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# **Social inequalities in quitting smoking: What factors mediate the relationship between socioeconomic position and smoking cessation?**

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# **Social inequalities in quitting smoking: What factors mediate the relationship between socioeconomic position and smoking cessation?**

## **ABSTRACT**

**Background:** Smokers from lower socio-economic groups are less likely to be successful in a quit attempt than more affluent smokers, even when they access smoking cessation services.

**Methods:** Data were collected from smoking cessation service users from three contrasting areas of Great Britain – Glasgow, North Cumbria and Nottingham. Routine monitoring data were supplemented with CO validated smoking status at 52 week follow up and survey data on socio-economic circumstances and smoking-related behaviour. Analysis was restricted to the 2397 clients aged between 25 and 59.

**Results:** At 52 week follow up 14.3% of the most affluent smokers remained quit compared with only 5.3% of the most disadvantaged. After adjustment for demographic factors, the most advantaged clients at the English sites and the Glasgow one to one programme were significantly more likely to have remained abstinent than those who were most disadvantaged (OR 2.5, CI 1.4 – 4.7 and 7.5 CI 1.4 to 40.3 respectively). Mechanisms producing the inequalities appeared to include treatment compliance, household smokers and referral source.

**Conclusions:** Rather than quitting smoking, disadvantaged smokers quit treatment. More should be done to encourage them to persevere through the first few weeks. Other causes of inequalities in quitting varied with the service provided.

## INTRODUCTION

In England, one in five adults smokes and tobacco causes 18% of deaths (1-2). In Scotland smoking rates are higher, at 24% (2) and smoking is estimated to account for up to 27% of deaths (1, 3). Tobacco is responsible for about half the socioeconomic position (SEP) difference (as measured through social class, income or education) in death rates (4) because smoking rates are higher among those with lower SEP in the majority of developed countries (5). Although smoking rates have been falling in the developed world, reductions have been slower amongst disadvantaged smokers and inequalities in smoking rates have increased in recent years (6).

SEP differences in quit rates and low quit rates among disadvantaged smokers have also been observed in studies of many smoking cessation interventions (7). There is some evidence to suggest that smoking cessation programmes that provide a combination of pharmacotherapy and structured behavioural support together appear to have some success among disadvantaged smokers (8-9). Quit rates in these types of interventions are poorer among disadvantaged smokers than for more affluent smokers but this can be mitigated by focussing resources on disadvantaged communities (8). If a greater proportion of disadvantaged than affluent smokers are encouraged to take up an intervention then the gap in smoking is less likely to widen (8-9).

Why do socioeconomically disadvantaged smokers find quitting more difficult? Possible reasons include lack of support for quit attempts, greater addiction to tobacco, less motivation to quit and less compliance with treatment. Features of cessation programmes may also favour high SEP groups such as referral routes and the structure or timing of treatment. Smokers with low SEP may find quitting more difficult due to less support from their family or community for their quit attempt (10). This may be because there is a higher proportion of smokers in their social network and/or their spouse or partner may be more likely to smoke (11). This lack of support has been identified as a reason for low quit rates among disadvantaged smokers (12). Addiction plays a powerful role in mediating the outcome of any quit attempt (10). The majority of smokers are highly dependent on tobacco and despite being motivated to quit smoking and being aware of the threat to health many regular smokers are unsuccessful in their quit attempts (13-14). Disadvantaged smokers are often more highly addicted, for example they may smoke more cigarettes a day or smoke on waking, thus they may find quitting harder (6, 15). Addiction has been found to explain some of the relationship between SEP and quitting (16).

Motivation is an important driver underlying successful smoking cessation (17). There have been inconsistent findings, however, on whether motivation to quit differs by SEP (6, 18). Likewise, use of pharmacotherapy and smoking cessation services has not been found to explain the relationship between SEP and quitting, particularly in the UK. It may be, however, that stronger commitment to effectively using pharmacotherapy and to keep attending services is important for quitting (19-20). Disadvantaged smokers are less likely to comply (20-21). In this paper we use the term compliance to describe engagement with and adherence to a smoking cessation programme. We acknowledge that this term is contested and has been described as denoting a somewhat paternalistic attitude towards non adherers (22-23). However, compliance is a term widely used in the literature on smoking cessation and for consistency we use it in this study (e.g. 6).

The nature of smoking cessation programmes is also likely to affect the chances of quitting. In a review of 50 RCTs (24) and another review of 23 studies since January 2000 (25) group-based behavioural support was not found to be significantly different to one to one support. However in a review of the effectiveness of the UK's NHS stop smoking services (26) group support was found to achieve a higher quit rate than one to one support, but one to one interventions had a higher uptake.

In 2009 Kotz and West described findings from the English Smoking Toolkit Survey which consistently showed a strong socio-economic gradient in the success of quit attempts. They concluded that: "there is a strong gradient across socioeconomic groups in success... Determining the cause of, and counteracting, this gradient is paramount in reducing health inequalities."(6 p43). The present study aims to directly address the first part of Kotz and West's conclusion by exploring the pathway between socioeconomic position and smoking cessation amongst smokers who tried to quit with the support of NHS Stop Smoking Services in the UK.

## **METHODS**

This paper reports results from secondary analysis of data collected in two separate studies of NHS smoking cessation programmes. The studies employed an identical research design and were conducted by the same research team. The smoking cessation programmes studied were an intensive group programme and one to one support in a pharmacy setting in Glasgow, Scotland (27) and primary care based programmes in Nottingham and North Cumbria, England, both of which offered one to one behavioural support with some group support (28-29). All clients were also offered pharmacotherapy during their quit attempt. This medication was free except for a small prescription charge paid by some clients. All programmes were delivered by trained advisors based on national guidelines. However these guidelines allowed services to offer their programmes in venues and formats that suited the local population; thus there were variations in programme content within as well as between sites. Further information on the nature and content of services and the areas in which they were offered is available elsewhere (27-29) Clients who attended the Glasgow services between March and May 2007 and the English services between October 2001 and March 2003 were included.

The outcome variable was CO validated continuous abstinence at 52 weeks. Data collection complied with the Russell standard commonly used in smoking cessation studies (27-30).

To measure SEP, five indicators of socioeconomic status (housing tenure, paying for prescriptions, employment status, neighbourhood deprivation and household type) were divided into two categories: one of which was more affluent than the other. These were home owner (not renter or other), pays for prescriptions not free, other employment status than unemployed, permanently sick or disabled, not in the most deprived quintile of neighbourhoods (as measured by the indices of multiple deprivation for England and Scotland) and other household type rather than single parent. This formed a scale of affluent indicators. Clients' positions ranged between 0 and 5 indicators of affluence.

Demographic measures included age quartiles (the boundaries were 34, 42 and 50), gender, ethnicity (White British, Asian, Black and Other) and location (Glasgow, Nottingham and North Cumbria). Social support was measured by whether the smoker

had anyone (spouse/partner, family, friend or colleague) to support their quit attempt (yes or no) and presence of other smokers in the household (yes or no). Motivation was measured through determination to quit, (not at all/quite/very compared with extremely) and addiction was measured through time to first cigarette on waking (within the first five minutes or longer). Compliance was measured through attendance: number of contacts with services (0 to 3, 4 to 6 and 7 to 15) and number of weeks of pharmacotherapy (no pharmacotherapy used, non compliant (1 to 3 weeks of all of NRT, Zyban and Champix if used), no evidence of compliance (1 to 3 weeks of all available variables), short term compliance (4 to 6 weeks was the longest time that any of NRT, Zyban or Champix were used) and long term compliance (7 or more weeks of NRT, Zyban or Champix). Programme features included referral source (self compared with professional) and format (group or one to one).

Many of the socioeconomic status measures did not apply to older people and younger people may have a different relationship with some of the postulated mechanisms such as addiction and motivation due to not being established smokers. Thus clients under the age of 25 and 60 or over were excluded.

Continuous abstinence rates were determined across all sites, English sites only (Nottingham and North Cumbria), and Glasgow one to one pharmacy based and Glasgow group interventions separately. There were too few English clients who attended groups (n=47 (2.0%)) to analyse these separately. Significance was determined, where sample size allowed, using chi square tests of linear association.

The difference in the chances of quitting between low and high SEP was assessed using logistic regression. Clients with 0 or 1 affluent indicators were compared with clients with all 5 affluent indicators. Demographic factors and smoking-related variables were entered into the model to see if the relationship remained.

Originally it was intended to look for relationships with inequalities in quitting merging both datasets. Due to differences in quit rates the datasets were analysed individually. For the Glasgow one to one service analysis not all variables could be entered in the same form because the lower quit rate increased multicollinearity. Ethnicity was excluded due to small numbers. Compliance with services and pharmacology were combined as service users tended to stop both simultaneously. Compliance was measured as attended all sessions or completed course of pharmacotherapy compared with completed neither. Addiction was measured as smokes cigarette within one hour of waking or longer. Categories of other variables had to be merged. SEP was grouped into 0-1 affluent indicators, 2 to 4 affluent indicators and all affluent indicators. Age was divided into tertiles (boundaries were 37 and 47 years) rather than into quartiles..

Where there was a significant relationship between SEP and quitting the extent to which demographic factors, and smoking factors (support, motivation, addiction, compliance and smoking cessation programme features) accounted for the relationship was assessed. Any change in the odds ratio of SEP was recorded when these factors were removed from a full model. Variables that reduced the odds ratio by 0.2 or more and changed both the confidence interval boundaries by 0.1 or more (to ensure that changes were not due to rounding or noise) were deemed to have had an effect on the relationship between SEP and quitting. Finally, if variables were found to mask the relationship between SEP and quitting their relationship with SEP was explored.

## RESULTS

CO validated quit rates at one year (Table 1) were higher among more affluent respondents for both English sites and the one to one but not the group intervention provided in Glasgow. However, during the study period relatively few smokers from disadvantaged backgrounds attended the group service. Continuous abstinence rates at one year were higher in England (average 14%) than Glasgow (average 3%). In England those with 4 or 5 affluent indicators had rather higher quit rates than the other groups. In the Glasgow one to one service the quit rate was fairly stable except for the most affluent group whose quit rate was double that of the next highest category suggesting that the service was disproportionately benefitting the most affluent.

Logistic regression (Table 2) on data from the two English sites (North Cumbria and Nottingham) suggested that in a bivariate model the most affluent group were 2.5 times more likely to quit. This was little changed when demographic variables were added and 2.3 when smoking related variables were included. Thus our explanatory variables were able to account for a part of the relationship between SEP and quitting. The one to one format service in Glasgow was more strongly patterned by SEP than the English data with the most affluent being nine times more likely to quit

As background the variables which predicted quitting are presented (Table 3). Quitters who participated in the English services were more likely to be affluent, male, black, extremely motivated, attend more sessions and take pharmacotherapy for more weeks or did not take it at all. Quitters from the Glasgow one to one service were more likely to be affluent, older, to complete the course either of pharmacotherapy or sessions and be referred by a professional rather than self referred.

To explore what was accounting for the relationship between SEP and quitting each variable was removed and replaced in turn and the effect on SEP was recorded (table 4). The relationship between SEP and quitting was influenced (by a variable's removal being associated with an increase in the odds ratio of SEP by 0.2 or more and a change in both the confidence interval boundaries by 0.1 or more) for the English sites, by whether clients complied with pharmacotherapy. For the Glasgow one to one service living without other smokers, not smoking within an hour of waking and professional rather than self referral also explained why more affluent smokers were more likely to quit.

Compliance with attendance increased the odds ratio of SEP for the most disadvantaged smokers, because when compared to those attending for 0 to 2 sessions smokers were most likely to quit if they attended 4 to 6 sessions (OR 5.2 (1.1 to 24.0)). Attending further sessions appeared to be almost counterproductive (OR 1.8 (0.2 to 13.6)).

In summary three smoking cessation services were studied: the English cessation service at two sites (Nottingham and North Cumbria) and in Glasgow a pharmacy based one to one service and a group service. SEP predicted quitting for the Glasgow one to one service and the English data. Disadvantaged clients were less likely to quit because they were not complying with treatment. In Glasgow SEP influenced quitting through age, social support (smokers in the household), addiction and referral route. In England for disadvantaged smokers there was a curvilinear relationship between attending sessions and quitting.

## DISCUSSION

### **Main findings of the study**

The results from this study suggest a complex relationship between SEP and quitting. The evidence from the one to one services in Glasgow and in England (where 98% of clients received one to one support) confirms that disadvantage is a barrier to quitting even after taking part in a smoking cessation programme.

The gap between the most and least advantaged at the English sites did not appear to be strongly affected by traditional explanations of motivation, addiction, or social support. Engagement in a smoking cessation programme may have overcome these issues or these factors may not have provided an influential contribution to inequalities in quit rates. Adherence to treatment, in contrast, was an important determinant of quitting and inequalities in quitting. There was a tendency amongst disadvantaged smokers to attend fewer sessions and take medication for fewer weeks than more advantaged smokers. Both were associated with lower quit rates.

An approach that encourages provider and patient to be treated as equals and allows for reasons for non-adherence (involving for example everyday life, lay knowledge or deficiencies in the proposed treatment) to be seen as reasonable and rational could improve adherence (22-23). It may be that services need to take a different approach with more disadvantaged groups to increase adherence. The life experiences of low SES groups may differ significantly from those of health care providers and that this may be one barrier to adherence (22-23).

Over recent years the stigma associated with smoking may have increased as smoking prevalence has fallen in countries such as the UK. Feelings of stigmatisation have been implicated in non adherence to treatment. Currently, however, it is unclear whether low SEP or high SEP groups feel more or less stigmatised by their smoking (31-32). The impact of stigmatisation on the relationship between adherence, quitting and SEP requires further investigation.

Very few clients from the Glasgow one to one service delivered in a pharmacy setting had quit at 52 weeks. Those that did remain abstinent tended to be the most affluent. Affluent smokers' abstinence rates were enhanced by a smoke free household in addition to two less studied mechanisms: long term adherence to treatment, and referral source. It has been suggested that self referral should increase quitting as an indicator of motivation (33) but here professional referral was associated with quitting. Professional referral can in some cases be an indicator of smoking induced poor health which can also motivate quitting (34).

Previously it has been suggested that inequalities in quit rates between the most and least disadvantaged are a reflection of different levels of addiction. Addiction was not a major driver here although Glasgow one to one clients were more likely to quit if they did not smoke within an hour of waking. More common measures of addiction could not be entered into the model due to multicollinearity but in bivariate analysis (not shown) they showed little relationship with quitting. This may be a consequence of the extensive use of pharmacotherapy mitigating the effects of addiction.



Social support for the quit attempt did not predict quitting or inequalities in quitting. The question on social support included in our data may have been too narrow a measure. In other studies disadvantaged smokers have been found to have lower overall social integration (12, 35) and in particular participation in formal and informal activities (36). Motivation to quit predicted quitting in the English dataset but did not appear to be part of the pathway between SEP and quitting. Other studies have suggested an ambiguous relationship between SEP and quitting and motivation (37).

In this study clients who used the Nottingham service and were identified as black or included black in their self-reporting of ethnicity were more likely to quit despite lower socioeconomic position. This is likely to be a small number anomaly. A similar pattern has nevertheless been found in the North East of England (38) but numbers were too small to assess significance.

The relationship between SEP and quitting was not completely accounted for by the independent variables in this study, particularly for the English sites. Other potential explanations of poorer smoking cessation rates among disadvantaged smokers, which were not able to be explored in this dataset, include poorer mental health (39), the work environment such as higher levels of boredom and stress (40) and a more stressful living environment and stigma associated with smoking (30, 31). Disadvantaged smokers may be more likely to view smoking as a way of dealing with other pressures (12, 41-42) and may have less understanding of or concern about the health risks of smoking (12). It is also possible that elements of the intervention not examined in our studies (such as the content or qualities of the people delivering treatment) could have influenced differences in quit rates.

### **What is already known**

It is well established that disadvantaged smokers are less likely to stop smoking even when they access smoking cessation programmes.

### **What this paper adds**

Our findings suggests that treatment compliance (especially with pharmacotherapy) and in some circumstances, living with other smokers and self-referral are more responsible for lower quit rates among disadvantaged smokers than less motivation or less social support. In order to reduce inequalities, smoking cessation programmes need to try and address these issues to increase their success with disadvantaged groups.

### **Limitations**

This study faced a number of limitations. About 3.5% of clients self reported that they had quit but did not have their smoking status validated by a CO monitor. They were classified as not quit for the analysis in accordance with the Russell standard (30) but it is likely that some of these smokers had quit, so our cessation rates are likely to be an underestimate.

Although the data come from three contrasting areas of the UK, these areas are not necessarily representative of the UK population and may have idiosyncratic features. There was also a time lag between data collection in England and Scotland that may have influenced our results, particularly as relevant policy changes (such as smoke free legislation in Scotland) took place between the two data collection periods. Although we found that Scottish group service clients with low SEP had a good quit rate, there were

relatively few of them. In future we would like to explore further whether group programmes can overcome the barrier of low SES in a larger dataset.

It has been argued that the determinants of health and health behaviours are different from the determinants of health inequalities (43). The same range of determinants was used for both in our study (tables 3 and 4). However, as non significant predictors of quitting were not excluded from the analysis of variables predicting inequalities, we allowed for the possibility that there may be different determinants of inequalities and we found this to be the case.

The conclusions of our analyses are also limited due to the ambiguous direction of causation between compliance and quitting. Lack of compliance could have caused relapse or a relapse for other reasons could have prevented compliance. In future, perhaps qualitative, work this direction of causation needs to be teased out. As it stands our data suggests that encouraging disadvantaged smokers to comply with pharmacotherapy is central to equalising their chances of quitting to other smokers. Future studies should be encouraged to collect data on compliance with pharmacotherapy in addition to whether or not pharmacotherapy was used in order to further explore the role of pharmacotherapy in attenuating the relationship between SEP and cessation (6).

Less than 10% of quit attempts in the UK involve the use of cessation services (44). Thus evidence in this paper only applies to a small proportion of smokers. Nevertheless, these services are one of the most cost-effective of all healthcare interventions (45) and evidence of the kind outlined in this paper can contribute to expanding the reach and effectiveness of these programmes.

In conclusion, our findings suggest that smoking cessation services face particular challenges in supporting more disadvantaged smokers to quit, particularly when support is delivered in a one to one format. In order to mitigate the effects of disadvantage, those planning and delivering services should take into account that these smokers may have other smokers in their home environment, pay particular attention to those who self refer and support and encourage these clients to take pharmacotherapy correctly and attend sessions for long enough to improve their chances of successfully quitting.

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## **COMPETING INTERESTS**

Linda Bauld is scientific advisor on Tobacco Control to the Department of Health in England

## REFERENCES

1. NHS. Statistics on Smoking: England 2008: The Health and Social Care Information Centre 2008 October.
2. Robinson S, Lader D. General Household Survey 2007: Smoking and drinking among adults: ONS 2009.
3. NHS Health Scotland, ISD Scotland, ASH Scotland. An Atlas of Tobacco Smoking in Scotland: a report estimating smoking prevalence and smoking-attributable deaths within Scotland: NHS Health Scotland 2007.
4. Jha P, Peto R, Zatonski W, Boreham J, Jarvis MJ, Lopez AD. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. *Lancet*. [Article]. 2006 Jul-Aug;368(9533):367-70.
5. Cavelaars AEJM, Kunst AE, Geurts JJM, Crialesi R, Grotvedt L, Helmert U, et al. Educational differences in smoking: international comparison. *BMJ*. 2000 April 22, 2000;320(7242):1102-7.
6. Kotz D, West R. Explaining the social gradient in smoking cessation: it's not in the trying, but in the succeeding. *Tob Control*. 2009 February 1, 2009;18(1):43-6.
7. Fernandez E, Schiaffino A, Borrell C, Benach J, Ariza C, Ramon JM, et al. Social class, education, and smoking cessation: Long-term follow-up of patients treated at a smoking cessation unit. *Nicotine Tob Res*. 2006 Feb;8(1):29-36.
8. Bauld L, Judge K, Platt S. Assessing the impact of smoking cessation services on reducing health inequalities in England: observational study. *Tob Control*. 2007 Dec;16(6):400-4.
9. Hiscock R, Pearce J, Barnett R, Moon G, Daley V. Do smoking cessation programmes influence geographical inequalities in health? An evaluation of the impact of the PEGS programme in Christchurch, New Zealand. *Tob Control*. 2009;18(5):371-6.
10. Chandola T, Head J, Bartley M. Socio-demographic predictors of quitting smoking: how important are household factors? *Addiction*. [Article]. 2004 Jun;99(6):770-7.
11. Mermelstein R, Cohen S, Lichtenstein E, Baer JS, Kamarck T. Social support and smoking cessation and maintenance. *J Consult Clin Psych*. 1986;54(4):447-53.
12. Lacey LP, Manfredi C, Balch G, Warnecke RB, Allen K, Edwards C. Social support in smoking cessation among black-women in Chicago public-housing. *Public Health Rep*. 1993;108(3):387-94.
13. Breitling LP, Rothenbacher D, Stegmaier C, Raum E, Brenner H. Older Smokers' Motivation and Attempts to Quit Smoking Epidemiological Insight into the Question of Lifestyle Versus Addiction. *Dtsch Arztebl Int*. 2009;106(27):451-5.
14. Jarvis MJ. A profile of tobacco smoking. *Addiction*. [Article]. 1994 Nov;89(11):1371-6.
15. Siahpush M, McNeill A, Borland R, Fong GT. Socioeconomic variations in nicotine dependence, self-efficacy, and intention to quit across four countries: findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control*. 2006;15:71-5.
16. Baker TB, Piper ME, McCarthy DE, Bolt DM, Smith SS, Kim S-Y, et al. Time to first cigarette in the morning as an index of ability to quit smoking: implications for nicotine dependence. *Nicotine Tob Res*. 2007;9 Suppl 4:S555-70.
17. Echer IC, Barreto SSM. Determination and support as successful factors for smoking cessation. *Revista Latino-Americana De Enfermagem*. 2008;16(3):445-51.
18. Rundmo T, Smedslund G, Gøtestam KG. Motivation for smoking cessation among the Norwegian public. *Add Beh*. 1997/6//;22(3):377-86.

19. Gorini G, Chellini E, Terrone R, Ciraolo F, Di Renzo L, Comodo N. Course on smoking cessation organized by the Italian League against Cancer in Florence: determinants of cessation at the end of the course and after 1 year. *Epidemiol Prev.* [Comparative Study; English Abstract;]. 1998 1998;22(3):165-70.
20. Lam T-H, Abdullah ASM, Chan SSC, Hedley AJ. Adherence to nicotine replacement therapy versus quitting smoking among Chinese smokers: a preliminary investigation. *Psychopharmacol.* 2005;177(4):400-8.
21. Nevid JS, Javier RA, Moulton JL. Factors predicting participant attrition in a community-based, culturally specific smoking-cessation program for Hispanic smokers. *Health Psychol.* [Article]. 1996 May;15(3):226-9.
22. Segal JZ. ``Compliance" to ``Concordance": A Critical View. *Journal of Medical Humanities.* 2007;28(2):81-96.
23. Raynor T, Britten N. Medicine information leaflets fail concordance test. *BMJ.* 2001;322(1541).
24. Mottillo S, Filion KB, Belisle P, Joseph L, Gervais A, O'Loughlin J, et al. Behavioural interventions for smoking cessation: a meta-analysis of randomized controlled trials. *Eur Heart J.* 2009 March 2, 2009;30(6):718-30.
25. Lemmen V, Oenema A, Knut I, Brug J. Effectiveness of smoking cessation interventions among adults: a systematic review of reviews. *Eur J Cancer Prev.* [Review]. 2008 Nov;17(6):535-44.
26. Bauld L, Bell K, McCullough L, Richardson L, Greaves L. The effectiveness of NHS smoking cessation services: a systematic review. *J Public Health.* 2009 July 28, 2009;fdp074.
27. Bauld L, Chesterman J, Ferguson J, Judge K. A comparison of the effectiveness of group-based and pharmacy-led smoking cessation treatment in Glasgow. *Addiction.* 2009;104:308-16.
28. Ferguson J, Bauld L, Chesterman J, Judge K. The English smoking treatment services:one-year outcomes. *Addiction.* 2005;100 (Suppl. 2):59-69.
29. Judge K, Bauld L, Chesterman J, Ferguson J. The English smoking treatment services: short-term outcomes. *Addiction.* 2005;100(s2):46-58.
30. West R, Hajek P, Stead L, Stapleton J. Outcome criteria in smoking cessation trials: proposal for a common standard. *Addiction.* 2005;100:299-303.
31. Burgess DJ, Fu SS, van Ryn M. Potential Unintended Consequences of Tobacco-Control Policies on Mothers Who Smoke. *American Journal of Preventive Medicine.* 2009;37(2):S151-S8.
32. Stuber J, Galea S, Link B. Smoking and the emergence of a stigmatized social status. *Soc Sci Med.* 2007;67:420-30.
33. McLeod D, Cornford E, Pullon S, de Silva K, Simplson C. Can Quit Practice: a comprehensive smoking cessation programme for the general practice team. *J New Zeal Medical Association.* 2005;118(1213).
34. McBride CM, Emmons KM, Lipkus IM. Understanding the potential of teachable moments: the case of smoking cessation. *Health Educ Res.* 2003 April 1, 2003;18(2):156-70.
35. Hanson BS, Isacson SO, Janzon L, Lindell SE. Social support and quitting smoking for good - is there an association - results from the population study, men born in 1914, Malmo, Sweden. *Add Beh.* 1990;15(3):221-33.
36. Lindstrom M, Hanson B, Ostergren P-O, Berglund G. Socioeconomic differences in smoking cessation: the role of social participation. *Scand J Public Health.* 2000;28:200-8.
37. West R. ABC of smoking cessation - Assessment of dependence and motivation to stop smoking. *BMJ.* 2004;328(7435):338-9.

38. NEPHO, Fresh. Are NHS Stop Smoking Services reducing health inequalities in the North East of England. Occasional Paper [serial on the Internet]. 2005; 20: Available from:  
[http://www.nepho.org.uk/securefiles/100629\\_1257//Occasional%20Paper%20No%2020%20-%20Are%20NHS%20Stop%20Smoking%20Services%20Reducing%20Health%20Inequalities%20in%20the%20North%20East%20of%20England.pdf](http://www.nepho.org.uk/securefiles/100629_1257//Occasional%20Paper%20No%2020%20-%20Are%20NHS%20Stop%20Smoking%20Services%20Reducing%20Health%20Inequalities%20in%20the%20North%20East%20of%20England.pdf).
39. Lomas C, Al-Khairalla M, Winter J. Socioeconomic status is an independent factor for smoking cessation in patients with chronic obstructive pulmonary disease: A population-based observational study. *Thorax*. 2008 Dec;63:A76-A7.
40. Albertsen K, Hannerz H, Borg V, Burr H. The effect of work environment and heavy smoking on the social inequalities in smoking cessation. *Public Health*. 2003 Nov;117(6):383-8.
41. Lawlor DA, Frankel S, Shaw M, Ebrahim S, Smith GD. Smoking and ill health: Does lay epidemiology explain the failure of smoking cessation programs among deprived populations? *Am J Public Health*. 2003 Feb;93(2):266-70.
42. Graham H. *When life's a drag: women smoking and disadvantage*. London: HMSO; 1993.
43. Graham H. Social Determinants and Their Unequal Distribution: Clarifying Policy Understandings. *Milbank Q*. 2004;82(1):101-24.
44. Shiffman S, Brockwell SE, Pillitteri JL, Gitchell JG. Use of Smoking-Cessation Treatments in the United States. *American Journal of Preventive Medicine*. 2008;34(2):102-11.
45. Raw M, McNeill A, West R. Smoking cessation: evidence based recommendations for the healthcare system. *BMJ*. 1999;318(7177):182-5.

Table 1 Quit rates by socioeconomic position

	All sites	England only	Glasgow only	Glasgow one-to-one	Glasgow group
N	2397	1377	996	695	301
	<i>N (% quit)</i>				
<i>SEP</i>					
0-1 affluent indicators	507 (5.1%)	230 (8.7%)	277 (2.2%)	227 (0.9%)	50 (8.0%)
2 affluent indicators	395 (9.1%)	240 (12.5%)	155 (3.9%)	116 (3.4%)	39 (5.1%)
3 affluent indicators	485 (6.4%)	294 (9.2%)	191 (2.1%)	135 (2.2%)	56 (1.8%)
4 affluent indicators	703 (13.4%)	463 (18.8%)	240 (2.9%)	149 (2.0%)	91 (4.4%)
5 affluent indicators	307 (14.3%)	174 (19.5%)	133 (7.5%)	68 (7.4%)	65 (7.7%)
total	9.6%	14.1%	3.3%	2.4%	5.3%
P (linear association)	<.001	<.001	NA	NA	NA

Table 2 Odds ratios (95% confidence intervals) of quitting by socioeconomic position

	England only	Glasgow one-to-one
N	1305	687
SEP* only		
0-1 affluent indicator	1	1
5 affluent indicators	2.5 (1.3 to 4.6)	9.1 (1.7 to 48.3)
(+demographic )		
0-1 affluent indicator	1	1
5 affluent indicators	2.5 (1.4 to 4.7)	7.5 (1.4 to 40.3)
(+ cessation related)		
0-1 affluent indicator	1	1
5 affluent indicators	2.3 (1.2 to 4.4)	5.1 (0.8 to 31.2)

\* SEP was entered as 5 categories England and 3 categories (0-1, 2-4 & all) Glasgow one to one



Table 3 Full models showing OR (95%CI) for each candidate predictor of CO validated quitting

	England		Glasgow one to one		
	N	OR (95%CI)	N	OR (95%CI)	
<i>SEP</i>					
0-1 affluent indicator	220	1	0-1 affluent indicators	225	1
2 affluent indicators	224	1.6 (0.8 to 3.0)	2-4 affluent indicators	396	2.0 (0.4 to 9.8)
3 affluent indicators	267	1.1 (0.6 to 2.2)	All affluent indicators	66	5.1 (0.8 to 31.2)
4 affluent indicators	434	2.3 (1.3 to 4.1)			
All affluent indicators	160	2.3 (1.2 to 4.4)			
<i>Age quartiles</i>					
25-34	352	1	<i>Age tertiles</i>		
35-42	350	1.2 (0.8 to 2.0)	25-37	260	1
43-50	277	1.4 (0.8 to 2.3)	38-47	243	2.6 (0.4 to 15.2)
51-59	326	1.5 (0.9 to 2.4)	48-59	184	5.8 (1.1 to 30.2)
<i>Gender</i>					
female	748	1	female	387	1
male	557	1.5 (1.1 to 2.1)	male	300	0.9 (0.3 to 2.8)
<i>Ethnicity</i>					
White British	1238	1			
Asian mentioned	17	0.6 (0.1 to 4.9)			
Black mentioned	15	6.9 (2.1 to 23.2)			
other/unknown	35	0.2 (0.0 to 1.5)			
<i>Location</i>					
Glasgow					
Nottingham	565	1			
North Cumbria	740	1.3 (0.9 to 2.0)			
<i>Support to quit</i>					
no support	93	1	no support	165	1
support	1212	1.6 (0.8 to 3.4)	support	522	1.0 (0.3 to 3.8)
<i>Household smokers</i>					
other smoker(s)	547	1	other smoker(s)	303	1
only smoker	758	1.3 (0.9 to 1.8)	only smoker	384	3.0 (0.8 to 11.2)
<i>Determination to quit</i>					
not at all/quite/very	793	1	not at all/quite/very	437	1
extremely	512	1.5 (1.1 to 2.1)	extremely	250	2.4 (0.8 to 7.5)
<i>Time to first daily smoke</i>					
within 5 mins	472	1	within 1 hour	640	1
longer	833	1.2 (0.8 to 1.8)	longer	47	3.4 (0.7 to 15.9)
<i>Attendance</i>					
0 to 3 contacts	455	1	<i>Compliance</i>		
4 to 6 contacts	624	2.0 (1.3 to 3.2)	Did not finish either	592	1
7 to 15 contacts	177	2.6 (1.4 to 4.7)	Finished NRT or sessions	95	9.5 (3.0 to 30.2)
contacts unknown	49	1.6 (0.6 to 4.6)			
<i>Pharmacotherapy</i>					
no pharmacotherapy	25	4.9 (1.5 to 15.5)			
non compliant (<4 weeks)	253	1			
no evidence of compliance	273	2.3 (1.0 to 4.9)			
compliant (4-6 weeks)	447	3.0 (1.4 to 6.1)			
compliant (7+ weeks)	307	4.8 (2.3 to 10.3)			
<i>Referral</i>					
Self referred	706	1	Self referred	525	1
Professional referred	599	1.1 (0.7 to 1.5)	Professional referred	162	4.0 (1.3 to 11.9)
<i>Intervention format</i>					
individual	1262	1			
group	43	1.2 (0.5 to 3.2)			

Table 4 The effect on the odds ratio of SEP\* of removing other variables singly

	England	Glasgow one-to-one
SEP only	2.5 (1.3 to 4.6)	9.1 (1.7 to 48.3)
Demographic related	2.5 (1.4 to 4.7)	7.5 (1.4 to 40.3)
Cessation related	2.3 (1.2 to 4.4)	5.1 (0.8 to 31.2)
Variable removed		
- Age	2.3 (1.2 to 4.5)	5.4 (0.9 to 32.2)
- Gender	2.4 (1.2 to 4.6)	5.1 (0.8 to 31.0)
- Ethnicity	2.2 (1.1 to 4.2)	
- Location	2.3 (1.2 to 4.4)	
-Support	2.3 (1.2 to 4.5)	5.1 (0.8 to 31.1)
- Household smoker	2.2 (1.2 to 4.3)	5.9 (1.0 to 35.0)
- Determination to quit	2.3 (1.2 to 4.4)	4.8 (0.8 to 28.3)
- Time to first cigarette	2.4 (1.3 to 4.6)	5.8 (0.9 to 35.2)
- Compliance		6.5 (1.1 to 37.9)
- compliance attendance	2.0 (1.0 to 3.8)	
- compliance pharmacotherapy	2.5 (1.3 to 4.8)	
- Referral	2.3 (1.2 to 4.4)	6.4 (1.1 to 38.1)
- Intervention format	2.3 (1.2 to 4.4)	

\* SEP was entered as 5 categories England and 3 categories (0-1, 2-4 & all) Glasgow one to one