried out in this study; 36 were collected using the active method and 57 with the passive method. The overall mean (and range) of the active samplers was 12.7  $\mu\text{g}/\text{m}^3$  (0.09-182.6  $\mu\text{g}/\text{m}^3$ ) while for the passive sampler the mean (and range) was 2.3  $\mu\text{g}/\text{m}^3$  (0.01- 38.3  $\mu\text{g}/\text{m}^3$ ).

Figure 1 shows the nicotine results by smoking patterns for the active and passive methods. Much lower levels of nicotine were observed when smoking did not occur in the house during the measurement period.

Figure 1 Residential nicotine levels by smoking patterns



The study was funded by the Department of Health, Social Services and Public Safety for Northern Ireland. Ethical approval for the study was obtained from the Heriot-Watt University Ethics Committee.

Table 1 Regression model for nicotine results with number of cigarettes smoked in 24 hours prior to sample collection as continuous variable

Variable	level	Beta	SE	t-value	p-value
Intercept		-3.9	0.8	-5.02	<0.0001
Measurement type	Active	2.6	0.5	4.82	<0.0001
	Passive	0.0	.	.	.
Number of cigarettes smoked <sup>1</sup>	(x10)	0.8	0.3	2.56	0.0134
Type of house	Detached	-0.8	0.8	-1.02	0.3120
	Semi-detached	2.1	1.3	1.59	0.1189
	Flat	1.2	0.7	1.75	0.0866
	Terraced	0.0	.	.	.
Double glazing	Yes	1.8	0.7	2.59	0.0123
	Yes, plus ventilation	0.9	0.8	1.05	0.2982
	No	0.0	.	.	.

Table 1 shows results of a regression model linking nicotine levels with variables such as number of cigarettes smoked during the final 24 hours of the measurements, type of home and whether there was any double glazing in the house. For each 10 cigarettes smoked, the nicotine levels increase by more than a factor of two. Nicotine levels were lower in detached houses, but higher in houses with double glazing.

## Conclusions

There were considerable differences in results between the active and passive sampling methods, the reasons for which were unclear. Unfortunately, no side-by-side measurements were available for analyses. Passive and active measurements were carried out over a different time scale (two weeks for passive versus 24 hours for active measurements) and the results presented here are similar to those reported previously. For example, Semple et al (2006) reported a mean level of 5.2  $\mu\text{g}/\text{m}^3$  in six houses in Scotland with smoking, although in seven other houses with smoking the levels were below the limit of detection.

A follow-up study will be carried out in 2008 to determine the impact of the smoke-free legislation in Northern Ireland on smoking levels at the homes of non-smokers living with smokers.

## References

- Hammond SK, Leaderer BP. (1987). A diffusion monitor to measure exposure to passive smoking. *Environmental Science and Technology*; 21: 494.
- Semple S, Hughson GW, Macdiarmid J, Ayres J. (2006). Environmental tobacco smoke: assessing non-smokers' exposure in domestic premises. <http://www.sehd.scot.nhs.uk/cso/Publications/ExecSumms/May/une06/Semple.pdf>



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