

# The self-reported oral health status and dental attendance of smokers and non-smokers

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**Aim:** To report the oral health status and dental attendance of smokers and non-smokers. **Methods:** A postal survey enquiring about smoking status, stop smoking advice, dental attendance and perceptions of oral health was conducted in Yorkshire and the Humber, UK, in 2008. To address potential biases data were weighted to account for variations in gender, age and deprivation. Data were analysed using descriptive statistics, chi-square tests and binary logistic regression. **Results:** A response rate of 43.1% was achieved (n=10,864). Across all deprivation quintiles, smokers (17.5% of respondents) were more likely than non-smokers to report fair, poor or very poor oral health (p<0.001). Smokers in the least deprived areas were more likely than non-smokers to attend the dentist symptomatically (p<0.001). Advice to quit was most frequently gained from GP services followed by NHS Stop Smoking Services and dental teams. **Conclusions:** Smokers were more likely than non-smokers to have a poor self-rated oral health status and attend the dentist symptomatically, irrespective of deprivation.

**Key words:** smoking, oral health, dental attendance, deprivation

## Introduction

Smoking and tobacco use poses one of the biggest threats to the public's health. It is estimated that by 2030 smoking and tobacco use will be the most common cause of premature death (World Bank, 1999). Smoking prevalence in the adult population (aged 16 and over) in England has fallen from 27% in 1998 to 21% in 2009 (Office for National Statistics, 2009). Over the same period smoking prevalence decreased in the Yorkshire and the Humber region of England from 29% to 22%: 21% to 16% among non-manual workers and for manual workers 32% to 26% so the gap remains fairly consistent between these two groups (Office for National Statistics, 2009). It is well documented that areas of socio-economic disadvantage correlate with higher rates of smoking (Broms *et al.*, 2004; Marmot, 2010).

The impacts of smoking on general health are well known. However, other than its role in oral cancer and periodontal disease (Binnie, 2005), its possible broader impacts on the oral cavity and dental attendance are less well known but range from relatively minor social inconveniences such as stained teeth, discoloured 'tooth-coloured' restorations and dentures, reduced taste sensation and halitosis through to delayed healing, increased risk of infection, bone loss and oral cancer and pre-cancer (Hilgers and Kinane, 2004; Johnson and Bain, 2000). Consequently, dental teams have been tasked with establishing patients' smoking status and referring to local stop smoking services when appropriate to do so (Department of Health, 2007). Within the UK, 60% of the adult population claim to attend the dentist for

regular check-ups (Department of Health, 2007). As these patients are considered generally 'healthy' (Chestnutt, 1999) compared with many of those attending their GP, it is suggested that a dental appointment is an ideal opportunity to support this public health intervention (Department of Health, 2007).

Primary Care Trusts (PCTs) are sub-regional organisations responsible for carrying out health needs assessments as part of their statutory responsibilities and in 2008 the first region-wide dental survey of adults in England was conducted across the Yorkshire and the Humber PCTs. This survey sought information on oral health but also on smoking and its impact on oral health and smoking cessation. The aim of this paper is to report the oral health status and dental attendance of smokers and non-smokers in the Yorkshire and the Humber region.

## Method

In 2008 a postal survey was undertaken in the Yorkshire and the Humber region investigating the oral health of adults. This self-administered survey contained validated questions from the national adult dental health survey (Kelly *et al.*, 1998). A precision estimate based on the proportion of people experiencing difficulties accessing dental services and a predicted response rate of 60% suggested that a sample of 1800 adults per PCT would provide adequate number for the aims of the study.

Questionnaires and covering letters were posted to 25,200 sampled individuals who were registered with a General Medical Practitioner in the 14 PCTs in the region along with a stamped addressed envelope. The sample's

details were obtained from NHS Connecting for Health with each PCT giving permission for their population to be sampled. Reminders were sent to non-respondents at 3-4 week intervals to boost response rates. Individuals who did not wish to participate were instructed to return their questionnaires uncompleted so that they could be excluded from further mailings. Details of a telephone helpline were provided in English and 20 other languages, with interpreters for participants who needed assistance to complete the questionnaire (Yorkshire and Humber Dental Public Health Observatory, 2009).

Participants were asked several questions relating to smoking. First, ‘Do you smoke cigarettes at all nowadays?’ Those who reported smoking were asked a follow up questions about whether or not they intended to give up smoking and if so the timescale for the quit attempt. Second, participants were asked whether they had received any advice from healthcare professionals about giving up smoking. The response options included: NHS Stop Smoking Service, GP nurse, doctor, pharmacy team, dentist, dental nurse/hygienist/therapist, midwife, health visitor, other healthcare professional and ‘I have not received any advice’.

The participants were asked, in general, why they attend the dentist, the reasons why they may find it difficult to get routine dental care and their perception of their oral health status.

Data were weighted to account for variations in PCT size, gender, age and deprivation. The weighting of the data was achieved by ‘cell weighting’, i.e. the weighting factor for a particular subgroup is the percentage regional population of the subgroup divided by the percentage responses gained regionally for the subgroup.

The data were analysed using chi-square tests and the Statistical Package for the Social Sciences (v12.1) with a statistical significance adopted at the 0.05 level. Binary logistic regression was also performed using the reference category (dependent variable) ‘smoker’ to assess if deprivation was a confounding factor in the association between smoking and oral health. Participants were allocated into a deprivation quintile using the Index of Multiple Deprivation (2007) by assigning their place of residence to a quintile of deprivation from ‘most deprived’ to ‘least deprived’ (Department of Communities and Local Government 2007).

Ethical and research governance approval was granted for all PCTs in the region.

## Results

From a sample of 25,200, 10,864 adults returned questionnaires (43.1%) of which 5560 (51.2%) were female. A greater proportion of responses were received from older age groups; the response rate in those aged 16-34 years was approximately half that of those aged 65-74.

Current smokers comprised less than a fifth of participants (17.5%): 16.6% of female and 18.5% of male participants. Analysis by PCT revealed that the lowest prevalence was in the mostly rural East Riding of Yorkshire (12.6%) and the highest in the city of Hull (25.8%). The average age of smokers was 40 years (range 16 to 97 years old) and 62.1% of smokers were in the 16-44 age range, this was consistent across all

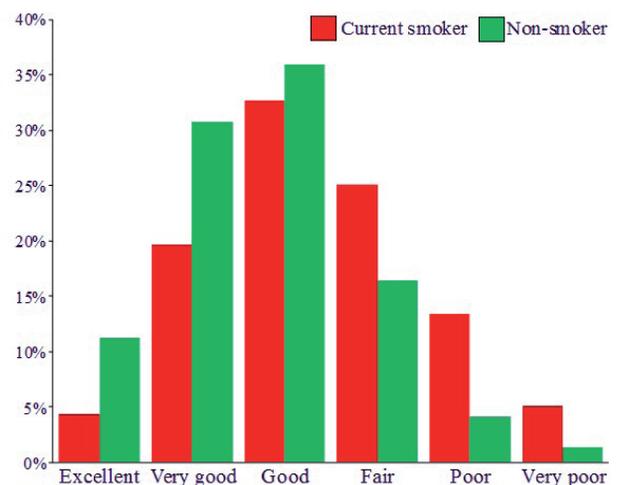
PCTs. There was a relationship between deprivation and smoking prevalence. In the least deprived areas 8.8% of participants reported smoking compared to 26.4% in the most deprived areas ( $p<0.001$ ).

Over half (58.5%) of smokers said they had not received any advice to quit smoking. Those who had received it most frequently cited as sources their GP and medical practice nurse (35.2%), NHS Stop Smoking Service (9%) and dental team members (8.8%).

Overall, smokers felt the health of their mouths was “good” followed by “fair” as opposed to non-smokers who had the greatest response to “good” followed by “very good” (Figure 1). There was a significant difference between smokers and non-smokers in their self-rated oral health status ( $p<0.001$ ).

The logistic regression identified that smokers in the least deprived quintile were approximately twice as likely to report worse oral health than non-smokers (Table 1). Regardless of deprivation, smokers were at least twice as likely to report fair, poor, or very poor oral health than non-smokers.

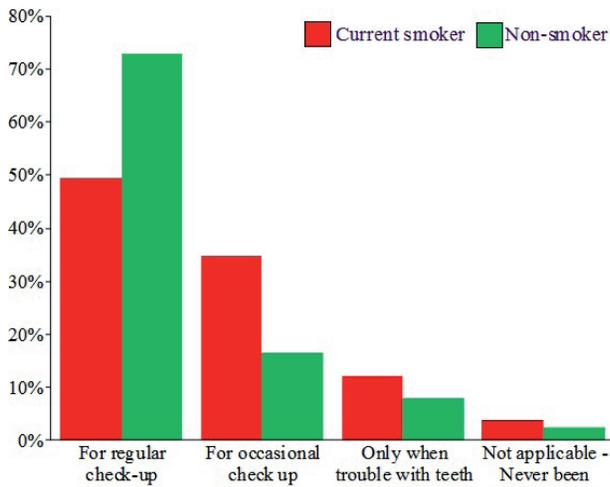
When asked about reasons for dental attendance, smokers most frequently reported attending for “regular check-ups” (49.4%) followed by “only when you have trouble with your teeth” (symptomatically) (34.9%). More non-smokers than smokers attended for “regular check-ups” (72.8%) and fewer reported “only when you have trouble with your teeth” (16.6%) ( $p<0.001$ ), see Figure 2.



**Figure 1.** All Yorkshire and Humber PCT respondents’ responses rating the health of their teeth, lips, jaws and mouth, by smoking status

**Table 1.** Odds ratios by deprivation quintile for smokers vs non-smokers reporting fair or worse oral health

IMD 2007 quintile	Odds ratios (95% conf. intervals)
Least deprived	2.74 (1.88, 4.00)
Less deprived	2.49 (1.89, 3.28)
Average	2.54 (1.98, 3.26)
More deprived	2.96 (2.33, 3.76)
Most deprived	2.08 (1.73, 2.49)



**Figure 2.** All Yorkshire and Humber PCT respondents categorising why, in general they go to the dentist, by smoking status

**Table 2.** Odds ratios by deprivation quintile for smokers vs non-smokers for symptomatic dental attendance

IMD 2007 quintile	Odds ratios (95% conf. intervals)
Least deprived	3.12 (2.07, 4.70)
Less deprived	2.72 (2.01, 3.67)
Average	2.77 (2.11, 3.63)
More deprived	3.22 (2.50, 4.16)
Most deprived	1.71 (1.41, 2.06)

Smokers in the least deprived areas were approximately twice as likely to attend the dentist symptomatically ('only when they are having trouble with their teeth') than non-smokers (Table 2). Nearly two-thirds of smokers (59.6%) reported attending within the last year as opposed to 76.5% of non-smokers ( $p < 0.001$ ), with 1.7% of smokers and 1.2% of non-smokers reporting never attending.

More smokers reported problems accessing routine care than non-smokers (28.7% vs 15.2%,  $p < 0.001$ ). Both smokers and non-smokers reported that difficulty accessing routine dental care was due to "no dentists taking patients", followed by "dentists only treating privately" and then "treatment too expensive".

## Discussion

This study compared perceived oral health and attendance patterns of people who smoke and those who do not smoke. Overall, smokers were more likely to report poor self-rated oral health status and attend the dentist symptomatically compared to non-smokers irrespective of the deprivation level of their place of residence.

The main limitation of this survey was the response rate although 43.1% compares favourably with other UK health-related postal surveys (Owen-Smith *et al.*, 2008). In this study of 10,864 adults, 17.5% reported they currently smoked. However, the General Lifestyle Survey (GLS) reported smoking prevalence of 22% for the same

region in 2009 (Office for National Statistics 2009). The GLS uses face-to-face data collection and achieved a response rate of 73%. It is possible that non-response bias may have influenced the findings as the response rate was lower from those in more deprived areas who are more likely to smoke (Broms, Silventoinen *et al.* 2004; Marmot 2010). In addition this survey may have elicited responses from 'healthier' people as it was a health-related survey and those opting to take part may have been more motivated towards health issues. However, to address these potential biases, the data were weighted to take account of variable response rates by gender, age and deprivation. The Yorkshire and the Humber Public Health Observatory developed a method to produce a 'best' estimate of smoking prevalence by looking at the quality and comparability of available local estimates (commercial organisations, national, regional and local lifestyle surveys and GP systems). Examination of these different data sources showed that this postal survey had some of the lowest smoking estimates for PCTs in the region (an average 7.6% lower than the 'best' estimate). However, research into non-response bias in a lifestyle survey has shown that when non-responders were followed up with a telephone questionnaire, their reported smoking prevalence was significantly higher than the responders, suggesting an overall increase in prevalence of 8.1%, range 2.0-14.3% (Hill *et al.*, 1997).

The association between deprivation and smoking prevalence identified here has been reported repeatedly elsewhere (Acheson, 1998; Broms *et al.*, 2004; Marmot, 2010). Lower socio-economic groups have higher smoking prevalence, less success when attempting to stop smoking and a greater dependence on tobacco than other socio-economic groups (Department of Health 2010). People who smoke are more likely to have poorer health and more likely to suffer material deprivation (Watt and Sheiham 1999). In this survey smokers perceived their oral health to be worse than non-smokers, this relationship remained after controlling for deprivation. As smoking has many detrimental oral effects this finding is perhaps unsurprising. More smokers reported they found it difficult to access routine care compared with non-smokers. This finding requires further research to unpick why smokers perceive barriers to accessing care and whether the inverse care law is in operation (Hart 1971). This is the first study to show that smokers were more likely to have poor self-rated oral health compared to non-smokers, irrespective of deprivation. There was a significant difference between smokers and non-smokers reasons for dental attendance, which was also unrelated to deprivation.

This study highlights that being a smoker may not only influence perceived oral health status, but there may also be a relationship between dental attendance independent of deprivation. Dental teams can identify smokers but there may be a limit to the proportion that can be accessed at a population level as they are less likely to attend on regularly. Smokers were more likely to report attending when having problems and this 'contact' with a dental team member may be an opportunity to raise the issue of smoking and signpost to local stop smoking services. However patients suffering acute dental problems may not be receptive to such advice at this time.

As reducing smoking prevalence is a target set by the UK governments, health care workers have been challenged to identify smokers and raise the subject of quitting (Department of Health 2010). Of smokers in this survey, over half said they had not received any advice on quitting. This may be because some participants did not recall this advice, or did not interpret a conversation about smoking as advice to quit.

The dental team is well placed to raise the impacts of smoking on the oral cavity as well as on general health, and should signpost smokers stop smoking services (Department of Health 2007; 2009; Department of Health and British Association for the Study of Community Dentistry 2009). It is encouraging that dental teams were the third most commonly reported source of quit advice, which may indicate that dental teams are responding to the call to enquire about their patients' smoking status and to provide appropriate assistance.

### Conclusions

This study has described the perceived oral health status and dental attendance of smokers and non-smokers. Smokers were less likely to attend for routine check ups and more likely to perceive they had poor oral health, irrespective of deprivation status. Participants accessed advice about stopping smoking most frequently from GP services followed by NHS Stop Smoking Services and then dental teams.

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