



# SMOKEFREE SPORTS

## Final Project Report



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Dr Lawrence Fowweather  
Dr Jo Trigwell  
Ciara McGee

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## Steering group 2012-13

Lawrence Foweather, LJMU  
Joanne Trigwell, LJMU  
Ciara McGee, LJMU  
Lorna Porcellato, LJMU  
Rebecca Murphy, LJMU  
Helen Casstles, Liverpool Community Health NHS Trust  
Matthew Philpott, Health Equalities Group  
Claire Spencer, Liverpool City Council  
Andrew Wileman, Merseyside Sports Partnership  
Julie McCann, Healthy Schools  
Michael Ussher, St George's University  
Aaron Leach, Florence Melly Primary School

## Delivery of intervention

Helen Casstles, Liverpool Community Health NHS Trust  
Katie Dougherty, Liverpool Community Health NHS Trust  
Richard Jones, Sportslinx  
Adam Tinsley, Sportslinx  
Louise O'Brien, Sportslinx  
Becky West, Sportslinx  
Karl Carney, Liverpool FC Foundation  
Ashton Lee, Liverpool FC Foundation  
Michael Foulkes, Everton in the Community  
Sean Robertson, Everton in the Community  
Tom Bainbridge, Everton in the Community  
Natasha Jonas  
Matthew Lee  
Tom Wolfenden

## Others

Susie Gardiner, Liverpool City Council  
Mark Haig, Liverpool FC Foundation  
Jackie Twort, Everton in the Community  
Liz Lamb, SportsLinx, Liverpool City Council  
Colin Deakin, Sportslinx, Liverpool City Council  
Glen Groves, Sportslinx, Liverpool City Council  
Aimee Williams, Liverpool City Council  
Stephen Tiffany, Liverpool City Council

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## ACRONYMS

LJMU: Liverpool John Moores University

NICE: National Institute for Clinical Excellence

SFS: SmokeFree Sports

## PREFACE

Many children enjoy taking part in physical activity, whilst physical education, sport and play are common denominators among children worldwide. Physical activity contexts therefore provide an opportunity to deliver health promotion activity en masse in a positive, fun and healthy environment. Over the past three years SmokeFree Sports has sought to harness this potential and develop an effective and engaging mechanism to prevent and protect children from smoking.

The main purpose of this report is to provide an overview of the research findings from the final phase of the SmokeFree Sports project – a smoking prevention intervention conducted in Liverpool primary schools in the 2012-13 academic year. The report also includes a summary of the innovative practices and campaign activities that have captured the interest of children and families, teachers and schools, and the local community. Information is presented in as much detail as possible, whilst findings are reported objectively together with practical recommendations so that others can learn from our experience.

The report has been made publicly available to inform future research, policy and practice. I hope that you find its content as interesting to read as the project was to implement.



Dr. Lawrence Fowweather  
SmokeFree Sports Project Manager and Principal Researcher  
Physical Activity Exchange, Liverpool John Moores University

# SMOKEFREE SPORTS 2012-13 RE-AIM EXECUTIVE SUMMARY

## R EACH

A steering group comprising of researchers and professionals from health, education and sport directed the intervention activities. Partners, potential adopters, implementers and recipients were involved in two years of formative work to develop the intervention. SFS linked with representatives from Liverpool City Council and Liverpool Community Health NHS Trust to offer bespoke training for sports coaches and primary school teachers to deliver brief interventions on smoking through physical activity.

SFS campaign was delivered in 32 Liverpool primary schools, three-quarters of which were located in the 10% most deprived super output areas in England. 1073 nine-to-ten year old children received components of the intervention, which included five activity sessions (multi-skill, 2 x Dance, 2 x Football) and one school assembly, between October 2012 and May 2013. Eleven schools from Knowsley were recruited as a comparison group. Consent and baseline data was collected from 1166 children (Age =  $9.5 \pm 0.3$ , 85.5% British white). Two percent of children had tried smoking. Children had strong intentions not to smoke and high refusal self-efficacy. Misconceptions about the dangers of smoking were common.

## E FFECTIVNESS

Compared to children in the comparison schools, participation in the intervention was associated with more negative attitudes towards smoking on four out of five questionnaire items. No intervention effect was found for children's refusal self-efficacy or intentions not to smoke, with scores remaining high (ceiling effect). However, qualitative data revealed that the intervention components made children more determined not to smoke and resolute in their abstinence. Further, children, teachers and coaches' comments supported that awareness of smoking factors had increased.

Coaches' and teachers' mostly viewed the 3 hour training workshop positively and their self-efficacy to deliver smoke free messages significantly increased following attendance. In subsequent interviews, further practical content and provision of multimedia resources were suggested as improvements to the workshop.

## A DOPTION

Due to funding requirements, SFS invited all state Liverpool primary schools ( $n=104$ ) to participate in the intervention via numerous channels including letter, email, telephone and meetings. Thirty-two schools consented to take part, with the majority of others not responding to repeated requests for participation. One school withdrew citing staffing issues.

Partner organisations were sub-contracted to deliver coaching activities and SFS training was compulsory for these coaches. A minimum of one teacher (or teaching assistant, mentor, sports coach) from each school was required to attend the training. Thirty-three teachers (53% female) and 11 coaches (9 males) enrolled onto the training, received training materials and agreed to adopt the SFS campaign. Teachers present were asked to feedback content to other Year 5 teachers so that they could adopt the programme.

## I MPLEMENTATION

The duration of the intervention ranged across schools due to school timetabling or deliverer availability. Engagement was high; SFS delivered a total of 223 out of 225 coaching sessions and 31 assemblies. Intervention fidelity varied across coaching activities (average fidelity score for sessions was 58%, ranging from 30.5% to 92.1%), with coaches listing the environment, child behaviour and child physical capability as mitigating factors. Session plans may therefore need greater flexibility. The intervention was well received: 99% of children enjoyed taking part & 85% of children & 82% of teachers scored the intervention 5 out of 5.

Teachers led 125 sessions, with over 90% self-rated as easy to deliver. Despite the offer of incentives, only half of Year 5 classes received the recommended dose of 5 teacher led sessions or signed the SFS pledges. Teachers may require additional support to deliver the intervention. More research is needed on teacher implementation of the intervention and how this could be improved. Observations of teachers' delivery would also provide insight.

## M AINTENANCE

A 12 month follow up study of SFS participants is planned for June/July 2014 (when children have almost finished Year 6). A later follow up study, particularly during early adolescence, would be useful to determine longer term impact.

It is unknown whether coaches and teachers will continue to implement activities post-intervention. Ongoing training, support and external delivery may be necessary to sustain the intervention. The importance of school settings taking ownership over the intervention was recognised but more research may be necessary to find appropriate strategies.

# CHAPTER 1

## Overview of SmokeFree Sports

### 1.1 About SmokeFree Sports

Established in October 2010, SmokeFree Sports (SFS) aims to use the power of physical activity to promote smoke free messages to children and young people. SFS was managed within the [Physical Activity Exchange](#) at Liverpool John Moores University (LJMU). SFS initially received funding from the Local Government Improvement and Development Agency for Phase 1 of the project (11 months); Liverpool Primary Care Trust and Liverpool City Council supported Phases 2 and 3 as part of the multi-faceted SmokeFree Liverpool campaign.

### 1.2 Rationale

Smoking is one of the leading causes of preventable morbidity and death, and is a risk factor for cardiovascular disease, chronic obstructive pulmonary disease and multiple cancers (Department of Health, 2011a). The economic impact of smoking is calculated to cost £13.74 billion a year in the UK (Nash & Featherstone, 2010). Although the proportion of adults and young people in England who smoke has declined in recent years (Health and Social Care Centre, 2013), tackling reduction of tobacco consumption continues to be a key public health priority (Department of Health, 2011).

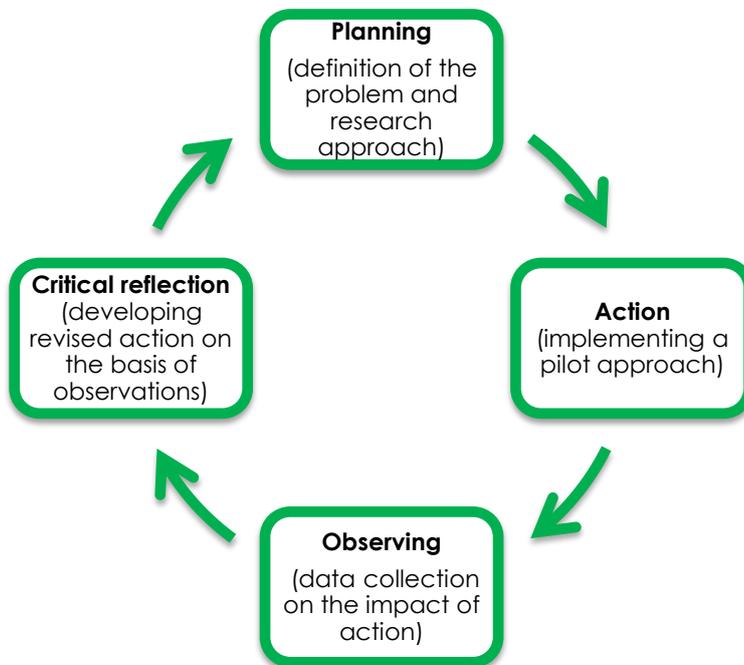
Each year in the UK, around 207,000 children start smoking (Cancer Research UK, 2013). Smoking a single cigarette in childhood is highly predictive of regular smoking in adolescence and initiation at an earlier age is a strong predictor of smoking behaviour later in life (Khuder et al., 1999); almost two-thirds of smokers started smoking before the age of 18 (Robinson & Bugler, 2008). Protecting children from starting to smoke is therefore an important public health priority (Department of Health, 2011a).

Participation in 60 minutes of moderate-to-vigorous physical activity each day is associated with a number of health benefits for children, including improved cardiovascular and bone health, weight management and higher self-esteem (Department of Health, 2011b). Children participate and enjoy physical activity within a number of contexts, for example, active play, physical education, afterschool clubs, sports clubs and structured exercise classes. Cross-sectional evidence suggests that participation in physical activity may be a protective factor against smoking for children (Kacynski et al., 2008). Therefore SFS was designed to explore whether physical activity could be used as a tool to protect and prevent children and young people from smoking.

### 1.3 Project management and steering group

Since SFS began in autumn 2010, key stakeholders from partner organisations have been represented on a project steering group. The purpose of the steering group was to review and ratify the intervention design and components. The involvement of individuals from partner organisations brought additional skills, creativity and resources whilst their expertise in health, education and/or sport sectors ensured the intervention was capable of being delivered ‘on the ground’.

A research sub-group ran alongside the project steering group to support the programme evaluation design, measures and interpretation of results. The project management placed great importance on evidence based practice; the intervention components and campaign activities were continuously improved through the project (Figure 1).



**Figure 1 An evidence based practice approach**

### 1.4 Phases of SmokeFree Sports

Two phases of formative work, conducted between February 2011 and May 2012, informed the design of the final intervention (Phase 3). These pilot projects were conducted to define and test essential programme elements and research measures, within different settings and across different age groups, and to gain insight into the feasibility and acceptability of the intervention.

Due to space limitations only a brief description of Phase 1 and 2 is offered below; more information can be provided on request (email [L.Foweather@ljamu.ac.uk](mailto:L.Foweather@ljamu.ac.uk)).

### **Phase 1**

Phase 1 was a community-based pilot intervention delivered across 5 youth clubs in City and North neighbourhood wards between February and June 2011 and targeting children and young people aged 7-18 years. The intervention had a smoking prevention and smoking cessation focus. Intervention components included social-marketing, coach education, provision of 12 weeks of coaching sessions (boxing, dance and dodgeball), a smoke free pledge and community events.

### **Phase 2**

Phase 2 was a school-based pilot intervention delivered to Year 5 children (aged 9-10 years) across 3 primary schools situated in City and North neighbourhood wards in Spring 2012. The intervention was focused on smoking prevention. Intervention components included social-marketing, coach education, a classroom taster session, provision of 6 weeks of coaching sessions (football and dance), a smoke free pledge and a celebration event.

### **Phase 3**

Phase 3 is the main focus of this report and relates to a primary school intervention delivered to Year 5 children across 32 Liverpool schools between October 2012 and May 2013. Eleven schools from Knowsley were also recruited as a comparison group. The intervention was focused on smoking prevention. Intervention components included social-marketing, coach and teacher education, provision of 5 coaching sessions (multi-skill, football and dance), a smoke free pledge and a school assembly with a Great Britain athlete. As a large sample of children was recruited into the study, a cross-sectional research study was also conducted to explore children's cognitions around smoking and related factors at baseline. More detail is provided in subsequent chapters.

## **1.5 SmokeFree Sports campaign activities**

Over the past three years, the project has developed and employed a number of positive intervention strategies to combat smoking that seek to utilise the natural appeal of physical activity and sport for younger generations and engage the sporting community in health promotion (Figure 2). These activities were continuously refined through a process of critical reflection using the research evidence and in consideration of practical and economic feasibility. An overview of the activities that represent the core initiatives of the project follows. Specific information surrounding the Phase 3 intervention components can be found in Chapter 3.



## Social-marketing campaign

- Developed brand logo & key campaign messages
- Distribute promotional materials & practical resources
- Social media presence on facebook and twitter



## Practitioner training & education

- Developed a bespoke training workshop
- Aims to give practitioners knowledge and skills to deliver smoke free messages through physical activity



## Coaching sessions

- Provision of coaching sessions in schools & communities
- Fun sports delivered by trained practitioners
- Smoke free messages integrated into practical activities



## Smoke free pledge

- Signed by children and young people
- Demonstrates a commitment to be smoke free for life
- Aims to empower children to take ownership over their health



## Smoke free policy & charter

- Policy for voluntary sports clubs to implement smoke free environments including outdoor playing fields
- Charter as a call to action among community sport organisations to engage with health promotion activity and smoking prevention



## Mass participation events

- School and community events to launch and celebrate SmokeFree Sports
- Sports tournaments and festivals to engage voluntary sport sector

Figure 2 Overview of SmokeFree Sports core activities

## **Social-marketing**

Formative work included the development of the SFS logo and creation of clear health promotion messages, in accordance with guidance from NICE (2008). Brand development was undertaken in partnership with a specialist marketing company and was tested through focus groups with children and young people. SFS was officially launched in February 2011, via community events and a social-marketing campaign. The project has distributed promotional materials among participants and practitioners - for example, pens, water bottles and sports equipment - to build awareness of the SFS brand. SFS is also visible on social media platforms such as Twitter and Facebook.

## **Education and training**

A bespoke training workshop was developed in order to prepare and educate practitioners to deliver brief interventions in support of smoke free healthy lifestyles to children and young people. The training was designed for any professionals or volunteers associated with physical activity and sport that come into contact with children and young people on a regular basis. This includes teachers, instructors, coaches, club officials, committee members and helpers. The training was offered free of charge to individuals from Liverpool on six occasions, with 77 individuals trained to date.

The unique evidence based learning content included theoretical and practical components that were continuously refined in order to be more effective and suitable for the target population. The workshop was supported by a training manual, which included a series of practical games and activities that can be played with children to promote smoke free messages.

## **Provision of coaching sessions**

SFS funded the provision of over 400 coaching sessions in local schools and communities during the project. The sessions were delivered by qualified sports coaches or dance instructors from partner organisations that had attended the SFS training. The decision to fund sports activities directly was taken to ensure that campaign messages were not diluted or lost amongst other drills or activities; sports development coaching sessions typically focus on skill development or boosting participation rates for that sport.

The coaching activities were selected in consultation with children and young people. The Phase 1 community pilot utilised mostly non-traditional sports (i.e. boxing, dance, dodgeball), whilst multi-skill, football and dance activities were used to engage participants in later phases of the project. Each session was designed to foster positive participation with the project in a fun learning environment. The novel aspect was asking coaches and instructors to implement activities that provide children with an awareness of their own health and well-being, as well as engage them in activities which improve their physical and mental health.

## **A smoke free pledge**

Teachers, coaches and instructors have been asked to encourage children and young people to show their commitment and make a pledge to be smoke free for life. Those who signed the pledge received a certificate for caring about their health and the health of others around them and choosing to lead a healthy lifestyle. Over 750 children have signed the pledge to date.

## **SmokeFree Sports policy and charter**

A guiding principle for SFS was that children and young people have the right to participate and enjoy physical activity and sport in a healthy, clean, smoke free environment. To support this vision, two documents were created – The SFS Policy and The SFS Charter (Figure 3). The SFS policy is a formal written document for voluntary sports clubs to enforce a smoke free policy. Ten voluntary clubs signed up to the policy and received a set of SFS branded bibs and cones for their efforts.

In November 2012 Liverpool John Moores University, together with major Liverpool sporting organisations, launched the SFS Charter. The Charter was a call to action for anyone and everyone with an interest or involvement in physical activity and sport to unite in a common cause to prevent and protect children and young people from smoking ([www.ljmu.ac.uk/smokefree-sports-charter](http://www.ljmu.ac.uk/smokefree-sports-charter)).

This advocacy initiative aimed to raise awareness of the dangers of smoking and prompt professional and voluntary sports clubs and representatives to recognise that they had a direct and indirect role to play in health promotion activity. By January 2013 over 250 individuals and organisations had signed the Charter, including Dr Vince Cable – UK Member of Parliament and Business Secretary, and Rebecca Adlington - Great Britain's Olympic gold medal winning swimmer. The Charter has also been used by leading charities ASH Scotland and ASH Wales to develop their own sport-related initiatives.

## **Mass participation events**

SmokeFree Sports sought to promote sport and physical activity participation as a healthy and positive alternative to smoking. As an example of this, ten junior teams from local football clubs and schools were invited to take part and compete against each other in a fun and friendly football competition. These tournaments and festivals were used to deliver smoke free messages to participants and their families, whilst voluntary sports clubs were also invited to take part in campaign activities.

# THE SMOKEFREE SPORTS CHARTER



## We recognise...

- that there is significant evidence demonstrating the negative health impacts of tobacco use and exposure

## We believe...

- children and young people have the right to participate and enjoy physical activity and sport in a clean, smoke free environment
- making areas where outdoor sport and recreation take place smoke free protects children and young people from second hand smoke and helps de-normalise smoking
- everyone involved in physical activity and sport is an important role model and has a responsibility to set an example with respect to healthy lifestyles and smoking

## We are committed...

- to making these values a reality for children and young people
- to educating children and young people about the dangers of smoking

## We will...

- make physical activity and sport a welcome place for everyone
- create a tobacco free culture where children and young people can live, love and breathe physical activity and sport, not smoke



### Founding Signatories



#TeamSmokeFree

Figure 3 The SmokeFree Sports Charter

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**The remaining chapters report the activities and research findings related to Phase 3 of the SmokeFree Sports project - a physical activity intervention to prevent smoking among 9-10 year old primary school children.**

**Chapter 2** outlines the local context via a cross-sectional study that explores baseline data collected as part of the intervention in a sample of >1000 children in Liverpool and Knowsley

**Chapter 3** provides an overview of the intervention activities and components

**Chapter 4** explores the impact of the bespoke training workshop

**Chapter 5** examines the implementation of the intervention

**Chapter 6** explores the impact of intervention

**Chapter 7** examines the acceptability and sustainability of the intervention

**Chapter 8** includes a conclusion and some recommendations for future work.

## CHAPTER 2

### Influences of gender, family and friends on 9-10 year old children's smoking-related cognitions

#### *What is already known on this subject?*

- Smoking onset begins between the ages of 11 and 13 years
- Evidence suggests that smoking patterns begin prior to experimentation with the development of attitudes, beliefs and intentions but there is a notable lack of research conducted in preadolescent children
- Family smoking behaviour and perceived prevalence of smoking among peers is associated with adolescent smoking

#### *What this study adds...*

- Around 2% of 9-10 year olds reported that they had experimented with smoking
- Our study suggests that there are early gender differences in preadolescent children's smoking-related intentions, refusal self-efficacy and attitudes
- Many children had misconceptions surrounding smoking addiction thus highlighting the importance of addiction education in smoking prevention efforts
- Over a quarter of children reported to be exposed to smoking in cars, supporting the case for banning smoking in cars when children are present.

## 2.1 Aims

To prevent children from starting to smoke it is essential to understand the factors that promote vulnerability to smoking among preadolescents. Therefore, this cross-sectional study aimed to examine the influence of gender; family smoking status; and friends smoking experimentation on attitudes towards smoking, intention to smoke and refusal self-efficacy in 9-10 year old primary school children in Merseyside. This chapter describes the baseline measurements of the intervention.

## 2.2 Methods

### Participants and settings

In September 2012, all eligible primary schools (mainstream state schools; n=154), from Liverpool (n=104) and Knowsley (n=50) in the North West of England, were invited to take part in the study. Prior to the recruitment of schools, local authorities were matched for similar characteristics based on population data including child and adult smoking rates (Health Profile, 2011, Public Health Observatory), as well as deprivation level (The Index of Multiple Deprivation 2010: A Liverpool Analysis) and ethnic composition (Office for National Statistics, 2009).

Schools received information about the project via post and email. To aid participation rates, schools who had not responded were followed-up with telephone calls. Following initial communication with each school, site visits were made by the research team to share information about the project with staff acting as study co-coordinators (including Year 5 class teachers, Head Teachers, PE and Personal Social Health and Economic (PSHE) Coordinators). Study information sheets were passed on to senior staff members and written consent was requested if they wished their school to take part.

In total 43 primary schools agreed to take part in the study, including 32 schools from Liverpool and 11 schools from Knowsley. Schools that declined to participate in the study provided multiple reasons for not taking part (e.g., too busy; key teacher on sick leave; already in receipt of external projects). In participating schools, all Year 5 children (n=1393) were invited to take part in the study.

To recruit children, parental consent was sought on an opt-out basis. The SFS team provided each school with information packs, containing a participant information sheet, consent form and stamped addressed envelope to send via post to parents. Parents were asked to sign and return the consent form or call the research team if they did not want their child to participate in the research within two weeks of receiving the information pack. Following opt-out deadlines, the SFS team visited schools to obtain child assent and collect baseline data.

Parental consent and child assent was obtained for 1339 children (96% response rate). On the date of baseline data collection, 123 children were absent from class. Children were excluded from the study if they had a special class placement (e.g., learning disability) or difficulty in speaking and or understanding the English language (n=33), or incomplete outcome measures (n=17).

The final sample therefore consisted of 1166 children (84% participation rate). The mean age of children in the sample was 9.5 (SD=0.3), and 51% of the sample were girls. Ethnic background was self-identified as White British (85.5%), White Other (1.5%), Mixed (2.8%), Asian (2.6%), Black (4.3%) and Chinese (.8%). Seventy-five percent of children lived in the 10% most deprived super output area in England (The English Indices of Deprivation 2010).

## Measures

### **Smoking questionnaire**

A questionnaire was constructed using items from questionnaires previously used within this age group (Health Survey for England, 2007; Global Youth Tobacco Survey, 2008). Additional items were developed by the research team to address future smoking intentions, perceptions about the impact of smoking on sport performance and exposure to smoking.

Questionnaire items measured demographics (e.g., age, gender, ethnicity, and home postcode); smoking behaviour; attitudes toward smoking; and intentions to smoke; smoking refusal self-efficacy; family and friends smoking behaviour; exposure to second hand smoke; and asthma.

The questionnaire was uploaded to the online survey tool SurveyMonkey [www.surveymonkey.com](http://www.surveymonkey.com). Children self-completed the questionnaire on desktop computers during class time and were asked to select responses based on what they believe to be correct. The research team were present to assist children with reading. To aid accuracy of responses, questionnaires were completed in silence and confidentiality was stressed. The survey took children approximately 30 minutes to complete. Completed surveys were submitted by the child and responses transmitted to a secure electronic database for subsequent analysis.

### **Child smoking behaviour (1 item)**

Smoking behaviour was assessed with one question taken from the Health Survey for England (2007). Children were asked to select from five responses which stage of smoking best described them. Response categories ranged from one (*I have never smoked, not even one puff*) to five (*I smoke at least once a day*).

Responses were re-coded to represent '*never experimented with smoking* (not even one puff), scored 0, and '*experimented with smoking* (any experimentation with smoking), scored 1. As an indicator of smoking behaviour, breath carbon monoxide (CO) concentrations from expired air were taken and recorded.

### **Attitude towards smoking (5 items)**

There are several dimensions of attitude (Rosenberg & Hovland, 1980) and for the purpose of this study attitude towards smoking was explored through the cognitive component (e.g., *'do you think smoking is bad for your health?'*). Response categories ranged from *definitely not* (scored 1) to *definitely yes* (scored 4), with higher scores indicating more negative attitudes towards smoking. One attitude item was reverse coded (*'do you think that it is safe to smoke for only a year or two as long as you quit after that?'*).

A summary scale was created but lacked internal consistency (Cronbach alpha= .49). Therefore responses were collapsed into a dichotomous variable to represent having the most negative attitude towards smoking (i.e. *definitely not*; scored 1) or any other attitudes towards smoking (scored 0) for subsequent analysis.

### **Intentions to smoke (3 items)**

Intention to smoke was assessed using two items taken from the Health Survey for England, (2007) (e.g. *'do you think you will smoke in the next month and next year?'*), as well as an additional item designed by the research team (*'do you think you will smoke in secondary school?'*).

Response categories ranged from *definitely yes* (scored 1) to *definitely not* (scored 4) and summed to produce a total intention score (possible range of 3-12). Cronbach alpha for the total intention scale showed good internal consistency, with a score of .81. A high score on the total intention scale indicated strong intentions not to smoke.

### **Smoking refusal self-efficacy (3 items)**

Children's refusal self-efficacy was assessed by asking; *'how confident are you... in staying a non-smoker'* or *'...that you could refuse a cigarette if offered one'*). Response categories ranged from one (*not confident at all*) to five (*very confident*) and were summed to create a total refusal self-efficacy score (possible range of 3-15). Cronbach alpha for total refusal self-efficacy scale revealed good internal consistency, with a score of .81. A higher score on the refusal self-efficacy scale indicated higher efficacy (confidence) to abstain from smoking.

### **Family Smoking Behaviour (1 item)**

Family smoking status was assessed using an item taken from the Health Survey for England, (2007). Children were asked to select from nine responses who in their family smokes (i.e., mum, step-mum, brother, uncle, cousin) plus the opportunity to include additional family members that smoke.

For the purpose of this study the term *'family'* included biological parents and their children (Turagabeci et al., 2007). Parents and siblings were collapsed into a dichotomous variable to represent having *non-smoking family members* (scored 0) or having *at least one smoking family member* (scored 1) and used in the subsequent analysis.

#### **Friend smoking experimentation (2 items)**

Friend experimentation with smoking was assessed with items adapted from Engels et al. (1997) (e.g., *"do any of your friends smoke?"* and *"have any of your friends tried smoking?"*). Response categories ranged from 1 (none of my friends smoke or have tried) to 4 (all of my friends smoke or have tried).

Both items were combined to create a dichotomous variable to represent having *'no friends that have experimented with smoking'* (never smoked or tried; scored 0) or having *'friends that had experimented with smoking'* (smoke or tried; scored 1) and used in the subsequent analysis.

#### **Child asthma and exposure to smoking (2 items)**

Items taken from the Health Survey for England (2007) were used to assess child asthma (e.g., *"did a doctor or nurse ever tell you had asthma"*) and exposure to smoking. Children were asked to select from five responses where they were exposed to smoking (e.g., at home, in cars) plus the opportunity to enter additional places.

### **Analysis**

Descriptive statistics were generated to describe the distribution of variables. Chi-square tests for independence were applied to test for associations between categorical variables. Data collected using interval scale variables did not meet parametric assumptions therefore a Mann-Whitney U test was used to explore between-group differences. Data were analysed using SPSS 20 for windows. Cohen's (1988) criteria for effect size was used and significance was set at  $p < 0.05$ .

## **2.3 Results**

### **Smoking behaviour**

The majority of children (97.8%) reported to have *'never smoked, not even a puff or two'*. Of the children (n=29) who reported to having tried 'to smoke a cigarette, a higher number were among boys (n=22) than girls (n=7). Carbon monoxide (CO) readings were taken and recorded from 82.4% of children (n=904). Children's self-reported smoking was supported by breath CO readings (Mean=1.3, SD±0.7). Eighty two percent of children had a CO reading between zero and five. No children

had a reading above 10ppm, which is usually taken as the cut-off between smokers and non-smokers (Bailey et al., 2013). Over half of children (57.4%) reported to have at least one family member that smokes and 18% had at least one friend that had experimented with smoking.

### Exposure to smoking

Forty percent (n=442) of children reported to be exposed to second hand smoke within the home and twenty-three percent were exposed to smoking cars (n=251). Nineteen percent (n=213) of children reported they had asthma. Of those children with asthma, 59% had at least family member that smoked; 43% were exposed to smokers within the home and 28% were exposed to smokers in cars.

### Intention to smoke

Table 1 shows item responses and total intention not to smoke. A large proportion of children (87.5%) did not intend to smoke across all three items measuring the concept of intention. There was a significant difference between gender and total intention ( $U = 159413.0$ ,  $z = -3.10$ ,  $p = 0.03$ ,  $r = .08$ ); with a higher proportion of girls stating they would '*definitely not*' smoke compared boys. There was a significance difference between family smoking status and total intention not to smoke ( $U = 155570.5$ ,  $z = -3.09$ ,  $p = .02$ ,  $r = -.10$ ); with a higher proportion of children with non-smoking family stating '*definitely not*' compared to children who have at least one smoking family member.

A statistically significant difference was also apparent for friends smoking experimentation and total intention not to smoke ( $U = 72548$ ,  $z = -11.34$ ,  $p = .000$ ,  $r = -.03$ .); with a higher proportion of children with no friends that had experimented with smoking stating '*definitely not*' compared to children with friends who had experimented with smoking.

### Refusal Self-efficacy

Table 1 shows item responses and total refusal self-efficacy. A high proportion (74.4%) of children claimed to be '*very confident*' to abstain from smoking across all three items measuring the concept of refusal self-efficacy. There were significant differences between gender and refusal self-efficacy ( $U = 160023.0$ ,  $z = -2.30$ ,  $p = .02$ ,  $r = .06$ .), with a higher proportion of girls stating they were '*very confident*' to abstain from smoking compared to boys. A second statistically significance difference was observed for family smoking status and refusal self-efficacy ( $U = 149399.0$ ,  $z = -3.9$ ,  $p = .000$ ,  $r = -.11$ .), with a higher proportion of children with non-smoking family members claiming to be '*very confident*' to stay a non-smoker and abstain from smoking if offered one compared to children who had at least one smoking family member.

## Attitudes towards smoking

Table 2 shows responses for smoking-related attitudes for gender; family smoking; and friend smoking experimentation. A high proportion of children (88.1%) “*definitely*” agreed that ‘*smoking is bad for your health*’. On the remaining attitude items children displayed less negative attitudes towards smoking. There was a significant association between gender and the statement ‘*do you think smoking is bad for your health?*’  $\chi^2(3, n = 1166) = 9.2, p = .02, \phi = -.07.$ ), with a higher proportion of girls agreeing ‘*definitely yes*’ compared to boys. A significant association was observed for family smoking status and statements ‘*do you think smoking is bad for your health?*’  $\chi^2(3, n = 1166) = 5.5, p = .01, \phi = -.07.$ ), and ‘*do you think it is safe to smoke for only a year or two as long as you quit after that?*’  $\chi^2(3, n = 1166) = 6.5, p = .01, \phi = -.07.$ ). A higher proportion of children with non-smoking family members ‘*definitely*’ agreed that smoking is bad for health and that it is not safe to smoke for only a year or two as long as you quit after that compared to children with at least one smoking family member.

There was significant relationship observed between friends smoking experimentation and items ‘*do you think smoking is bad for your health?*’  $\chi^2(3, n = 1166) = 39.2, p = <0.001, \phi = .18.$ ), ‘*do you think the smoke from other people’s cigarettes is harmful to you?*’  $\chi^2(3, n = 1166) = 17.5, p = <0.001, \phi = .01$ ) and ‘*do you think smoking effect sports performance?*’  $\chi^2(3, n = 1166) = 5.8, p = 0.1, \phi = .07.$ ). A higher proportion of children with no friends that had experimented with smoking agreed ‘*definitely yes*’ compared to children with friends who had experimented with smoking. A significant relationship was also apparent for the statement ‘*do you think it is safe to smoke for only a year or two as long as you quit after that?*’  $\chi^2(3, n = 1166) = 12.3, p = <0.001, \phi = -.01.$ ), with a higher proportion of children with no friends that had experimented with smoking agreeing ‘*definitely not*’ compared to children with friends who had experimented with smoking.

**Table 1 Smoking-related intentions and self-efficacy among 9-10 year old children in Liverpool and Knowsley (%)**

Item (response)	All (n=1166)	Boys (n=574)	Girls (n=592)	Smoking family <sup>†</sup> (n=669)	No smoking family (n=447)	Friends Smoke <sup>‡</sup> (n=213)	No friends smoke (n=953)
Do you think you will try cigarette in next month? ( <i>definitely not</i> )	94.3	92.3	96.1	92.5	96.6	83.8	96.6
At any time in next year do you think you will smoke? ( <i>definitely not</i> )	94.1	92.3	95.8	92.8	95.8	83.1	96.5
Do you think you will be smoking in secondary school? ( <i>definitely not</i> )	90.7	88.7	92.6	88.0	94.2	73.2	94.5
No intentions to smoke in future ( <i>responded definitely not to 3 items above</i> )	87.5	<b>84.3 *</b>	<b>90.5*</b>	84.9*	<b>90.0*</b>	<b>64.3*</b>	<b>92.7*</b>
How confident are you that you can stay a non-smoker? ( <i>very confident</i> )	81.9	79.8	84.0	78.2	86.9	66.7	85.3
How confident are you that you could say no to a cigarette if someone offered one? ( <i>very confident</i> )	83.3	80.5	86.0	80.0	87.7	68.1	86.7
How confident are you that you could be a non-smoker if your friends smoked? ( <i>very confident</i> )	79.8	77.4	82.3	76.2	84.7	60.6	84.2
Self-efficacy to stay a non-smoker							

Note: (†) at least one member (‡) at least one friend smokes/or tried. \*Significant difference ( $P < 0.05$ )

**Table 2 Attitudes towards smoking among 9-10 year children in Liverpool and Knowsley (%)**

Item (response)	All (n=1166)	Boys (n=574)	Girls (n=592)	Smoking family <sup>†</sup> (n=669)	No smoking family (n=447)	Friends Smoke <sup>‡</sup> (n=213)	No friends smoke (n=953)
Do you think that smoking cigarettes is bad for your health? ( <i>definitely yes</i> )	88.9	<b>85.7*</b>	<b>92.1*</b>	<b>87.0*</b>	<b>91.5*</b>	<b>76.5*</b>	<b>91.7*</b>
Do you think that it is safe to smoke for only a year or two as long as you quit after that? ( <i>definitely not</i> )	62.9	62.7	63.0	<b>59.6*</b>	<b>67.2*</b>	<b>52.1*</b>	<b>65.3*</b>
Once someone has started smoking, do you think it would be difficult to quit? ( <i>definitely yes</i> )	50.8	50.3	51.1	49.9	51.9	48.8	51.2
Do you think the smoke from other people's cigarettes is harmful to you? ( <i>definitely yes</i> )	64.4	62.7	65.9	63.2	65.8	<b>51.6*</b>	<b>67.2*</b>
Do you think smoking effects sports performance? ( <i>definitely yes</i> )	56.0	57.1	54.9	54.0	58.8	<b>48.4*</b>	<b>57.7*</b>
Do you think smoking makes you gain or lose weight? ( <i>no difference</i> )	42.0	43.7	40.4	42.8	41.0	40.4	42.4

Note: (†) at least one member (±) at least one friend smokes/or tried. \*Significant difference ( $P < 0.05$ )

## 2.4 Discussion

This study investigated the influence of gender; family smoking status; and friends smoking experimentation on smoking-related attitudes, intentions and refusal self-efficacy in 9-10 year old primary school children from Merseyside. The majority of children had never tried to smoke a cigarette, not even one puff. Although no significant differences were observed between gender and smoking experimentation, a higher proportion of boys had experimented with smoking.

Fifty-seven percent of children reported to have at least one family member that smoked and eighteen percent of children perceived that their friends had experimented with smoking (smoke or had tried). Forty-percent of children were exposed to smoking within the home and in cars (23%). Eighteen percent of children reported they had asthma and of those children with asthma, 59% had at least one family member who smoked and were exposed to smokers within the home (43%) and in cars (28%).

The findings also demonstrate a significant relationship between gender and one attitude item; for family smoking, two attitude items; and for friend smoking experimentation, four attitude items. Results also show boys, children with smoking family members and those with friends who had experimented with smoking had significantly higher intentions to smoke and lower refusal self-efficacy, than their counterparts.

The majority of children believed that '*smoking is bad for your health*', although for other attitude items children displayed less negative attitudes towards smoking. For example 49% of children did not believe it would '*definitely*' be difficult to quit smoking once started. This finding exemplifies children's misconception, indicating they may underestimate the addictive nature of smoking.

Evidence suggests that children who perceive it to be easy to quit smoking once started are more likely to report intentions to smoke (Wang et al., 2004). Such perceptions are worrying as nicotine addiction can develop within a few days of smoking (Di Franza et al., 2000). Although most children displayed strong intentions not to smoke and had positive perceptions of refusal self-efficacy, others were less certain regarding their future behavioural intentions and abstinence from smoking if offered.

Boys were less likely to believe that '*smoking is bad for your health*', had greater intentions to smoke in the future and lower smoking refusal self-efficacy. These findings may in part explain the small differences in the rates of smoking experimentation between genders and partly concur with

Galanti et al. (2001) who found that having a positive attitude towards smoking, and a lack of firm commitment to abstain from smoking predicted smoking onset.

Other plausible explanations for the gender differences in smoking experimentation may be that boys perceived friend approval of smoking (Flay et al., 1998) or spend more time unsupervised outside the home engaging in anti-social behaviours (Bogart et al., 2006; Greene & Bannerjee, 2009).

Evidence suggests that smoking patterns begin prior to experimentation with the development of attitudes, beliefs and intentions to smoke (Porcellato et al., 1999). When findings from previous research are considered in line with those from the current study, it is apparent that 9-10 year old children represent an important cohort for primary prevention. Whilst interventions have been recommended for girls (see review Carson et al., 2011), our findings indicate that boys should also be targeted. However, the gender differences observed in this study do not warrant specific prevention or interventions for boys and girls but it is advisable to include gender sensitive messages to dispel the myths surrounding smoking, particularly surrounding addiction and normative beliefs.

Over half of children reported to have at least one family member that smoked and many children were exposed to smoking within the home and in cars. In our sample nineteen percent of children reported to have asthma. Of these children with asthma 59% had at least one family member that smoked; exposed to second hand smoke in the home (43%) and in cars (28%).

Exposure to second-hand smoke can cause respiratory disease, cot death, middle ear infections and asthma attacks in children (Royal College of Physicians, 2010). A review by the British Medical Association's Board of Science concluded that there is no safe level of exposure to tobacco smoke for children and adverse effects can be found at low levels. Taken together with the findings from our study, there is an urgent need to reduce children's' exposure to second hand smoke. Since the SmokeFree legislation in 2007 there has been increasing public support for a ban on smoking in cars, especially when children are present ([www.ash.org.uk](http://www.ash.org.uk)). Our findings provide additional support to the case for introducing a smoking ban in private cars when children are present.

According to the social learning theory (Bandura, 1986), children learn through observing the behaviour of role models in their social environment. Experimentation with smoking may be directly influenced by the attitudes and smoking behaviour of parents and siblings. Children exposed to family members that smoke may perceive smoking as socially acceptable and therefore may be more likely to smoke (Otten et al., 2009) or socialise with pro-smoking peers (Tucker et al., 2008).

Consistent with previous research, children who had at least one family member that smoked had less negative attitudes towards smoking and stronger intentions to smoke compared to children with non-smoking family members (Brook et al., 1999; Porcellato et al., 1999; Schuck et al., 2012; Andrews et al., 2005). This is also consistent with having friends that had experimented with smoking (Vitoria et al., 2011). Moreover, children with smoking family members and friends who had experimented with smoking had significantly lower smoking refusal self-efficacy. Decreases in refusal self-efficacy have been associated with smoking initiation in the teenage years (Hiemestra et al., 2011) but little is known about the influence of family and friends on preadolescents' smoking refusal self-efficacy.

### **Study limitations**

There are a number of limitations attached to this study. First, the analysis is based on self-reported cross-sectional survey, which only suggests but cannot demonstrate that gender, family smoking and friends smoking experimentation lead to less negative attitudes toward smoking, higher intentions to smoke or decreases in refusal self-efficacy. However, self-reported smoking behaviour was confirmed by taking and recording exhaled carbon monoxide.

Second, it was not possible to directly record smoking behaviour for social influences, therefore children's perceptions of family and friends smoking habits and their exposure to smoking were used. Previous research into smoking in the home and cars suggests that adults and youth may report differently on exposure to smoking, whether due to youths being more candid, or being more or less able to recall the actual exposure (Thomas et al., 2005). Moreover, smoking youth tend to overestimate exposure to smoking (Otten et al., 2009). However others (Barnett et al., 1997) have suggested that children are reliable reporters of smoking in their social environment. It would also be useful to compare children with paired family reports of smoking in the home and in cars.

Third, our study did not assess parental structure (living with two biological parents). Children with parents smoke are likely to have easier access to cigarettes in the home than youth whose parents do not smoke (Tyas & Pederson 1998). Moreover, evidence suggests that step-parents who smoke are as influential as biological parents in youth smoking onset (Fidler et al., 2007).

Finally, the results are drawn from two deprived local authorities with high adult smoking prevalence, which could limit how generalisable the results are to other regions of England. This research, however, contributes to providing much needed information of relevance to disadvantaged areas, where the need for intervention is proportionally greater.

## Conclusion

Nine to ten year old children are an under-researched cohort in smoking studies and this study makes a unique contribution to the literature concerning the influence of gender; family smoking status; and friends smoking experimentation on attitudes towards smoking, intentions to smoke and refusal self-efficacy.

Previous research has examined smoking-related attitudes and normative perceptions but rarely integrate the influence of family and peers. These factors are important since smoking is a complex behaviour and children's smoking-related cognitions are most likely influenced by multiple social and societal factors. This study also examined the influence of gender, which can further provide insights how future smoking prevention and intervention programmes can be tailored for youth.

Efforts to prevent smoking onset in children in Merseyside should focus on reducing prevalence of smoking among parents and young adults in addition to providing children with the skills necessary to resist negative influences from significant others. Moreover, introducing legislation relating to banning smoking in cars would help protect children from the physical harms of second-hand smoke exposure. In particular, future interventions should consider components to empower non-smoking children with the self-efficacy to avoid smoking, but also remind them about the powerful addictive properties of nicotine. Furthermore, interventions should provide gender sensitive messages to dispel the myths, surrounding smoking, particularly around social norms.

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## CHAPTER 3

### Description of the intervention



#### 3.1 Context

##### **Physical education and sport as a context to deliver smoking prevention education**

Since all children that attend primary school are required to participate in physical education, and over three quarters of children aged 5-10 participate in sport outside of school (DCMS, 2013), it is clear that Physical education and sport play a central role in their lives. Physical education and sport can help to shape children's health and well-being, contributing to their physical, social, emotional and psychological development.

There is a growing recognition of the importance of health-based physical Education (PE) in promoting knowledge, skills and understanding required to lead healthy and active lifestyles (Alfrey et al., 2012). Whilst health-related PE is predominantly considered in regards to lifelong physical activity, this lesson could provide a forum for other health promotion activity, such as smoking prevention. Outside of the curriculum, National Governing Bodies of sport and community sport

organisations deliver sports specific programmes at primary schools. Whilst these efforts are predominantly designed to promote participation and develop skills in their respective sports, they may also provide an additional opportunity for health promotion initiatives.

### **Provision of health-related PE and sport in primary schools**

Despite the importance of PE in the curriculum, often primary teachers are not PE specialists and lack confidence in their ability to deliver lessons. As a result, primary schools are increasingly employing qualified sports coaches to lead the teaching of PE. Further, sports coaches may be hired to work alongside primary teachers when teaching PE, giving teachers the opportunity to observe delivery and participate in sessions (Whipp et al., 2011). These sports coaches have the potential to be positive role models and can incorporate health promotion activity within their coaching practice, placing them in an ideal position to be effective in supporting young people's health through promotion, prevention and early intervention. Whether primary teachers and qualified sport coaches can effectively deliver smoking prevention education through health-related physical education within a primary school setting is yet to be investigated.

## **3.2 Aims and objectives**

In light of this evidence and building on the knowledge gained from Phase 1 and Phase 2 of SmokeFree Sports, the 2012-13 Intervention (Phase 3) aimed to train sports coaches and primary school teachers to deliver smoking prevention education through the medium of physical activity, specifically sport and physical education.

Our objectives included to: a) strengthen children's intentions to be smoke free, b) give children the confidence that they can refuse a cigarette, and c) increase negative attitudes toward smoking.

## **3.3 Partners and stakeholders**

Phase 3 of the project was undertaken in partnership with multi-disciplinary organisations, including, Liverpool City Council, Liverpool Community Health, the Centre for Public Health at LJMU, St George's University, Merseyside Sports, Healthy Stadia, Liverpool Healthy Schools team, Florence Melly Primary School, Everton in the Community, Liverpool FC Foundation and Alder Hey NHS Trust.

### 3.4 Target population

Year 5 children (9-10 years old) were the focus of this SFS city-wide intervention because evidence suggests that smoking related attitudes are developed in childhood prior to experimentation (Porcellato et al., 1999). Since data shows one-third of children have tried smoking by the age 11 (NHS Information Centre, 2010), it is recognised smoking prevention education must target primary school aged children.

The school was chosen as the setting for the intervention on the basis of our earlier formative work and to maximise the number of children reached and make use of the available infrastructure. The funding agreement required that the intervention was delivered within Liverpool City Council local authority boundaries. Therefore, all mainstream state primary schools in Liverpool were invited to take part in the intervention.

### 3.5 Intervention design

#### Theoretical model

A logic model was used to guide the design of the pilot study. Logic models are often used in the development and evaluation of health promotion projects (Goodstadt, 2005; Bartholomew et al. 2011), since they offer a visual representation of the project's theory for change (i.e. how the intervention aims to prevent the onset of smoking among children) (Coffman, 1999) and rationale for programme activities.

The logic model displayed in Figure 4 represents the anticipated causal relationship between the planned project input (resources, project partners and formative work), activities (recruitment, development of resources and delivery of intervention components), outputs (number of participants recruited and intervention activities delivered), outcomes (immediate and short/mid-term outcomes) and impact (long-term impact of intervention) (Coffman, 1999, The Health Communication Unit, 2007) for the SFS intervention.

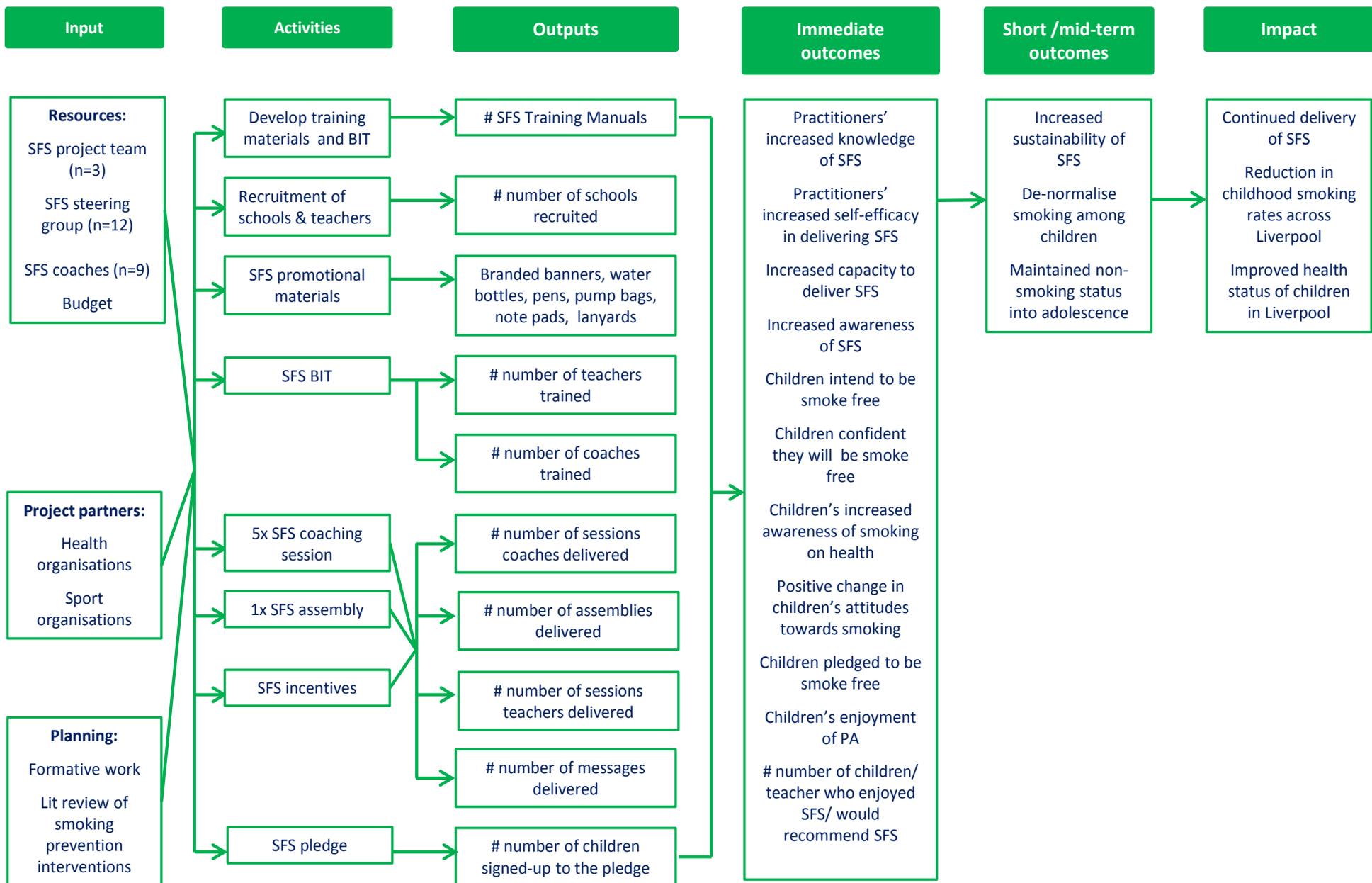


Figure 4 Logic model overview of SmokeFree Sports 2012-13 intervention

## 3.6 Intervention components

### Staffing

The intervention was coordinated by two full time researchers at LJMU. SFS sub-contracted three partner organisations to support delivery of the SFS intervention, including Liverpool FC Foundation, Everton FC in the Community and Liverpool City Council. These partner organisations supplied qualified sports coaches and instructors to deliver intervention components (as specified below).

To increase the sustainability of the intervention, attempts were made to utilise primary school staff that delivered physical education (including class teachers, PE coordinators, teaching assistants and external sport coaches; all clustered and referred to as teachers for the purposes of this report).

### Training for project delivery

In line with NICE (2010) recommendations that outline staff who are working in smoking prevention should be sufficiently trained, external sports coaches employed to deliver SFS sessions and at least one teacher from each participating school were required to take part in a SFS training workshop. Teachers who attended the training were asked to feedback information to colleagues.

The workshop comprised of a two hour theory and a one hour practical session and was delivered within local leisure centre facilities during school hours. The workshop aimed to provide coaches and teachers with details of the project as well as key facts about smoking relating to prevalence, social influences and its impact on health and sport performance. During the training participants were also informed of the SFS key messages to promote to children throughout sessions (see Table 5), and given tips on how to do this in a sensitive but effective manner through physical activity.

SFS key messages were adapted from a tobacco-control programme from the US state of Maine called Tobacco Free Athletes (see [www.tobaccofreemaine.org](http://www.tobaccofreemaine.org)) as well as information provided by the World Health Organisation. Messages were amended to ensure their relevance for a UK audience and suitability for children following formative work. Guidance on how to deliver smoking messages were developed using a Tobacco Stinks campaign resource ([www.tobaccostinks.com](http://www.tobaccostinks.com)).

Workshops were delivered between October 2012 and February 2013; all teaching staff completing the training by November 2012. All sports coaches received the training prior to delivering SFS coaching sessions in schools. The theory components of the workshops were delivered by the SFS Research Officer (JT) and Project Officer (CM), a Community NHS trust Smoke Free Coordinator, whilst the practical session was led by Liverpool City Council sport coaches and a dance instructor.

**Table 3 Examples of SFS key messages for delivery to children**

**Key Messages\***

Smoking cuts down on fitness.

Smoking reduces the amount of oxygen you can take in.

A non-smoker can recover from strenuous exercise quicker than those who smoke.

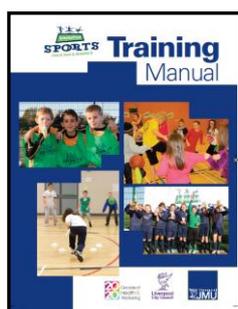
The long term health effects of smoking may seem to be in the distant future, but they're real.

\*Note: Additional messages were delivered during the delivery of sessions in accordance to themes below

**SFS training packs**

SFS external coaches and each school received SFS training packs, consisting of a SFS training manual and smoke free pledges for Year 5 children. These components were adapted from the Tobacco Free Athletes project.

The training manual summarised information covered in the training and included ten session plans. Session plans were designed to cover at least one of the five SFS themes. SFS themes included:



- smoking and health
- smoking and sport performance
- the contents of a cigarette and financial cost of smoking
- smoking and social influences
- the benefits of participating physical activity.

SFS themes were informed by previous research, process data from earlier SFS studies, and discussions with researchers, health professionals and teachers. Once the themes and learning outcomes of sessions were agreed by project partners, session plans were designed by experienced sport coaches and a dance instructor and initially reviewed by the SFS research team. On agreement of the activities for each session between researchers and coaches, teachers reviewed the plans, ensuring their usability and alignment with the National Curriculum outcomes for Key Stage two. Session plans included learning and PE Curriculum outcomes, key messages for delivery and details of activities. Each session plan included: a 'SFS starter' (one or two warm-up activities), at least one main activity and a cool down. Each activity was given a child-friendly smoking-related name (e.g. 'Nicotine Attack'). Sessions were designed to last for 60 minutes. See Table 4 for examples of activities included in the session plans.

**Table 4 Examples of activities included in the training manual**

Session type	Theme of session	Learning outcomes	SFS messages to be delivered	Key Example game
Multi-skill	Smoking and health	-Describe the long and short term effects of smoking on health  -Recognise the advantages of being smoke free	-Young smokers produce phlegm (Yuck!) more than twice as often as those who don't smoke	<b>Clear it out!</b> : In teams ('non-smoker' vs. 'smoker'), children complete a hockey obstacle course by dribbling a large foam ball through a channel (made with ropes and slalom of cones). This represents the journey that phlegm takes down the throat and through the respiratory tract culminating in the lungs (represented using a hoop). Once through the obstacle course, children have to hit the ball into the hoop from a distance of around three metres (space dependant) until it stays in. The 'non-smoking' team then pick the ball up and run back with it, whilst the 'smoking' team must travel back not using their hands (with the ball between their feet) to show smokers difficulties in getting phlegm up.
Dance	Smoking and social influences	-Describe the factors that influence young people to smoke  -Recognise how they can avoid pressure to smoke	-Don't be pressured into smoking*  -Most people choose not to smoke	<b>Standing up to smoking!</b> : Altogether, get the children to think of different poses to show what they would do if under pressure (e.g. head in hands, dropping down on knees, hugging themselves). Next, split the children into groups of five (depending on class size). Each group creates a circle around one person. Work on ways the group can make the person in the middle feel uncomfortable (e.g. making them jump, circling around them, invading their space). The person in the middle will do poses relating to feeling under pressure. Let the children take turns to go in the middle and experience both aspects.  Next, ask the children creating the outside of the circles to demonstrate how to avoid peer pressure by doing strong, bold movements (e.g. standing up tall, pushing hands out or crossing arms in front of body in defiance). The child in the middle of the group will need to put pressure on the 'outside' children to smoke (performing moves created in activity above). This activity shows children if they stick together they can beat peer pressure and not succumb to trying cigarettes. Let the children take turns to go in the middle and experience both aspects.
Football	Smoking, health and sport performance	-Describe the long and short terms effects of smoking  -Recognise the advantages of being smoke free  -Recognise the impact of smoking on sport and physical activity performance  -Describe how the physiological effects of smoking limit sports performance	-Smoking is bad for your health*  -Smoking reduces the amount of oxygen you can take in	<b>Attack the artery</b> : Mark out three to five stations (class size dependent) with shuttle cones and place a target at the end of each station (see diagram). Explain to the children that the path to the target represents the artery and the target represents the muscle that needs oxygen rich blood (the ball). Have three progressions that all children complete at the same time.  In progression one (non-smokers) children dribble the ball down the channel, once they reach the end zone they shoot at the target. This represents how oxygen rich blood flows freely to the active muscles. For progression two (smoker) children need to dribble down and through a row cones before they shoot in the end zone. This represents the narrowing of an artery and how it makes it more difficult for oxygen rich blood to get to the muscles. In progression three, simply add a defender who is allowed to pressurise children with the ball before they shoot in the end zone (static or moving - no tackling allowed). This represents a fatty plaque deposit which blocks the artery and further restricts the supply of oxygen rich blood to the muscles. Count the number of goals scored in each progression.

\*Note: Additional key message delivered in accordance to the SFS key themes

Teachers were incentivised to deliver a minimum of five out of the ten session plans included in the training manual to Year 5 classes over the 2012/13 academic year. Schools who met this requirement, and completed an evaluation for each session, received SFS branded sports equipment (sports cones and bibs) at the end of the intervention.



Left: Branded bibs and cones



Right: SmokeFree Sports Pledge Forms

Within the training pack, teachers also received SFS pledges for Year 5 children. Teachers were asked to encourage children to sign the pledge to be smoke free. It was recommended that children were given the opportunity to sign the SFS pledge following the delivery of a SFS session delivered by a coach or teacher.

### **SFS coaching sessions and school assembly**

Each school received five SFS coaching sessions during school hours between October 2012 and April 2013. In most instances, SFS coaching sessions replaced usual PE lessons. Schools received one multi-skill (delivered by Liverpool City Council sports coaches), two dance (delivered by Liverpool City Council instructors) and two football sessions (one delivered by Everton in the Community and one by Liverpool FC Foundation coaches). Excluding the session delivered by Everton in the Community, session plans were included in the SFS training manual. Collectively, sessions plans were designed so the five session delivered by coaches would cover information on all five SFS themes. Furthermore, teachers were actively encouraged to watch or participate in coaching sessions.



Liverpool FC Foundation - Football



Everton in the community - Football



Sportslinx – Multi-activity



Sportslinx – Multi-activity



Sportslinx – Dance



Sportslinx - Dance

On completion of the SFS coaching sessions, schools received a SFS assembly from a local sports star between April and May, celebrating children's participation in the project. During the assembly, a member of the SFS research team (JT, CM or LF) re-capped smoke free messages through question and answer with children, before a local sports star discussed their sporting achievements and the importance of being smoke free. The assembly concluded with a question and answer session between the SFS sports star and children and each child receiving a certificate for participating in the project. Based on school preferences, assemblies were delivered to the whole school, all junior year groups or only Year 5.



*Tom Wolfenden  
(Badminton)*



*Natasha Jonas  
(Boxing)*



*Matt Lee  
(Handball)*

### **SFS branded collateral**

As an incentive to participate in the research, children were given SFS branded water bottles, drawstring bags and pens. All teaching staff who attended the training and additional staff who delivered PE to Year 5 students received a SFS drawstring bag, note pad, pen, whistle and lanyard. Children from comparison schools were given SFS branded collateral for participating in the study (water bottle and drawstring bag). On completion of data collection at follow-up, children will also receive SFS branded pens and each school will be given a SFS training pack.



### **Duration of the intervention**

SFS was delivered in the 2012-13 school academic cycle, between October 2012 and May 2013. A schematic overview of the intervention activities and research measures is shown in Figure 5. Importantly, a 12 month follow up study of participants is planned in June and July 2014 to assess the long term effects of the programme. The findings will be added to this report at a later date.

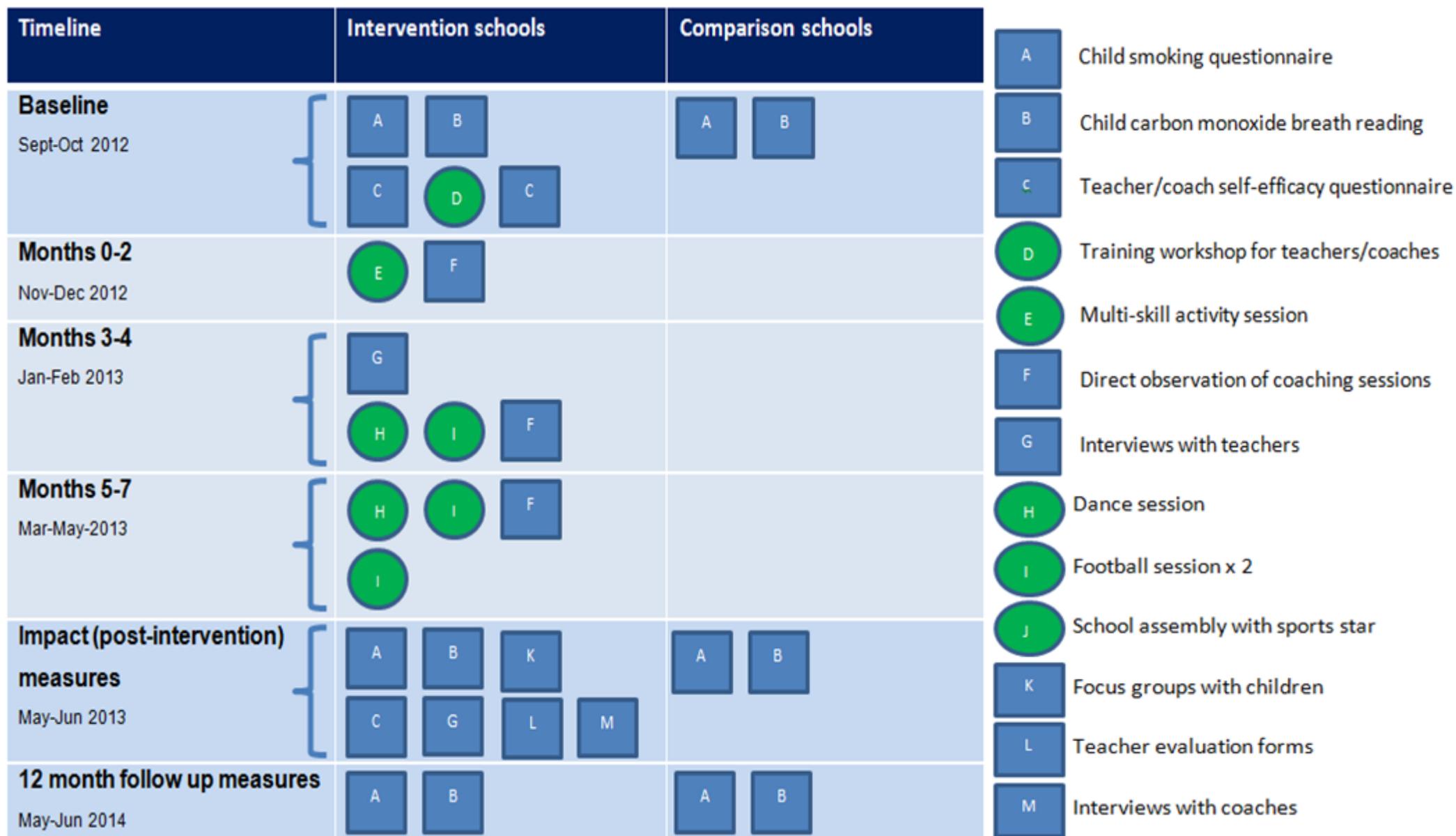


Figure 5 Schematic overview of SmokeFree Sports 2012-13 intervention

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## CHAPTER 4

### Effect of a bespoke training workshop on teachers' and coaches' self-efficacy to deliver SmokeFree Sports

#### *What is already known on this subject?*

- NICE guidance highlights the importance of using trained professionals to deliver school-based interventions to prevent the uptake of smoking
- School teachers have successfully been trained to deliver smoking education in classroom settings
- Sports coaches have successfully been trained to deliver community health promotion initiatives around, for example, healthy eating or alcohol prevention
- It is not known whether teachers or coaches can be trained to deliver a school-based smoking prevention intervention through physical education.

#### *What this study adds...*

- A bespoke 3 hour workshop significantly increases the confidence of both teachers and sports coaches to deliver smoking education through physical activity in school.
- A follow up study of teachers showed that this confidence was maintained post-intervention.

#### 4.1 Aims

Individuals are more likely to engage and contribute positively in activities through which they have a high perceived self-efficacy, defined as *"the belief in one's capabilities to organise and execute the courses of action required to manage prospective situations"* (Bandura, 1997: 168). Therefore, prior to the intervention, at least one teacher from each participating school and all SFS coaches were required to attend a brief intervention training workshop and received a SFS delivery manual. The aim of this study was to determine the influence of brief intervention training on teachers' and coaches' self-efficacy to deliver SFS to children.

#### 4.2 Methods

##### Participants and recruitment

All coaches (n=11) and teachers (n=33) who attended the training agreed to participate in this study.

## Design and measures

To assess the impact of the training a self-efficacy questionnaire, modified from Lane *et al.*'s (2002) measure of self-efficacy, was utilised. Each question was scored using a 'Likert' scale, with 0 indicating 'no confidence at all' and 4 being 'very confident' (see Table 5 for example questions). The phrase 'how confident are you in your ability to [insert competency]' was utilised (Lane *et al.*, 2002) and is consistent with previous research (Bandura, 1977).

Questions were developed by the research team following a consultation period with health professionals, who were experienced in coaching, behaviour change and substance use. The questions surrounded the knowledge and skills required to deliver smoke free messages and were aligned with the learning outcomes from the training. Items were piloted in previous research (Foweather *et al.*, 2011) and modified for the purposes of this study. Questions were tested amongst three sports coaches of similar experience and demographics expected to the participants, as well as two primary school teachers. Amendments were made according to the feedback received, aiding the content and face validity of the questionnaire.

The final questionnaire comprised of 15 items (eight delivery and six knowledge items) and took participants approximately 10 minutes to complete. Questionnaires were completed in full at three time-points across the intervention (pre- and immediately post-training as well as at post six month intervention) by 24 teachers (12 males) that attended the SFS brief intervention training workshop. Eight (6 males) of the 11 coaches who attended the training completed questionnaires in full at pre- and immediately post-training.

**Table 5 Examples of domain-specific coach self-efficacy items**

Domain	Item
Knowledge	How confident are you in your knowledge of the short and long term health risks of smoking?
Knowledge	How confident are you in your knowledge of the effects of nicotine on the body?
Delivery	How confident are you in your ability to communicate the short and long term health risks of smoking to children and young people?
Delivery	How confident are you in your ability to communicate the effects of nicotine on the body to children and young people?

## Data preparation and analysis

Descriptive statistics were generated for all the variables in the study and checked for normality. For analysis, questions were grouped into three summary variables:

- total self-efficacy score
- knowledge self-efficacy score
- delivery self-efficacy score

As data was non-parametric, Friedman tests were conducted to determine differences in teachers' self-efficacy across the three time points, with Wilcoxon Signed Rank Tests applied for post-hoc comparisons (using a Bonferonni adjusted alpha value) and to analyse coaches' data.

## 4.3 Results

Descriptive statistics for coaches and teachers scores for total, knowledge and delivery self-efficacy are displayed in Table 6. Median scores for each question are displayed in Figures 6 and 7.

For teachers, total, knowledge and delivery self-efficacy results indicated there was a statistically significant difference over time points for all domains ( $p < 0.001$ ). There was a significant increase in total, knowledge and delivery self-efficacy between pre-training and post-training ( $p < 0.001$ ) and between pre-training and post-intervention ( $p < 0.001$ ). No difference was apparent for total, knowledge and delivery self-efficacy between post-training and post-intervention ( $p > 0.05$ ).

For coaches, data revealed a significant effect for time, across total ( $p < 0.05$ ), delivery ( $p < 0.05$ ) and knowledge ( $p < 0.05$ ) self-efficacy scales.

**Table 6 Total, knowledge and delivery at all-time points for teachers and coaches**

	Teachers			Coaches	
	Median (Inter-Quartile Range)			Median (Inter-Quartile Range)	
	Pre-training	Post-training	Post-Intervention	Pre-training	Post-training
Total	38 (30, 43)	54 (49, 59)	55 (52, 58)	42 (37, 48)	59 (55, 60)
Knowledge	12 (10, 14)	19 (17, 20)	19 (17, 20)	14 (12, 16)	20 (18, 20)
Delivery	25 (20, 29)	37 (32, 40)	36 (34, 38)	29 (25, 32)	39 (38, 40)

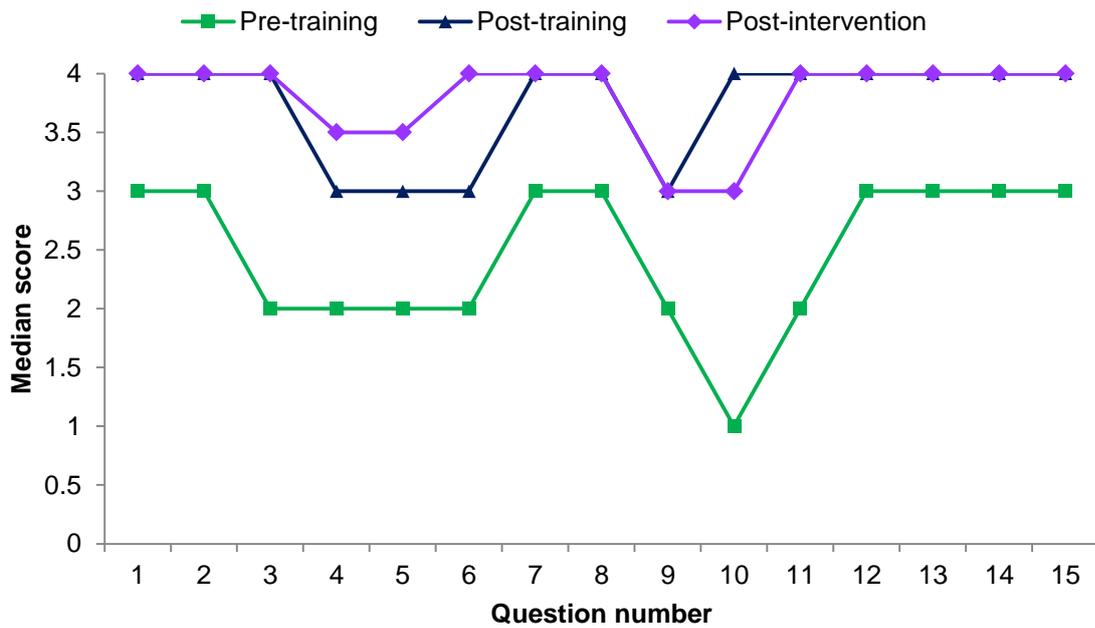


Figure 6 Median self-efficacy score per question for teachers at pre-training, post-training and post-intervention

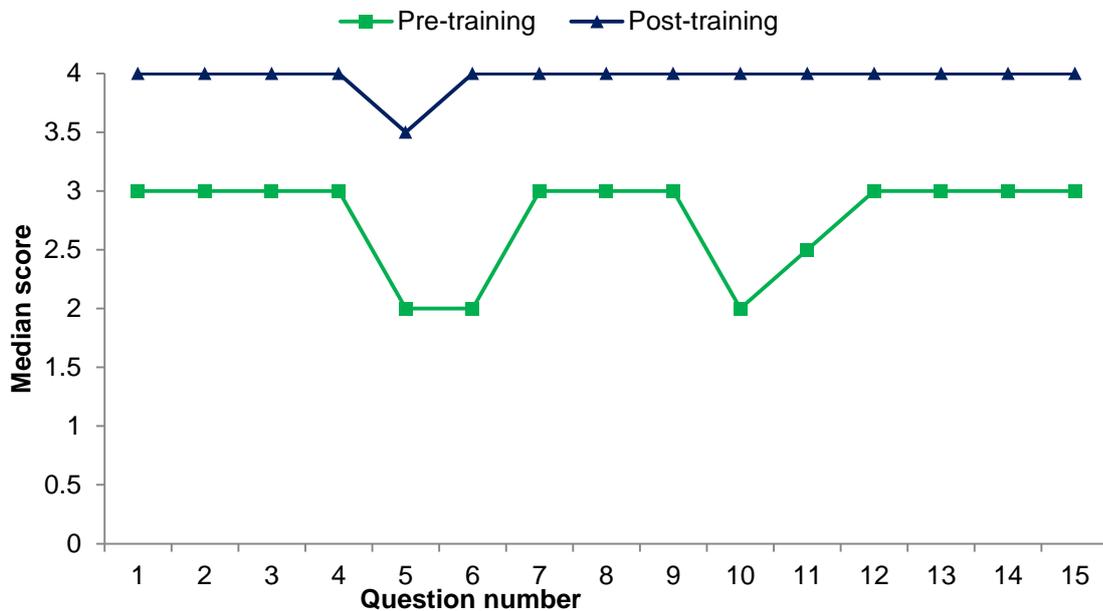


Figure 7 Median self-efficacy score per question for coaches at pre-training, post-training and post-intervention

## 4.4 Discussion

The aim for this study was to determine the effect of brief intervention training on teachers' and coaches' self-efficacy to deliver smoke free messages to children. The results showed that both teachers' and coaches' self-efficacy positively increased from pre- to post-training across all the components, total, knowledge and delivery, and, for teachers, these improvements were maintained at post-intervention.

Results demonstrate that through effective training, coaches and teachers can develop self-efficacy in their knowledge and skills to deliver smoking education in primary PE. These results align to research undertaken by Kealey et al. (2000) who found that following in-service training, elementary school teachers felt better prepared to deliver tobacco use prevention curricular. Further, Bapat et al. (2009) and Glang et al., (2010) reported positive training effects to enhance sports coaches' knowledge, confidence and attitudes towards improving mental health literacy and sports concussion management and prevention, respectively.

The positive effects of the training could be explained by examining qualitative data collected as part of the larger research study (interviews conducted with 11 teachers and seven coaches who attended the training, as well as eight teachers who did not attend the training (see Chapter 5 for further details) in accordance with aspects of Bandura's (1997) sources of self-efficacy; (i) mastery experiences (previous successful performance); (ii) social modelling (witnessing other people successfully completing a task); and (iii) verbal and social persuasion (people are persuaded to believe that they have the skills and capabilities to succeed).

Teachers and coaches described how their learning from the training was attributable to these sources of self-efficacy. Specifically, teachers noted benefiting from opportunities to gain mastery experience during the practical component of the training.

*“Actually doing them [the SFS sessions] was the best thing for me because sometimes I can't visualise things that well”. (Teacher, interview data)*

This could have been of particular importance for teachers due to their lack of confidence and perceived competence in terms of delivering PE (Morgan and Bourke, 2005).

Both coaches and teachers recognised the importance of observing others (social modelling) in the development of their delivery self-efficacy.

*“Seeing some of the games in action and how they panned out, how they worked when we were practising them as adults, then you get an idea of a few of the potential pitfalls” (Teacher, interview data)*

*“I thought it was good the way we got it [the practical training] from other people, because you are seeing people who have done this before so you know what is expected then”. (Coach 3, interview data)*

Lastly, the role of verbal and social persuasion was considered instrumental in the development of self-efficacy.

*“It gave me more PE ideas because PE is not my strong point at all so it was nice to see the PE activities and how you could get that smoke-free message in”. (Teacher, interview data).*

*“I think a lot of people that sort of signed up to it and maybe signed up themselves or been signed up by the school and they went into it kind of like ‘umh’ and I think you went away with a vast majority actually looking forward to taking part in it with real enthusiasm”. (Coach 1, interview data).*

To reiterate the importance of the training, teachers who did not attend identified two of Bandura’s sources and factors affecting self-efficacy, covered during the training and that they felt would have aided their delivery. For instance, participating within the practical aspect of the training and consequently fulfilling the mastery and social modelling components of self-efficacy. The succeeding quote, when asked to provide any tips to other teachers before delivering SFS sessions, displays a requirement for mastery:

*“To run through it [SFS sessions] or go through it or even go through it with a colleague just to [allow me to] feel more confident really or even an inset day having the staff doing it just to get the confidence”. (Teacher, interview data)*

## Conclusion

In conclusion this study has shown the value and utility of brief intervention training for increasing teachers' and coaches' self-efficacy to deliver a smoking prevention intervention. Training positively increased both teachers' and coaches' knowledge and delivery based self-efficacy of the SFS project and its principles. A greater understanding of how brief intervention training can influence self-efficacy is important and strategies for enhancing efficacy in practice should lead to more efficient health promotion training and effective subsequent delivery. Using teachers and coaches as opposed to health practitioners to deliver public health messages can be cost effective and practically appropriate but must be supplemented by suitable training.

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## CHAPTER 5

### Implementation of SFS - a process evaluation

#### *What is already known on this topic?*

- School-based health promotion interventions have previously been criticised for not reporting details surrounding intervention implementation.
- Understanding how an intervention is implemented is important for interpreting whether or not it is effective as well as exploring possible changes needed for future delivery.

#### *What this study adds...*

- Results reveals teachers require additional support to ensure optional intervention components are delivered.
- Data suggests it may be difficult to deliver physical activity sessions for health promotion with high fidelity do to unique setting-related barriers faced and children's needs and preferences, thus suggesting flexibility must be built into the implementation of interventions.

### 5.1 Aims

Understanding how an intervention is implemented is important for interpreting whether or not an intervention is effective as well as exploring possible changes needed for future delivery. The aim of this study was to examine the implementation of SFS in regards to the following components:

- Reach - did the target audience participate in the intervention? What proportion of the target population received the intervention?
- Dose - were intervention components delivered as planned in terms of frequency and duration?
- Fidelity - to what extent was the intervention was delivered as intended?

### 5.2 Methods

#### **Participants and recruitment**

SFS sport coaches as well as teachers from intervention schools were invited to participate in the study. All (n=9) SFS sport coaches leading on the delivery of SFS sessions consented for

researchers to observe their coaching sessions and collect implementation data. Purposive sampling techniques were employed to select a sub-sample of schools where observations would take place, ensuring schools with one, two and three form classes were represented as well as schools from across each of the neighbourhood management areas in Liverpool. Coaches who led SFS sessions were also invited to participate in an interview once delivery of their session type (i.e. multi-skill or dance) was complete.

For the purposes of this study, throughout the intervention all teachers who taught PE to Year 5 were encouraged by the research team to deliver SFS sessions and fill-in an evaluation form on completion of delivery. Furthermore, using purposive sampling techniques a sub-sample of teachers who attended the SFS brief intervention training were asked to participate in an interview at the end of the study. Teachers were selected for interview based on the results of the self-efficacy questionnaire that was completed post-training, ensuring teachers with high and low self-efficacy in delivering SFS were represented. All teachers who did not attend the training but delivered PE to Year 5 were also invited to interview.

### Design and measures

A range of research methods were employed to explore the implementation of SFS. Table 7 provides a summary of methods used.

**Table 7 Data sources used to assess implementation of SFS**

Data source	Sample	Date of data collection	Implementation aspect assessed		
			Reach	Dose	Fidelity
SFS booking logs	32 schools	Oct 2012-Jun 2013	X	X	
Interviews	7 coaches; 20 teachers	Jan-Jun 2013			X
Self-evaluation of intervention delivery	125 sessions completed by 24 teachers	Oct 2012-Jun 2013		X	X
Semi-structured observations of intervention delivery	50 sessions across 12 intervention schools (10 for each activity type)	Oct 2012-Apr 2013		X	X

### SFS booking logs

SFS booking logs were used to assess intervention reach and dose. Throughout the study period, the SFS research team recorded school details (e.g. class size, deliverer of PE to Year 5) and dates components of the intervention were delivered, including SFS training workshops, coaching

sessions and assemblies. Communications (including emails, telephone calls and face-to-face discussions) with teachers regarding the collection of implementation data were also logged.

## **Interviews**

Interviews with teachers and coaches were conducted to explore their perceptions and experiences of the SFS intervention. In total, 20 teachers participated in an interview, including 12 teachers who attended the training (seven with high self-efficacy in delivering SFS post-training, five with low) and eight who did not. Interviews with teachers took place within the school setting within two weeks of the intervention ending (defined as the delivery of a SFS assembly). Moreover, seven out of the nine coaches who led SFS sessions also participated in an interview. Interviews with coaches were conducted face-to-face at coaches or researcher's workplaces (n=6) or via telephone (n=1) within three weeks of completing the delivery of their session type.

Semi-structured interview schedules were designed to cover all aspects of the SFS intervention including training, SFS manual, coaching sessions and assembly, as well as their opinions surrounding qualities of SFS deliverers'. In addition, teachers were asked about the delivery of their own sessions, and their schools engagement with the intervention. Opportunities were given at the end of each session for teachers and coaches to make comments about topics that had not been covered. All interviews were recorded and lasted between 30 and 60 minutes.

## **Self-evaluation of intervention delivery**

Self-evaluation of implementation is considered a common measure of dose, fidelity and acceptability within school-based health promotion studies (Dusenbury et al., 2003). To assess the implementation of SFS, teachers were asked to complete an evaluation sheet immediately following the delivery of a SFS session. In total, 24 teachers filled in and returned self-evaluations of intervention delivery.

Self-evaluation sheets were included in the manual and designed to take approximately five minutes to complete. Utilising a three point scale, teachers were asked to score each session they delivered in terms of clarity of instruction given (very easy, minor confusion or major problem), ease of delivering activities (no problem, minor problem, major problem with delivery), adaptations made (no, minor or major adaptations or made to the session plan), as well as children's engagement (easy, minor or major problems for student to engage), understanding (easy, minor, or major problem for students to understand) and enjoyment (all/most students, some, few/no students enjoyed session) of sessions. Teachers were given the option to provide additional comments regarding the session.

## Direct observations of intervention delivery

To explore the dose and fidelity of SFS coaching sessions, 50 semi-structured observations of coaching sessions took place (10 for each activity type). Observations were carried out across 13 schools (Alt Valley, n=4; Liverpool City and North, n=4; Liverpool South, n=2; Liverpool East, n=2; Central, n=1), with a minimum of two observations overall conducted at each school (mean number of observations at each school=3.8; range 2 to 8).

One trained researcher was present at each observation and completed an observational record. Observational records were designed to record session length, class size, teacher presence, as well as details of how the activities were introduced, explained and delivered, children's engagement and barriers coaches' faced. Observation records were piloted by two researchers and amendments made accordingly to assist in the recording of information, thus aiding the reliability of data collected. Observational records were typed-up following each session for subsequent analysis.

## Data preparation and analysis

SFS booking log were maintained and analysed in Excel. Quantitative data collected via self-evaluations and semi-structured observations of delivery were coded and inputted into SPSS Version 20. Semi-structured observational data was coded on a three point scale (options: *yes, in part, no*). Sessions were divided into the following sections *introduction, warm-up, main section* and *cool down* for coding, with each activity within the sections scored separately. Sections were scored against the following criteria:

- Introduction:
  - Did coach introduce themselves and the SFS intervention?
- Warm up and main section:
  - Was each activity delivered as outlined in the manual?
  - Was the name of the game cited and the purpose of the activity explained as outline in the manual?
  - Was key message # delivered as outlined in the manual? (item repeated for each message outlined for delivery)
- Cool down:
  - Was the activity delivered as outlined in the manual?
  - Was key message # delivered as outlined in the manual? (item repeated for each message outlined for delivery)

To aid the reliability of data, a sub-sample of fidelity scores were cross-checked by a second researcher; inter-coder reliability was high with both researchers agreeing on all scores given. Total scores were calculated for each session and converted into a percentage for comparisons across activities ((total fidelity score across components of observation ÷ number of components for session type) x 100). Fidelity was scored as low ( $\leq 33\%$ ), average (34-66%) or high ( $\geq 67\%$ ), as categorised in previous research (Lee et al., 2013). For fidelity to be defined as acceptable, at least two thirds (67%) of the session had to be delivered as intended.

All interview recordings were transcribed verbatim for analysis. Interview transcripts as well as open responses from self-evaluations of intervention delivery were imported into NVivo version 10 for thematic analysis of qualitative data as outlined below (Boyatzis, 1998; Marshall & Rossman, 2006):

1. Transcripts were read and re-read to get an overall feel of the material, allowing the researcher to get familiar with the data.
2. The data were categorised into broad themes, by identifying recurring, similar and underlying themes.
3. Initially a deductive approach was employed as interviews contained similar material, where findings were interpreted based on the interview schedule.
4. An inductive approach was then employed, creating and categorising new themes from data that did not fit the pre-determined categories.
5. Data were then organised schematically to assist with interpretation of the higher and lower order themes.
6. To aid the credibility and trustworthiness of the results, analyses and interpretations of the data were discussed and checked with the research team.

## 5.3 Results

### Reach

Overall, 1073 children, from 32 schools (including 45 Year 5 classes), received components of the SFS intervention. Thirty-one of these schools (44 classes) completed the SFS intervention (school attrition rate=3.1%). Completion was defined as at least one teacher attending the brief intervention training and Year 5 children receiving five SFS coaching sessions and an assembly. One school withdrew during the study period citing school staffing issues. Schools that received the intervention in full were dispersed across all five Neighbourhood Management Areas in Liverpool, including Alt Valley (n=8), Liverpool City and North (n=7), Liverpool South (n=7), Liverpool East (n=7) and Central (n=2). Three-quarters (75%) of these schools were located in the 10% most deprived Super Output Area's in England (IMD, 2007).

The SFS brief intervention training was attended by thirty-three teachers (from 32 schools; job roles including: teacher, n=25; teaching assistant/ learning mentor, n=6; sports coach, n=2) and all SFS sports coaches delivering sessions (n=11). Of the teachers who attended the training, 53% were female and 62.5% aged 20-39 years. Teachers had between one and 34 years experience of coaching or teaching (mean=9.7 years, s.d.=7.5). Four teachers reported to currently smoke. In addition, nine out of the 11 SFS sports coaches who attended the training were male (81.8%) and eight (72.7%) were aged between 20 and 39 years. Coaches had between two and ten years of coaching experience (mean=3.3, s.d.=1.1). All coaches reported not to smoke.

### **Dose**

Across the course of the intervention period, 223 out of the planned 225 SFS coaching sessions and 31 SFS assemblies were delivered. On average, a 29.5 day interval occurred between coaching sessions (range, 0 to 90 days, s.d.=22.4). Observational data revealed the duration of coaching sessions ranged from approximately 30 to 60 minutes (approximate mean=48.1 minutes, s.d.=8). Assemblies lasted between 15 and 30 minutes based on time allocated by schools. Variations included length of time SFS sports star discussed their sporting achievements and time allocated for questions. Overall, duration of the SFS intervention ranged from 126 to 201 days (mean=169.4 days, s.d.=21.5).

A number of Year 5 classes also received optional components of the intervention. Nearly half (47.7%) of Year 5 classes received a minimum of five SFS sessions from teachers. In total, teachers led 125 SFS sessions, with 56.8% of classes receiving at least two sessions. The first six sessions in the manual were selected for delivery most frequently (sessions one (n=14), two (n=21), three (n=22), four (n=21), five (n=20) and six (n=16). Data from teachers' SFS evaluation questionnaires revealed 20 Year 5 classes signed a SFS pledge (43.5%, approximately 470 children). Eleven Year 5 classes (25%) received the SFS optional intervention components in full (received a minimum of five SFS sessions from teachers and signed the SFS pledge).

Fifteen schools who participated for the study's duration did not return completed evaluations for all Year 5 classes within their school (in two schools with multiple Year 5 classes, sessions were only delivered in one Year 5 class). Reasons recorded by the research team for non-delivery/ non-completion of evaluations included, misplacing training manual, lack of time to complete session evaluations, extended period of sick leave taken during intervention period or Year 5 teacher/ PE teacher entered post part-way through school year. Despite repeated attempts by the research team to contact teachers, reasons for non-delivery or completion are unknown for nine Year 5 classes.

## Fidelity

Observational records were utilised to score the fidelity of 50 SFS coaching sessions. Overall, the average fidelity score for SFS coaching sessions was 57.8% (range 30.5% to 92.1%, s.d.=15.8). Whilst 28% of sessions observed scored high for fidelity, a further 70% were recorded as average. Mean fidelity scores differed across session type (session 1=72.9%; 2=56.1%; 3=52.2%; 4=55%; 5=58.2%). Furthermore, variations in fidelity scores occurred within different sections (warm-up, main activity and cool-down) of session type (see Table 8 for details).

**Table 8 Section of sessions that scored lowest for fidelity**

Session	Section attributed lowest fidelity score
1	Cool down, all key messages not re-capped
2	Cool down, not delivered as outline in the manual, all key messages not re-capped
3	Cool down, all key messages not re-capped
4	Warm-up activity 2, not delivered as outlined in the manual, name and purpose of activity not explained, all key messages not re-capped
5	Main activity 2, not delivered as outlined in the manual, name and purpose of activity not explained, all key messages not re-capped

Reasons for disparities in the fidelity of SFS coaching sessions were explored during interviews. Coaches recognised the importance of consistency in adhering to session plans but identified a number of barriers to delivering sessions as intended (see Table 9). Barriers reported related to the school settings and children, with the former factor leading to more frequent deviations from session plans. In regards to the school setting, barriers included class size, limited time relating to organisation (including, late arrival of class, disruptions in hall leading to early finishes) and the environment (including, hall size, delivering outside due to no access to sports hall). Furthermore, coaches reported modifications were sometimes made to sessions based on children's behaviour and physical disabilities. It was also noted by coaches that delivery of sessions improved over the course of the intervention period as familiarity with activities and messages increased.

*"I think the first 10 schools weren't as good as the last 20 schools, purely because it was, it was something new you hadn't done it before. We had delivered the games before but trying to get your messages in, and they weren't fluent, the last sort of, I'd say the last two thirds of the sessions were so fluent because we'd run through it". (Coach 1, interview data)*

**Table 9 Barriers coaches faced in delivering SFS sessions**

<b>Barriers to delivery</b>	<b>Quotes</b>
<b>School setting</b>	
Class size	<i>"Like the one [name of school], they've only got like nine kids in each class, so we delivered with nine kids. So obviously the session changes, we ended up putting an extra game in I think there, just because you go through things too quickly". (Coach 1, interview data)</i>
Environment	<i>"Obviously some schools have a big hall and some schools don't have such a big hall, so it was mainly the facility we could use and also class size that altered on how the session was delivered". (Coach 2, interview data)</i>
Time	<i>"Yeah, we found that when we were going after dinner time, so it was normally the half one session, obviously the children had just got in from dinner time so where the session was meant to start at half one, by the time they have gone back up to the classroom, got settled, got changed that might have went to a quarter to two and obviously you have to wrap that back up and have the session done for maybe twenty, twenty five past [two] or so". (Coach 5, interview data)</i>
<b>Children</b>	
Behaviour	<i>"... I had to adapt that in a couple of schools because they [kids] were just getting silly and trying to hit each other really as they were coming through, so I adapted that slightly". (Coach 7, interview data)</i>
Disabilities	<i>"The only one [session] we had to modify... there was a few kids with disabilities in the school, in the class that we done, and that was just stuff we know how to adapt to anyway". (Coach 6, interview data)</i>

To determine fidelity of SFS sessions delivered by teachers, self-evaluation data was used. For 50.8% of the SFS sessions led by teachers no adaptations were reported, a further 43.5% of sessions were delivered with minor amendments. Data from self-evaluations revealed, 91.9% of sessions that took place were deemed 'easy to deliver', with a further 87.1% delivered with 'no problems experienced'.

Self-evaluation forms requested teachers explained why modifications were made to session delivery. Reasons were explored further during interviews (12 out of the 20 teachers interviewed reported to deliver SFS sessions). Barriers teachers' reported to delivering sessions as intended included, time restrictions, environment (including delivering outside, size of hall), children's educational understanding (including literacy and numeracy skills as well as knowledge of the human body) and managing children's challenging behaviour when on the 'smoking' team. In addition, modifications were made based on children's preferences for an activity. See Table 10 for a summary of barriers faced by teachers in delivering sessions.

**Table 10 Barriers teachers faced in delivering SFS sessions**

Barriers to delivery	Quotes
Time	<i>"Did not have time to complete all activities". (Teacher, school 20, self-evaluation data)</i>
Environment	<i>"It was weather more than anything you know. The game were we had to have the cones and you had to turn them over we were out in a force 10 gale and they were just blowing everywhere and they were getting really upset". (Teacher, school 1, interview data)</i>
Educational understanding	<i>"Some children didn't have good knowledge of human body - this meant that they needed lots of support with bean bag game". (Teacher 1, school 41, self-evaluation data)</i>
Behaviour	<i>"I quite often had characters in a bit of a sulk because of it [being put on the 'smokers' team]". (Teacher, school 13, interview data).</i>
Children's preferences	<i>"Used the same messages but changed the sport to basketball instead of football due to previous issues with some of the girls engaging with the context. The children loved the session". (Teacher 1, school 8, self-evaluation data)</i>

## 5.4 Discussion

The aim of this study was to explore the implementation of the SFS intervention. Implementation data revealed intervention reach was high, with more than 1000 children taking part in SFS. It is suggested high intervention reach was partly attributable to how SFS was built into the school timetable, often a substitute for usual PE lessons, where participation was compulsory (except in circumstances where children were exempt from usual PE lessons).

High intervention reach was also coupled with the low observed attrition rates (based on school drop-out rates), and comparable to other large scale secondary school-based smoking prevention studies prior to follow-up periods (Peterson et al., 2000; Campbell et al., 2008). As a result of recruiting and maintaining engagement with 31 schools across the study period, to our knowledge SFS is the largest primary-school based smoking prevention intervention to take place in the UK.

Disparities in intervention dose were, however, apparent, and related to optional components of the intervention, including additional delivery of SFS sessions by teachers and signing SFS pledges. Additional sessions were received by 56.8% of Year 5 classes, with 47.7% getting the recommended five additional sessions to reinforce the SFS key messages. SFS pledges were

signed by nearly half (43.5%) of Year 5 classes. Results therefore indicate that a significant number of schools would not have received any intervention components if SFS sports coaches had not been employed to lead sessions and an assembly delivered. Further research is needed to explore what additional support is required to ensure optional components are delivered in all schools for future SFS studies.

An acceptable level of fidelity (defined as  $\geq 67\%$  of the session delivered as intended) was found in 28% of coaching sessions, whilst adaptations were made to nearly half of sessions delivered by teachers. Variations in dose and fidelity have been observed in other health promotion interventions within school settings. For example, The Midwest Prevention Project, a drug abuse prevention project for adolescents, revealed 68% of teachers deviated at least slightly from the prescribed set of lessons (Prentz et al., 1990). Similarly, an obesity risk-reduction nutritional curriculum intervention delivered by teachers, reported the average lesson completion rate as 70%, with a mean score of 76% for 'faithfulness' to the curriculum (Lee et al., 2013).

Higher levels of dose and fidelity were reported for the Hutchinson Smoking Prevention Project, where data showed the intervention was implemented by nearly all teachers ( $>99\%$ ), with 86% of observed lessons taking place as outlined (Peterson et al., 2000). Furthermore, results from the 'A Stop Smoking in School Trial' (ASSIST) intervention reported fidelity of intervention delivery as 'high', where all stages of the intervention were rolled-out across schools and 'desired' peer support levels were obtained (Holliday et al., 2009). Research therefore illustrates dose and fidelity levels vary and achieving complete implementation of a health promotion intervention in the school settings is unlikely and moreover not always desirable (see below). When comparing studies consideration must be given to how dose and fidelity is measured and scored as well as the nature of the intervention under investigation.

Whilst SFS session plans were designed to be pragmatic for consistent implementation across schools, several barriers to delivering sessions as intended were cited by coaches and teachers. Particular barriers experienced during sessions (e.g. environment, class size and children's physical disabilities) related specifically to the use of physical activity as a vehicle for delivering smoking prevention education. In relation, barriers reported regarding children's engagement and school settings suggest general adaptations to the session plans are necessary to aid practical implementation of the intervention, for example reducing session length. Moreover, session plans were adapted to aid children's educational understanding and participation as well as meet their preferences, a practice that is recommended in school-based health promotion to and promote ownership and children's engagement (Dusenbury et al., 2003).

It is therefore suggested greater flexibility in the design of session plans is needed to ensure fidelity of intervention implementation is not compromised. The ASSIST study has previously documented success in integrating such an approach, where a 'traffic light system' was designed labelling intervention components as red (essential component of the intervention and should not be omitted), amber (intervention component intended to consolidate skills and can be omitted during particular circumstances such as serious time constraints) and green (this is a linking activity and can be omitted if there are time constraints) in regards to their implementation (Holliday et al., 2009). If flexibility is to be built into the design of SFS session plans, it is recommended further research is needed to investigate the impact of individual components and explore conditions in which modifications to the intervention should be made (Dusenbury et al., 2003).

Whilst the study has been insightful into the implementation of the intervention a number of limitations and implications for future research are recognised. Whilst self-report data to ascertain intervention implementation is commonly used in school-based health promotion studies (Dusenbury et al., 2003), it is recognised self-report data may overestimate actual dose (see Allen et al., 1990) and researchers may lack agreement with teachers' fidelity scores if direct observation had taken place (see Hansen and McNeal, 1999). Direct observations of a sub-sample of SFS sessions delivered by teachers to assess researcher-teacher agreement of fidelity scores would have been beneficial. Moreover, video recording SFS coaching sessions would have allowed for researchers to cross-check scoring of fidelity aiding reliability of data.

This process evaluation exploring reach, dose and fidelity of SFS provides useful details in regards to intervention implementation. Data from this study shows whilst intervention reach was high, disparities in intervention duration and uptake, as well as the extent to which components were delivered as intended were apparent. This information is important to in order to make improvements to aid the delivery of SFS in future practice and addresses assumptions regarding intervention implementation. How the dose and fidelity obtained in the current study will impact on the effectiveness of the intervention in relation to children's smoking related attitudes, intentions and refusal-self-efficacy, will be inferred from impact data (see Chapter 6).

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## CHAPTER 6

### Impact of the SmokeFree Sports intervention

#### What is already known on this subject?

- Early age of smoking initiation increases the likelihood of subsequent smoking and dependency
- However, school-based smoking prevention interventions have generally been developed and implemented in secondary schools.

#### What this study adds...

- In the short-term, utilising physical activity to foster children's negative attitudes towards smoking and to strengthen intentions not to smoke and refusal self-efficacy appears just as effective as classroom based smoking prevention interventions.

### 6.1 Aims

An estimated 330,000 young people under the age of 16 try smoking for the first time in England, indicating a clear need for smoking prevention in children. Schools are optimal settings for relaying messages about the health risks associated with smoking and for implementing smoking prevention programmes. However, there is a notable lack of smoking prevention interventions in UK primary schools. Therefore this study aimed to evaluate the short-term impact of SmokeFree Sports on Year 5 children's (aged nine to ten years) smoking related intentions, self-efficacy and attitudes toward smoking.

### 6.2 Methods

#### Participants and settings

Participants and settings were as described in the cross-sectional study (see Chapter 2). Briefly, 154 state primary schools across Liverpool (n=104) and Knowsley (n=50) local authorities were identified as being eligible for the study and were subsequently invited to take part. Forty-three state

primary schools across Liverpool and Knowsley consented to participate. Due to funding requirements it was not possible to randomise schools to the intervention; therefore adopting a non-randomised controlled study design, schools were clustered into two groups:

1. Intervention group (Liverpool primary schools; n=32) received their usual smoking-related education plus SFS
2. Comparison group (Knowsley primary schools; n=11) received only their usual smoking-related education

Baseline data was collected in September and October 2012. Post intervention measures were completed following the intervention in May and June 2013. See Figure 5 for a schematic overview of intervention and evaluation components. One intervention school dropped out during the study due to internal staffing issues, prohibiting collection of post-intervention data. Full details surrounding the flow of schools and participants through the trial are provided in Figure 8.

## **Design and description of the intervention**

For a description of the intervention and its implementation, see Chapters 3 and 4.

## **Measures**

### ***Smoking questionnaire***

To assess the impact of SFS children completed a smoking questionnaire at baseline and again within 14 days of the final component of the intervention (i.e. school assembly). The questionnaire is described in detail elsewhere (Chapter 3). To validate self-report smoking behaviour, carbon monoxide (CO) concentrations in expired air were taken and recorded.

### ***Focus groups with children***

To add context to quantitative data, mixed-sex focus groups (n=18) were facilitated with children (n=95; 45% boys). Focus groups explored children's responses to the smoking questionnaire, appropriateness of the intervention and improvements for future implementation. Key topics discussed included perspectives on the games delivered; recall of games and smoke free messages; quality of deliverers; and views for improvement of the intervention. During focus groups, photographs of SFS games were used to help children recall activity type. Focus groups lasted from 30 to 50 minutes, were conducted with groups of five to six children and audio recorded using a Dictaphone.

### ***Interviews with teachers and coaches***

Semi-structured interviews with teachers and coaches were conducted to explore views and opinions of the level of appropriateness and impact of the SmokeFree sports intervention (see Chapter 5).

### **Data analysis**

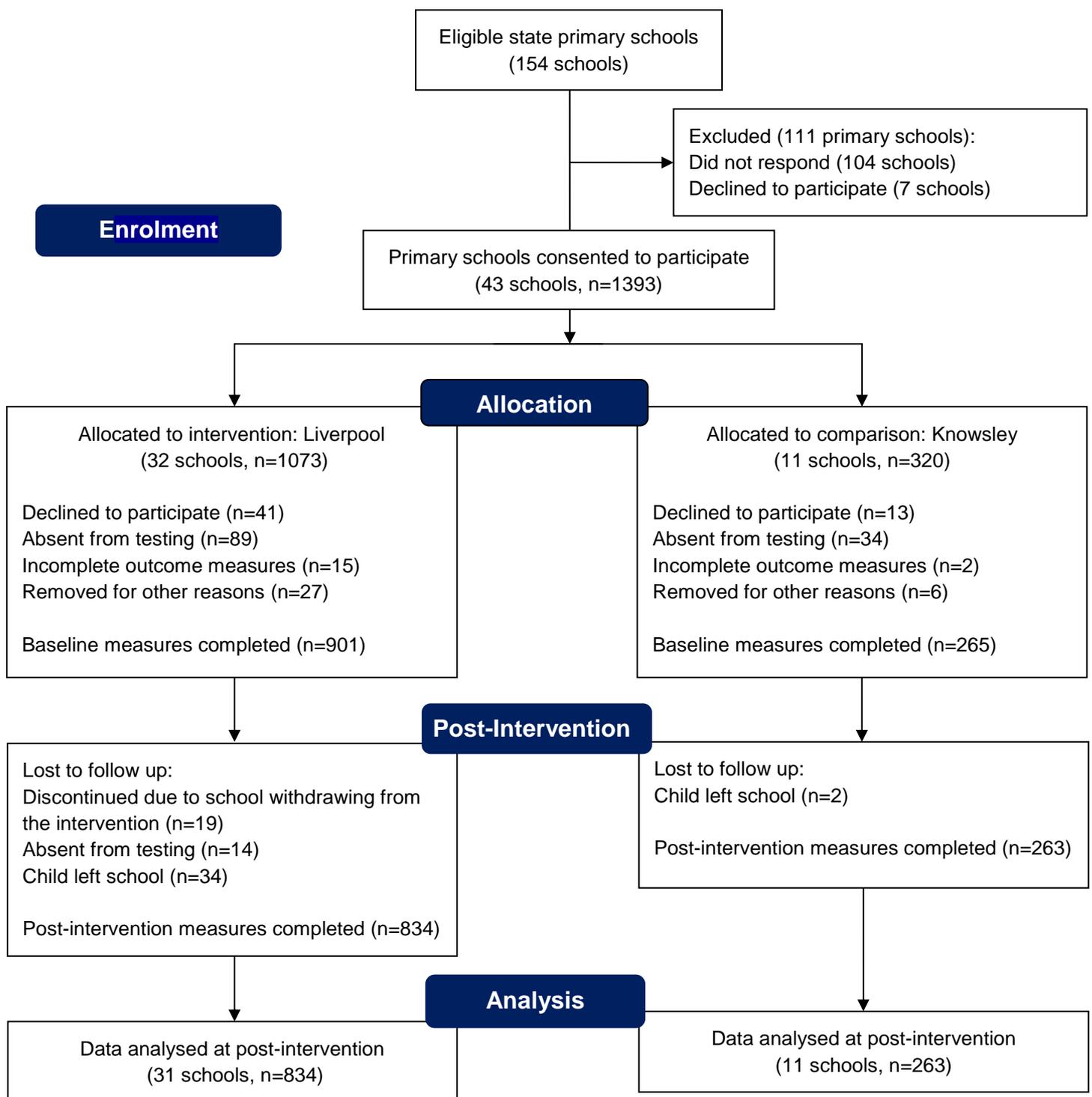
Prior to data analysis, questionnaires were collated and checked for normality using descriptive statistics. After adjustments for baseline values (to control for differences between intervention and comparison groups), gender, family smoking status and friends smoking experimentation (included as a result of the cross-sectional study findings), intervention effects were explored using ANCOVA and logistic regression. To facilitate interpretation, adjusted odds ratio were converted to relative risk (RR) estimates together with their associated 90% confidence intervals using the formula provided by Zhang & Yu (1998). Statistical significance was set at  $P < 0.05$  and all analyses were conducted using SPSS version 20. Focus groups were transcribed verbatim, imported into NVivo 10 software, and subjected to thematic analysis (refer to chapter 5 for a description).

## **6.3 Results**

In total, 1097 children (mean age; 10.1 years;  $SD = \pm 0.2$ , 51% girls) completed the questionnaire at baseline and post-intervention, and were therefore included in the final analysis (see Figure 8 for progress of schools and participants through the study). Participant attrition rates from baseline were 7% and 1% for the intervention and comparison groups, respectively. However, the withdrawal of one school from the intervention automatically excluded 19 children from post-intervention assessments. Had the school not withdrawn the attrition rate for the intervention group would have been 5%.

### **Intention to smoke and refusal self-efficacy**

Table 11 displays children's smoking-related intentions and refusal self-efficacy at baseline and post-intervention. There were no significant differences between children who participated in SFS and children in comparison schools on smoking-related intentions ( $P = .45$ ) or refusal self-efficacy ( $P = .20$ ) at post-intervention. Whilst there were no significant intervention effects on children's smoking-related intentions and refusal self-efficacy (possible ceiling effect), qualitative data revealed that SFS made children more determined not to smoke (*"we've learnt it's bad and not to do it [smoke] so I'm definitely not going to smoke when I'm older"* (Girl, school 38 (gp 2), focus group data). Children's reasoning for not wanting to smoke and having confidence to abstain from



**Figure 8** Flow diagram of progress of schools and participants through the research study

smoking surrounded the cost of cigarettes (*“it costs you loads of money when you could go on holiday and may as well spend it on something else not cigarettes”*. (Girl, school 4, focus group data), chemicals in a cigarette (*“because now I’ve learnt how many chemicals and what goes in to them that’s why I wouldn’t smoke.”* (Boy, school 18, focus group data), and its impact on sport performance (*“its double times harder to do like sports and activities for smokers than non-smokers.”* (Boy, school 3, focus group data).

**Table 11 Smoking intentions and self-efficacy scores at baseline and post-intervention (Mean, SD)**

	Comparison (n=263)		Intervention (n=834)		AMD (90%CI)
	Baseline	Post	Baseline	Post	
No intention to smoke in future	11.68 (0.9)	11.74 (0.7)	11.75 (0.8)	11.80 (0.7)	.03 (-.04 to .11)
Self-efficacy to stay a non-smoker	13.48 (3.2)	13.66 (2.9)	13.65 (3.0)	13.95 (2.6)	.24 (-.07 to .55)

Note: AMD = Adjusted Mean Difference, i.e. intervention group mean change minus comparison group mean change, adjusted for baseline differences, gender, family smoking (parents/siblings) and friends smoking experimentation (smoke/tried); 90% CI = 90% confidence interval

Teachers and coaches believed that the information children learned through SFS would have a positive impact on their smoking behaviour (*“I think it [SFS] will have a great impact on it [children’s smoking behaviour].”*) (Teacher 2, school 8, interview data). However, teachers were sceptical regarding the long-term impact of SFS on children’s future smoking behaviours, recognising external pressures on children to smoke (*“It’s effective now but I feel if it [SFS] doesn’t continue they’ll just get pressured anyway.”*) (Teacher 1, school 2, interview data).

### Attitude towards smoking

Table 12 displays children’s attitudes towards smoking at baseline and post-intervention. At post-intervention children who participated in SFS were significantly more likely to have negative attitudes toward smoking than did children in comparison schools (Table 13). Children who took part in SFS were more likely to believe that: 1) *it is not safe to smoke for a year or two as long as you quit after that* (RR= 1.2,  $P<0.01$ ); 2) *it is difficult to quit smoking once started* (RR= 1.5,  $P<0.05$ ); 3) *smoke from other peoples cigarette is harmful to you* (RR= 1.2,  $P<0.01$ ), 4) *smoking effects sport performance* (RR= 1.6,  $P<0.01$ ) and 5) *makes no difference to weight* (RR=2.0,  $P<0.01$ ).

**Table 12 Children’s attitudes towards smoking at baseline and post-intervention (%)**

	Comparison (n=263)		Intervention (n= 834)	
	Baseline	Post	Baseline	Post
Do you think that smoking cigarettes is bad for your health? <i>(definitely yes)</i>	89.0	91.3	89.1	93.8
Do you think that it is safe to smoke for only a year or two as long as you quit after that? <i>(definitely not)</i>	60.5	54.8	63.8	67.7
Once someone has started smoking, do you think it would be difficult to quit? <i>(definitely yes)</i>	43.3	43.3	52.6	67.1
Do you think the smoke from other people’s cigarettes is harmful to you? <i>(definitely yes)</i>	60.5	56.3	65.3	69.5
Do you think smoking effects sports performance? <i>(definitely yes)</i>	51.7	53.2	56.8	88.0
Do you think smoking makes you gain or lose weight? <i>(no difference)</i>	40.7	33.5	42.8	68.1

Note: \*Significant difference ( $P<0.05$ ), <sup>a</sup> Intervention group percentage change from baseline to post-intervention versus comparison group percentage change from baseline to post-intervention.

**Table 13 Binary logistic regression analyses exploring likelihood of developing negative attitudes toward smoking at post-intervention, relative to comparison group.**

	β	SE	OR	90% CI	RR	P
Do you think that smoking cigarettes is bad for your health? <i>(definitely yes)</i>	1.29	0.28	1.45	0.86 to 2.43	1.03	0.15
Do you think that it is safe to smoke for only a year or two as long as you quit after that? <i>(definitely not)</i>	0.5	0.14	1.73	1.29 to 2.32	1.2	<0.01
Once someone has started smoking, do you think it would be difficult to quit? <i>(definitely yes)</i>	0.94	0.15	2.5	1.9 to 3.46	1.5	<0.01
Do you think the smoke from other people’s cigarettes is harmful to you? <i>(definitely yes)</i>	0.05	0.15	1.7	1.29 to 2.34	1.2	<0.01
Do you think smoking effects sports performance? <i>(definitely yes)</i>	1.88	0.16	6.4	4.69 to 8.99	1.6	<0.01
Smoking cigarettes makes you gain or lose weight? <i>(no difference)</i>	1.48	0.15	4.3	3.24 to 5.92	2.0	<0.01

Note: Adjusted for baseline values, gender, family smoking (parent/sibling) and friends smoking experimentation (tried/smoke); β, regression coefficient; SE, standard error; OR adjusted odds ratio; 90% CI, confidence intervals; RR, adjusted relative risk.

Qualitative data revealed that children believed smoking prevention to be the purpose of SFS (*“trying to encourage kids not to smoke”*. (Girl, school 10, focus groups data)). Children in the focus groups demonstrated they already had a negative disposition towards smoking but SFS was considered to have an impact on their smoking-related attitudes.

In particular, children were able to recall games related to the health effects of smoking (*“we had to try and get the ball through but the non-smokers had a wider [space] and the smokers had it narrower so it was harder for them [smokers] to get the phlegm out”*. (Boy, school 3, focus group data)), and its impact on sport performance (*“you had to run fast, your heart beat goes faster when you’re a smoker and when you’re a non-smoker your heart beats a steady beat.”* (Boy, school 38 (gp 2), focus group data)).

Children remembered learning about the chemical components of a cigarette (*“in the chemical soup game we did all the chemicals that go into a cigarette like rat poison, tar, copper, tobacco, nicotine..., nicotine, that makes it addictive”*, (Boy, school 15 (gp 1), focus group data)), and the effects of smoking on weight (*“people think that smoking makes you lose weight that’s why they do it but then it doesn’t make you lose weight”*. (Boy, school 15 (gp 2), focus group data)

Analysis of interviews indicated that teachers believed that SFS had a positive impact on children’s smoking-related attitudes (*“they could answer back stuff that I would have had to have checked, they were remembering it, it’s burned into them”*. (Teacher, school 2, interview data)), and that the information provided was suitable for all children (*“it wasn’t just the brighter kids were answering the questions it was all, they were all involved”*. (Teacher, school 18, interview data)).

Coaches were in agreement with teachers and believed SFS increased children’s awareness of smoking factors with one coach stating; *“they come in with a perception already [smoking] is bad but by the end of the session they realise a lot more of the chemicals inside cigarettes and they understand the effects [of smoking], of what it can do to the lungs, the throat so yeah it is really beneficial for the kids to do the activities because it really drills home the effects that smoking has on their bodies.”* (Coach 2, interview data).

## 6.4 Discussion

According to the Cochrane review of school-based smoking prevention interventions (Thomas et al., 2012), this is the first study to utilise physical activity to deliver smoke free messages to children. The purpose of this study was to evaluate the short-term impact of SFS on nine to ten year old

primary school children's, intentions, refusal self-efficacy and attitudes toward smoking. SmokeFree Sports had a positive impact on children's attitudes towards smoking. Whilst after analysing questionnaire data there were no intervention effects observed for smoking intentions and refusal self-efficacy, participants in focus groups articulated that SFS made them more determined not to smoke and confident to abstain from smoking. Interviews with teachers and coaches also revealed SFS positively impacted on children's short-term smoking-related attitudes and intentions. These findings lend support to the use of physical activity to deliver smoke free messages to primary school children.

The positive outcome observed for children's attitudes toward smoking are in line with McGahee and Tingen (2000) who implemented a school-based curriculum called "Do It Yourself-Making Healthy Choices" for children aged ten to eleven years across nine public schools in the United States. This intervention comprised of five modules including: 1) the effects of smoking on the body, 2) reasons why people smoke, 3) decision making and alternatives to smoking, 4) refusal skills and 5) practicing refusal skills through role plays. It was found that children in the intervention had significantly more negative attitudes toward smoking than did children in control schools. Consistent with our study, no significant differences were found for smoking refusal self-efficacy between intervention and comparison schools.

Similarly, Crone et al. (2011) evaluated the impact of a smoking education programme called 'But I don't smoke' for Dutch children in grades 5 and 6 (aged 10 and 11 years). This intervention comprised of six 1-hour lessons (3 lessons in grade 5, and 3 lessons in grade 6), and focused on the consequences of smoking, attitudes toward smoking, intention to smoke and resisting social pressure, with the control schools continuing with their usual smoking education. Children's perceptions surrounding the short and long term disadvantages of smoking significantly increased but no differences on the remaining behavioural determinants were found between the two groups.

Consistent with these preadolescent school-based interventions, we found no significant differences between children who participated in SFS and children in comparison schools on self-reported smoking intentions and refusal self-efficacy. Possible explanations for the lack of significant differences between the two groups may be because children at this age still uniformly possess anti-smoking expectancies thus the intervention could not demonstrate effects in the short-term due to a ceiling effect. Limited intervention effects could also be due to variations in the dose and fidelity of the intervention, although implementation was sufficient to change attitudes. Previous research has demonstrated that the fidelity with which an intervention is implemented affects how well it succeeds (Dusenbury et al., 2003).

Whilst quantitative data did not show an effect, qualitative data demonstrated that the games played and the information received during SFS strengthen children's intentions not to smoke and their refusal self-efficacy. These data are important because youth who have a firm commitment not to smoke and strong refusal self-efficacy skills are less likely to smoke (Wakefield 2004; Harakeh et al., 2004; Otten et al., 2004). Whilst teachers and coaches' believed SFS would have a positive impact on children's behaviour, some expressed SFS would need to continue to ensure children would not succumb to external pressures to smoke. However, the positive impact of SFS on children's attitudes towards smoking may help strengthen children's intention not to smoke. This is particularly important because intention to smoke strongly predicts subsequent smoking onset in youth (see review, Conrad et al., 1992).

Our school-based study, which used physical activity to foster negative attitudes towards smoking, appears just as effective as classroom based smoking prevention programmes. Evidence suggests that engagement in physical activity may serve as a protective factor against smoking in adolescence (Aaron et al., 1995; Audrian-Govern et al., 2003). Hence, physical activity may improve health not only directly but also through its protecting effect from smoking. According to Alfrey et al. (2012), health-related physical education (PE) is an important component for promoting knowledge, skills and understanding required to lead healthy and active lifestyles. Our study lends support to the use of health-related PE to deliver smoking prevention education to children.

## Conclusion

In conclusion, SmokeFree Sports had a positive impact on children's attitudes towards smoking post-intervention and qualitative data revealed the intervention strengthened intentions not to smoke in the future and refusal self-efficacy. Based on our cross sectional findings surrounding the influence of family member smoking on children's smoking related intentions, refusal self-efficacy and attitudes, future smoking prevention efforts should consider involving parents in order to overcome social norms and create a positive image of a non-smoking lifestyle among children. The findings of this study lend support to the use of physical education and sport mechanisms to deliver smoking education to Year 5 (aged nine to ten years) children. To assess the medium-term effects of SFS and therefore the efficacy of physical education and sport mechanisms as a smoking prevention strategy, twelve month follow-up measures will be completed in May and June 2014.

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## CHAPTER 7

### Acceptability and sustainability of SFS – a process evaluation

#### *What is already known on this topic?*

- School-based health promotion interventions have previously been criticised for not conducting thorough process evaluations.
- Understanding participants perceptions of an intervention and views regarding its sustainability are important for assessing whether it is acceptable to participants, and if so, how it might be implemented as routine practice.

#### *What this study adds*

- Physical activity is considered an acceptable mechanism to deliver smoking-related education to children in school settings.
- Data suggests ongoing support, such as the provision of training and feedback, for deliverers' of a school-based smoking prevention intervention utilising PE would be beneficial.

### 7.1 Aims

Exploring participants perceptions of an intervention and views regarding its sustainability are important for assessing whether it is acceptable to participants, and if so, how it might be implemented as routine practice. The aim of this study was to examine the perceived acceptability of the SFS intervention from the perspectives of children, teachers and coaches, and sustainability from the views of deliverers.

### 7.2 Methods

#### **Participants and recruitment**

Children and teachers from intervention schools as well as SFS sports coaches participated in this study. All children who participated in the impact study (See Chapter 6 for details surrounding

participants and recruitment), as well as teachers and coaches recruited for the implementation study (see Chapter 5 for details), also took part in process measures to explore the wider acceptability and sustainability of the intervention. In addition, all Year 5 teachers and others who taught PE to Year 5 were asked to complete a questionnaire evaluating SFS post-intervention.

### Design and measures

A range of research methods were employed to explore the acceptability and sustainability of SFS. Table 14 provides a summary of methods used.

**Table 14 Data sources used to assess acceptability and sustainability of SFS**

Data source	Sample	Date of data collection	Implementation aspect assessed	
			Acceptability	Sustainability
SFS evaluation questionnaires	1097 children; 50 teachers	Apr 2013-Jun 2013	X	
Focus groups	95 children (18 focus groups)	Apr 2013-Jun 2013	X	
Interviews	7 coaches; 20 teachers	Jan-Jun 2013	X	X
Self-evaluation of intervention delivery	125 sessions completed by 24 teachers	Oct 2012-Jun 2013	X	

### SFS evaluation questionnaires

Post-intervention, 1097 children completed a short questionnaire to evaluate SFS. Children were asked six questions to explore enjoyment, perceived usefulness and general views of the intervention. Questions were inserted at the end of the online smoking questionnaire and took approximately five minutes to complete.

For teachers, a one-page evaluation questionnaire was designed to collect information about smoking education delivered to Year 5 children across the 2012/13 academic year as well as explore teachers' perceptions surrounding the acceptability of SFS. Questions assessing acceptability of SFS related to perceived usefulness, general views as well as strengths and weaknesses of the intervention. The questionnaire was designed to take approximately five minutes to complete. Fifty teachers filled in a questionnaire at the end of the intervention.

### ***Focus groups and interviews***

Focus groups were conducted with children (see Chapter 6), and interviews with coaches and teachers (see Chapter 5), to explore perceptions the implementation of SFS as well as the acceptability of the intervention. Interviews were also employed to assess deliverers' views surrounding the sustainability of SFS.

### ***Teachers' self-evaluation of intervention delivery***

In addition, teachers' evaluations of session delivery were used to explore perceived acceptability of SFS. For further details of this method see Chapter 5.

### **Data preparation and analysis**

Questionnaire data was analysed in SPSS version 20 and descriptive statistics generated. Self-evaluation data, interviews and focus groups were analysed as outlined in Chapters 5 and 6.

## **7.2 Results**

### **Acceptability**

Overall, SFS was viewed positively and considered to align with the PSHE curricula. Questionnaire data revealed almost all children enjoyed ('a little' or 'a lot') taking part in SFS (98.5%), with 85.1% of children scoring SFS five out of five. Furthermore, 96.8% of children reported they would recommend ('probably' or 'definitely') the intervention to a friend, and 88% considered SFS 'very useful' in helping them to stay smoke free.

Similarly, 82% of teachers scored SFS five out of five. All teachers stated they would recommend ('probably' or 'definitely') SFS to other schools and 80% thought SFS would be 'very useful' in helping children to stay smoke free. In addition, coaches and teachers praised the organisation of the intervention and professionalism of staff (SFS evaluation questionnaire and interview data).

*"I think everything is set up well, it's well organised, its well run, the messages are clear and concise ... you know everything is in place for it to be successful". (Coach 1, interview data)*

*"A really excellent planned and delivered programme with enthusiastic and committed staff". (Teacher, school 3, SFS evaluation questionnaire data)*

### ***Physical activity as mechanisms to deliver smoking education***

Physical activity was considered an acceptable tool to deliver smoke free messages. Collectively, children, teachers and coaches viewed physical activity as a useful mechanism to engage children in smoking prevention education.

*“Like when you’re in class and your teacher’s telling you not to smoke and you’re sitting there going ‘I’m bored’, [and they are saying] ‘like no don’t smoke and it’s bad for you’, and you’re just sitting on the carpet....what we do every day and we’re thinking this is just a boring lesson.... and then the coaches are better cause as [child] said they do loads of activities with you... they try and make it as fun as possible and then that’s why I like SFS coming in”. (Girl, school 3, focus group data)*

In particular, children and teachers felt SFS offered a “fun” learning experience where smoking-related messages were demonstrated and ‘experienced’ through physical activity, thus aiding children’s understanding.

*“They taught us through fun and games and using sport to help us understand how with the football, if they use the footballs to go down your throat [dribbled ball through cones], and how hard it was if you smoke, and if you don’t smoke how it was easier”. (Boy, school 38 (gp 3), focus group data)*

*“Instead of them being told that information and writing it down they can actually feel the effects on their body which is they learn from experience so it’ll be more vital to them in their understanding”. (Teacher (1), school 2, interview data)*

Similarly, coaches regarded physical activity as a useful mechanism to deliver smoke free messages due to the inherent relationship between physical activity and smoking as well as children’s interest in the pastime.

*“I think personally football is the best thing to use [to deliver smoke free messages] because in football... like when you are playing professional football it is 90 minutes and professional footballers are training each day, so if they are smoking they are not going to be able to take part in the sport... if you go to young children ‘who wants to be footballers?’ and you tell them about like they [footballers] are training every day and they are not smoking, the children are going to want to look up to... so to use football as a way to get them away from smoking I think it is the best method”. (Coach 3, interview data)*

This method was considered “*inclusive*” by coaches and teachers, and according to coaches since children enjoyed and were familiar with physical activity, this would also encourage participation in SFS.

*“I just think sport is quite prevalent in nearly every child’s life and I think no matter what most of them kids will be doing sport in school and I could imagine most of them doing sport after school as well so it is something that is quite frequent in their life so they can relate to a bit more”.*  
(Coach 5, interview data)

### **Perceptions of the SFS brief intervention training workshop and manual**

Collectively, teachers and coaches viewed the training and manual positively. Two teachers did however feel the training was unnecessary when coupled with the manual.

*“I think I could have got by without it because as I say you see it again and I think this book [the manual] by the way was very helpful”.* (Teacher, school 1, interview data)

Whilst teachers and coaches valued the importance of the theoretical and practical sessions of the workshop, it was felt the practical session worked particularly well.

*“I thought it was good the way we got it from other people because you are seeing people who have done this before so you know what is expected then”.* (Coach 3, interview data)

Moreover, teachers reported the manual aided the delivery of their sessions, praising the clarity of the instructions and simplicity of the session plans.

*“The manual, I thought was really useful, it breaks down [activities] really simply with clear explanations”.* (Teacher, school 15, interview data)

Coaches also recognised the importance of the manual, using it to refresh their knowledge of activities and key messages to deliver.

*“I think before... because there was such a time period between the training and the actual sessions [starting], obviously you’ve got Christmas and stuff. Just looking over it [the manual], making sure we were ready for what we were doing come January. So I think without that I think it wouldn’t have worked as well as it did”.* (Coach 4, interview data)

Recommendations to improve the training and manual were offered. In relation to the practical element of the training, teachers and coaches felt more time to practice delivery would have been beneficial. For the theory session, teachers felt this section could have been condensed, whilst coaches reported more interactive tasks would have been beneficial. Coaches also suggested that information surrounding potential issues that children may raise about smoking and how this could be addressed warranted attention in the training and/or manual. Coaches and teachers thought the user-ability of SFS training manual could also be improved through the inclusion of visual diagrams and/or a DVD of activities.

### **Coaching sessions and assembly**

Questionnaire data revealed the majority of children enjoyed the SFS coaching sessions and assembly; 71.4% of children reported to enjoy the multi-skill session 'a lot', 67.2% the dance sessions, 68.7% the football sessions and 72.2% the assembly.

**Table 15 Positive aspects of coaching sessions**

<b>Positive aspects of coaching sessions</b>	<b>Quote</b>
Fun activities/ enjoyment	<p><i>"I enjoyed the Liverpool coaching and activity where they did all the football with you". (Girl, school 38 (gp 1), focus group data)</i></p> <p><i>"...the whole noise, the kids laughing, joking and at the end of the session when you are doing the feedback and the Q&amp;A's they knew all the answers, they had remembered all the things". (Coach 2, interview data)</i></p>
Educational/ engaging	<p><i>"My favourite one [game] was 'Smoking Fools and Cool Dudes' because it shows how much harder it was for a smoker to catch up with the non-smokers". (Boy/girl, school 11 (gp 2), focus group data)</i></p> <p><i>"The participation was really good, they really enjoyed it, there was no one that didn't want to take part, and they were answering questions very well so they were well engaged in the lessons". (Teacher, school 36, interview data)</i></p> <p><i>"Really well I thought it was well received by the staff, the kids loved it and I know myself and the other coach really enjoyed delivering it and just from the feedback and the questions we asked at the end of each session they were aware of all the messages we wanted to get across within the sessions" (Coach 2, interview data)</i></p>
Experience different activities	<p><i>"I like it [dance], and I've never really had the opportunity to like to it and it's unusual to get things like that". (Boy, school 3, focus group data)</i></p>

During focus groups, children stated they enjoyed SFS coaching session because of the games played and were able to describe elements of favourite activities. Moreover, sessions were considered fun, educational and offered children the opportunity to experience different activities. In general, teachers and coaches gave a positive overview of the coaching sessions, commenting that children appeared to enjoy the sessions, showed enthusiasm to partake in games, and were responsive to the smoke free messages, answering and asking coaches' questions (see Table 15 for a summary of positive aspects of coaching sessions).

Coaches noted that on occasion smoke free messages were met with resistance or confusion; coaches were however confident in addressing these issues with children.

*“ Well at the start [of the session] you seem to get a little mix [in response to messages] because you would get people who would say ‘my mum smokes and she still goes the gym and that’, so you would say ‘do you think if she didn’t smoke and she went the gym she would be a lot healthier or maybe able to go the gym a bit more?’”.* (Coach 3, interview data)

Despite an overall positive review, negative aspects or types of coaching sessions were reported (see Table 16 for details). Predominately, children stated individual preferences for an activity and disliking others. Specifically, children found often one football session to be less favourable than another based on the football team the coaches represented.

*“I only said I didn’t like the Liverpool one [football session] is because I do not like Liverpool football team”.* (Boy, school 18, SFS evaluation questionnaire data)

Negative aspects of coaching sessions were discussed in more detail by coaches and teachers. The ‘unfairness’ of being hindered when on the smoking team was considered by teachers as an aspect of the sessions that children sometimes did not enjoy. One teacher also reported they felt children found the sessions un-stimulating due to their repetitive nature, a view not shared by children.

A further criticism of the programme, raised by children, teachers and coaches, related to sessions having extended periods of sedentary time; predominantly, this surrounded having large groups where multiple children were on the same task, spending too much time talking through messages rather than demonstrating these through activities, and working on posters (dance session).

**Table 16 Negative aspects of coaching sessions**

Negative aspects of coaching sessions	Quote
Session type/ activities	<i>"It was like embarrassing and I'm not good at dance". (Boy, school 16 (gp 2), focus group data)</i>
Unfairness of games	<i>"The only thing the children didn't enjoy at first was the unfairness, what they perceived to be unfair by not having the same chance as the other ones [on the non-smoking team]". (Teacher 1, interview data)</i>
Repetitive nature of sessions	<i>"I understand the use of repeating activities but I felt that they found it slightly boring..." (Teacher (1), school 2, interview data)</i>
Messages delivered were perceived to be incorrect	<i>"The [football] coach got things technically wrong he used words like 'plaque' instead of ' phlegm' and other things like statistics he got wrong". (Teacher (3), school 2, interview data)</i>
Lack of clarity of message/ purpose of game	<i>"Some more [sessions] than others, the football were set out really well with the representation ... But it wasn't quite as clear [the purpose of the activity] say in the dancing". (Teacher (1), school 38, interview data)</i>
Sedentary nature of games	<i>"I didn't like it when you had to sit down and write because it wasn't really active". (Boy, school 27, focus group data)</i>  <i>"I find it important to get them straight into it [the activity] and I think the dance did that whereas the football maybe could've said half of what he said" (Teacher 18, interview data)</i>  <i>"...back to the warm up you know more kids, instead of like standing at the cones at the end, maybe like setting them a different challenge while they are waiting round because obviously the only people that were working were in the middle..." (Coach 4, interview data)</i>

In relation to messages delivered, limitations were discussed. Teachers noted that coaches sometimes provided children with information that was *"technically wrong"* and believed it was essential coaches had a full understanding of messages before delivery of sessions. It was also recognised that the clarity of messages and purposes of games delivered could be improved in particular sessions. Additional recommendations surrounded utilising more visual aids to reinforce smoking messages and having a greater focus on assisting children to deal with peer pressure.

Regarding the assembly, children were able to recall the assembly and enjoyed seeing visual resources, listening to SFS sports stars as well asking questions, receiving certificates and autographs. Overall, teachers viewed the assembly in a positive light and an appropriate way to end the project; the SFS assembly was deemed a *"highlight"* of the intervention and SFS sports stars considered *"inspirational"*.

*“Oh excellent [the SFS assembly], no I thought that bringing the people in [SFS sports star] just gave another message again you know. I mean we can stand there till we’re blue in the face saying ‘don’t smoke and this and that’ but to have somebody who’s been successful in a sporting field, I think it just notches it up even more doesn’t it? And, erm, the children’s behaviour was very good which tells me straight away they were interested and they were wrapped up in what they were saying, so I think that’s key to them just to bring it all together at the end”. (Teacher (2), school 16, interview data)*

### **Teachers’ sessions**

The collective viewpoints from teachers’ self-evaluations and interview data revealed teachers own delivery of SFS was positive. Data from session evaluations revealed sessions were easy for children to engage in (84.7%) and understand (85.5%), and that most children appeared to enjoy the sessions (92.7%).

*“Children were exhausted! Messages understood. Good for general fitness, will do this again. Felt pupils engaged in sessions”. (Teacher 27, session plan evaluation)*

Moreover, it was also noted that conveying SFS messages to children worked better than expected, sessions linked well with the curriculum and led to additional class work

*“The talking bits worked a lot better than I expected”. (Teacher 1, interview data)*

*“Enjoyable activity that actually led to a lot of class work where children were amazed at the cost of smoking!”(Teacher 12, session plan evaluation)*

Notably, one teacher who reported to deliver sessions discussed that their smoking status was an initial barrier to engaging in the delivery of sessions.

*“I think at first I was sort of battling myself a little bit because I was smoking”. (Teacher (2), school 38, interview data)*

During focus groups, whilst some children were able to recall teachers delivering SFS sessions and discussed various games played, most groups were unable to remember whether activities were played or discussed games that were not recognisable from SFS session plans.

## Deliverer' of SFS

Children, teachers and coaches were asked about qualities of deliverers. Whilst multiple strengths of teachers and coaches delivering SFS sessions were recognised (see Table 17 for a summary of advantageous of using teachers, and Table 18 for coaches, to deliver SFS), disadvantages of deliverers were also discussed.

Notably, coaches' felt teachers often lack enthusiasm for physical activity and confidence in delivering PE as well as concerns surrounding teachers smoking status.

*"I bring enthusiasm which a lot of teachers lack enthusiasm for the actual sport side, they aren't particular fond of doing PE they see it as a... like a... a time of the week were they don't really won't to do it but they have to it". (Coach 1, interview data)*

*"I think I also bring belief in the project whereas you know there are teachers from certain schools that you saw having cigarettes in between sessions or coming in from sessions having been on their cigarette break". (Coach 1, interview data)*

**Table 17 Advantages of using teachers to deliver SFS**

Strength of Teachers	Quote
<i>Children's perspectives</i>	
Respected	<i>"Teachers, because they can get our attention easily and we have to listen". (Boy, school 38 (gp 2), focus group data)</i>
Knowledge of smoking issues	<i>"They understand it [smoking issues] more". (Girl, school 18, focus group data)</i>
Experience of working with children	<i>"Because they're trained to be with children and teach children" (Boy, school 18 (gp 2), focus group data)</i>
Relationship with teacher	<i>"We all know the teacher and trust the teachers more". (Boy, school 8 (gp 1), focus group data)</i>
<i>Teachers' perspectives</i>	
Relationship with child	<i>"I know the kids so I can look ahead and see which activities they might struggle with". (Teacher, school 13, interview data)</i>
<i>Coaches' perspectives</i>	
Relationship with child	<i>"Obviously they work with those children everyday so obviously they know what makes the kids click". (Coach 4, interview data)</i>
Time to follow-up messages	<i>"If they get into it they can deliver these messages constantly, you know five days a week with the kids". (Coach 1, interview data)</i>

**Table 18 Advantages of using coaches to deliver SFS**

Strength of Coaches	Quotes
<i>Children's perspectives</i>	
Role model (non-smoker, healthy and active)	<i>"Because they don't smoke and they've teached us not to smoke when we're older so we can be like them and enjoy sport in our lives". (Girl, school 4, focus group data)</i>
Fun	<i>"Because they [coaches] were like fun". (Boy, school 3, focus group data)</i>
Experience and knowledge of smoking issues and sport	<i>"They [coaches] know more about smoking and sports than teachers do". (Boy, school 20, focus group data)</i>
<i>Teachers' perspectives</i>	
Knowledge of SFS/ experience of delivering session and PA	<i>"They [the coaches] know the whole project and the programme inside out and back to front". (Teacher 2 (school 16), interview data)</i>
Fresh approach	<i>"It's good for the kids to have coaches coming in and getting fresh ideas and ways of looking at things".(Teacher (2), school 5, interview data)</i>
Authority and credibility	<i>"When a coach comes in especially when they've got the Liverpool or Everton badge they think they're professionals and they can have almost more authority and credibility over the kids". (Teacher, school 15, interview data)</i>
<i>Coaches perspectives</i>	
Coaching experience	<i>"We are more, for our job, specialised in the sport element". (Coach 5, interview data)</i>
Experience delivering SFS	<i>"maybe a bit more knowledge of the sessions and the drills themselves so how to set them up and when to break things down to say when to get the messages in..". (Coach 4, interview data)</i>
Role model status	<i>"a little role model to look up to because we made the sessions fun and made them enjoy it whether they support Liverpool or Everton or not to being more beneficial". (Coach 6, interview data)</i>
Belief and enthusiasm	<i>"I actually had a belief in what I was saying, it gives more belief to your sessions, it gives you more clarity, a better underpinning of it so you your not just basing it on what it says your basing it on what you think and what you believe and what you know and then all of a sudden it's got more integrity". (Coach 1, interview data)</i>
Novelty factor	<i>"I'd say sports coaches are like adored in many aspects, especially like you know, it's a fresh face". (Coach 1, interview data)</i>
Power of football badge	<i>"As a football coach coming into the children I think that when they see us they don't see just a normal person they see Everton Football Club and they see all their idols who play for that team or the people they look up to so that when you start delivering the SmokeFree sessions they listen because they think about how Fellaini or Pienaar have listened to their coach". (Coach 3, interview data)</i>

This latter concern was reiterated by children as a disadvantage of using teachers, impacting on their credibility when discussing the importance of being smoke free.

*“I'd say it's bad, because if some of the teachers smoke and they have to deliver things about how bad smoking is, then instead of discouraging them about smoking they could be encouraging them”. (Boy, school 38 (gp 2), focus group data)*

The only disadvantage stated by children to the use of coaches related to their lack of relationship.

*“Cause we didn't really know their name but we know [teacher's name] better but we didn't know them much”. (Girl, school 16 (gp 2), focus group data)*

Moreover, teachers and coaches recognised the benefits of combined delivery, stating teachers could learn from coaches.

*“I think the coaches help the teachers to show them because they've been trained in it”. (Teacher 30, interview data)*

*“The teachers that got up and got involved and took part [in coaching sessions] enjoyed it and got a lot out of it and seen how we delivered it because I think a lot of them were like I'm not too sure how to do it but hopefully we gave them ideas and confidence to say 'here's some ideas, deliver it this way’”. (Coach 2, interview data)*

In reality, however, coaches noted that whilst teachers were present for the majority of sessions, teachers' engagement with coaching sessions ranged extensively, from sitting in the sessions marking work, assisting with behavioural issues and activities, to actively participating in the session with children.

*“They were asking what they can do, umh joining in, I mean we went to [name of school], we did the same for three classes in [name of school], and the young teaching student... he joined in, he came down every week to help out because he enjoyed the sessions”. (Coach 1, interview data)*

*“But I did try and say you know, they need to be part of it, some of them would but most of them didn't stay or even watch or couldn't really”. (Coach 7, interview data)*

Combined delivery was also considered by coaches and teachers to provide variety in delivery, with coaches recognising teachers could reinforce messages delivered during coaching sessions.

*“It [using the teachers and coaches] opens it [the delivery] up from the children’s view as well, it’s not just one person standing in front of the class nagging...a variety of people that the children might not come across in normal life”. (Teacher (1), school 5, interview data)*

## **Sustainability**

Firstly, sustainability of SFS was discussed in relation to the importance of effect maintenance. Teachers’ and coaches’ recognised the importance of maintaining intervention delivery within the school setting to ensure the intervention had a long-term impact on smoking behaviour.

*“It’s effective now... but I feel if it doesn’t continue they’ll just get pressured anyway with peer pressure”. (Teacher (1), school 2, interview data)*

*“I’d say maybe...in a couple of months just go in and go over what they’ve learnt or put a session on for them just to carry it on really, to keep it going, just making sure that they don’t forget you know what effects it does have on you in the long term and short term”. (Coach 4, interview data)*

Secondly, teachers’ felt to aid the sustainability of the intervention a cultural awareness of SFS was needed across the school. As a minimum, this involved informing all staff and children about the nature of the SFS study.

*“More assemblies to get the message to everyone, maybe literally a whole school assembly with all the teachers all the assistants at the start of the project and then we’d all know what Year 5 are doing the purpose behind it the reason for it, and then everyone get the same message then.... the Year 5 group become the experts but everyone would be aware of what was going on”. (Teacher, school 29, interview data)*

Further engagement of staff and children was recommended, with teachers suggesting enrolling more staff on the SFS brief intervention training workshop, feeding back training to all staff members and engaging children across year groups in the intervention.

*“We are a two-form entry [school], so make sure two teachers are fully on the course together... or even the teaching assistants, getting them involved”. (Teacher (2), school 8, interview data)*

*“Keeping it going in Year six, next year, for these children that have had it already and introducing it lower down the school and things as well”. (Teacher (2), school 38, interview data)*

To manage the training of additional staff members within schools, it was suggested in-house training would be beneficial.

*“Maybe if you came into school to deliver a small meeting... that might be best”. (Teacher (1), school 16, interview data)*

Coaches’ were in agreement with teachers, recognising the importance of training more staff members in order to engage them in the intervention and recommending the intervention target additional year groups to aid cultural awareness of SFS within the school environment.

*“I think when we do the training, I think we should have a few more of the teachers present because the teachers didn't actually realise actually what we were doing”. (Coach 6, interview data)*

*“Maybe target different year groups as well”. (Coach 3, interview data)*

Crucially, children, teachers and coaches generally wanted to participate in SFS again in the future.

## **7.4 Discussion**

SFS is considered to be an acceptable method to educate children about smoking. The intervention was praised for its organisation and professionalism of staff by teachers and coaches and described as engaging, fun and educational. Moreover, almost all children reported to enjoy taking part in SFS, with more than 80% of children and teachers rating the intervention five out of five.

Acceptability data provided useful insights for updating intervention components if SFS was implemented in routine practice. Collectively, children, teachers and coaches generally found intervention components useful and deliverers’ viewed session delivery as ‘easy’. Nevertheless, modifications to the brief intervention training and manual (including session plans) were recommended. Predominately, modifications surrounded aiding deliverer’ self-efficacy in regards to the delivery of sessions, as well as increasing children’s engagement in sessions and understanding of smoking related messages.

Example recommendations included having more time to practice delivery during the practical section of the brief intervention training, improving the user-ability of the manual through the inclusion of visual diagrams and/or DVD, and modifying games to reduce time children spent sedentary during sessions. In particular, addressing time spent sedentary during sessions is considered particularly important since the philosophical underpinning of the intervention is to deliver smoking-related messages through physical activity.

Notably, sedentary periods during coaching sessions often related to barriers surrounding class/ hall size and modifications made by coaches to session plans (see Chapter 5 for information relating to intervention fidelity). Data suggests whilst flexibility must be built into the session plans to allow for differences in settings across schools, the importance of implementing the intervention as intended must be reinforced to deliverers', ensuring time spent sedentary during activities is minimised.

Whilst coaching sessions were considered educational, teachers' noted smoking-related messages delivered were on occasions inaccurate. Notably, direct observations of coaching sessions confirmed SFS key messages were not always delivered as outlined in the manual. Teachers recommended coaches had a full understanding of messages before delivery of sessions.

Based on a review of school-based drug abuse prevention interventions documenting extensive training, including follow-ups, was associated with higher quality implementation and outcomes (Dusenbury et al., 2003), it is recommended ongoing training for deliverers is needed. Moreover, it is suggested formative feedback and consultation during early phases of delivery should be considered and found useful in an earlier school-based smoking prevention intervention delivered by teachers (Tortu et al., 1989).

Overall, advantages of utilising either coaches or teachers to deliver SFS were recognised, as well as the simultaneous employment of both. Children reported having a non-smoking, active and healthy role model an important advantage of utilising coaches to deliver SFS. In relation, children and coaches believed teachers' smoking status could negatively impact intervention integrity, with one teacher who smoked also reporting their smoking status as an initial barrier to engaging in the delivery of SFS sessions. Data therefore highlights deliverers' smoking status should be considered in the implementation of a smoking prevention intervention, potentially affecting children's and teachers' engagement.

Moreover, whilst the benefits of using both teachers and coaches to deliver SFS included teachers learning from coaches, it was noted teachers often did not engage fully in SFS coaching sessions. Whilst previous research has highlighted the benefits of observing coaching and participating in

sessions enhances teachers' skills and confidence in regards to their ability to effectively deliver PE (Whipp et al., 2011), further methods to engage teachers in SFS coaching sessions are needed. It is asserted increasing teachers' skills and confidence in leading SFS session may lead to higher levels of intervention implementation (for further details surrounding the dose and fidelity of SFS see Chapter 5).

In relation to intervention implementation, the importance of sustaining the intervention within the school setting was recognised. Sustainability was discussed in regards to maintaining perceived intervention effectiveness and increasing school awareness of SFS. Since it was reported SFS aligned with PSHE curricular and had strong cross-curricular links, this is expected to aid intervention sustainability within the school setting.

Whilst this study provides a comprehensive account of the perceived acceptability and sustainability of SFS, limitations and implications for future research are recognised. Firstly, some children, teachers and coaches were unable to explain in detail intervention components during post-data collection. Whilst self-evaluations of teachers' session were completed throughout the intervention it would have been advantageous to explore participants' perceptions of all intervention components during the study period, similar to the ASSIST intervention (Audrey et al., 2008). Secondly, little is known regarding why teachers' engagement with the intervention varied. To provide teachers with the necessary support to lead SFS sessions, comparisons between teachers who delivered sessions and those who did not, in regards to the acceptability of the intervention, would have been beneficial.

In conclusion, SFS is considered to be an acceptable method to educate children about smoking. If proven to have a long-term impact on children's smoking behaviour and intentions, there will be grounds to promote PA as an important component of a smoking prevention strategy.

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## CHAPTER 8

### Conclusion and implications of findings

#### 8.1 Conclusion

SmokeFree Sports was established in October 2010 with the aim of using the power of physical activity and sport to promote smoke free messages to children and young people. The final phase of the project included one of the largest primary school smoking prevention interventions to be conducted in the UK, involving over 1000 children. Intervention schools received an innovative programme that included practitioner training, five activity sessions and a school assembly with a leading athlete. The impact of this intervention was comprehensively assessed through robust evaluations of training, implementation, impact and acceptability and sustainability, drawing on quantitative and qualitative research methods with children, teachers and sports coaches.

To prevent children from starting to smoke it is important to understand the factors that promote vulnerability to smoking among preadolescents – an under researched cohort. We analysed baseline data to explore the influences of gender, family and friends on 9-10 year old children's smoking-related attitudes. The results of this cross-sectional study indicated that many children held common misconceptions around the harms of smoking.

It is understandable that these children, who are mostly from areas of deprivation, appear to be confused about the dangers of smoking given their physical and social environment. Over half of children reported having at least one immediate family member that smoked. Further, whilst peer influence in adolescent smoking is well documented, our findings suggest that friends may also be an important factor to consider for prepubescent children. It is therefore recommended that consideration is given to developing family and peer components.

Our findings indicate that practitioners, specifically sports coaches and teachers, can be trained to use physical activity as a tool to educate children about the dangers of smoking. Training was effective in raising self-efficacy (confidence) to deliver the programme and the training manual was well-received. However, as only half of classes received 5 teacher led sessions, teachers may need additional resources to deliver the intervention in practice. Multimedia tools (e.g. DVD/videos/website) were suggested as being useful in engaging and supporting teachers that did not attend the training.

This was a relatively large and complex intervention to implement – including 32 primary schools – and thus required significant administrative efforts to organise and coordinate coaching sessions and school assemblies with teachers, schools and coaches. Whilst the duration of the intervention could not be standardised across schools for practical reasons, the external coaches should be applauded for delivering 223 sessions between November 2012 and May 2013 – often travelling significant distances across the city and delivering multiple sessions in one day. The extent to which the intervention was delivered as intended (fidelity) varied across activities - suggesting post-training support may also be needed for coaches. Whilst some degree of variation is to be expected, it is essential that important components of an intervention are delivered with accuracy and consistency.

The results suggest that the intervention dose delivered was sufficient to impact children. Children that received the SFS intervention more likely to have negative attitudes towards smoking than children in comparison schools who followed their usual curriculum. Delivery of smoking education through practical activities in the school sports hall appears to work at least as well as smoking prevention interventions delivered through traditional classroom based learning. Importantly, these physically active sessions underpinned a positive intervention approach to smoking prevention that appears to be acceptable to children, teachers and coaches. Nevertheless, strategies to increase the sustainability of SFS and embed intervention components and principles into the everyday practices of schools and community organisations requires further investigation.

## 8.2 Recommendations for future research

- Whilst a 12 month follow-up will determine medium term impact, a three to five year follow-up of research participants is necessary to explore the long term impact of the intervention
- Conduct an economic evaluation of the intervention to determine its cost-benefit ratio
- Investigate the minimum dose and components necessary for the programme to be effective
- Conduct direct observations of SFS sessions delivered by teachers to determine intervention fidelity and establish efficacy in practice
- Qualitative research with community organisations, schools and teachers to explore strategies for enhanced sustainability and translation of the intervention into practice
- Repeat the SFS intervention in a different geographical location to explore whether findings can be replicated. Blind researchers to the intervention allocation where possible.
- Explore the feasibility of SFS in other ages, for example, younger children or early adolescents
- Explore the feasibility of using physical activity as a tool to counter other health risks for children and young people, e.g. drugs, alcohol and substance misuse, bullying, mental health etc.

### 8.3 Recommendations for future practice

- Development of multimedia resources and content to support training, delivery and sustainability of the intervention
- Modify the SFS training manual to include activities from other sports and additional content for briefings concerning latest hot topics for smoking e.g. electronic cigarettes
- Develop a system to allow for variation and flexibility in the delivery of the intervention
- Quality assurance and monitoring of delivery staff to ensure intervention is delivered as intended with further training and support provided as necessary
- Include strategies to ensure the intervention is sustainable, perhaps gaining commitments from delivery partners and settings for an exit plan post-funding (and therefore post direct support).



**Thank you for reading.**

For more information about SmokeFree Sports, contact:

Dr Lawrence Fowweather

Physical Activity Exchange

Research Institute for Sport and Exercise Sciences

Liverpool John Moores University

62 Great Crosshall Street

Liverpool

L3 2AT

T: 0151 2314152

L.Fowweather@ljmu.ac.uk

[www.ljmu.ac.uk/paexchange](http://www.ljmu.ac.uk/paexchange)