Evaluating Long-term Outcomes of NHS Stop Smoking Services (ELONS): a prospective cohort study

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Declared competing interests of authors: Dr Shahab has received grants and honoraria from Pfizer, a manufacturer of smoking cessation products. In the last 3 years, Professor Aveyard has received a consultancy fee for 1 day of consultancy with Pfizer, a manufacturer of smoking cessation products. Professor Coleman was paid an honorarium and travel expenses for speaking at Paris Smoking Cessation Practitioners' Conference in January 2014. He was also reimbursed for attending two expert meetings hosted by Pierre Fabre Laboratories (PFL, France), a company that manufactures nicotine replacement therapy (2008 and 2012). Dr McRobbie has received research grants, honoraria and travel expenses from Pfizer and Johnson & Johnson, manufacturers of smoking cessation products. Dr McEwen is a trustee and board member for Action on Smoking and Health (ASH), but received no financial reimbursement for this. He has received travel funding, honorariums and consultancy payments from manufacturers of smoking cessation products (Pfizer Ltd, Novartis UK and GlaxoSmithKline Consumer Healthcare Ltd) and hospitality from North 51 that provide online and database services. He also has a shared patent on a novel nicotine device but has received no payment for, or relating to, this patent.

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Scientific summary

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Scientific summary

Background

NHS Stop Smoking Services (SSSs) provide free at the point of use treatment for smokers who would like to stop. They were piloted in 1999 and rolled out across the UK from 2000. Since their inception they have evolved to offer a variety of support options. In particular, the services have moved away from offering support in groups, to providing a range of one-to-one support options in different settings. There are now also a wider variety of types of practitioner offering stop smoking support, with a particular growth in pharmacy-based provision. Significant differences have been identified between the quit rates 'achieved' by services in different locations, which may be partly because of the quality of behavioural support delivered by the practitioner who offers it. Members of our team conducted a previous national evaluation of SSSs in England between 2000 and 2004. This included a longer-term follow-up element, carried out 1 year after participating smokers had set a quit date. Given the changes that have happened in the provision of services over this decade, and the ongoing need for evidence on effectiveness, the Evaluating Long-term Outcomes for NHS Stop Smoking Services (ELONS) study was commissioned. This report sets out the findings.

Aim and objectives

The principal aim of the study was to explore the factors that determine longer-term abstinence from smoking following intervention by SSSs.

The study objectives were to:

1. examine the effectiveness of SSSs by primary care trust (PCT) and intervention type using routine data
2. explore the reach of services by identifying what proportion of the local population set a quit date with services using routine data
3. describe the factors that determine longer-term abstinence from smoking or relapse to smoking among clients who set a quit date with services in a sample of PCTs in England
4. examine the relationship between client characteristics [in particular socioeconomic status (SES), age, gender, disability and ethnicity], adherence to treatment, intervention type received and longer-term abstinence
5. create an evidence base to guide delivery of interventions by SSSs so that these interventions will have maximal effect on smoking cessation and population health.

Method

The ELONS study was an observational study with two main stages:

1. secondary analysis of routine data collected by SSSs
2. a prospective cohort study of SSS clients with three additional elements:

    i. a client satisfaction survey (CSS)
    ii. a well-being survey
    iii. a study of longer-term nicotine replacement therapy (NRT) use.

The setting for the study was SSSs in England. For the secondary analysis, routine data from 49 services were obtained. For the prospective study and its added elements, nine services were involved. The target population was service clients.

Results

Secondary analysis of routine data collected by Stop Smoking Services

QuitManager (North 51, Nottingham, UK), an online database for recording information on SSS clients, provided the data for analysis. A total of 202,804 clients records were extracted for analysis over two separate time periods: July–December 2010 and January–June 2011.

Key findings from this element were:

- The estimated number of clients treated by SSS from mid-2010 to mid-2011 was 5–10% of their smoking population.
- The self-reported and carbon monoxide (CO)-validated quit rates were 48% and 34% respectively at 4 weeks post quit date. Highest quit rates were found among older people, men and clients with higher SES. January was the month with the highest number of quit dates set and successful quitters.
- Affluent smokers were more likely to be abstinent from smoking at 4 weeks than disadvantaged smokers.
- Varenicline (Champix®, Pfizer) and combination NRT were both used frequently and increased the chances of quitting compared with a single NRT product.
- The majority (79%) of clients received one-to-one behavioural support. This type of support was significantly less successful than open rolling groups [adjusted odds ratio for open groups 1.28, 95% confidence interval (CI) 1.15 to 1.41 compared with one to one].
- Clients who saw specialist practitioners had higher quit rates than those who saw other types of practitioners.
- As a result of SSS treatment, the estimated number of ex-smokers per 100,000 population was 184 from mid-2010–mid-2011.

Prospective study

The secondary analysis phase of the ELONS study (phase 1) identified SSSs (based on various criteria, e.g. type of behavioural support offered) to be invited to take part in the prospective study. Nine agreed to recruit clients into the prospective study, which required practitioners to consent clients to the study and collect additional client and treatment data. This recruitment approach presented several challenges and the final sample achieved was 3075. Weights were created to correct for non-response as only a small proportion of all eligible clients in each study area were recruited. Key findings include:

- In terms of smoking cessation in the short term, the CO-validated quit rate at 4 weeks was 44.1%. With weighting this reduced marginally to 41.2%.
- For smoking cessation in the longer term, the CO-validated quit rate at 1 year was 9.3% but after weighting this reduced to 7.7%.
- Predictors of abstinence at 52 weeks included:
    - attending group behavioural support or receiving one-to-one support from a specialist practitioner
    - taking varenicline
    - attending in the New Year
    - being older
    - being more affluent
    - having a lower dependence on tobacco

  - having a higher well-being score
  - having support from a spouse or partner
  - having a social network not populated with smokers.

- Taking stop smoking medication and attending support sessions (described here as 'adherence') was significantly associated with smoking cessation – more so at 4 weeks than at 1 year.
- Limited comparisons with previous evaluations of SSSs are possible. Quit rates for 4 and 52 weeks from the ELONS prospective study were lower than those identified in the previous national evaluation in England, but higher than a more recent study in Glasgow that examined closed group and pharmacy-based services.

Client satisfaction

All clients who participated in the prospective study (regardless of the outcome of their quit attempt) were sent a client satisfaction survey to give feedback on the service they received. There were 1006 questionnaires received and the final data set had 996 cases. Key findings were:

- A consistent pattern emerged that suggested that smokers who accessed SSSs in the study areas and responded to the survey had a positive experience. This was the case for both quitters and non-quitters. The vast majority who replied to the questionnaire indicated that they would recommend the service to others and return should the need arise.
- Additional comments highlighted the importance of practitioner/client rapport and previous research suggests that this is an important factor in a successful quit attempt.
- Despite survey findings suggesting that stop smoking medication was easy to acquire, additional comments pointed to a more complex picture where the process of obtaining this medication was over complicated and time-consuming for some respondents.
- Suggested improvements included evening appointment times, having a choice of group or one-to-one support, and a longer period of behavioural support.

Well-being study

Well-being can improve after smoking cessation, but smokers often have concerns about stopping because they believe smoking itself brings benefits such as reduced stress levels. As part of the baseline monitoring data collection for the prospective study, clients were asked additional questions about their health and well-being. In addition, all clients, regardless of whether or not they had quit smoking, were sent postal questionnaires at 4 and 52 weeks post quit date, which included questions on well-being. Key findings include:

- Smokers who had higher levels of well-being when they first started attending were more likely to be non-smokers at 4 weeks and 1 year later.
- The most consistent baseline factors associated with well-being at baseline, 4 weeks and 52 weeks were having a diagnosed mental health condition, being dependent on tobacco, and young or older age.
- Clients aged 45–54 years had lower well-being scores than younger and older clients at all three time points, although differences were not always significant.
- Clients who had higher levels of well-being were consistently more likely to agree that they enjoyed a challenge, were doing well in life and felt more in control than other clients. A mediator of the association between dependence on tobacco and well-being appeared to be not being able to cope with stress.

Longer-term nicotine replacement study

Additional funding was obtained to add an element that focused on longer-term NRT use. This involved collecting saliva samples from participants at baseline and at 1 year and using these to test for relevant biomarkers. Just over one-third of prospective study participants provided information on longer-term NRT use ($n = 1047$) and were included. There were 258 participants (8.5% of the whole ELONS study sample) who provided baseline and follow-up saliva samples that were analysed for biomarkers. Key findings were:

- Of clients followed up at 12 months, 61.5% reported that they had used NRT during their quit attempt. However, this is likely to include over-the-counter use, as this number is substantially higher than the number of participants recorded as using NRT by the services (34.4%).
- Most clients who started on NRT used it for at least 8 weeks and more than one in five (21.5%) used it for longer than the standard 3 months.
- Long-term use was relatively rare with fewer than 1 in 10 participants still using non-combustible nicotine products at the 12-month follow-up (8.4%).
- Within this category of non-combustible nicotine products were electronic cigarettes (e-cigarettes). Few participants reported their use at 1 year (2.9%), although these data include smokers and non-smokers and most people had relapsed by 1 year post quit date. However, e-cigarettes were the most popular single product at 1 year.
- Long-term ex-smokers had much higher odds of still using non-combustible nicotine products at the 12-month follow-up than those who relapsed. Concurrent use among relapsers was 3.7% compared with 14.0% of continuous abstainers. This difference remained significant even after removing those who used e-cigarettes only.
- In terms of the biomarker analysis, 258 participants (8.5% of the whole ELONS study sample) provided baseline and follow-up saliva samples and were included. Greater levels of cotinine were associated with greater self-reported dependence. As expected, within-group analysis showed that smokers who had stopped had significantly lower cotinine levels at follow-up than those who had relapsed to smoking at follow-up. However, this was the case only for ex-smokers who did not use NRT. Cotinine levels for smokers who had stopped at follow-up but who used NRT long term had not changed from baseline to follow-up and neither did cotinine levels for those who had relapsed to smoking (irrespective of NRT use). There were no differences as a function of NRT use and smoking status at follow-up in baseline levels of alpha-amylase, a biomarker of stress.

Conclusions

In terms of smoking cessation in the short term, findings are broadly comparable with those from routinely collected data from services. From our prospective study of just over 3000 smokers attending SSSs in nine areas of England, we found that just over 4 in 10 (41.2%) were biochemically validated as abstinent from smoking at 4 weeks post quit date. Our secondary analysis of routine data from 49 of 150 services in England found 4-week quit rates of 48% when self-reported data were included, falling to 34% when biochemical validation had occurred. This same analysis found that services were reaching up to 10% of smokers in their area in the year from July 2010. National Institute for Health and Clinical Excellence guidance previously recommended that services aim to reach at least 5% of their smoking population in 1 year. These results provide a useful indicator that (a) routine data provide a helpful and not inaccurate indicator of short-term smoking cessation outcomes and (b) services are continuing to effectively reach smokers and support them to stop.

No routine data exist for longer-term cessation outcomes at 1 year and it is some time since a study in England has looked at this issue. We found that just fewer than 8% of smokers were still abstinent from smoking 1 year after setting a quit date. If these results are applied to all of England, then we estimate that in the year 2012–13 the services supported 36,249 clients to become non-smokers for the remainder of their lives.

A range of factors, including many linked to the characteristics of clients and also SSS characteristics, influenced outcomes. For example, smokers supported to quit with the specialist service were more likely to stop smoking in the longer term. In addition, the ELONS study has shown that longer-term outcomes are influenced by the type of behavioural support a smoker receives; open groups resulted in better outcomes than other forms of behavioural support.

Three additional elements were added to the ELONS study that were more exploratory in nature and have a number of limitations. These focused on client satisfaction, well-being and longer-term NRT use. Overall, we found that those who responded to the satisfaction survey were positive about the support that they received and would recommend SSSs to others. We found that assessment of well-being could be included in routine monitoring and that positive well-being at baseline was a significant predictor of smoking abstinence at 1-year follow-up. Fewer than 1 in 10 clients who had stopped smoking at 1 year were still using non-combustible nicotine products, suggesting that long-term use is not that prevalent. However, among those who did continue to use these products we found no evidence of harm from longer-term use in the data we collected.

The study raises a number of issues for future research including:

- examining the role of e-cigarettes in smoking cessation for service clients. This study did not look at e-cigarette use (except briefly in the longer-term NRT study) but this is a priority for future studies
- more detailed comparisons of rolling groups with other forms of behavioural support
- further exploration of the role of practitioner knowledge, skills and use of effective behaviour change techniques in supporting service clients to stop smoking
- surveillance of the impact of structural and funding changes on the future development and sustainability of SSSs
- more detailed analysis of well-being over time between those who successfully stop smoking and those who relapse
- further research on longer-term use of non-combustible nicotine products that measures a wider array of biomarkers of smoking-related harm such as lung function tests or carcinogen metabolites.

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