Tobacco display and brand communication at the point of sale: implications for adolescent smoking behaviour

Dionysis Spanopoulos, John Britton, Ann McNeill, Elena Ratschen, Lisa Szatkowski

Division of Epidemiology and Public Health, UK Centre for Tobacco Control Studies, Nottingham City Hospital, Nottingham, UK

Correspondence to
Dionysis Spanopoulos, Division of Epidemiology and Public Health, UK Centre for Tobacco Control Studies, Nottingham City Hospital, Clinical Sciences Building, Nottingham NG5 1PB, UK; mcxds5@nottingham.ac.uk

Received 5 September 2012
Revised 3 January 2013
Accepted 30 January 2013
Published Online First
28 February 2013

ABSTRACT

Background In England, point-of-sale (PoS) displays in larger shops were prohibited in April 2012, with an exemption for smaller retailers until 2015. The aim of this study was to examine the association between tobacco displays and brand communication at the PoS and adolescent smoking behaviour, and to assess the potential benefits likely to accrue from this legislation.

Methods Self-completion questionnaire survey in students aged 11–15 years in March 2011.

Results The odds of ever-smoking doubled for those visiting shops almost daily relative to less than once a week (OR 2.23, 95% CI 1.40 to 3.55), and susceptibility increased by around 60% (OR 1.62, 95% CI 1.25 to 2.10). Noticing tobacco on display every time during store visits increased the odds of susceptibility more than threefold compared with never noticing tobacco (OR 3.15, 95% CI 1.52 to 6.54). For each additional tobacco brand recognised at the PoS, the adjusted odds of being an ever-smoker increased by 5% (OR 1.05, 95% CI 1.03 to 1.06) and of susceptibility by 4% (OR 1.04, 95% CI 1.02 to 1.05). The association between frequency of visiting stores and susceptibility was predominantly due to exposure in small shops.

Conclusions Exposure to and awareness of PoS displays and brands in displays were associated with smoking susceptibility. The association between PoS display exposure and smoking susceptibility was predominantly due to exposure in small shops. These findings suggest that a one-off, comprehensive tobacco display ban is the recommended approach for countries considering a display ban.

INTRODUCTION

Tobacco use is the leading cause of preventable death worldwide, killing nearly six million people every year.[1] In England alone, smoking caused over 80 000 deaths in 2009, more than the combined total attributable to the next six most common causes of preventable death.[2] Half of all regular smokers die prematurely as a consequence of their smoking,[3] and smokers have an average life expectancy 10 years lower than non-smokers.[4] Since more than 80% of smokers first experiment with and become addicted to smoking in their teenage years,[5] protecting children and young people from exposures that increase the likelihood of experimentation with tobacco, including advertising and other forms of promotion of tobacco and tobacco brands, is a critical public health priority.

Tobacco marketing in the Western world is nowadays highly regulated. Nevertheless, in countries that restrict tobacco marketing, point-of-sale (PoS) displays have emerged as an important communication avenue between potential new smokers and the industry.[6] In the UK, most forms of tobacco advertising and marketing, including advertisements at the PoS, were prohibited by the 2002 Tobacco Promotion and Advertising Act. However, the Act did not regulate the size or content of the PoS displays of tobacco products themselves, and product displays emerged as the most important remaining channel of tobacco marketing. Only recently, in April 2012, PoS tobacco displays in large stores (exceeding a floor area of 3000 sq ft) were prohibited in England under the terms of the Health Act 2009. However, display of tobacco products at the PoS in smaller shops will be allowed to continue until April 2015.[7]

Previous studies have demonstrated an association between PoS tobacco displays and both adolescent smoking[8] and susceptibility to smoking.[8 9] This study examined the characteristics of these associations for large and small shops in aggregate, and in more detail, to assess the potential health benefits of the phased ban currently being implemented in England for the benefit of other countries considering a display ban in a similar manner in the future; moreover, this study examined the role of PoS displays as a means of tobacco branding communication to youth and how such communication is associated with smoking and smoking susceptibility among never-smokers.

METHODS

Data collection

We wrote to the head teachers of all state secondary schools with students in school years 7–10 (aged 11–15 years) in and around Nottingham City informing them of the objectives and procedure of the study and requesting consent for their school to participate. The head teachers of 11 out of the 36 schools initially contacted agreed to participate, and in these schools during the Spring term of 2011 we distributed an information sheet for parents explaining the study, with an option to decline consent.

In March 2011, approximately 1 year prior to the display ban in larger shops, we invited all students with no parental objection to complete a seven-page questionnaire that collected information on year in school, gender, ethnic background, postcode, academic performance in the last year, the number of friends who smoke cigarettes, smoking among family members, whether smoking is allowed in their home and an estimate of perceived smoking prevalence among peers using the question 'Out of 100 people of your age, how many do

To cite: Spanopoulos D, Britton J, McNeill A, *et al*. *Tob Control* 2014;**23**: 64–69.

you think smoke cigarettes at least once a week?'. We measured rebelliousness and sensation seeking using a series of four previously defined questions.[10] Personal smoking status was ascertained based on questions from the *Smoking, drinking and drug use among young people in England* national survey.[11] Exposure to and awareness of PoS displays were assessed for supermarkets and small shops (defined as 'corner shops', 'newsagents' and 'off-licences') using questions adapted from previous studies,[8 12 13] asking students how frequently they visit these types of stores, adopting a 6-point response scale ranging from 'almost every day' to 'less than once a month'. Awareness of PoS displays was measured by asking students how often they noticed cigarettes on display when they visited supermarkets and small shops, adopting a 6-point response scale ranging from 'every time' to 'never'. Questionnaire data were scanned using Optical Mark Recognition technology.

For analysis of smoking and susceptibility to smoking, we categorised respondents as never-smokers if they indicated that they had 'never smoked, not even a puff or two' and ever-smokers if they reported they had 'only ever tried smoking once' or more. Students who reported that they had never smoked were prompted to answer three further questions used previously to assess susceptibility to smoking.[14] Students were classified as 'non-susceptible' if they answered 'No' to the question 'Do you think that you will try a cigarette soon?' and 'Definitely not' to the questions 'If one of your best friends were to offer you a cigarette, would you smoke it?' and 'Do you think you will smoke a cigarette at any time during the next year?'. Students who answered 'Definitely yes', 'Probably yes' or 'Probably not' to either of the last two questions or 'Yes' to the first question were classified as 'susceptible'.

For the rebelliousness/sensation seeking index, we used data only from students who answered all four questions and used the median response to define groups of low and high rebelliousness/sensation seeking. We also created a binary variable to categorise perceived smoking prevalence among peers, in line with methods used previously[15]; since 12% of 15-year olds in England in 2010 reported themselves to be regular smokers,[11] we therefore classified perceived peer smoking prevalences of up to 15% as an underestimate or about right, and prevalences over 15% as an overestimate. We used postcodes to assign a deprivation score for the home address according to the 2010 Index of Multiple Deprivation (IMD)[16] categorised into five quintiles according to national deprivation levels.

Since very few respondents reported visiting shops less than once a week, we collapsed the frequency of visits data into a four-level ordered categorical variable for supermarkets and small shops, indicating whether students visited them almost every day, two or three times a week, once a week or less than once a week. A main exposure variable was defined taking the response for the type of store students reported visiting most frequently. Again, for the assessment of the extent of noticing PoS displays, a five-level ordered variable was derived to indicate students' responses for supermarkets and small shops separately, and as a main exposure variable taking the response for the type of store in which students reported noticing PoS displays most frequently. We quantified brand awareness by asking students a single question about whether they noticed any specific tobacco brands on display when visiting either supermarkets or small shops, and asking them to identify these from a list of the 16 cigarette and 4 Roll Your Own tobacco brands most commonly displayed in Nottingham shops, according to the data collected for a previous study,[17] or in free text for other brands. Brand awareness was modelled as a continuous variable indicating the number of brands identified.

Statistical analysis

Analyses were carried out using the Stata 11 statistical package. We used univariate logistic regression to investigate the association between our main exposure variables (exposure to and awareness of PoS displays and brand recognition) and the main outcome variables (ever-smoking and susceptibility to smoking), and multivariate logistic regression to adjust for sociodemographic factors and other likely confounders (including gender, year group, ethnicity, perceived academic performance, rebelliousness/sensation seeking, parental and sibling smoking, home smoking status, friends smoking, perceived peer smoking prevalence and IMD quintile. We excluded data from students who did not provide full data for the two outcome and three exposure variables. χ^2 Tests were used to compare the characteristics of students included and excluded from the analysis. Missing data for all confounding variables were imputed using Stata's multiple imputation procedures; 25 imputed datasets were created and combined using Rubin's rules.[18] Confidence intervals were estimated with allowance for clustering of students within schools. PoS display exposure was analysed for large and small shops combined, and separately with mutual adjustment in order to evaluate the independent association between adolescent smoking behaviour and store type, and therefore to assess the health implications from the recent tobacco display ban in supermarkets. In particular, separate categorical variables measuring exposure in supermarkets and small shops were entered simultaneously, along with other confounding variables, in two separate logistic models exploring the association with ever-smoking and susceptibility to smoking, respectively.

RESULTS

Of an estimated 8810 students enrolled in years 7–10 (aged 11–15 years) in the participating schools, we collected and scanned valid questionnaire data from 6485 (74%) students. Of these, 1109 students did not provide information for the main outcome and exposure variables, leaving 5376 with sufficient data for analysis. Characteristics of those included and excluded are given in table 1. Those excluded from the analysis were more likely to be male, to report average or below average academic performance and to report that smoking is not allowed in their home, and less likely to overestimate peer smoking prevalence. However, many students had missing data on some of these items, which may account for some of these differences.

Of the students included in the analysis, 17.7% were ever-smokers, and of the never-smokers, 27.2% were defined as susceptible to smoking (table 1).

In multivariate models, both smoking and susceptibility to smoking were positively associated with increasing school year, lower academic performance, high rebelliousness/sensation seeking, living in a house where smoking is allowed and having friends who smoke. The likelihood of being an ever-smoker was also higher for students whose parents or siblings smoked and increased with increasing deprivation quintile, and susceptibility was higher among females and students of white ethnicity.

Over 90% of students reported visiting either a supermarket or a small shop at least once a week and over 25% visited small shops almost every day (table 2).

Students were more likely to report noticing PoS displays every time they visit a small shop than when they visit a supermarket ($p<0.001$). Among the 98.3% of students who reported noticing PoS displays at least 'hardly ever', students recognised a median of 3 different brands (range 0–20). Ever-smokers reported a median (IQR) of 6 (3–10) brands, susceptible

Table 1 Characteristics of students who answered all main outcome and exposure questions compared with students who were excluded from the analysis

	Students excluded from analysis (N (%))	Students included in analysis (N (%))	Ever-smokers (N (%))	Susceptible never-smokers (N (%))	χ^2 p Value (included–excluded)
Total	1109 (100)	5376 (100)	953 (100)	1204 (100)	
Sex					
Male	679 (61.2)	2644 (49.2)	464 (48.7)	585 (48.6)	<0.001
Female	426 (38.4)	2728 (50.7)	487 (51.1)	618 (51.3)	
Missing	4 (0.4)	4 (0.1)	2 (0.2)	1 (0.1)	
School year					
Year 7	303 (27.3)	1402 (26.1)	98 (10.3)	275 (22.8)	0.340
Year 8	333 (30.0)	1546 (28.8)	193 (20.3)	346 (28.7)	
Year 9	250 (22.5)	1279 (23.8)	299 (31.4)	309 (25.7)	
Year 10	214 (19.3)	1144 (21.3)	361 (37.9)	274 (22.8)	
Missing	9 (0.8)	5 (0.1)	2 (0.2)	0 (0)	
Perceived academic performance					
Excellent or good	738 (66.5)	4129 (76.8)	579 (60.8)	885 (73.5)	<0.001
Average or below average	301 (27.1)	1196 (22.2)	358 (37.6)	315 (26.2)	
Missing	70 (6.3)	51 (0.9)	16 (1.7)	4 (0.3)	
Rebelliousness					
Low	507 (45.7)	2733 (50.8)	233 (24.5)	463 (38.5)	0.375
High	495 (44.6)	2510 (46.7)	684 (71.8)	708 (58.8)	
Missing	107 (9.6)	133 (2.5)	36 (3.8)	33(2.7)	
Parental smoking					
Neither	713 (64.3)	3424 (63.7)	409 (42.9)	740 (61.5)	0.056
At least one	347 (31.3)	1910 (35.5)	533 (55.9)	452 (37.5)	
Missing	49 (4.4)	42 (0.8)	11 (1.2)	12 (1)	
Sibling smoking					
None	930 (83.9)	4716 (87.7)	679 (71.3)	1056 (87.7)	0.530
At least one	130 (11.7)	618 (11.5)	263 (27.6)	136 (11.3)	
Missing	49 (4.4)	42 (0.8)	11 (1.2)	12 (1)	
Smoking in the home					
Not allowed	845 (76.2)	4132 (76.9)	567 (59.5)	891 (74)	0.046
Allowed	201 (18.1)	1165 (21.7)	363 (38.1)	292 (24.3)	
Missing	63 (5.7)	79 (1.5)	23 (2.4)	21 (1.7)	
Number of friends who smoke					
None	451 (40.7)	2230 (41.5)	75 (7.9)	343 (28.5)	0.051
1 or 2	127 (11.5)	755 (14.0)	142 (14.9)	234 (19.4)	
3 or more	204 (18.4)	1142 (21.2)	517 (54.3)	321 (26.7)	
Not sure	267 (24.1)	1203 (22.4)	206 (21.6)	298 (24.8)	
Missing	60 (5.4)	46 (0.9)	13 (1.4)	8 (0.7)	
Perceived peer smoking prevalence					
Underestimate or about right	217 (19.6)	985 (18.3)	79 (8.3)	193 (16)	0.022
Overestimate	760 (68.5)	4187 (77.9)	816 (85.6)	965 (80.2)	
Missing	132 (11.9)	204 (3.8)	58 (6.1)	46 (3.8)	
Ethnicity					
White	809 (72.9)	4247 (79.0)	767 (80.5)	963 (80)	0.891
Non-white	164 (14.8)	850 (15.8)	133 (14)	171 (14.2)	
Missing	136 (12.3)	279 (5.2)	53 (5.6)	70 (5.8)	
National Index of Multiple Deprivation quintile					
Least deprived	284 (25.6)	1515 (28.2)	157 (16.5)	367 (30.5)	0.376
Quintile 2	80 (7.2)	535 (10.0)	80 (8.4)	116 (9.6)	
Quintile 3	126 (11.4)	688 (12.8)	115 (12.1)	161 (13.4)	
Quintile 4	99 (8.9)	635 (11.8)	135 (14.2)	137 (11.4)	
Most deprived	157 (14.2)	896 (16.7)	192 (20.1)	182 (15.1)	
Missing	363 (32.7)	1107 (20.6)	274 (28.8)	241 (20)	

never-smokers 4 (1–7) and non-susceptible never-smokers 2 (0–5). In univariate analysis, both smoking and susceptibility to smoking were strongly and significantly associated with increasing frequency of visiting stores, awareness of PoS displays and brand recognition, and with the exception of the association between awareness of PoS displays and

Table 2 Frequency of visiting stores and noticing point-of-sale displays

	Most frequently visited store	Supermarkets	Small shops
Frequency of visiting stores (n, %)			
Less than once a week	501 (9.3)	1321 (24.6)	1400 (26.0)
Once a week	1147 (21.3)	1907 (35.5)	992 (18.5)
Two or three times a week	2020 (37.6)	1564 (29.1)	1557 (29.0)
Almost every day	1708 (31.8)	584 (10.9)	1427 (26.5)
Frequency of noticing displays (n, %)			
Never	86 (1.6)	207 (3.9)	170 (3.2)
Hardly ever	289 (5.4)	656 (12.2)	382 (7.1)
Sometimes	613 (11.4)	1196 (22.2)	711 (13.2)
Most times	1351 (25.1)	1569 (29.2)	1386 (25.8)
Every time	3032 (56.4)	1702 (31.7)	2640 (49.1)
I don't go to this type of store	5 (0.1)	46 (0.9)	87 (1.6)

ever-smoking, remained so after adjustment for confounders in multivariate analysis (table 3).

After adjustment for confounding, ever-smoking was over twice as likely among students who visited shops displaying cigarettes almost every day relative to less than once per week (OR 2.23, 95% CI 1.40 to 3.55), and susceptibility increased by around 60% (OR 1.62, 95% CI 1.25 to 2.10). Among students who reported noticing tobacco displays every time they visited a store (compared with those who reported never noticing PoS displays), the odds of susceptibility to smoking were increased more than threefold (OR 3.15, 95% CI 1.52 to 6.54). For each additional tobacco brand recognised at the PoS, the adjusted odds of being an ever-smoker increased by 5% (OR 1.05, 95% CI 1.03 to 1.06), and of susceptibility to smoking by 4% (OR 1.04, 95% CI 1.02 to 1.05). These findings were not appreciably different in sensitivity analyses using complete cases only, coding missing data as a separate category and increasing the number of imputations used. Moreover, students visiting stores less than once a week recognised a median of 1 brand on display; students visiting stores once a week recognised a median of 2 brands and students visiting stores two or three times a week and almost every day recognised a median of 3 and 5 brands, respectively (Kruskal–Wallis test for difference $p<0.001$). Higher frequency of noticing displays was associated with higher level of brand recognition in a similar fashion.

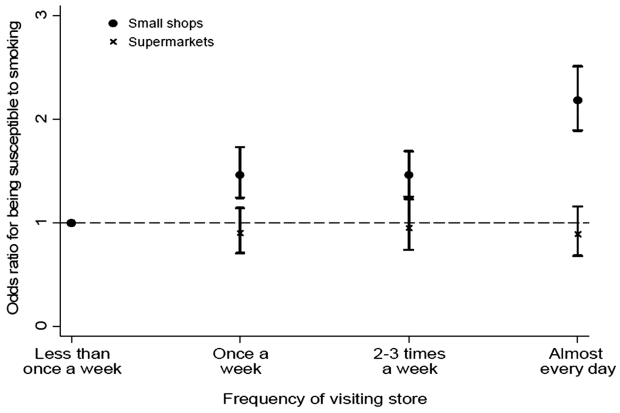

Figure 1 Association between frequency of exposure to tobacco displays in supermarkets and small shops and susceptibility to smoking.

Analysis of independent effects of exposure in large or small shops on susceptibility to smoking demonstrated that, after mutual adjustment, the effects of small shop exposure remained significant, whereas large shop effects did not (figure 1), with students who reported visiting small shops almost every day being more than twice as likely to be susceptible to smoking than those who visited less than once a week (OR 2.18, 95% CI 1.89 to 2.51). There were no significant differences by store type between exposure to displays and ever-smoking and between awareness of displays and either ever-smoking or susceptibility.

DISCUSSION

This study, which was carried out a year before the implementation of a PoS display ban in larger shops in England in April

Table 3 Association between exposure to and awareness of point-of-sale displays and brand recognition and smoking behaviour

	Ever-smoking				Susceptibility to smoking			
	Unadjusted		Adjusted*		Unadjusted		Adjusted*	
	OR	p Value for trend	OR	p Value for trend	OR	p Value for trend	OR	p Value for trend
Frequency of visiting stores								
Less than once a week	1.00 (ref)	<0.001	1.00 (ref)	<0.001	1.00 (ref)	<0.001	1.00 (ref)	<0.001
Once a week	1.10 (0.73–1.65)		1.19 (0.78–1.82)		0.96 (0.78–1.18)		0.98 (0.84–1.15)	
Two or three times a week	2.23 (1.42–3.52)		1.70 (1.09–2.65)		1.29 (1.04–1.60)		1.13 (0.91–1.41)	
Almost every day	4.57 (2.73–7.64)		2.23 (1.40–3.55)		2.27 (1.81–2.85)		1.62 (1.25–2.10)	
Frequency of noticing displays (among students who reported visiting stores)								
Never	1.00 (ref)	<0.001	1.00 (ref)	0.907	1.00 (ref)	<0.001	1.00 (ref)	<0.001
Hardly ever	2.36 (1.18–4.71)		2.20 (1.09–4.43)		2.17 (1.29–3.66)		2.08 (1.27–3.42)	
Sometimes	1.92 (0.92–3.98)		1.68 (0.80–3.54)		2.17 (1.12–4.21)		2.12 (0.99–4.54)	
Most times	1.90 (1.09–3.34)		1.50 (0.84–2.70)		3.18 (1.73–5.85)		2.88 (1.45–5.71)	
Every time	2.85 (1.49–5.45)		1.67 (0.85–3.28)		3.91 (2.05–7.43)		3.15 (1.52–6.54)	
Brand recognition (among students who reported noticing displays)								
Increasing number of brands recognised	1.12 (1.11–1.13)	<0.001	1.05 (1.03–1.06)	<0.001	1.07 (1.06–1.09)	<0.001	1.04 (1.02–1.05)	<0.001

*Adjusted for: gender, year group, ethnicity, perceived academic performance, rebelliousness/sensation seeking, parental and sibling smoking, home smoking status, friends smoking, perceived peer smoking prevalence and Index of Multiple Deprivation quintile.

2012, demonstrates independent significant associations between PoS display exposure and brand awareness, and both ever-smoking and susceptibility to smoking among secondary school students. The study also shows that the association between frequency of visiting stores and smoking susceptibility arose predominantly from exposure in small shops. Our finding that PoS tobacco displays are widely seen by young people, and our observed effects of display exposure and brand recognition on smoking susceptibility, indicates that PoS displays are a potentially important medium of marketing tobacco products to children and young people. Our observation that the independent effect of exposure on susceptibility was much stronger for small than large shops suggests that the recent prohibition of PoS tobacco displays in large shops in England is likely to have rather less impact on adolescent smoking behaviour than the small shop prohibition scheduled for April 2015.

Our study involved secondary school children in years 7–10 (aged 11–15 years) from a single UK city, and our findings are dependent on self-reported measures of exposure and outcome. The schools we studied included a range of inner city and suburban locations with catchments that covered a wide range of levels of deprivation. We used measures of smoking prevalence drawn from standard national UK surveys and of susceptibility to smoking that have been widely used elsewhere.[14 19 20] Coupled with a participation rate of 74%, these characteristics suggest that our findings are likely to be valid and representative of the wider UK population.

Although the sale of tobacco to persons under 18 years was illegal in England at the time of the study under the Children and Young Persons (Sale of Tobacco etc.) Order 2007,[21] a national survey indicated that 45% of secondary school students reported that they buy their cigarettes from a shop.[11] It is therefore likely that the association between exposure to tobacco displays and ever-smoking arises, at least in part, from visiting shops to purchase tobacco. However, the association between exposure to PoS displays and susceptibility to future smoking among adolescents who have never smoked suggests a causal element in this association.

A limitation of this study is that it uses prompted awareness of brands rather than unprompted as the latter would have complicated the design and the size of the questionnaire. This might affect to some extent the validity of students' responses; nevertheless, students in higher groups of exposure reported awareness of a higher number of brands. Moreover, the overall high level of tobacco brand awareness among adolescents in a jurisdiction where tobacco marketing is highly restricted, and the exposure–response relationship between reported brand recognition and ever-smoking and susceptibility is an alarming finding in its own right.

Furthermore, exposure to and noticing of PoS displays were based on self-report and therefore data regarding PoS displays are subject to recall bias. However, our findings are consistent with findings from other countries according to which exposure to tobacco displays and PoS tobacco marketing is associated with adolescent smoking behaviour. A US study found that the frequency of visiting stores known to carry cigarette advertising was associated with ever-smoking and the frequency of noticing cigarette advertisements when visiting these stores was related to smoking susceptibility.[12] A study in New Zealand, which used similar exposure measures to ours, and was conducted in a similar jurisdiction to ours where PoS advertising was not allowed except PoS displays, found that exposure to and awareness of PoS displays were both associated with adolescent smoking and susceptibility.[8] Moreover, a recent UK household study around a thousand 11–16-year-old never-smokers also found that noticing tobacco displays and higher attraction to them was associated with smoking susceptibility.[9] Evaluations of PoS displays in Ireland and Norway have also suggested that they have a marked effect on younger people and smoking initiation.[15 22] Nevertheless, this is the first study to demonstrate the potential role of PoS displays as an effective means of communicating tobacco branding to young people, highlighting a significant association between the level of exposure to tobacco displays and reported brand recognition and linking such recognition to adolescent smoking behaviour.

Moreover, this is the first study to assess the potential health benefits for young people occurring from the recent tobacco display ban in supermarkets under the terms of the Health Act 2009, indicating that by postponing the display ban in small shops, the government has delayed the component of this legislation with greater potency to influence adolescent smoking behaviour. School students tend to visit small shops more often than supermarkets; exposure in small shops is almost unavoidable as PoS displays are always placed just behind the pay point, whereas in larger shops there may be several pay points, with only a few being next to PoS displays, so exposure to PoS displays in larger shops is less inevitable. It is therefore entirely plausible that small retailer displays are likely to play a greater role in influencing student smoking behaviour.

It is also therefore regrettable that implementation of the small retailer PoS prohibition in England has been delayed, ostensibly to allow retailers additional time to prepare for the legislation, despite research in Ireland and Norway showing very high retailer compliance immediately following the introduction of PoS laws.[22 23] A consequence of this delay, however, is perpetuating exposure of children and young people to a potentially important influence on future smoking behaviour.

In summary, our findings are consistent with others,[8 9] which suggest that PoS displays are likely to be harmful; our findings also support that PoS tobacco displays can be a highly effective avenue for promoting tobacco brands to young people in countries where tobacco marketing is highly regulated, increasing smoking susceptibility among young people who have never smoked. Similarly, our findings suggest that banning tobacco displays in a phased manner should not be imitated by other countries in the future.

What this paper adds

- This study shows that tobacco displays are a potentially effective channel for promoting cigarette brands to young people, linking such promotion with ever-smoking and susceptibility to future smoking.
- The association between exposure to tobacco displays and susceptibility to smoke is predominantly explained by exposure in small shops and therefore the recent tobacco ban in supermarkets in England fails to safeguard young people from exposure associated with smoking initiation.

Acknowledgements This study was funded by the Nottingham City Primary Care Trust, supported by a University of Nottingham PhD studentship, with input from the UK Centre for Tobacco Control Studies, which is a UKCRC Centre of Public Health Research Excellence for which funding from the British Heart Foundation, Cancer Research UK, the Economic and Social Research Council, the Medical Research Council and the Department of Health, under the auspices of the UK Clinical

Research Collaboration, is gratefully acknowledged. We would like to thank all head teachers, school staff and students who took part in the study.

Contributors DS had the primary role in questionnaire and study design. DS, JB, AM and ER contributed to the collection of data. LS supervised data analysis. DS, JB, AM, ER and LS contributed to the study design, interpretation of data and preparation of the manuscript.

Competing interests None.

Ethics approval The study was approved by the University of Nottingham School of Education Research Ethics Committee.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1 World Health Organization. *WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco*. Geneva, Switzerland: World Health Organization, 2011.
2 Department of Health. *Healthy lives, healthy people: A tobacco control plan for England*. London: Department of Health, 2011.
3 World Health Organization. *Tobacco: deadly in any form or disguise*. Geneva, Switzerland: World Health Organization, 2006.
4 Doll R, Peto R, Boreham J, *et al*. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ* 2004;328:1519.
5 Department of Health. *Smoking kills: a white paper on tobacco.* London: Department of Health, 1998.
6 Quedley M, Ng B, Sapre N, *et al*. In sight, in mind: retailer compliance with legislation on limiting retail tobacco displays. *Nicotine Tob Res* 2008;10:1347–54.
7 Prohibition of tobacco display in shops. Available: http://www.parliament.uk/briefing-papers/SN05537 (accessed 21 Apr 2012).
8 Paynter J, Edwards R, Schluter PJ, *et al*. Point of sale tobacco displays and smoking among 14–15 year olds in New Zealand: a cross-sectional study. *Tob Control* 2009;18:268–74.
9 Mackintosh AM, Moodie C, Hastings G. The association between point-of-sale displays and youth smoking susceptibility. *Nicotine Tob Res* 2012;14:616–20.
10 Hanewinkel R, Isensee B, Sargent JD, *et al*. Cigarette advertising and adolescent smoking. *Am J Prev Med* 2010;38:359–66.
11 The Health and Social Care Information Centre. *Smoking, drinking and drug use among young people in England in 2010*. London, UK: Health and Social Care Information Centre, Lifestyles Statistics, 2010.
12 Feighery EC, Henriksen L, Wang Y, *et al*. An evaluation of four measures of adolescents' exposure to cigarette marketing in stores. *Nicotine Tob* 2006;8:751–9.
13 National Youth Tobacco Survey 2009. http://www.cdc.gov/tobacco/data_statistics/surveys/nyts/index.htm (accessed 30 Mar 2012).
14 Pierce J, Choi WS, Gilpin EA, *et al*. Tobacco industry promotion of cigarettes and adolescent smoking. *JAMA* 1998;279:511–15.
15 McNeill A, Lewis S, Quinn C, *et al*. Evaluation of the removal of point-of-sale tobacco displays in Ireland. *Tob Control* 2010;20:137–43.
16 Communities and neighbourhoods. Indices of deprivation 2010. http://www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/ (accessed 19 Jun 2012).
17 Spanopoulos D, Ratschen E, McNeill A, *et al*. Retail price and point of sale display of tobacco in the UK: a descriptive study of small retailers. *PLoS One* 2012;7:e29871.
18 Royston P. Multiple imputation of missing values. *Stata J* 2004;4:227–41.
19 Pierce JP, Choi WS, Gilpin EA, *et al*. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 1996;15:355–61.
20 Mowery PD, Farrelly MC, Haviland ML, *et al*. Progression to established smoking among US youths. *Am J Public Health* 2004;94:331–7.
21 The Children and Young Persons (Sale of Tobacco etc.) Order 2007. http://www.legislation.gov.uk/uksi/2007/767/contents/made (accessed 1 May 2012).
22 Scheffels J, Lavik R. Out of sight, out of mind? Removal of point-of-sale tobacco displays in Norway. *Tob Control* 2013;22:e37–42.
23 Quinn C, Lewis S, Edwards R, *et al*. Economic evaluation of the removal of tobacco promotional displays in Ireland. *Tob Control* 2011;20:151–5.