

# Development and evaluation of an intervention providing insight into the tobacco industry to prevent smoking uptake: a mixed-methods study

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**Disclaimer:** This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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## Scientific summary

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# Scientific summary

## Background

Cigarette smoking is a significant preventable cause of morbidity and mortality. In 2013 in England, 17% of deaths among adults aged 35 years and over (78,200 deaths in total) were attributable to smoking. Most smokers become addicted to smoking before they reach the age of 18 years, and nearly 40% become addicted before the age of 16 years, predominantly during their years in secondary education. Smokers who start at an early age tend to smoke more cigarettes per day in adulthood, smoke for longer, are less likely to quit and are more likely to die from a smoking-attributable cause.

School-based smoking-prevention education is potentially a good way in which to reach large numbers of young people with an anti-smoking message. Existing education resources and approaches tend to focus on providing young people with information about the harms of smoking, increasing awareness of the influence of peer pressure, and giving children the confidence and ability to say 'no' if offered a cigarette. However, although existing evidence shows that school-based interventions to reduce the uptake of smoking may have short-term positive effects, there is little robust evidence that these interventions prevent young people from taking up smoking in the longer term.

In the USA, evaluation of the *Truth*<sup>®</sup> campaign suggests that a focus on the ethics and exploitative tactics of the tobacco industry may be effective in encouraging young people not to smoke. Through mass media campaigns, *Truth*<sup>®</sup> exposes the tobacco industry's deceptive marketing strategies, the addictive nature and health effects of cigarettes, and the negative effects of the industry on the environment and society. There is merit in attempting to understand whether or not the approach of the *Truth*<sup>®</sup> campaign is acceptable and effective if translated into a school-based smoking-prevention intervention.

The emphasis of the *Truth*<sup>®</sup> campaign was adopted by Kick It, the UK NHS Stop Smoking Service for Hammersmith and Fulham, Kensington and Chelsea, Westminster, Kingston upon Thames and Richmond upon Thames, in designing Operation Smoke Storm, a novel educational package for use in schools. This package initially comprised three 50-minute classroom-based sessions in which students assume the roles of secret agents to uncover industry tactics through videos, quizzes, discussions and group presentations.

Here, we describe work in two UK schools to refine Operation Smoke Storm and extend it with additional intervention components, and to evaluate the acceptability and effectiveness of the full intervention. Evaluation results were used to inform a decision over whether or not a fully powered cluster randomised controlled trial of the intervention is warranted. To the best of our knowledge, this is the first time that the approach of the *Truth*<sup>®</sup> campaign has been tested in a school setting, either in the UK or internationally.

## Objectives

The overall purpose of this research was to assess whether or not a multicomponent intervention involving educational resources for use in schools, alongside family components, was effective and cost-effective in preventing the uptake of smoking in school-aged children. Specific objectives were to:

1. pilot Operation Smoke Storm with Year 7 students (aged 11–12 years) to gain preliminary evidence for its acceptability and effectiveness and to use this evidence subsequently to refine the resource
2. develop an effective and acceptable booster intervention for use with students in Year 8 (aged 12–13 years) to maintain and strengthen the effects of Operation Smoke Storm

3. identify and develop acceptable and effective intervention components for use by families which build on Operation Smoke Storm to prevent the uptake of smoking in young people and to promote and signpost support for cessation to students, their family members and school staff who smoke
4. provide preliminary evidence for the effectiveness and cost-effectiveness of the combined school and family intervention on which to base a decision over whether or not to continue to a fully powered trial.

## Methods

### *Intervention delivery and data collection*

The study comprised two phases of work. In phase 1, Operation Smoke Storm was delivered (by the usual class teacher) to all Year 7 students ( $n = 585$ ) in two Nottinghamshire schools during their Personal, Social and Health Education (PSHE) lessons. There was an element of convenience sampling in the selection of schools, but the two schools that agreed to participate (out of a total of six that were invited) had contrasting catchment areas, with one serving a more deprived population than the other. Students completed questionnaires before and immediately after the lessons to gather data on smoking behaviour and susceptibility to smoking. Eight focus groups with 79 students in total were then carried out (two groups of boys and two groups of girls in each school) to explore views on the acceptability and potential effectiveness of the intervention and to gather information on any necessary improvements to the lessons. Semistructured interviews were conducted with 18 teachers who delivered the intervention and with the Head of PSHE at each school to elicit their views on the acceptability and potential effectiveness of the intervention. Views on the design of a booster intervention for use in Year 8 and a family-based component to engage parents were also sought from students and teachers, using examples of existing resources to facilitate discussion.

The Year 7 Operation Smoke Storm lessons were refined based on the qualitative feedback from students and teachers, and booster and family components were developed. The booster component consisted of a 1-hour 'off-the-shelf' lesson for use in Year 8 in which students learnt about strategies employed to market tobacco, from the perspectives of an industry executive, a marketing company and a health campaigner, through a teenager's social media blog. The family component consisted of a booklet to accompany the Year 7 lessons, containing a series of activities designed to stimulate discussions about smoking between parents and students at home. The family booklet was piloted with two external public research groups, the National Children's Bureau and the Nottingham Smokers' Panel, which resulted in further refinements to create the final product.

In phase 2, PSHE or science teachers delivered the booster session to Year 8 students ( $n = 538$ ), the same students who had received Operation Smoke Storm 1 year earlier when they were in Year 7. Questionnaires were administered after the booster session to gather data on smoking behaviour and susceptibility after receiving the intervention. Qualitative work again comprised four focus groups in each school (with 51 students in total) and interviews with seven Year 8 teachers to assess the acceptability and effectiveness of the booster component.

At the same time, the refined Year 7 lessons were delivered to the new cohort of Year 7 students ( $n = 350$ ) in one school only, and these students were given the new family booklet to take home. Changes in the delivery of PSHE in the second school meant that it was not able to accommodate delivery of the Year 7 sessions and so took part in the Year 8 component only. Qualitative work comprised two focus groups with Year 7 students ( $n = 16$ ), interviews with 10 Year 7 teachers, and nine paired student–parent semistructured interviews to assess the reach, acceptability and perceived impact of the family component.

### *Data analysis*

The primary quantitative analysis used logistic regression to compare the self-reported odds of ever smoking and susceptibility to smoking in Year 8 students after the delivery of the booster session with the odds among Year 8 students in local 'control' schools who did not receive the intervention but who were asked identical questions as part of another study. Initially, we planned to link students' responses to the

questionnaires they completed in Year 7 and Year 8. However, problems became evident over the course of the study which meant that this proved impossible and, thus, odds ratios could not be adjusted for differences between intervention and control groups at baseline. However, models were adjusted for sociodemographic variables using data collected in Year 8, and smoking behaviour at Year 7 was compared between intervention and control schools to quantify any differences. Quantitative data were also summarised to describe students' views of Operation Smoke Storm and changes in their attitudes towards smoking over time.

Standardised procedures were used to analyse all qualitative data gathered from student focus groups and teacher and paired student–parent interviews. Digital audio recordings were transcribed clean verbatim, checked for accuracy and anonymity, and then analysed using the framework approach to examine emergent themes. A sample of focus group and interview transcripts was read initially to identify initial codes, themes and subthemes and any within- or between-group differences (according to school and gender). Initial codes, themes and subthemes were discussed between the researchers in order to reach consensus on an initial analytical framework. This framework was then applied and refined following an analysis of the remaining transcripts. Data were then indexed according to the final framework and the transcripts were charted into matrices according to each theme to facilitate synthesis and interpretation.

## Results

### *Quantitative findings*

Among students in the two intervention schools the self-reported combined prevalence of ever smoking and susceptibility to smoking increased from 18.2% in Year 7 to 33.8% in Year 8; the prevalence of ever smoking alone increased from 2.3% to 7.8%. In control schools the combined prevalence of ever smoking and susceptibility increased from 22.9% in Year 7 to 30.9% in Year 8, and ever smoking from 6.3% to 10.6%. After adjusting for significant confounders, there were no differences in ever smoking and susceptibility to smoking between intervention and control schools in Year 7. In Year 8, after adjusting for significant confounders, the odds of a student in an intervention school being an ever smoker or susceptible never smoker were 28% higher than the odds for a student in a control school, although this difference was not statistically significant [adjusted odds ratio (aOR) 1.28, 95% confidence interval (CI) 0.83 to 1.97;  $p = 0.263$ ]. Students in intervention schools were slightly less likely to have ever smoked than students in control schools, although, again, the difference was not statistically significant (aOR 0.82, 95% CI 0.42 to 1.58;  $p = 0.549$ ).

Despite its apparent lack of effectiveness, students broadly liked Operation Smoke Storm; 77.1% of Year 7 students and 72.4% of Year 8 students in phase 2 said that Operation Smoke Storm was 'very good' or 'OK'. Approximately two-thirds of Year 7 students reported having talked to family or friends about the lessons. After receiving Operation Smoke Storm students were more likely to disagree with statements such as 'companies making cigarettes only try to attract customers over 18 years old' and 'companies that make cigarettes sell dangerous products, but still operate in a fair and decent way.' However, there was some suggestion that exposure to Operation Smoke Storm might have increased uncertainty about trying a cigarette to see what it is like among students who might otherwise have thought that this was not acceptable, but there is no evidence that it altered attitudes towards regular smoking.

### *Qualitative findings*

Broadly, data from student focus groups and teacher interviews suggest that Operation Smoke Storm is an acceptable smoking-prevention intervention for use in UK secondary schools. Some logistical issues were raised regarding the format of the resources, although, on the whole, teachers felt that these did not detract from the overall delivery of the resource and student engagement. Year 7 students generally liked the lessons and bought into the secret agent scenario. On the whole, students and their parents endorsed the idea of the family booklet, although, often, it was not used as intended; many students simply did not show the booklet to their parents, and some parents did not have the time or did not feel that it was necessary to look at it with their children.

The Year 8 booster session was well received, and, again, most students bought into the storyline. Students and teachers felt that the resource helped to raise awareness of the harmful effects of tobacco, as well as awareness around the novel aspect of the resource regarding tobacco industry practices. Teachers did, however, highlight differences in the extent to which students of higher and lower academic abilities could remember the new information and complete the activities. Some teachers voiced concerns that the messages raised in the booster session were too subtle for students of lower academic ability to grasp. Given the known association between educational attainment and smoking, it might be that Operation Smoke Storm did not reach the students most likely to become smokers. However, teachers felt that, overall, all students were able to learn something new about tobacco from the lessons.

### Intervention costs

The overall cost of revising the Year 7 sessions and developing the family booklet and Year 8 booster lesson was £36,041. However, these development costs were a one-time expense and with an increase in the number of users the unit development cost will approach zero. The total cost of delivering the complete intervention package to two schools was an estimated £3934, corresponding to an estimated average cost of £253 per class or £13 per student.

### Conclusions

Operation Smoke Storm appears to be an acceptable resource for delivering smoking-prevention education in UK secondary schools, which teachers, students and parents enjoyed. However, it does not appear to have reduced smoking and susceptibility to smoking. Further work would be useful to explore potential reasons for this apparent lack of effectiveness, such as whether subtle messages relating to tobacco industry practices were not understood by those most likely to smoke, whether any impact of the intervention might be delayed beyond the relatively short follow-up period studied here, or whether slight variations in the way in which individual teachers delivered the intervention had an impact. There were also limitations in the methods employed in this evaluation. The quantitative analysis relied on self-reported data on smoking behaviours, which may be subject to bias, although steps were taken to preserve students' anonymity and to encourage honest answers. In addition, the findings from this small, non-randomised, study may not be generalisable to other schools.

A number of practical issues were encountered during the study, particularly difficulties in engaging, recruiting and retaining schools, with support dependent upon buy-in from key members of staff such as Heads of PSHE. Informal discussions with local public health practitioners suggested that changes to the delivery of PSHE, such as the replacement of weekly lessons with just a handful of PSHE days spread throughout the year, freeing up time to spend on core subjects, is becoming increasingly common.

Based on these results, and strengthened by uncertainty about the ability to deliver large-scale studies in this setting, the decision was taken that a fully powered cluster randomised trial of Operation Smoke Storm is not warranted.

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