

Exploring Reductions in Smoking During Pregnancy in Glasgow

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EXECUTIVE SUMMARY

Official statistics on smoking during pregnancy in Scotland are drawn from SMR02 data that are collected at a woman's booking visit during the first trimester of pregnancy. The report presents findings from a re-analysis of these data for Scotland as a whole and Glasgow in particular. The analysis showed that reductions in smoking rates, particularly in more disadvantaged areas, were not due to women giving up smoking. Instead, the proportion of women whose smoking status was recorded as 'not known' rose significantly in the period 1995-2005 (by one third) across Scotland, with the problem being most acute in Glasgow, where the percentage of 'not known' cases trebled between 2000 and 2005.

As a result of the findings of this analysis, closer inspection of both SMR02 and the health visitor First Visit records system (recorded during the health visitor's first visit to a woman and her new baby following the birth, usually around 10 days post-partum) was conducted by colleagues at ISD Scotland. This analysis found that the health visitor First Visit records confirmed the positive finding from the SMR02 that rates of smoking by pregnant women had fallen over the last decade, so that just over a fifth of pregnant women were smokers in 2005. The First Visit system consistently recorded lower levels of smoking than the SMR02, suggesting that a small number of women choose to give up smoking after their child is born.

The recent rise in the number of women whose smoking status was recorded as 'not known' does not apply to the First Visit data. It is limited to the SMR02, where the level of 'not known' cases increased by an above average rate among women from the most deprived areas, whilst decreasing among women from the least deprived areas. This suggests that asking women from poor areas about their smoking habits is more problematic in the antenatal setting than after birth.

As a result of these findings, the other elements of the study examined women's attitudes to smoking and smoking cessation during pregnancy, and midwives' role in recording smoking status at booking and referring to smoking cessation services. The findings presented are based on qualitative interviews with 19 women living in the study areas and 39 midwives who were involved in the process of collecting and recording SMR02 data in the three maternity service sites in Glasgow. The findings from the interviews with the participating women were discussed under the themes of smoking behaviour and attitudes, pregnancy and cessation, and information and support. The views of midwives are discussed in relation to the process of collecting and recording smoking data, and the reasons why midwives do not ask and advise women about smoking at every booking visit. Recommendations for action based on the issues identified are included.

1 BACKGROUND

Smoking during pregnancy is harmful to women and unborn children. It is associated with risks such as pre-term and low birth weight babies (Lumley, 2004; Charlton, 1996; Di Franza et al, 2004), miscarriage (Charlton, 1996) and attention deficit hyperactivity disorder (Bastra et al, 1993). Passive smoke exposure has also been linked to asthma, lower respiratory tract infections, middle ear infections in children (Di Franza et al, 2004; Cook and Strachan, 1997) and sudden infant death syndrome (US Dept of Health and Human Services, 2001). Despite these dangers, and rising public awareness of the harmful effects of smoking, a significant proportion of pregnant women in Scotland are smokers. As this study will describe, there is some uncertainty regarding current rates of smoking during pregnancy in Scotland (ISD, 2006). However, it can be estimated that around one in four babies¹ in Scotland is born to a mother who smokes.

Reducing smoking rates during pregnancy is a policy priority in all parts of the UK. In Scotland, the Scottish Executive has established a national target that seeks a reduction in the proportion of women who smoke during pregnancy from 29% in 1995 to 20% by 2010.

Smoking is also linked with socio-economic status and is one of the leading causes of health inequalities (Jha et al, 2006). Women from lower socio-economic groups are more likely to smoke and less likely to stop smoking (Graham, 2003; Hamlyn et al, 2000). Women living in deprived areas are more likely to smoke during pregnancy than their more affluent neighbours. In addition to the overall target to reduce smoking in pregnancy, the Scottish Executive has also established a target to reduce inequalities in smoking rates. This is expressed in terms of increasing the rate of improvement for the most deprived communities by 15% by 2008.

THE GLASGOW STUDY

Despite a decline in smoking rates since the 1970s, Glasgow still has one of the highest rates of smoking prevalence in the country. In the 2005 Glasgow Health and Well-being Survey, smoking prevalence in the Greater Glasgow area was over 37%. It is estimated that one in five people in Glasgow die because of their smoking habit. Smoking during pregnancy is also more common in Glasgow than in some other parts of the country, reflecting the challenges that the city faces in terms of deprivation and poor health.

As part of the development of community health profiles undertaken by the Public Health Institute for Scotland (now part of Health Scotland) in 2004 and 2005, a full analysis of trends in smoking during pregnancy in Scotland, including Glasgow, was carried out by David Walsh and Bruce Whyte. They compared data collected from women attending a booking visit during the first trimester of pregnancy (the SMR02) with that recorded by health visitors at home post-delivery for the period 1994-2002. This analysis showed a general downward trend across the country with a small number of notable areas in Glasgow and Edinburgh showing much larger, statistically significant reductions. This was in contrast to the findings of an analysis of

¹ The most recent analysis of SMR02 data suggests that 22.9% of pregnant women identified themselves as current smokers in 2005, with an additional 5.5% whose smoking status was recorded as unknown (Tappin, 2007).

breastfeeding and low birth weight data for the same period which showed no significant differences.

In 2005, a study to explore the issue of declining smoking rates in pregnancy was commissioned by Glasgow Centre for Population Health, Health Scotland and Greater Glasgow NHS Board, and managed by Glasgow Centre for Population Health. The original study brief proposed a comparative research design that would explore the reasons why smoking in pregnancy appeared to have significantly reduced in some deprived areas in Glasgow, but not in others. The original aim of the study was to:

Identify the factors that led to a reduction in the figures for smoking during pregnancy by exploring social, economic, housing and service provision contexts in Haghill and Ruchazie in comparison with Parkhead North and Barlanark.

The four study areas included two where smoking rates appeared to have reduced significantly between 1994 and 2002 (Haghill and Ruchazie) and two where the reduction was not significant (Parkhead North and Barlanark). The research team intended to examine the issue by undertaking a study that would involve a number of different elements and would involve mixed methods. The researchers assumed that the reductions must be attributable to changes in smoking behaviour by women in the study areas (in particular, smoking cessation, perhaps with the support of health services) and/or changes in the profile of the population in the communities in question. Thus they set out to explore these issues.

However, before beginning any fieldwork in the study areas, the researchers proposed that they conduct some analysis of the data that had informed the study design. This began with a review of SMR02 data, which is the primary source of routine data about smoking in pregnancy in Scotland. The findings of this analysis fundamentally altered the design of the study.

As a result of this change in direction, the research became more complex and the study took on a number of different elements that were not included in the original proposal. In describing findings from our research, it is therefore not possible to present this report in a traditional format, first describing our methods and then outlining all our findings. Instead, it is necessary to explain how the study progressed in stages. With each stage, we describe what data we collected, how we analysed it and what our main findings were. We then conclude this report with a discussion that brings together the various strands of the study and considers its implications for policy and practice. The remaining sections of our report therefore fall into five categories:

- Identifying smokers
- Profiling case study areas
- Focus groups with women in the community
- The role of midwives
- Discussion and conclusion

2 IDENTIFYING SMOKERS

INTRODUCTION

In this chapter we review official means of recording and reporting the smoking status of pregnant women in Scotland, and particularly in Glasgow. First, we examine the SMR02 data for Scotland and Glasgow to see if the numbers of women who are currently smoking has been falling, and if so, whether this is reflected in an increase in the number of 'former' and 'never' smokers. Second, we compare the patterns reported by the SMR02 (Booking) data with health visitor (First Visit) data. Here, we focus in upon particular Glasgow maternity hospitals and compare data for women from deprived and non-deprived areas. Lastly, we review research on the efficiency and effectiveness of using the Breath CO test at antenatal clinics to identify smokers for referral to support services.

I: SMR02 ANALYSIS

Progress towards achieving Scotland's overall target to reduce smoking in pregnancy, and its target to reduce smoking-related inequalities in health during pregnancy, is being measured using SMR02 data. These data are collected at a woman's first antenatal booking (usually within the first three months of pregnancy). These booking visits take place either at hospital or in the community.

The first stage of our study involved further analysis of this SMR02 data to determine to what extent smoking during pregnancy rates had changed in recent years in Scotland and in Glasgow.

The National Picture

The first part of our analysis drew on the work of the Scottish Executive Measuring Inequalities in Health Working Group (MIHWG). This group examined data related to all six of Scotland's health inequalities targets. In relation to smoking in pregnancy, the MIHWG (2003) found that whereas smoking rates among women living in the most advantaged areas remained broadly the same from 1994-2003, there was a steady decline in the most disadvantaged areas.

Between 1994 and 2003 rates of smoking in pregnancy in the most deprived areas dropped by 15.2% which represents a cumulative decrease of -1.81% per annum. The way in which the health inequality target has been expressed requires that the rate of decline should increase by 15% over that observed for the period 1994 to 2003. This implies a reduction of -2.08% from the baseline figure of 35.8 in 2003 to yield a target figure of 32.2 for 2008.

Although this target rate is desirable in itself it is important to be explicit about the assumption that underpinned it. When the target was set it must have been assumed that smoking during pregnancy rates in the most advantaged areas would decline, if at all, at a slower rate than in the most disadvantaged so that the inequalities expressed in terms of the ratio between them would continue to fall.

Since this initial analysis was conducted, new data became available for 2004 and these are incorporated into the picture of trends since 1994 that are illustrated in

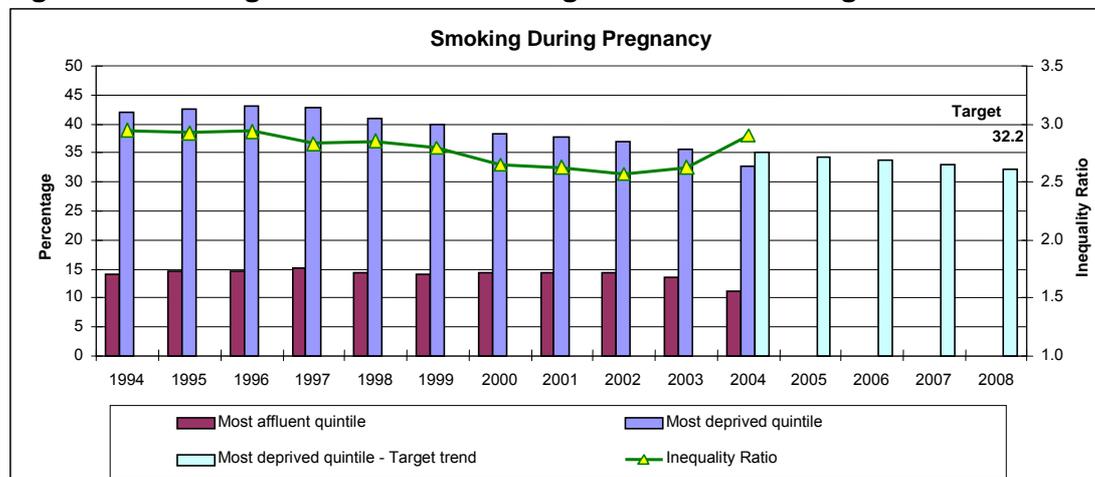
Figure 1, which has been produced by the Scottish Executive (Scottish Executive, 2005).

Figure 1 shows smoking rates across Scotland in the most advantaged and disadvantaged quintiles as measured by the Carstairs Index of Deprivation. It also shows the inequality ratio calculated as the most disadvantaged rate divided by the most advantaged rate, and the intermediate target rates for 2004-2007 implied in the setting of the health inequality target for the most disadvantaged areas of 32.2% for 2008.

During the first year of the target period, between 2003 and 2004, there was an 8.38% reduction in smoking during pregnancy in the most deprived areas. This was the biggest annual decrease in percentage terms since the start of the data series in 1994. It represents 83% of the reduction planned for the five-year period 2003-8. Nevertheless, although there was a large percentage decrease in smoking during pregnancy in the most deprived areas, the percentage decrease in the most affluent areas was almost twice as high at -16.91% between 2003 and 2004. This means that the inequality ratio has widened by 10.27% in the first target year from 2.63 (2003) to 2.90 (2004).

In order to maintain the health inequality ratio as it was at the start of the current period (2003) and assuming no further reduction in smoking in affluent areas, the target smoking figure for deprived areas would have to be reduced to 29.7% in 2008. If the health inequality ratio were to be itself improved by 15%, the target smoking figure for deprived areas would have to be reduced further to 25.2% by 2008.

Figure 1: Smoking Rates: Most Advantaged and Disadvantaged Quintiles



Source: Scottish Executive, 2005

Smoking During Pregnancy in Glasgow

The next stage of our analysis involved examining smoking in pregnancy rates using the SMR02 in Glasgow. We began by examining rates in the four study areas proposed in the initial study, all being deprived parts of Glasgow. Table 1 compares smoking in pregnancy rates between 1997 and 2002 for the study (Haghill & Ruchazie) and comparator (Parkhead N & Barlanark) areas that were originally proposed.

Table 1: SMR02 Data for GCPH Study Locations (Deprived Areas in Glasgow)

| STATUS | STUDY AREAS | | COMPARATOR AREAS | |
|-----------------------|------------------|------------------|------------------|------------------|
| | 1997 + 1998 | 2001 + 2002 | 1997 + 1998 | 2001 + 2002 |
| | <u>N (%)</u> | <u>N (%)</u> | <u>N (%)</u> | <u>N (%)</u> |
| <i>Never smoker</i> | 113 (27.3) | 107 (33.3) | 93 (30.5) | 71 (29.7) |
| <i>Current smoker</i> | 245 (59.2) | 127 (39.6) | 174 (57.0) | 121 (50.6) |
| <i>Former smoker</i> | 55 (13.3) | 43 (13.4) | 35 (11.5) | 31 (13.0) |
| <i>Don't Know</i> | 1 (0.2) | 44 (13.7) | 3 (1.0) | 16 (5.7) |
| Total births | 414 (100) | 321 (100) | 305 (100) | 239 (100) |

As Table 1 shows, SMR02 data is organised into 4 categories. The responses are categorised as 'never-smokers', 'former smokers', 'current smokers' and 'don't knows'. The key features of Table 1 include:

- There was a large reduction in the proportion of 'current smokers' in the study areas from 59% in 1997+1998 to 39.6% in 2001+2002 compared with a much smaller reduction (57% to 50.6%) in the comparator areas.
- In neither case is the observed reduction due to substantial increases in 'former smokers', which suggests that any reduction in smoking is unlikely to be as a result of any recent interventions or services.
- In the study areas the reduction in smoking is mainly (approximately two-thirds) a result of the very substantial increase in the proportion recorded as 'don't know' (0.2% to 13.7%) and to a lesser extent (approximately one-third) to the increase in the proportion of 'never smokers'. From being similar in the earlier period, the rate of recording 'don't knows' in the study areas is far higher than in the comparison areas in the later period.
- If we considered the 'don't knows' in the study areas in the later period to have behaviour similar to the subjects in the same areas in the earlier period, we would find, firstly, that the reduction in smoking in the later period is much lower (48% rather than 39%) and secondly, that a far greater share of the reduction would be due to an increase in 'never smokers' rather than an increase in former smokers.

In order to further explore the patterns of response identified for the study areas, we examined SMR02 data for all of the Greater Glasgow Health Board area. The intention was to determine whether the patterns observed in the study areas were distinctive or whether similar findings could be identified for patterns of smoking in pregnancy in other areas. The results are shown in Table 2. It compares trends in smoking in pregnancy status between 1997 and 1998 with 2001 and 2002 for the most and least disadvantaged quintiles in Glasgow as measured by the Carstairs Deprivation Index².

² Obtained from the MRC Social and Public Health Sciences Unit, University of Glasgow

Table 2: SMR02 Data for Greater Glasgow: Numbers of Births by Self-reported Smoking Status

| <i>Year</i> | <i>Births</i> | MOST DEPRIVED QUINTILE | | | |
|----------------------|---------------|-------------------------------|-----------------------|----------------------|-------------------|
| | | <i>Never smoker</i> | <i>Current smoker</i> | <i>Former smoker</i> | <i>Don't know</i> |
| 1997+98 (row pct) | 11,154 | 5,105 45.77 | 4,981 44.66 | 932 8.36 | 136 1.22 |
| 2001+02 (row pct) | 9,449 | 4,699 49.73 | 3,564 37.72 | 680 7.20 | 506 5.36 |
| Change (%) | - 15.3 | +3.96 | -6.94 | -1.16 | +4.14 |

| <i>Year</i> | <i>Births</i> | LEAST DEPRIVED QUINTILE | | | |
|----------------------|---------------|--------------------------------|-----------------------|----------------------|-------------------|
| | | <i>Never smoker</i> | <i>Current smoker</i> | <i>Former smoker</i> | <i>Don't know</i> |
| 1997+98 (row pct) | 2,942 | 2,355 80.05 | 299 10.16 | 234 7.95 | 54 1.84 |
| 2001+02 (row pct) | 2,668 | 2,164 81.11 | 264 9.90 | 182 6.82 | 58 2.17 |
| Change (%) | - 8.9 | +1.06 | -0.27 | -1.13 | +0.34 |

The key features of Table 2 are set out below.

- There appears to be a 7 percentage point reduction (-15%) in current smoking in the most deprived quintile compared with virtually no change in the most advantaged quintile.
- The changes over time by deprivation category in Glasgow are broadly consistent with the national data trends shown in Figure 1.
- The two most important reasons for the reduction in deprived areas are (a) the 4.14 percentage point increase in those classified as 'don't know' and (b) those recorded as 'never smokers' (-3.96 percentage points).
- There is a much more substantial increase in the proportion of 'don't knows' in the most disadvantaged quintile (1.22% to 5.36%) than in the most advantaged (1.84% to 2.17%).
- There is also a larger relative reduction in the number of births in the most disadvantaged areas (-15.3%) than in the least disadvantaged (-8.9%).

One of the most important issues to arise from Tables 1 and 2 is the possibility that a large part of the apparent reduction in smoking in the most deprived areas is artefactual. Nonetheless, it is still the case that the rate of smoking during pregnancy in deprived areas in Glasgow is falling, whilst it is little changed (though of course lower) in more affluent areas.

The findings from this analysis prompted a significant change in the direction of our research. They suggested that the original study design – to compare two areas where smoking rates had significantly reduced with two others where the reduction had not been as large – was no longer appropriate. The study needed to change because the SMR02 analysis suggested that we could no longer be confident that the reductions in smoking in pregnancy observed had anything to do with women quitting.

Thus a decision was taken to shift the focus of the study more towards examining how SMR02 data is collected, and also look more broadly at the social context of smoking in deprived areas. We also decided that further analysis of another important source of data – ‘First Visit’ records from health visitors – should be undertaken and compared with the SMR02 findings.

II: FIRST VISIT RECORDS COMPARED WITH THE SMR02

Scotland

The smoking status of mothers is recorded by health visitors when they make their first visit to the mother and baby about ten days after birth. Table 3 compares the findings from this system (CHPS-PS)³ with the results from the SMR02 for Scotland as a whole, over the period 1995 to 2005. We can see that both systems indicate a reduction in smoking by pregnant women over the last decade, so that around a fifth of pregnant women smoke in 2005, compared with over a quarter in 1995. The Scottish Executive is therefore close to its target of reducing to 23% the number of women smoking during pregnancy by 2005 (as recorded in the SMR02 system), but whether or not it has reached its target depends upon the number of smokers contained within the expanded ‘not known’ category. It is interesting that the number of smokers is larger in the Booking system than the First Visit system: one might expect that some women who give up smoking upon becoming pregnant may choose to resume smoking after birth, making the First Visit data for smokers higher, but this is not the case here.

Table 3: Smoking Status of Mothers in Scotland: 1995-2005

| | Proportion of Mothers (col. pct) | | | % Change 1995-2005 |
|--------------------------------|----------------------------------|------|------|-----------------------|
| | 1995 | 2000 | 2005 | |
| Smoking at Booking: | | | | |
| Smoker | 29.0 | 26.6 | 22.7 | -12.7 |
| Non-Smoker ¹ | 66.0 | 65.5 | 70.6 | +7.0 |
| Not Known | 5.0 | 7.9 | 6.7 | +34.0 |
| Smoking at First Visit: | | | | |
| Smoker | 26.8 | 25.5 | 21.4 | -11.1 |
| Non-Smoker | 63.5 | 66.5 | 72.8 | +14.6 |
| Not Known | 9.7 | 7.9 | 5.8 | -40.2 |

1. Includes ‘never smokers’ and ‘former smokers’

Source: ISD Scotland

³ Data from the first visit is recorded on the Pre-School component of the Child Health Surveillance Programme (CHSP-PS).

The First Visit data show the larger increase in non-smokers over the period, probably reflecting the fact that this system started at a lower level of recorded non-smoking. The biggest contrast in the two systems is in the number of 'not known' cases, which has increased by a third in the antenatal Booking system, but reduced by 40% in the First Visit system. Whilst the First Visit system had more 'not known' cases to start with, this position is now reversed with more 'not known' cases in the hospital recording system, which has become slightly less effective over time.

The two systems also record smoking status by level of deprivation of the area where the pregnant women live. Table 4 compares the results for the least and most deprived quintiles of areas from the two systems for the years 2000 and 2005. For both the least deprived and the most deprived areas of residence, the First Visit system records the lowest rates of smoking among pregnant women, suggesting that some women choose to stop smoking after the birth of their baby. The level of 'not known' cases is the same in both systems for the least deprived areas in 2005. However, in the Booking/SMR02 system, the level of 'not known' cases has increased by over 40% in five years for pregnant women from deprived areas and is over 60% higher than the level of 'not known' cases recorded in the First Visit system. This indicates that there may be a small but significant difficulty in addressing the issue of smoking in antenatal settings with women from deprived areas.

Table 4: Smoking Status in Least and Most Deprived Area:, Scotland

| | Year | Smoker (%) | Non-Smoker (%) | Not Known (%) |
|---------------------|------------|------------|----------------|---------------|
| Booking: | | | | |
| Least Deprived | 2000 | 9.7 | 80.9 | 9.4 |
| | 2005 | 7.7 | 87.1 | 5.2 |
| | Change (%) | -21.6 | +7.7 | -44.7 |
| Most Deprived | 2000 | 45.3 | 48.7 | 5.9 |
| | 2005 | 38.4 | 53.2 | 8.4 |
| | Change (%) | -15.2 | +9.2 | +42.4 |
| First Visit: | | | | |
| Least Deprived | 2000 | 7.6 | 83.6 | 8.8 |
| | 2005 | 6.3 | 88.5 | 5.2 |
| | Change (%) | -17.1 | +5.9 | -40.1 |
| Most Deprived | 2000 | 43.5 | 49.7 | 6.8 |
| | 2005 | 35.8 | 59.1 | 5.2 |
| | Change (%) | -17.7 | +18.9 | -23.5 |

Health Boards

We can also compare data from the two systems of recording for ten health boards⁴. Table 5 shows the rank ordering for levels of smoking among pregnant women according to the two data sources. Three of the top four health boards are the same in each data set, as are three of the bottom four health boards. However, Borders changes by six rank positions between the two systems, rising from 8th position in the SMR02 data-set to 2nd position in the CHPS-PS data-set. Greater Glasgow holds the same position in both sets of data – fourth place.

⁴ Five health boards do not participate in the CHSP-PS system: Grampian, Highlands, Orkney, Shetland and Western Isles.

Table 5: Rates of Smoking Among Pregnant Women by Health Board: 2005

| Smoking at Booking | | | Smoking at First Visit | | |
|--------------------|---------------------|---------------------|------------------------|---------------------|---------------------|
| Rank | Health Board | Rate of Smoking (%) | Rank | Health Board | Rate of Smoking (%) |
| 1 | Lothian | 12.6 | 1 | Lothian | 19.3 |
| 2 | Argyll & Clyde | 23.0 | 2 | Borders | 20.2 |
| 3 | Forth Valley | 23.1 | 3 | Forth Valley | 20.4 |
| 4 | Gtr. Glasgow | 23.8 | 4 | Gtr. Glasgow | 21.0 |
| 5 | Dumfries & Galloway | 25.3 | 5 | Lanarkshire | 21.0 |
| 5 | Lanarkshire | 25.3 | 6 | Argyll & Clyde | 21.8 |
| 7 | Tayside | 26.8 | 7 | Fife | 23.1 |
| 8 | Borders | 27.6 | 8 | Dumfries & Galloway | 23.9 |
| 9 | Fife | 29.0 | 9 | Ayrshire & Arran | 24.0 |
| 10 | Ayrshire & Arran | 29.6 | 10 | Tayside | 24.4 |

If we look now at the level of missing data in both recording systems, we see from Table 6 that there are four health boards where the number of 'not known' cases is higher in the SMR02 data-set, namely Argyll & Clyde, Greater Glasgow, Lanarkshire and Tayside. In Lanarkshire's case the level of don't knows is 30% higher in the SMR02 data, but in Glasgow's case, where the discrepancy is largest, the level of don't knows is over three times higher in the SMR02 data-set than in the CHPS-PS data. It is worth noting however that in the case of most health boards (six of the ten) the level of 'not known' cases is in fact much lower in the SMR02 system, rather than in the CHPS-PS system. The problem of data collection in antenatal settings is therefore not widespread, but rather peculiar to particular parts of the country.

Whereas across Scotland the level of 'not known' cases in the SMR02 data has risen by 34% over the decade 1995-2005, in the case of Greater Glasgow the rate of 'not known' cases has risen by 230%, and this rise has all occurred from 1995, when the number of 'not known' cases in Greater Glasgow stood at 4.3%, compared with 14.3% in 2005.

Table 6: Smoking 'Not Known' Cases in the Booking and First Visit Recording Systems by Health Board: 2005

| | Percentage of 'Not Known' Cases | | |
|---------------------|---------------------------------|-------------|--------------|
| | Booking | First Visit | Ratio (B/FV) |
| Argyll & Clyde | 9.8 | 5.3 | 1.8 |
| Ayrshire & Arran | 0.5 | 5.7 | 0.1 |
| Borders | 2.1 | 10.7 | 0.2 |
| Dumfries & Galloway | 2.8 | 11.6 | 0.2 |
| Fife | 1.6 | 9.8 | 0.2 |
| Forth Valley | 4.9 | 10.1 | 0.5 |
| Greater Glasgow | 14.3 | 4.1 | 3.5 |
| Lanarkshire | 7.7 | 5.9 | 1.3 |
| Lothian | 1.3 | 3.4 | 0.4 |
| Tayside | 12.0 | 4.9 | 2.4 |

Greater Glasgow

Tables 7 and 8 below show the smoking status of women in Glasgow over a five year period, for both the least deprived quintile of areas of residence and for the most deprived areas. There are slightly fewer mothers recorded in the First Visit system than in the Booking system, apart from the least deprived areas in 2000, which may be due to an unusually high number of home births or private hospital births among this group of women in 2000, both of which are not recorded in the Booking system.

The tables show that the two recording systems are moving in opposite directions with regard to completion of information, and this is true for women from both ends of the social spectrum (i.e. from least deprived and from most deprived areas). Thus, between 2000 and 2005, the First Visit system in Glasgow has halved its number of 'not known' cases, whilst the Booking system has roughly trebled its 'not known' cases. As it has reduced its 'not known' cases, the First Visit system is recording more non-smokers.

Table 7: Smoking Status in Least Deprived Areas: Glasgow (%)

| | Smoker | Non-Smoker | Not Known |
|-----------------------|--------|------------|-----------|
| 2000: | | | |
| Booking (n=1,450) | 9 | 88 | 3 |
| First Visit (n=1,742) | 6 | 84 | 10 |
| 2005: | | | |
| Booking (n=1,465) | 7 | 85 | 8 |
| First Visit (n=1,394) | 4 | 92 | 4 |

Table 8: Smoking Status in Most Deprived Areas: Glasgow (%)

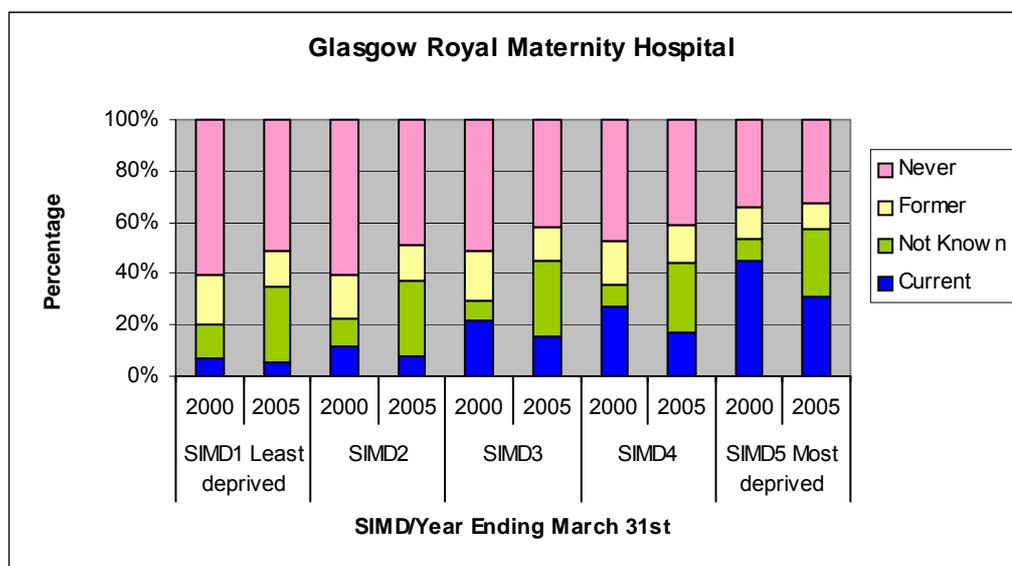
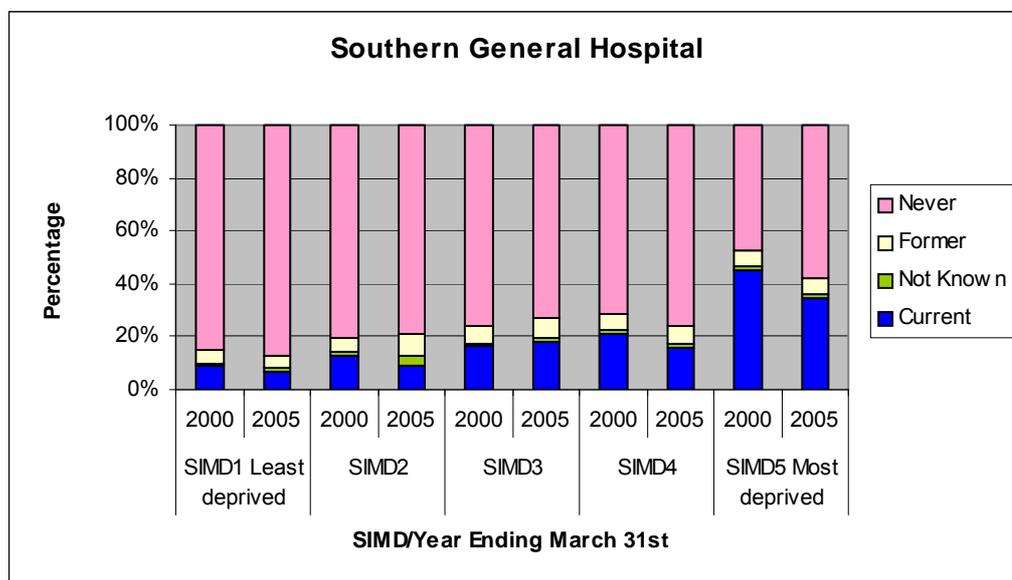
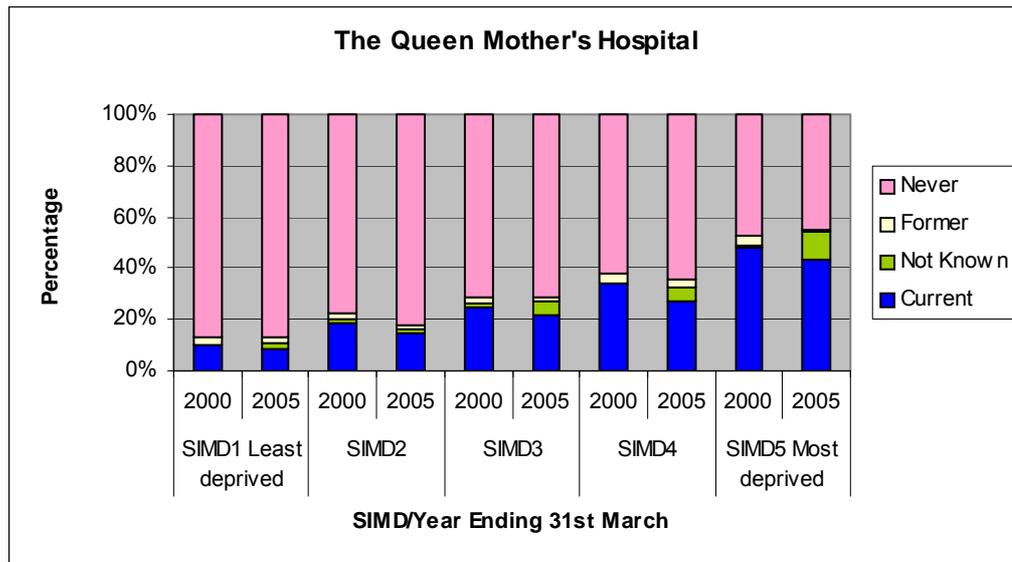
| | Smoker | Non-Smoker | Not Known |
|-----------------------|--------|------------|-----------|
| 2000: | | | |
| Booking (n=4,410) | 46 | 49 | 5 |
| First Visit (n=4,095) | 43 | 49 | 8 |
| 2005: | | | |
| Booking (n=4,476) | 35 | 48 | 17 |
| First Visit (n=4,410) | 33 | 63 | 4 |

Focusing on the most deprived areas (Table 8) we see that in the First Visit system, an increase over five years of 14% in the number of non-smoker mothers derives from a 10 point reduction in smoker cases and a 4 point reduction in 'not known' cases. But we are left with the dilemma of deciding between two scenarios: either that the 11 point reduction in smoker cases recorded at first booking for mothers from deprived areas is a true reflection of reality and that the majority of the 17% 'not known' cases recorded at booking in 2005 should be in the 'non-smoker' category; or the increase in non-smoker cases at first visit in 2005 partly reflects a decision by some women to stop smoking after the birth of their child, and only a minority part of the 17% not known cases at booking should be considered to be non-smokers at that time. We do not have a means of deciding between the two descriptions of what is really going on.

If we look at the pattern of recording for each of the three maternity hospitals in Glasgow, we see that the problem of deficient recording is concentrated at the Glasgow Royal Maternity Hospital, where the number of cases for whom the smoking status of pregnant women is 'not known' has trebled over the five year period 2000-2005, for women from areas at all levels of deprivation (see Figure 2). Whilst the number of 'not known' cases stands at nearly 30% for the Royal, it has remained consistently low at around 1% at the Southern General, but has also risen at the Queen Mother's Hospital, though to much lower levels than at the Royal (typically 2-10% by level of deprivation). The number of former smokers recorded at the Royal has been dropping for women from all types of area.

Thus, at the key site in question, the Glasgow Royal Maternity Hospital, the difficulty in recording the smoking status of pregnant women is not specific to women from deprived backgrounds, since high rates of 'not known' are recorded for women from all types of area. However, what we do know about the Royal is that, firstly, it deals with many more cases of pregnancy than either of the other two hospitals (approximately 2.5 times as many cases in a year); and, secondly, that a far higher share of its case-load comprises women from the most deprived areas – there are eight times as many pregnant women treated at the Royal from the most deprived quintile of areas as from the least deprived, compared with twice as many at each of the other two hospitals. So the volume of case load and the social mix of the case load may be having an effect upon the ability to record pregnant women's smoking status, though if it is a problem, it appears to be a problem affecting cases of women from all areas.

Figure 2: Smoking at Booking by Level of Deprivation Per Hospital



III: USE OF THE BREATH CO TEST

In order to cover the full range of ways in which the health service attempts to identify those pregnant women who smoke, the research team consulted additional related but independent research on the efficiency and effectiveness of the Breath Carbon Monoxide (CO) Test used in Glasgow antenatal clinics since April 2004. The Breath test is used as a motivational tool and all self reported smokers and women who have a CO recording >8ppm are referred to the smoking cessation link midwife for advice and support to stop smoking as well as on the effects of environmental tobacco smoke.

The research, carried out by Zara Usmani, and summarised in Appendix 2 to this report, shows that the health service cannot rely on the use of the Breath CO Test at the threshold of 8 ppm as up to 40% of smokers have CO levels below this cut-off (see table 12 in Appendix 2). In other words, the CO test at this threshold is not sensitive enough to identify all smokers. The CO test threshold has since been lowered in Glasgow to 5 ppm, although the research reviewed here indicated that a threshold of 3 ppm would be the most efficient cut-off.

SUMMARY

Our analysis of SMR02 data suggested that caution was required in interpreting the latest Scottish statistics on smoking in pregnancy showing that prevalence in deprived areas is substantially declining. If the observed reduction in the proportion of current smokers was matched to at least some degree by a rise in the number of ex-smokers, then the trends might have been explicable in terms of smoking cessation and other tobacco interventions. But our analysis showed that this was clearly not the case. The fact that the reduction in the most disadvantaged areas was driven by a rise in the proportion of 'don't knows' and 'never smokers' required an explanation, and led us to examine more closely the collection of smoking status information for pregnant women.

The health visitor First Visit records confirm the finding from the antenatal clinic Booking system that rates of smoking by pregnant women have fallen over the last decade, so that just over a fifth of pregnant women were smokers in 2005. Due to 'not known' cases, we cannot be certain whether the Scottish Executive target of no more than 23% of pregnant women being smokers by 2005 has been met. The First Visit system has consistently recorded lower levels of smoking than the antenatal Booking system, suggesting that a small number of women choose to give up smoking after their child is born. However, whilst we know that 1 in 7 of the non-smokers identified by SMR02 at the antenatal booking is a former smoker, we cannot identify the number of former smokers in the First Visit records. It would be preferable if the health visitor data was comparable to the SMR02 data in this respect.

The issue of 'not known' cases is particular to the SMR02 (antenatal booking) system. These cases have increased by a third across Scotland in the period 1995-2005 within the Booking system of recording, whilst dropping by 40% in the First Visit recording system. Furthermore, within the SMR02 system alone (and not in the First Visit system), the level of 'not known' cases has increased by an above average rate among women from the most deprived areas, whilst decreasing among women from the least deprived areas. This suggested that asking women from poor areas about their smoking habits is more problematic in the antenatal setting than after birth.

The problem of 'not known' cases within the SMR02 system is far larger in the case of Greater Glasgow than in other health board areas. Between 2000 and 2005 the percentage of 'not known' cases in Greater Glasgow trebled. In addition to Greater Glasgow, there are three other health board areas where the level of 'not known' cases is higher in the Booking recording system than in the First Visit recording system. In other health board areas, the level of 'not known' cases is far lower in the antenatal system. The problem of accurate recording of smoking status among pregnant women is therefore not a universal one, but is highly variable across the country.

When we looked in more detail at the reporting of smoking status at booking for individual Glasgow maternity hospitals, we found that the problem was most acute at the Glasgow Royal Maternity Hospital and was prevalent for women from all levels of deprivation, thus countering one of our earlier conclusions that this issue mostly affected the interaction between health service staff and pregnant women from deprived areas. However, we also know that the Royal deals with far more pregnancies across the board than either of the other two Glasgow hospitals, and that it has a far higher proportion of cases from the most deprived areas. Thus, total case load and case load mix may affect the recording of smoking status, but when it does affect the process, it appears to impact upon recording for women of all backgrounds. Early indications are that the prevalence of 'not known' cases at the Royal remains unchanged at around 30% for 2006, again across all types of area.

Because of the large number of 'not known' cases in the antenatal Booking system for women from deprived areas in Glasgow, we do not know to what extent the ten point reduction in smoking for these women recorded by health visitors at first visit over the period 2000-2005 represents a real, equivalent reduction in smoking during pregnancy, or to some extent a choice made by women to stop smoking after the birth of their child. The latter scenario would reflect a greater awareness and concern about the dangers of smoking to a baby than to a foetus among women from deprived areas.

Finally, our review of research into the efficiency and effectiveness of the Breath CO Test indicated that the most efficient threshold for the test was far below its then cut-off of 8ppm (since lowered to 5 ppm) since up to 40% of smokers have CO levels below this threshold. However, services cannot rely upon self report alone as a significant minority of women are smokers who do not declare their habit when asked. Alternatives to the CO test, such as a blood test for cotinine, would be more accurate but more complex and costly to administer.

3 PROFILING CASE STUDY AREAS

The previous chapter highlighted some unresolved questions around the reporting of smoking during pregnancy using the two measures: SMR02 and Health Visitor data. Our review of the SMR02 data indicated the possibility that a large part of the apparent reduction of smoking in the most deprived areas is an artefact of the data collection process. Health visitor data does suggest a reduction in smoking, but we do not know if this represents a real reduction in smoking during pregnancy or a choice made to stop following the birth of their child. These points raise further questions concerning the methods for monitoring smoking in pregnancy, and the experiences of women and midwives:

- What is the current process for recording smoking data, and what factors might affect the accuracy of recording?
- How do women in deprived areas feel about smoking generally, and during pregnancy?
- What is their understanding of the risks of smoking during pregnancy?
- What is their knowledge and experience of smoking cessation services?

We carried out a second phase of qualitative research within the two study areas where smoking rates appeared to have reduced significantly between 1994 and 2002 (Haghill and Ruchazie) in order to explore these questions. The findings of this qualitative work are reported in Chapters 4 and 5. This section of the report presents a profile of the two areas to provide a context for the qualitative findings which follow. Population dimensions including basic demography and social and economic variables are considered, and health indicators and smoking-related statistics are presented. In addition, there is some description of the physical environment of each area as observed by researchers. By including this contextual description, we aim to provide a background to the findings which follow on smoking during pregnancy from the perspective of both mothers and midwives who work with women living in these areas.

Defining the Areas

A definition of 'area' based on postcode sectors has been used to delineate the case study areas. Thus, Haghill is defined by postcode sector G31 3, and Ruchazie by postcode sector G33 3. This allows for description of the various dimensions outlined above, although it is important to recognize that these boundaries do not necessarily coincide neatly with those of service provision, nor do they map precisely onto residents' definitions of 'community' or 'neighbourhood' boundaries.

In compiling this section two principal sources were drawn upon: community health and well-being profiles covering Bridgeton and Dennistoun (Kelso et al, 2004a), and Eastern Glasgow (Kelso et al, 2004b). These profiles were produced by NHS Health Scotland in collaboration with the Information & Statistics Division (ISD) of NHS Scotland, and Communities Scotland. (Further information is available at: www.healthscotland.com/profiles). Statistics relating to Haghill and Ruchazie are brought together in Appendix 1. These tables also include comparisons with the Scottish average for both areas, although caution is necessary in interpretation of any differences between the national average and the case study areas⁵.

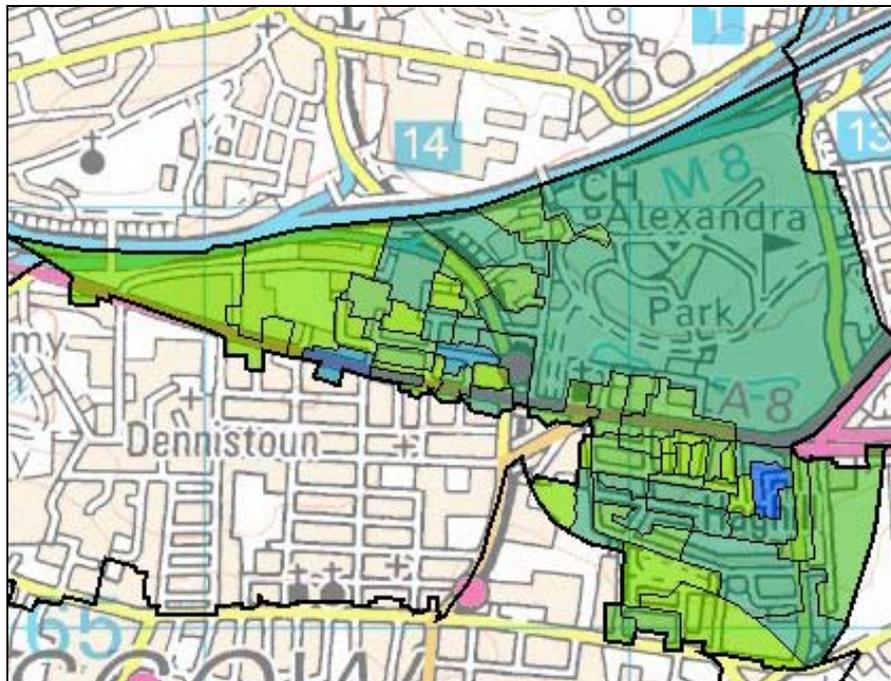
⁵ Kelso et al (2004a; 2004b) draw attention to the fact that some measures are based on small numbers and may fluctuate over time, which means that large differences with the Scottish average and changes over time should be interpreted with caution.

Location and Facilities

Haghill is an area within Dennistoun which is situated approximately three miles East of Glasgow city centre. Alexandra Park to the North-East of Haghill takes up around forty hectares. A mix of housing types is located to the south and west of the park, and these are served by a busy shopping area running through Haghill (Alexandra Parade).

This area is well catered for in terms of educational and leisure facilities for the community. Within the broader district of Dennistoun there are four primary schools (including Haghill Primary), a secondary school, nurseries, a sports centre situated on Alexandra Parade which doubles as a primary school, other sports grounds, a public swimming pool, public parks, neighbourhood centres, and a branch library.

Figure 3: Map of Haghill



Source 2001 Census data supplied by the General Register Office for Scotland.
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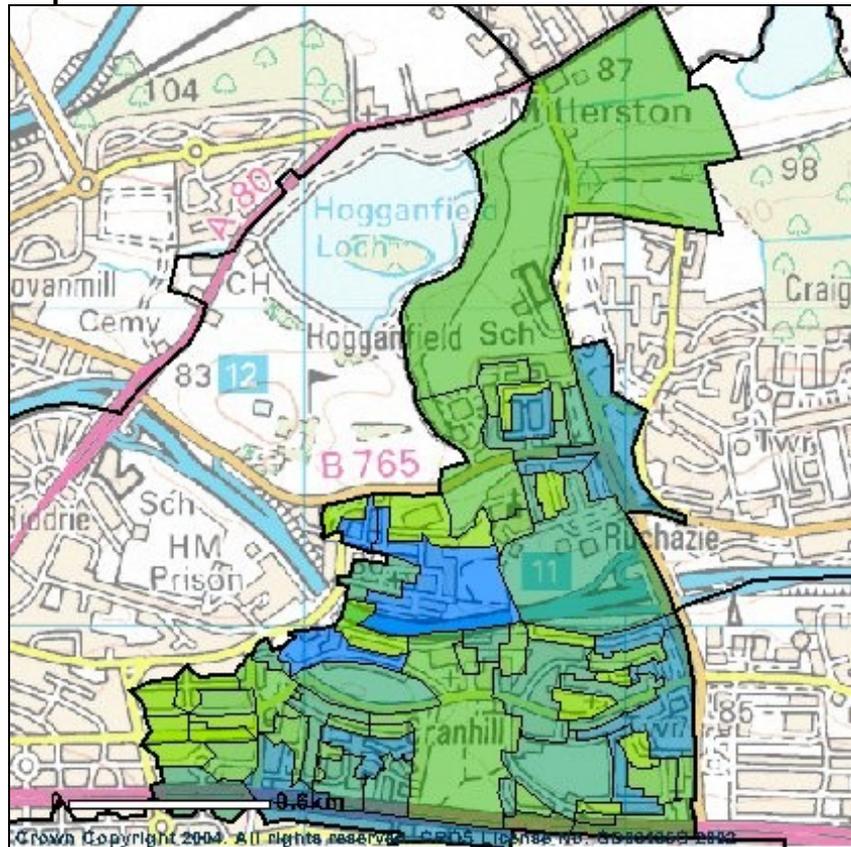


School/sports centre; shops on Alexandra Parade

Ruchazie is located slightly further to the East of Glasgow city centre, (approximately three and three-quarter miles East). The area's Southern boundary runs alongside the M8 motorway, while to the North and West of the area lies Hogganfield Loch, a large stretch of parkland.

Although parts of Ruchazie have undergone regeneration and there are a number of recent housing developments, this area has the appearance of being less economically active than Haghill. Facilities for local communities include a secondary school, three primary schools which are currently undergoing relocation into new premises, a community centre, a community hall attached to the Church of Scotland, and a nursery.

Figure 4: Map of Ruchazie



Source 2001 Census data supplied by the General Register Office for Scotland.
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Community centre, Housing in Ruchazie; Ruchazie Primary School

Demographic Profile

Statistics presented in Appendix 1 (see Table 9), show that during 2001 Ruchazie had a slightly higher population at almost 7,000, than that of Haghill with just under 6,000 people. Compared to the Scottish average, the population was skewed toward females in both areas. Around 45% of the population in each area was male compared with 54% female. There was variation between the areas in terms of age distribution. Ruchazie's population had the lower concentration of the two areas of those aged 15 or younger, while Haghill had a slightly higher 16-64 group. In both areas the presence of minority ethnic communities was very low (1.8% in Haghill/ 0.6% in Ruchazie).

Figures on in- and out-migration during 2001 indicated a drop in population numbers for both areas. Haghill saw a population outflow of 10.2% with just 8.2% inflow. Ruchazie saw particularly low movement into the area of 4% with 7.7% moving out of the area. During research visits to Ruchazie residents commented on difficulties associated with poor housing stock and management of problem residents which may present one barrier to in-migration.

The average age of first time mothers was 24.9 in Haghill and 21.6 in Ruchazie. There was a relatively high rate of teenage pregnancies in each area, and the rate of babies with a low birth weight was also relatively high, especially in Ruchazie.

Social and Economic Indicators

Available indicators are suggestive of relatively deprived social and economic environments for both areas, with Ruchazie appearing to fare somewhat less well than Haghill in many respects (see Table 10). For instance the average gross household income is £16,772 in Haghill and £15,327 in Ruchazie. A relatively low percentage of residents in the two areas are home owners (37.2 % in Haghill/ 25.5% in Ruchazie). Both areas had relatively high percentages of adults with no qualifications (47.1%/ 57%), and claimants of unemployment benefits (4.9%/ 7.5%) and Income Support (34.4%/ 40%).

Health of the Population

As would be expected given the strong association between health and deprivation, health-related statistics in both case study areas are poor in comparison with the national average. Almost a fifth of residents in each area rate their own health as 'not good' (19% in Haghill/ 18% in Ruchazie). Around three in ten had a long-term limiting illness (30.6%/ 29.5%).

Smoking-related statistics are indicative of the scale of this particular health issue within the two areas. Relatively high percentages of adult smokers have been recorded (52.7% in Haghill/ 56.3% in Ruchazie) and smoking attributable deaths are also high compared to the national average. Significantly for the current study, smoking during pregnancy is especially high in both areas, recorded at 38.1% in Haghill and 46.3% in Ruchazie (Table 11).

4 FOCUS GROUPS WITH WOMEN IN THE COMMUNITY

The second stage of our study involved exploring smoking among pregnant women who live in Haghill and Ruchazie, through a series of focus group discussions. These were used to explore women's perceptions of smoking, specifically smoking during pregnancy, barriers to quitting and perceptions of support and advice received.

METHODS

The research employed a qualitative research design, chosen because of the scope that qualitative methods offer to explore research participants' views in depth, and the potential to provide an understanding of processes such as take-up of cessation interventions and the factors at play in such situations (Morse et al, 2000). Knowledge of these processes can be used to inform future interventions.

Recruitment Strategies

Recruitment focused on women with children aged 10 or younger, who currently smoked or had quit smoking in the past 10 years (the period during which the apparent reduction in smoking during pregnancy was observed). A number of strategies were used to recruit participants. First, posters were put up in a range of locations within each of the two areas. These included venues thought to attract a range of women in the target group, such as nurseries, primary schools, health centres, community centres, churches, local libraries and shops. The poster gave brief details about the study aims and what participation in the research would involve. Contact details for one of the researchers were included and a gift voucher was offered as a means of encouraging participation. This approach proved ineffective with no-one contacting the researcher.

Two researchers then visited appropriate venues in the two areas seeking assistance from workers and community leaders. A community centre worker agreed to speak to a number of women on behalf of the research team and arrange a time that was suitable to meet. On two occasions it appeared as if a number of women had agreed to meet with the researchers, but on each occasion there was no attendance. A third meeting was set up with a community leader and some staff members of the community centre but, despite telephone reminders, none of the women turned up.

In addition, the head teacher of a primary school in Haghill agreed that researchers could attempt to recruit women when they came to drop off or pick up their children from the school. This approach worked well as the researchers were able to explain the nature of the research, and a number of women agreed to come back the following day to be interviewed. Permission was given to use a room on school premises for interview purposes.

Contact was also made with one of the health visitors in Ruchazie and it was arranged that researchers could attempt to recruit women at a local drop-in clinic. Again this recruitment method proved more successful.

An attempt was made to conduct one more discussion group at a local nursery school, but on this last occasion the researcher was only able to interview 2 women on an individual basis. All participants ($n = 19$) signed a consent form and received a £15 store token to thank them for the time they contributed to the study.

Achieved Sample

In total, nineteen women participated: seventeen taking part in one of three focus groups, and two being interviewed on an individual basis. All participants were current ($n=14$) or previous smokers ($n=5$). The small sample size means that findings cannot be generalised to a wider population. However, the age and marital status of participants varied, as did their family size and family profile, thus representing women living in a range of circumstances.

Data Collection and Analysis

The focus group discussions were carried out at a place familiar and convenient to participants: a primary school, a community centre, and a nursery. The group interviews lasted between forty-five minutes and an hour, and the one-to-one interviews lasted around twenty minutes. Consent to be interviewed and recorded was obtained at the outset.

All of the women were encouraged to speak about their views and experiences, but although an informal approach was taken, it was difficult to engage many of the women and several were disinclined to discuss the interview topics to any great extent. As the discussion which follows will show, the difficulties experienced by researchers in terms of recruitment and generating interest in the topic reflects some of the barriers encountered by midwives trying to engage women living in disadvantaged circumstances.

All interviews were recorded and fully transcribed. Themes emerging from the interview transcripts were identified. Informants' words are quoted verbatim in the presentation of findings to illustrate these themes.

FINDINGS

Thematic analysis revealed a range of smoking behaviour and attitudes. Some of these were specific to smoking in pregnancy or in the presence of children; others related to smoking generally. The findings⁶ will be discussed under three broad themes: smoking behaviour and attitudes, pregnancy and cessation, and information and support.

Smoking Behaviour and Attitudes

The group discussions invariably started with the women talking about their dislike of smoking, particularly the smell and the expense associated with smoking. Discussions also focused on some of the associated risks of smoking and all of the women were aware that there was a lot to be gained by giving up. Stories relating to family history suggest a broad experiential knowledge of smoking-related morbidity and mortality. These included familial experiences of heart disease and by-pass surgery, amputation, lung cancer and premature death. However, despite their awareness of the damaging effects of smoking and their dislike of smoking, few of the participating women had been motivated to stop smoking and most showed little intention of quitting. The

⁶ In the following discussion G signifies group interview, I signifies individual interview and P signifies participant. For example, G1, P1 signifies group 1, participant 1.

women who had stopped smoking reported being motivated by their own health and that of others, including the health of their unborn children.

Existing research literature suggests that a number of environmental and psychological factors are implicated in women's smoking. Women who start young, who have lower educational attainments and have partners that smoke are less likely to stop smoking (West, 2002). A number of these factors had resonance in the present study.

All of the participating women began smoking at a young age, with most starting between the ages of 11 and 16. The women reported that it was easy to obtain cigarettes below the legal purchasing age, and they commented on the various tactics and sources that were used to obtain cigarettes when they first started smoking. This included taking them from their parents' packets, sharing with friends, and getting adults to purchase cigarettes for them. Some of the women also talked about trying to hide their smoking status from significant family members when they first started smoking, but none of the women had been dissuaded to stop smoking.

G3, P4: "My dad would not give me trouble for smoking, because he smoked and he thought that was being hypocritical. He didn't like it, but he would rather that I did it in front of him than behind him."

G2, P1: "Aye, when I was younger I used to steal fags out my ma's packet... She knew, she knew we were smoking but never done anything."

The general impression was that smoking was widely accepted and tolerated in the communities where the women live. All of the women stated that it was common for friends, family and others to smoke and for their own smoking to be tolerated by family and friends.

G1, P2: "My family – they are all heavy, heavy smokers and some of them smoke between forty and sixty a day."

G3, P3: "Everybody smokes. Everywhere you go people are smoking outside."

G3, P4: "It's like having a mobile phone in your hand."

G1, P7: "More stresses here, and then growing up here more groups of people were starting to smoke. I didn't start smoking until I was sixteen, but all my pals smoked."

The discussions pointed to the significance of the women's social situation. Stress in the form of financial worries and family problems were important factors in their smoking behaviour and on a day-to-day basis lighting up was stimulated by a number of specific stressors and triggers. Participants talked of boredom, needing time for themselves, and trying to relax. A number of the women were also more prone to smoke in certain social situations such as when they are around other smokers, when socialising, when they are on the phone, after meals or when drinking alcohol or having a coffee or tea.

G1, P1: "When I get stressed with them I smoke – constantly. When the kids all start driving me up around the wall I smoke and smoke and smoke."

G3, P3: "I'm no a heavy smoker, but I don't like visiting my family and talking without smoking – how sad is that?"

G3, P3: *“God, it’s whatever! It’s boredom sometimes. Or when you are at a party and in company and you are standing with folk – that’s difficult.”*

A number of the women did talk about increasing social pressure to quit. Sources included their children, non-smoking partners, the medical profession and the public more generally. However, for the most part, these pressures were ineffective. Cessation was seen as something that you had to want to do for yourself. The general view was that ‘willpower’ was needed to quit, and this is in keeping with the findings of other studies (Haslam and Draper, 2001; Hotham et al, 2002). Other researchers have also reported that fear of weight gain (Hotham et al, 2002) and partners that smoke (DiClemente et al, 2000) are significant to women’s continued smoking behaviour. In the present study a number of the women had resisted attempting to quit, or had quit and relapsed, partly out of concern about weight gain.

G2: P1: *“It’s hard to stop because of the weight.”*

G3, P3: *“I gave it up for about 6 weeks and I was quite happy with it – and I never needed the patches or anything like that. I found it really quite easy, but then I put weight on. I have always been very thin and I started putting weight on and I couldnae cope with it...so I actually forced myself tae start smoking again.”*

The addictive and habitual nature of smoking also prevented cessation.

G3, P1: *“Its habit. I don’t really think about it, its habit more than anything.”*

G3, P3: *“Aye, its habit. It’s like brushing your teeth in the morning. Well it’s the first thing I do when I get up in the morning - that’s me, I’ll have a fag before I do anything, then I will do this or that. It’s like opening your eyes in the morning isn’t it?”*

G2, P2: *“It’s bad for you, but it’s addictive. I cut down, but I couldnae stop.”*

Pregnancy and Cessation

Pregnancy can provide the impetus to stop smoking, and previous studies have found that women are more likely to stop smoking during pregnancy than before or after (Haug et al, 1994). However, not all women stop. According to Abrahamsson and Ejlertsson (2002) pregnant women and their smoking status can be grouped into five categories: non-smokers, quitters, decreaseers, continuers and relapsers. In the present study, one woman had stopped before pregnancy; a few had attempted to quit but had returned to their previous smoking habits; three had stopped smoking during their most recent pregnancy and remained non-smokers after pregnancy. Several of the women had decreased the number of cigarettes they smoked either during or after pregnancy and one woman had quit postpartum. Nevertheless, most of the women did not stop during pregnancy and a number of the women who smoked during their first pregnancy also smoked during subsequent pregnancies.

The two women who managed to stop during pregnancy reported self-sustained abstinence. The other two women said they were encouraged to quit by their GP. All four of the women who had successfully quit during or after pregnancy were primarily motivated to stop because of health and financial reasons.

G1, P7: *“Because my dad was not that well and I really wanted to try and stop smoking for his health. So I think that it was just time to go – right, that is enough. And then because I found out I was pregnant, that gave me the extra push.”*

G1, P3: *“It was more to do with money and health, because I was thinking about my wee lassie, and that made me want to stop smoking for myself and for the wean.”*

G2, P3: *“When I found out I was pregnant I was told to stop smoking because of my health. I was told to stop smoking and drinking. They offered the patches but I didnae need them, I just stopped.”*

Some women who quit during pregnancy may resume postpartum; some who have smoked during pregnancy may however quit postpartum and it is thought that this is motivated by heightened awareness of the dangers of environmental tobacco smoke to children (DiCemente et al, 2000). Although the women in this study were not explicitly asked if they had tried to quit after pregnancy the discussions indicated a heightened awareness of the effects of environmental tobacco smoke following the birth of their children. One of the women in the current study quit postpartum, while others took active steps to try and reduce or prevent smoking in the presence of their baby.

G1, P2: *“I smoked all through my pregnancy. But when she was born [if] anybody tried to smoke, I was like – ‘outside now’, or ‘in the kitchen!’”*

G1, P3: *“I know what you mean, you didnae really think about it. I smoked when I was pregnant. The first time round it didnae bother me – I smoked away and I didnae really think about the health of the baby. But see when I had him and see when anybody came to see him in the first few weeks – I was like ‘get out!’. Even though I had smoked like a chimney I wouldnae let anybody smoke round him”*

G2, P3: *“My partner smokes, but he doesn’t smoke around the wean anyway...He goes into the toilet and smokes with the window up.”*

G3, P2: *“I think you shouldnae smoke in front of kids. I don’t really think that there is a need for it.”*

Information and Support

Other researchers have reported that most women are aware of the risks associated with smoking in pregnancy (Forrest et al, 1995; Haslam et al, 1997; Haslam and Draper, 2001). When asked, several risks such as low birth weight, cot death, asthma and chest infection were raised in the present group discussions. However, women may not be able to explain how the baby is put at risk (Lendahls et al, 2002) or they may not see the risks as a threat to their own unborn child (Haslam, 1997; Haslam and Draper, 2001). Indeed, many of the women in the present study lacked detailed understanding of smoking during pregnancy. For the most part, the women’s knowledge of risks associated with smoking in pregnancy was vague and incomplete, and some of the women were confused and sceptical about associated risk factors. Several of the women talked about women smoking during pregnancy with no consequences to the unborn child, and of women who had children with health problems even though they had stopped smoking before or during pregnancy.

G3, P3: *"I find that confusing as well. With my first birth I never touched a fag and she has chest problems. With my second one I never touched a fag and she has severe asthma. She grew out of it and now she has grown back into it, and I don't understand that – she doesn't even smoke. And with the last ones I smoked and they have no problems at all."*

The women could recall sources of information, such as posters, leaflets and advertising campaigns relating to smoking and passive smoking. They knew of nicotine replacement therapies and that these products were available from the pharmacy and were on prescription. There was also a general awareness of support services such as national help lines and smoking cessation groups within the locality.

However, a number of the women were uninformed or felt subjected to mixed messages when it comes to breastfeeding and the use of nicotine replacement therapy during and after pregnancy. This resulted in failure to adopt these options.

G1, P7: *"They tell us that it is not that good to smoke when you are breastfeeding but that it's best to breastfeed?"*

G3, P4: *"Because I would have liked to have breastfed and I knew that if I had breastfed her then I would have to give up smoking."*

I1: *"I think I would have found it easier to stop with patches, but I didn't think you could use them when you were pregnant"*

Contact with medical professionals during pregnancy was also explored. The impression gained from the discussions and interviews was that the women expected to be asked about their smoking status during pregnancy.

G1, P7: *"They are desperate to try and get pregnant mothers to stop."*

G2, P1: *"Every time you see them they ask if you have cut down yet. They are always asking you about it."*

Most of the women who participated in the focus groups had been pregnant prior to 2004, when specialist smoking cessation services for pregnant women were developed in Glasgow. However, before that point health professionals should have been providing advice about how to stop smoking and should have offered some sort of follow-up support. None of the women in this part of the research reported receiving any such information or support. None of the women spoke spontaneously about being given detailed information on services available, and none of them spoke of being referred to specialist services. For many of the women it was clear that the process of discussing smoking with health professionals and subsequent advice and information that they had received was not especially engaging or persuasive. Many of the women were aware of being asked about their smoking, but had difficulty remembering what they had been asked or told, and some indicated that the interaction was limited to gathering baseline information about their smoking status.

I1: *"They just ask if you are a smoker and if you are a smoker how many do you smoke."*

G3, P1: *"How much do you smoke? That was all that I was really asked at the start."*

G3, P4: *“They see how much you smoke and then tell you to try and cut down and that’s really it – end of conversation. They don’t even say quit, try and quit or nothing. Just try and cut down and that’s it.”*

The discussions also suggest that many of the women were discouraged from quitting when information and advice from health professionals and/or others was perceived as ‘nagging’.

G1, P3: *“It’s no use people telling you, you have got to want to stop smoking yourself. You have to want it yourself to give you the push. My man stopped smoking about three years ago and when he stopped he would get on to me, and that only made me smoke more.”*

G1, P2: *“I must admit, if I was smoking and every time they tell me to stop my smoking, I’d never do it.”*

G1, P2: *“If their [medical professional] attitude is no good I just say I’ve stopped smoking for 2 days.”*

DISCUSSION

Unfortunately most of the women involved in the focus groups did not stop smoking before, during or after pregnancy. Several of the women were reluctant to think about quitting and they did not appear to respond to smoking cessation information and advice. The group discussions were however focusing on women who had smoked during pregnancy and do not provide much information on those women who successfully quit or make changes in smoking habits during pregnancy. The data does nevertheless point to a number of issues that are worth further consideration in order to promote progress in smoking cessation during pregnancy.

The focus group discussions with women in two deprived neighbourhoods in East Glasgow show the significance of social influences on smoking behaviour. All of the women started smoking at a young age, and there was agreement that smoking is usual and acceptable where they live. A number of the women were affected by financial and family stress. Others were disinclined to quit because of concerns about potential weight gain. To maximise effectiveness, cessation programmes should therefore take the social context of smoking into consideration. Interventions that involve the individual’s support network, or incorporate diet and weight loss into smoking cessation programmes need further development.

Professionals also need to be aware that *detailed* understanding of smoking risks is limited. Moreover, the findings of the group discussions indicate that the women’s perceptions of service delivery may be a barrier to cessation. The women expected to be asked about their smoking habits by health professionals during pregnancy, but support from medical professions was often perceived as unhelpful. Support was often limited to information gathering about smoking status, and for a number of women some rather negative views of medical professionals ‘telling’ or ‘nagging’ them to quit prevailed. The findings of this study are confirmed by other studies that have examined midwives attitudes to discussing smoking behaviour during pregnancy (Condliffe et al, 2005). Arborelius and Nyberg (1997), for example, found that warnings and ‘moralising’ from midwives could make women smoke more. This suggests that there is a need to find new ways of providing information and advice to encourage hard-to-reach groups of women to engage in smoking cessation services, such as reinforcing positive feedback and support.

The results also point to a number of possible opportunities for intervention. For instance, women who continue to smoke during pregnancy may be more receptive to quitting or cutting down in the postpartum period. Most of the women in the present study were actively trying to prevent or reduce their children's exposure to environmental tobacco smoke. The women were obviously concerned about the health of the baby and it may be worthwhile incorporating harm reduction strategies that focus on the family and postpartum cessation. This suggests a need for a flexible approach to cessation intervention and the postpartum period might be an opportune time to encourage cessation. Other researchers have proposed extending cessation services into the postpartum period (Johnson et al, 2000) and additional research is needed to establish the cost effectiveness and outcomes of developing such services.

SUMMARY POINTS:

- ❖ Most of the women who took part in the focused discussions continued to smoke during pregnancy and did not appear to respond to cessation advice and information.
- ❖ Many of the women were resistant to cessation advice that was perceived as 'nagging'.
- ❖ The women tended to be more aware of the adverse effects of smoking to the health of the baby than they were to the unborn foetus. As a result, most of the women were attempting to reduce or prevent their children being exposed to environmental tobacco smoke. This appears to be a significant change in the women's smoking habits.
- ❖ Women who smoke during pregnancy may be open to quitting in the postpartum period and this might be an opportune time to encourage cessation.

5 THE ROLE OF MIDWIVES

This chapter considers the part played by midwives in gathering smoking-related data and initiating take-up of cessation services among pregnant women. Accurate and up-to-date information on smoking status is needed for the delivery of the most opportune advice and support services. Collecting and recording the smoking status of women during pregnancy would appear, on the surface at least, to be a fairly straightforward process. Women are asked to describe their smoking behaviour at their first antenatal booking appointment and the information is recorded on the SMR02. The collated information should enable the prevalence of smoking in pregnancy to be established. However, as outlined earlier in the report, concerns have been raised about the SMR02 data. The aim of this part of the research is therefore to explore the process of collecting and recording smoking data at the antenatal booking appointment in all three of Glasgow's maternity hospitals. In particular, it was hoped that this exploration would provide an insight into possible reasons for the presence of missing data discussed in Chapter 2.

METHODS

Qualitative individual and group interviews took place with midwives, and documents used when collecting and recording smoking status at the antenatal booking visit were examined. The aim was to shed light on factors that hinder or help complex processes such as collecting and recording smoking status data. An understanding of these processes can then be built into future interventions.

Ethical Approval

After consultation with the chair of the relevant NHS Research Ethics Committee, it was decided that this part of the research would require ethical approval. A Local Research Ethics Committee proposal was therefore developed and submitted in April 2006. We received full ethical approval for the work on May 17th. The approval was, however, conditional on Research & Development agreement from each of the participating hospital sites.

The process of Research & Development approval differed in each participating study site and in one of the sites the process was particularly lengthy and difficult. This meant that data collection could not proceed as initially anticipated or desired and considerable delays were experienced.

Subsequent recruitment of midwives in the three maternity hospitals also had to be negotiated with senior midwifery managers. Who was available to be interviewed, the length of the interview and the format of the interview all had to be agreed, and these were all constrained by workload and service delivery pressures at the time of data collection. For example, it was agreed that community midwives could be interviewed in groups, but not in one-to-one interviews, which would have been more time consuming for the service. It was also agreed that the one-to-one interviews with midwives working in outpatients would not last any longer than 15-20 minutes.

Data Collection and Analysis

Qualitative interviews were held with thirty-nine participants who were involved in the process of collecting and recording SMR02 data in the three maternity service sites in Glasgow: The Queen Mother's Maternity Hospital, The Southern General and The Princess Royal Maternity Hospital. The majority of participants (n=33) were community midwives or out-patient midwives. Four participants were nursing assistants who were trained to deliver the carbon monoxide monitoring service, and two were smoking cessation midwives responsible for the delivery of *Breathe* services in Glasgow.

The aim of the interviews was to explore the midwives' experiences and perceptions of the data collection process, and to listen to their concerns about the process. Consent to be interviewed and recorded was obtained prior to the interview. All participants agreed to the interviews being tape-recorded.

It should be noted here that there are methodological difficulties in attempting to identify the reasons for incomplete SMR02 data. For instance, potentially, midwives may be inconsistent in completion of the booking visit history and so may feel uncomfortable taking part in research that asks them the reasons why. Questions could appear confrontational if not handled well. Participants were put at ease by asking more general questions about smoking in pregnancy, which may be useful in highlighting some of the reasons why women who smoke during pregnancy might refuse smoking cessation services. The researcher who interviewed the midwives was not associated with the midwives employers or manager. Thus it was hoped that the midwives were able to critically reflect on their experience of giving smoking cessation advice and on the process of recording the smoking status of pregnant women.

The interviews were transcribed verbatim and the interview data were analysed thematically. The themes that emerged from the data focused on the process of collecting and recording smoking data and the difficulties associated with this process. These themes are discussed below, and anonymous verbatim quotes have been used to illustrate interpretations and claims being made.

FINDINGS

The Process of Collecting and Recording Smoking Data

Women were routinely asked about their smoking status during their antenatal consultation, and the midwives interviewed in all three maternity sites followed a similar process when collecting information about smoking during the booking visit. The process that should be followed is described below. However, the discussion that follows suggests that there can be deviations in this process.

1. A questionnaire⁷ and an information pack about the first antenatal visit are sent to women before attending the booking clinic. Part of the questionnaire is about smoking, and information relating to smoking and carbon monoxide monitoring is

⁷ The questionnaire is sent to the women in advance to give them time to think of past medical conditions etc. It is hoped that the women bring this information with them to the first visit but whether or not they do does not impact on the history taking process at the visit.

included. The women should therefore be aware that smoking related questions are part of the content of antenatal care.

2. Next the booking visit takes place. This provides an opportunity to ask women about smoking, assess carbon monoxide levels, give brief advice and offer assistance by way of a referral to a smoking cessation midwife.

Women are asked about their past and current smoking status. Typically, this involves asking women if they smoke and if so how many cigarettes they smoke, if their partner smokes and whether they have considered quitting. **Information on smoking status should be recorded in patient case notes and/or computer records.**

Where practical, all women (smokers and non-smokers) should receive carbon monoxide monitoring. The advantage of this approach is that it is anticipated that some women may not be completely truthful when describing their smoking behaviour at the booking clinic. The test also provides an opportunity to raise the issue of environmental tobacco smoke with non-smokers. **The carbon monoxide reading is written in the case notes and the smoking cessation referral form.**

Current smokers should receive advice from a midwife about the dangers of smoking and all pregnant women who smoke are automatically offered referral to the smoking cessation midwife for support. **The referral form is filled out and one copy is sent to the smoking cessation midwife and one copy is retained in the case notes.**

3. Following referral, the smoking cessation midwife will contact those women who have indicated that they wish to stop smoking. An initial appointment is made for a face-to-face talk, and a programme of telephone support follows this. Where appropriate, nicotine replacement therapy is provided by pharmacists.

Implementation Issues

Gathering and recording information, and supporting and giving advice are part of the content of antenatal care, and recording SMR02 data is a routine part of the antenatal process. The midwives working in antenatal care tended to view their role in the process as successful if they were able to ask about and record smoking status information. The impression gained from the interviews was that smoking would always be mentioned, but the midwives were relying on others to do any follow up support, such as providing cessation interventions. The interviewed midwives were very aware of their own part in recording procedures, but many of the midwives were not fully aware of the impact and success of the smoking cessation support service as a whole and detailed knowledge about how smoking status data were collated and analysed was limited.

Moreover, the actual implementation of the collecting and recording process varied across the three maternity sites and a number of barriers, such as client need and time constraints, prevented midwives from gathering smoking status information at every booking visit. These issues will now be discussed.

Variations in Sites and Context

The booking visit can take place in both community or hospital settings, and the data collection and recording process could vary according to service delivery sites. Sites used for booking appointments include health centres and GP surgeries, as well as the out-patient departments in the three participating hospitals. Where the data collection took place impacted on the process of data collection in a number of ways. For the most part, data were collected and recorded by professional midwives in all sites, but in some situations nursing assistants helped gather smoking related information. Interestingly, both of the smoking cessation midwives reported improvements in the referral process as a result of nursing assistant involvement.

Recording procedures varied across settings with midwives recording booking information either in writing and/or on to a computer database. The computerised booking process can continue even if some of the information is incomplete. However, there still appeared to be a lot of reliance on written records across the sites. In only one of the hospital out-patient departments were there enough resources to record all booking information on to a computerised system at the time of data collection. In one of the out-patient departments, staff used written records only. In another department, both computer and written records were used. Here staff tended to favour using written records when time constraints directed, and recording the information by hand appeared to be a prevailing department policy. For example, when asked if they were more likely to make written or computerised recordings, midwives made the following comments:

“Probably about 50/50 but quite often we get told don't use the computer. ‘Hand write them today because the clinic is so busy’. I mean, it does save a considerable amount of time. Too many patients coming through the clinic - sometimes you've got 20 patients at booking appointment and ideally you would have at least half an hour if you were using the computer and that's longer to do it all, and you just know that queues are stacking up outside and it's difficult”. (Outpatient midwife, Princess Royal Maternity, 5)

“We are supposed to use the computer if we have time. If it's very, very busy, it takes longer to do it on the computer, so we will just hand write it. So we should use the computer for a booking appointment but if we are pushed for time then we will write them” (Outpatient midwife, Princess Royal Maternity, 6)

Midwives working within the community tended to record the information in writing and then transfer the information to a computer system at a later time. Inevitably, this is a lengthy process and one midwife suggested that the process might not be complete if the computers were down. Others suggested that the process could be completed at the time of delivery.

“You have to go back at some point and put all the information on, because you can't do a delivery unless they're on the system. So when it comes to forty weeks and they've delivered. If they've not been put on the computer initially, you just have to do it again.” (Community midwife, Princess Royal Maternity)

Community midwives are also responsible for asking clients about their smoking before they are discharged into the care of health visitors. One group of community midwives indicated that if they made a point of asking everybody on discharge, then they would enter it into computer records. But the suggestion was that they do not routinely ask, and often record it as a 'don't know' on discharge.

The community clinics were also potentially more problematic because they were busier and more likely to be lacking resources. A number of the community midwives, for example, complained that they did not have access to carbon monoxide monitors in some of the community settings, which prevented the delivery of carbon monoxide monitoring. Others reported a lack of allocated rooms in the community clinics, in which to do the carbon monoxide monitoring.

“It is so busy out in the community and they are often not allocated rooms to do the carbon monoxide testing....” (Smoking cessation midwife, 1)

“...In the small satellite clinics there isn’t the same facilities available to do carbon monoxide testing and to complete the referral forms...they can’t do carbon monoxide monitoring because we don’t have carbon monoxide monitors available and they are costly. So to give every single community midwife a carbon monoxide monitor would be hugely prohibitive – cost-wise.” (Smoking cessation midwife, 2)

Thus, the results of the interviews indicate that data relating to smoking during pregnancy are managed differently across sites, but this does not necessarily mean that this will impact on the quality of data collated. There is insufficient evidence from the current interview data to know whether case note records or computer records provide more accurate and up-to-date smoking status information. **Research is needed to quantify the outputs from the two methods.**

As noted previously in Chapter 2, we know that the problem of reporting smoking status at booking was far more acute at the Princess Royal Maternity Hospital, but there is insufficient evidence to say whether the data collection process is supported more favourably in one setting or another. The total case load and case load mix may affect the recording of smoking status. However, it may be possible that factors such as training and individual motivation are more significant to data collection procedures than workload or setting. The interviews with midwives have been useful in exposing a number of variations in the recording of smoking status, but **more research is needed to make comparisons between the different hospital sites.**

Reasons Why Midwives Do Not Ask and Advise at Every Booking

There was agreement that it is important to ask attending women about their smoking habits. Although some women were thought to be a bit ambivalent or guilty about their smoking habits, most of the midwives agreed that the women expected to be asked and the vast majority of the midwives thought that it was easy to ask about smoking. However, the data in Chapter 2 revealed that there were times when midwives might not ask about smoking or give smoking related advice. The current research therefore focused on midwives’ engagement with the process of asking and advising in the hope of understanding why midwives might not ask about smoking status, or not carry out carbon monoxide monitoring or subsequently refer women to the *Breathe* service. The interviews with midwives were successful in identifying a number of reasons why midwives do not ask and advise at every antenatal booking. For example, a lack of time and a preoccupation with other client needs appeared to make the process more difficult. Some midwives were also concerned that smoking questions and advice may damage their relationships with clients. Some of the midwives suggested that clients are not always receptive to questions about smoking and there was some evidence to suggest that the midwives do not universally monitor and refer all women to cessation services at the antenatal booking visit. These themes will now be discussed.

Time and workload constraints

“The first visit, everything is so busy, and everybody wants to see her, scan, the doctor, the midwife...” (Smoking cessation midwife, 1)

Antenatal care involves different aspects of care and smoking intervention and advice are only part of the content. There is evidence to suggest that checking the baby’s health is the most important aspect of this care for mothers-to-be (Hildingsson et al, 2002), and it makes sense that this is also important for midwives. However, the clinics were very busy and the midwives had a lot of information to cover. Time and workload constraints were a recurring theme in the interviews and midwives who were involved in busy clinics sometimes felt pressured about incorporating smoking assessment and advice into their existing workload. Under such circumstances, smoking assessment and advice were not undertaken as a priority but were somewhat limited and perfunctory. Bearing this in mind, it is not surprising that a number of midwives indicated that they might be deterred from completing smoking related assessments because of their workload.

“...There are pressures on from everywhere – to be talking about this, and counselling about that. At the moment we have managed to incorporate the smoking thing.” (Outpatient midwife, Queen Mother’s, 1)

“...Our lives are full of priorities. Em... that’s a tricky one and I don’t really know how to answer it. What is a priority? I think that it is an important issue, but I don’t know if it as priority.” (Outpatient midwife, Queen Mother’s, 2)

“I suppose there are some people who are unsure of what they are doing and I think sometimes it shows if they are rushing the clinic, they might not complete everything.” (Outpatient midwife, Southern General, 4)

Midwives are less likely to monitor non-smokers

All of the participating sites appeared to value the *Breathe* service but commitment and strategies appeared to vary across sites. One outpatient department did not send the referral forms of women who stated that they were non-smokers on to the *Breathe* service, for example. Yet, an important aspect of carbon monoxide monitoring is to identify smokers who may verbally claim to be non-smokers. Recent research does indicate that smokers’ under-report cigarette consumption at booking clinics (Lawrence, Aveyard and Crogham, 2003) and some may report to be non-smokers, so it is very important that all women are monitored for carbon monoxide. All of the interviewed midwives claimed to be offering carbon monoxide monitoring to non-smokers as well as smokers. Few difficulties were expressed; although a number of the midwives had doubts about the relevance of discussing and monitoring smoking with mothers-to-be who said they were non-smokers and who said their partners were non-smokers.

“...If these women are non-smokers and their partners are non-smokers, I am not quite sure. And among the million other questions that we have to ask, it seems slightly irrelevant?” (Outpatient midwife, Queen Mother’s, 2)

Referral to the *Breathe* service did however fluctuate, and the smoking cessation midwives expressed concern that staff shortages and workload deterred monitoring and referral. Midwives who were already sceptical would find it difficult to commit time to this process, for example.

"I'm sure that if there are problems with staffing in the clinics, if there is a particularly high sick rate, if the clinics are particularly busy the midwives will prioritise, and they will see this as low priority. So the first thing they are going to drop off a booking visit is this." (Smoking cessation midwife, 2)

Additionally, one of the smoking cessation midwives was currently concerned about the low level of monitoring in a particular area.

"... They are not doing it on all non-smokers because the carbon monoxide boxes are piling up there. So they are not doing it." (Smoking cessation midwife, 1)

"... They are not doing it on non-smokers and...it's looking as if it is becoming a bit of a routine." (Smoking cessation midwife, 1)

Preoccupation with other client needs

The midwives interviewed did not always view smoking as the most important aspect of antenatal care and there were occasions when some of those interviewed thought that it was inappropriate to ask women about smoking. A number of the midwives indicated that they do not always ask about smoking because their attention is drawn to other and more immediate concerns that the attending woman may be experiencing. This includes environmental and psychological difficulties such as anxiety and depression, a previous traumatic obstetric history, domestic abuse. And often in such circumstances the women were perceived as being too burdened to be able to think about quitting.

"Some of the difficulties might be that if someone has got a very bad obstetric history then smoking is kind of low down on the agenda. What they are looking for is a live baby. Of course they have to realise that it can help to produce a better baby. But sometimes if someone has a lot of things going on in their lives – you know, like a recent bereavement, or someone is in jail, or they have children with difficulties. You know, it depends on how many pressures that they have got – where their smoking is for them to think if is important for them to give up." (Outpatient midwife, Queen Mother's, 1)

"It might not be a priority of somebody who is coming in and they have maybe lost a baby the last time with such and such a medical problem...It's rare that it is not done, but there are the odd occasions." (Outpatient midwife, Queen Mother's, 5)

"... The wee stressed lassie, you know what I mean? Who has got problems other than smoking...I usually recognise that, God, that is not really her priority at this point in time! That's...I would spend more time on abuse at home. I would find that a bigger issue." (Outpatient midwife, Southern General, 2)

Damaging to the client-midwife relationship

Midwives were concerned that the advice they were giving was not conveyed as authoritarian or lecturing, but rather that it was seen as encouraging and giving choices to mothers-to-be. Some women were seen as less interested in receiving advice and stopping smoking and midwives did not want to damage their relationship with them by being too authoritarian.

“I think there’s that thing, you know, if you’re too hard line about a particular issue, then you’re going to lose them on other issues like, they might not attend, because I’m not going to see her again because she’s just going to brow-beat me about something, so you’ve got to weigh up the lesser and the goods and the evils because if you do come hard line and fundamental about it, you’ve lost them on other issues.” (Community midwife, Princess Royal Maternity)

Some clients are not receptive to smoking-related questions and advice

Most clients were seen as being open to discuss smoking issues as they wanted to know about their health and the health of their baby, but many of the participants could describe women who were not that receptive to smoking related advice and questions. Some women may not initially disclose their smoking habits, for example; others may become agitated or aggressive when asked.

“You’ll say, do you smoke – yes or no? No. And then you will do the reading and it’s about 12 or 13. And we’ll say that reading is quite high for somebody that doesn’t smoke. Do you live with a smoker? Does any of your family smoke? Then, No – Well I really do smoke.” (Nursing assistant, Southern General, 1)

“If she is a smoker and she’s adamant that she doesn’t want help, I’m not going to agitate an alligator. So I will leave it there...If they are angry, that’s when I get off it.” (Outpatient midwife, Southern General, 2)

“I had one woman who became quite em...aggressive and she was obviously a secret smoker. A professional woman and no way did she want it...she assured me that she didn’t smoke, and didn’t want any referral made, and didn’t want any information.” (Outpatient midwife, Queen Mother’s, 5)

DISCUSSION

Although the researcher was willing to interview participants at a time and place convenient to them, many of the interviews were somewhat rushed because of time constraints on participants. The difficulties encountered by the researcher typifies some of the time constraints that midwives working in antenatal settings experience and, as such, midwives have difficulty incorporating all that is expected of them into their work schedule. Thus the midwives’ role in gathering and recording smoking information has to be seen in the context of the other work that they do. There is little evidence from the current research to suggest that midwives are not routinely asking about smoking and recommending follow up support in the antenatal setting. However, a number of issues emerged from the interviews that suggest that asking women about smoking can still be problematic in the antenatal setting.

The process of obtaining accurate smoking related information can be complicated by various factors and complete records cannot be guaranteed. Examining how SMR02 data are collected through qualitative interviews revealed variations and local discretion in the collection and recording process across the participating research sites. These variations in practice make it difficult to expose the extent to which smoking status is likely to be recorded as 'don't know' in the antenatal setting, but it was possible to identify a number of factors that could affect the recording process. As a result, there does appear to be potential for data entry to be incomplete, particularly in times of staff shortages and increased workload. There is therefore a need to consider ways of improving consistency in data collection and recording proceedings within and across antenatal settings.

Many of the midwives interviewed suggested that they do not always have sufficient time or resources to engage in the recording process as fully as might be expected. Assessing and monitoring smoking habits, although seen as a necessary part of the antenatal booking, is nonetheless viewed by some midwives as a lower priority than other issues. Carbon monoxide monitoring takes time and the monitoring of women who stated that they were non-smokers was particularly problematic in some settings. A number of the midwives were not routinely monitoring non-smokers and for many midwives domestic violence, alcohol misuse, mental health issues and breastfeeding support were perceived as greater priorities. While it is acceptable and necessary to apply discretion when appropriate, such discretion can have an impact on the equitable distribution of service provision. There is a need to consider the reasons why service providers are not providing a universal service in terms of advice and information about the risks of smoking and environmental tobacco smoke. Some of the interviewed midwives suggested that there were times when it was inappropriate to ask women about their smoking behaviour and that there are times when women are not responsive to being asked. However, recent research by Paul Aveyard and colleagues (2005) has suggested that women in pregnancy do not find smoking advice from a midwife stressful, and recommend that midwives should not be fearful of giving smoking advice and support to pregnant women. The findings of the current study also suggest that women do expect to be asked about their smoking status.

One suggestion is to make smoking assessment and advice more of a priority in antenatal settings through mandatory smoking cessation training for midwives. However, some caution is needed before accepting this at face value. Midwives were already challenged to meet the various priorities that they were set. As a minimum standard all women should be asked about their smoking habits and have their carbon monoxide levels monitored. To achieve this end carbon monoxide monitors have to be available to all midwives, including in community settings. However, to extend services in a perfunctory way may, as discussed in the focus groups, underscore the reasons why women are deterred from engaging with smoking cessation information and advice. This suggests that service provision should not only be mandatory, but there is a need for more open dialogue at antenatal visits. Further research might look to establish whether the way information is delivered has an impact on cessation outcomes.

SUMMARY POINTS:

- ❖ The booking visit provides an opportunity to ask women about smoking, assess carbon monoxide levels, give brief advice and offer assistance by way of a referral to a smoking cessation midwife.
- ❖ There are variations in the way smoking data are collected and recorded across the maternity services, but whether and how differences in the way data are managed has an impact on the SMR02 remains unanswered.
- ❖ The fact that referral to smoking cessation services did not always occur as planned means that some people can potentially slip through the net.
- ❖ There were few (but some) occasions when the need to gather smoking data was discrepant with midwives' perceptions of client need and service priorities.

6 DISCUSSION

This study examined the issue of smoking in pregnancy in Glasgow. The research was originally intended to explore the reasons why smoking rates had dropped in disadvantaged areas of the city, but the research design was changed following findings from the first stage of the project. The new study identified a number of important issues for policy, practice and future research. These include:

- How smoking rates in pregnancy are monitored
- How the social context of smoking shapes women's behaviour
- The role of midwives in raising the issue of smoking in pregnancy and referring women to smoking cessation services

MONITORING SMOKING IN PREGNANCY

Official statistics on smoking during pregnancy in Scotland are drawn from SMR02 data that are collected at a woman's booking visit during the first trimester of pregnancy. The first stage of the study involved a re-analysis of these data for Scotland as a whole and Glasgow in particular. The analysis showed that reductions in smoking rates, particularly in more disadvantaged areas, were not due to women giving up smoking. Instead, the proportion of women whose smoking status was recorded as 'not known' rose significantly in the period 1995-2005 (by one third) across Scotland, with the problem being most acute in Glasgow, where the percentage of 'not known' cases trebled between 2000 and 2005. This finding suggests that the SMR02, in Glasgow in particular, is not a wholly reliable source for monitoring changes in smoking in pregnancy.

As a result of the findings of this analysis, closer inspection of both SMR02 and the health visitor First Visit records system (recorded during the health visitor's first visit to a woman and her new baby following the birth, usually around 10 days post-partum) was conducted by colleagues at ISD Scotland.

This analysis found that the health visitor First Visit records confirmed the positive finding from the SMR02 that rates of smoking by pregnant women had fallen over the last decade, so that just over a fifth of pregnant women were smokers in 2005. The First Visit system consistently recorded lower levels of smoking than the SMR02, suggesting that a small number of women choose to give up smoking after their child is born.

The recent rise in the number of women whose smoking status was recorded as 'not known' does not apply to the First Visit data. It is limited to the SMR02, where the level of 'not known' cases increased by an above average rate among women from the most deprived areas, whilst decreasing among women from the least deprived areas. This suggests that asking women from poor areas about their smoking habits is more problematic in the antenatal setting than after birth.

As a result of these findings, the other elements of the study examined women's attitudes to smoking and smoking cessation during pregnancy, and midwives' role in recording smoking status at booking and referring to smoking cessation services.

THE SOCIAL CONTEXT OF SMOKING

The study examined the views of women regarding smoking in pregnancy in two deprived areas of Glasgow. These communities – Haghill and Ruchazie – have significantly higher smoking rates (53% and 56% respectively) than the national average, and recorded rates of smoking in pregnancy are also high (38% and 46%). The study explored the views of 19 women who had been pregnant at some point in the last ten years and were current or former smokers. Almost all of the women had continued to smoke during their pregnancies. They reported that smoking in general, including smoking in pregnancy, was widespread in their communities and was, to some extent, regarded as normal behaviour. Their reasons for starting and continuing to smoke, as well as their accounts of cessation and relapse, mirror the findings of other studies that have explored the social context of smoking in disadvantaged areas (Bancroft et al, 2003; Graham, 1993; Graham, 2003; Wiltshire et al, 2003).

The women were aware of some of the risks of smoking to both themselves and the foetus but also identified alternative or conflicting evidence (that their children were healthy despite being exposed to smoking, and that other people's children had health problems despite being born to a non-smoker) to justify their behaviour. In this respect the findings are similar to other recent studies that have explored disadvantaged women's attitudes to smoking during pregnancy and to exposing children to the effects of tobacco (Robinson, 2007; Robinson and Kirkcaldy, 2007).

The women who took part in the research could recall receiving advice to stop smoking from health professionals although none reported receiving structured support to quit. Many of the women expressed resistance to this advice and did not report that it had made any difference to their smoking behaviour.

A potentially important finding from this part of the study was that the women interviewed were more aware of the adverse effects of smoking to the health of a baby or child than to the unborn foetus. They reported active attempts to reduce their children's exposure to environmental tobacco smoke. This finding can be linked to results from the analysis of health visitors First Visit data that suggest that some women may give up smoking in the immediate post-partum period. Current interventions to reduce smoking are not specifically targeted at women who have recently had children. Further consideration should be given to working with this group to improve the health of the mother, reduce children's exposure to environmental tobacco smoke and to increase the chances of abstinence during any future pregnancies.

THE ROLE OF MIDWIVES

The study also examined the role of midwives in collecting and recording data on the smoking status of women during the booking visit. Interviews were conducted with thirty-five midwives and four nursing assistants in all three of Glasgow's maternity hospitals. Booking visits can be conducted in community clinics and outpatient departments, and midwives delivering services in both settings were interviewed.

Interviewees reported that all women should be asked about their smoking status at booking, all should be CO monitored to confirm the reported status, and those that are smokers should be provided with brief advice to stop and then referred to the specialist stop smoking service, *Breathe*. The research identified a number of issues

that can affect how this process takes place and whether each stage in the process is carried out.

The first issue identified was that the collection and recording process varies across the three maternity sites in Glasgow, and between outpatient and community clinics. Recording procedures varied with midwives recording booking information either in writing and/or on to a computer database. In only one of the hospital out-patient departments were there enough resources to record all booking information on to a computerised system at the time of data collection. In the community, midwives tended to record the information in writing with the information being transferred to a computer system at a later time.

Unfortunately, although the study identified significant variation in recording procedures, no conclusions could be drawn about whether case note records or computer records provide more accurate and up-to-date smoking status information and therefore result in more accurate SMR02 data. More research is needed to quantify the outputs from the two methods and to make comparisons between the different hospital sites in this regard.

The second issue identified was that interviewees provided a number of reasons and examples to explain why identifying smoking status did not always form a central part of the booking visit. In many cases, this was because of time constraints and/or staffing levels. Some midwives also provided examples where preoccupation with other client needs (such as domestic abuse or a complex obstetric history) could make raising the issue of smoking seem less important. As other studies have found, some midwives were also concerned that offering advice on smoking may damage their relationships with clients (Condliffe et al, 2005) and that clients are not always receptive to questions about smoking (Hotham et al, 2002).

Finally, the interviews identified a number of reasons why pregnant women in Glasgow were not always CO monitored and smokers then referred to cessation services. One issue appeared to affect community clinics, where midwives reported that they did not always have access to CO monitors. Another related to midwives' attitudes to the relevance of monitoring non-smokers. An important objective of CO monitoring is to identify women who are smokers but may not be willing to admit this. Studies have consistently found that relying on self-report underestimates smoking during pregnancy (Ford et al, 1996; Graham and Owen, 2003), and CO monitoring, despite its limitations, is one way to compensate for this. Only once a woman has been identified as a smoker can the issue of advice and support to stop be raised. However, it is apparent from the findings of this study that women who self-report as non-smokers in Glasgow are not always CO monitored. This undermines an important component of the *Breathe* service and, along with issues such as time and staff shortages that can affect midwives' ability to refer; it can result in missed opportunities to intervene to reduce smoking in pregnancy.

CONCLUSION

Reducing smoking in pregnancy is a policy priority in Scotland as elsewhere. Huge progress has been made in recent years in developing services to help women to stop, particularly in Glasgow. However, this study has demonstrated that there are a number of complex problems surrounding the reasons why women smoke, how

smokers are identified and referred to services, and the reliability of national data on the number of women smoking during pregnancy.

In particular, it has highlighted the persistent and complex relationship between disadvantage, smoking and pregnancy. This issue has been examined in previous studies but this is perhaps one of the only examples of a project that has attempted to explore this relationship not only in the context of women's experiences, but also its implications for how smoking is recorded and discussed in the ante-natal setting.

In many ways this study poses more questions than it has answered. More research is needed on a number of issues raised in this report. But there is perhaps one clear finding that is supported by other studies currently underway. This is that we cannot currently say with any great certainty how many women are smoking during pregnancy in Scotland and how many receive appropriate cessation support. We certainly cannot say whether government targets for reducing smoking during pregnancy, and reducing inequalities in smoking during pregnancy, will be met. It is important that these issues are better understood through new policies, improved monitoring and further research in the future.

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APPENDIX 1: COMMUNITY PROFILES

The tables contained in this Appendix provide statistical information on the two areas selected as case studies (see chapter 3). These tables are based on figures contained in community health and well-being profiles covering Bridgeton and Dennistoun (Kelso et al, 2004a), and Eastern Glasgow (Kelso et al, 2004b). These profiles were produced by NHS Health Scotland in collaboration with the Information & Statistics Division (ISD) of NHS Scotland, and Communities Scotland.

Table 9: Demographic Indicators: Haghill and Ruchazie compared with Scottish Average

| INDICATOR | HAGHILL | | ABOVE/ BELOW SCOTTISH AVERAGE (%) | RUCHAZIE | | ABOVE/ BELOW SCOTTISH AVERAGE (%) |
|---|---------------|----------------|--|---------------|----------------|--|
| Male ⁱ | 45.6% | (2,659) | -2 | 45.4% | (3,163) | -3 |
| Female ⁱ | 54.4% | (3,168) | +2 | 54.6% | (3,801) | +3 |
| Aged 0-15 ⁱ | 17.7% | (1,033) | -8 | 25.3% | (1,761) | +32 |
| Aged 16-64 ⁱ | 67.9% | (3,956) | +5 | 61.2% | (4,261) | -6 |
| Aged 65+ ⁱ | 14.4% | (838) | -10 | 13.5% | (942) | -15 |
| Population inflow – previous year ⁱ | 8.2% | (479) | 0 | 4.0% | (281) | -51 |
| Population outflow - previous year ⁱ | 10.2% | (597) | +35 | 7.7% | (538) | +1 |
| Minority ethnic groups ⁱ | 1.8% | (102) | -13 | 0.6% | (43) | -69 |
| Average age of first time mothers ⁱⁱ | | 24.9 | -6 | | 21.6 | -18 |
| Teenage pregnancies (3 year total) ⁱⁱⁱ | 22.8 per 100 | (56) | +75 | 24 per 100 | (104) | +84 |
| Low birthweight babies (3 year total) ^{iv} | 8.3 per 100 | (19) | +45 | 14.4 per 100 | (38) | +150 |
| Total population | 100.0% | (5,827) | | 100.0% | (6,964) | |

ⁱ Source: Census 2001 (expressed as %: N)

ⁱⁱ Source: ISD SMR2 1999/2001 (Average age in years over 3 year period)

ⁱⁱⁱ Source: ISD SMR1 & SMR2 2000/2002 (Teenage pregnancies totalled over 3 years, expressed as crude rate per 100 females aged 13-19: N)

^{iv} Source: ISD SMR2 2000/2002 (Live births <2500g totalled over 3 years, expressed as crude rate per 100 females aged 13-19: N)

Table 10: Social and Economic Indicators: Haghill and Ruchazie compared with Scottish Average

| INDICATOR | HAGHILL | | ABOVE/ BELOW SCOTTISH AVERAGE (%) | RUCHAZIE | | ABOVE/ BELOW SCOTTISH AVERAGE (%) |
|---|---------------|---------|--|---------------|---------|--|
| Adults (16-74) with no qualifications ⁱ | 47.1% | (2,090) | +42 | 57.0% | (2,757) | +72 |
| Social grade AB ⁹ ⁱ | 7.8% | (372) | -59 | 3.9% | (205) | -79 |
| Social grade E ¹⁰ ⁱ | 38.7% | (1,853) | +73 | 45.5% | (2,369) | +103 |
| Owner occupiers ⁱ | 37.2% | (1,203) | -41 | 25.5% | (768) | -59 |
| Unemployed claimants ⁱⁱ | 4.9% | (187) | +52 | 7.5% | (307) | +132 |
| Income support claimants ⁱⁱⁱ | 34.4% | (1,300) | +172 | 40.0% | (1,603) | +217 |
| Adults unable to work due to illness/ disability ^{iv} | 26.9% | (1,015) | +154 | 28.2% | (1,150) | +167 |
| Total workplaces ^v | 16.6 per 1000 | (97) | -49 | 12.2 per 1000 | (85) | -62 |
| Households without access to car/van ⁱ | 71.5% | (2,310) | +109 | 69.6% | (2,095) | +103 |
| Average annual gross household income ^{vi} | | £16,772 | -35 | | £15,327 | -41 |

ⁱ Source: Census 2001 (expressed as %: N)

ⁱⁱ Source: NOMIS 2003 (averaged over a 12-month period, expressed as percentage of working age population: N)

ⁱⁱⁱ Source: Department of Work and Pensions 2000 (snapshot in time of claimants on the Income Support Computer System –ISCS – expressed as percentage of working age population: N)

^{iv} Source: Department of Work and Pensions 2000 (working age population – 16-59 for women and 16-64 for men – claiming Incapacity Benefit or Severe Disability Allowance)

^v Source: Annual Business Inquiry 2002 (expressed as number of workplaces per 1000 population: number of workplaces)

^{vi} Source: Communities Scotland (CACI Paycheck data)

⁹ Defined as higher and intermediate managerial / administrative / professional (Kelso et al, 2004a; 2004b)

¹⁰ Defined as on state benefit, unemployed, lowest grade workers (Kelso et al, 2004a; 2004b)

Table 11: Health-related Indicators: Haghill and Ruchazie compared with Scottish Average

| INDICATOR | HAGHILL | | ABOVE/ BELOW SCOTTISH AVERAGE | RUCHAZIE | | ABOVE/ BELOW SCOTTISH AVERAGE |
|--|-------------------|---------|--|-------------------|---------|--|
| | | | (%) | | | (%) |
| Self-assessed health classified as 'not good' ⁱ | 19.0% | (1,105) | +87 | 18.0% | (1,256) | +78 |
| Long-term limiting illness ⁱ | 30.6% | (1,783) | +51 | 29.5% | (2,056) | +45 |
| Estimated smokers ⁱⁱ | 52.7% | (2,337) | +52 | 56.3% | (2,720) | +62 |
| Smoking attributable deaths ⁱⁱⁱ | 672.2 per 100,000 | (20) | +68 | 701.1 per 100,000 | (24) | +75 |
| Smoking during pregnancy (3 year total) ^{iv} | 38.1% | (88) | +40 | 46.3% | (126) | +71 |
| Breastfeeding at 6-8 weeks ^v | 15.2% | (8) | -56 | 15.6% | (13) | -54 |
| Hospital admissions – cancer ^{vi} | | (146) | +9 | | (188) | +19 |
| Hospital admissions – heart disease ^{vi} | | (95) | +57 | | (132) | +94 |
| Hospital admissions – stroke ^{vi} | | (17) | +18 | | (29) | +106 |
| Hospital admissions – diabetes ^{vi} | | (47) | +21 | | (62) | +35 |
| Deaths – cancer ^{vii} | | (22) | +46 | | (26) | +55 |
| Deaths – heart disease ^{vii} | | (23) | +60 | | (20) | +26 |

i Source: Census 2001 (expressed as %: N)

ii Source: Portsmouth University 2001 (current smokers aged 16-74)

iii Source: Portsmouth University 1995/2001 (average annual deaths due to smoking related causes among those aged 35 and over, expressed as rate per 100,000 population: N)

iv Source: ISD SMR2 2000/2002 (maternal smoking recorded at booking – totalled over 3 years – expressed as % of all admissions: N)

v Source: ISD Child Health Surveillance Programme - Pre-School

2000/2002 (average annual % and N of children being breastfed at 6-8 week review)

vi Source: ISD SMR1 2000/2002 (average numbers of acute hospital continuous inpatient stays)

vii Source: General Register Office for Scotland 2000/2002 (average annual number of deaths)

APPENDIX 2: USE OF THE BREATH CARBON MONOXIDE (CO) TEST¹¹

Zara Usmani

Biochemical validation of smoking status during pregnancy serves two purposes. First, it is an objective check on smoking status at a time when women may feel under pressure to make false declarations of non-smoking (Lawrence et al, 2003; Orleans et al, 2000). Indeed, studies have shown the unreliability of self-reported smoking status in maternity care (Owen and McNeill, 2001). Second, providing biochemical evidence of smoking and its effects during pregnancy can increase women's motivation to stop smoking and make use of treatment services (McClure, 2004). The biochemical test serves, therefore, as both an identifier and a motivator.

Since April 2004, the Breath CO Test has been used in antenatal clinics in Glasgow. All women are CO monitored using a portable CO monitor, and those who are self-reported smokers or who record a reading of ≥ 8 ppm are referred to a smoking cessation link midwife for a six-week support programme. Although the 8ppm cut-off is widely accepted as an abstinence threshold (Benowitz et al, 2002), it has been suggested that the threshold may be too high to pick up all smokers (Javors et al, 2005). An attempt was made, therefore, to assess the optimal cut-off level to distinguish smokers from non-smokers amongst pregnant women using data from one maternity unit in Glasgow.

The research involved extracting data from completed forms from the *Breathe* smoking intervention programme at the Southern General Maternity Unit, Glasgow. This was done for all women who had booked into the antenatal clinic in the period July 2005 to June 2006 and for whom both self-report smoking status and CO validated smoking status was available: 2,548 cases in total¹². The data extracted included: self-reported smoking status; CO levels; date of birth; date of booking; partial postcode; and number of cigarettes smoked per day.

We shall consider the findings of the research in four areas:

- The sensitivity of the CO Test
- An Alternative CO Threshold
- The Accuracy of Self-Report Smoking Status
- Potential Inefficiency in Targeting Resources

The Sensitivity of the CO Test

Table 12 shows the comparison between self-reported smoking status and CO validated smoking status at the 8ppm cut-off. We can see that over the year, 219 women who said they were smokers had a CO reading below 8ppm, and 27 women who said they were non-smokers had a CO reading above 8ppm. Whilst 21% of

¹¹ This section of the report summarises research carried out by a Glasgow University medical student, Zara Usmani. Her work was conducted independently of the main project but is included here as it was informed by our wider research interests and was reported to the same research steering group at GCPH.

¹² The Southern General has an 85-90% return rate for the *Breathe* service forms.

women said they were smokers, the CO Test only identified 14% of women as smokers.

Table 12: Comparison of Self-Reported and CO Validates Smoking Status

| <i>CO-Validated</i> | <i>Self-Report</i> | | <i>Total</i> |
|---------------------------------|--------------------|-------------------|-----------------|
| | <i>Smoker</i> | <i>Non-Smoker</i> | |
| Yes = \geq 8ppm (col. Pct) | 327 (59.9) | 27 (1.3) | 354 (13.9) |
| No = \leq 8ppm (col. Pct) | 219 (40.1) | 1975 (98.7) | 2194 (86.1) |
| Total (row pct) | 546 (21.4) | 2002 (78.6) | 2548 (100.0) |

We can apply two statistical measures to these results:

Sensitivity: The percentage of smokers with a CO reading at or above the threshold, which in this case is 59.9%. In other words the CO test picks up 60% of smokers; this is its sensitivity.

Specificity: The percentage of non-smokers with a CO reading below the threshold, which in this case is 98.7%, i.e. the test correctly categorises 99% of non-smokers.

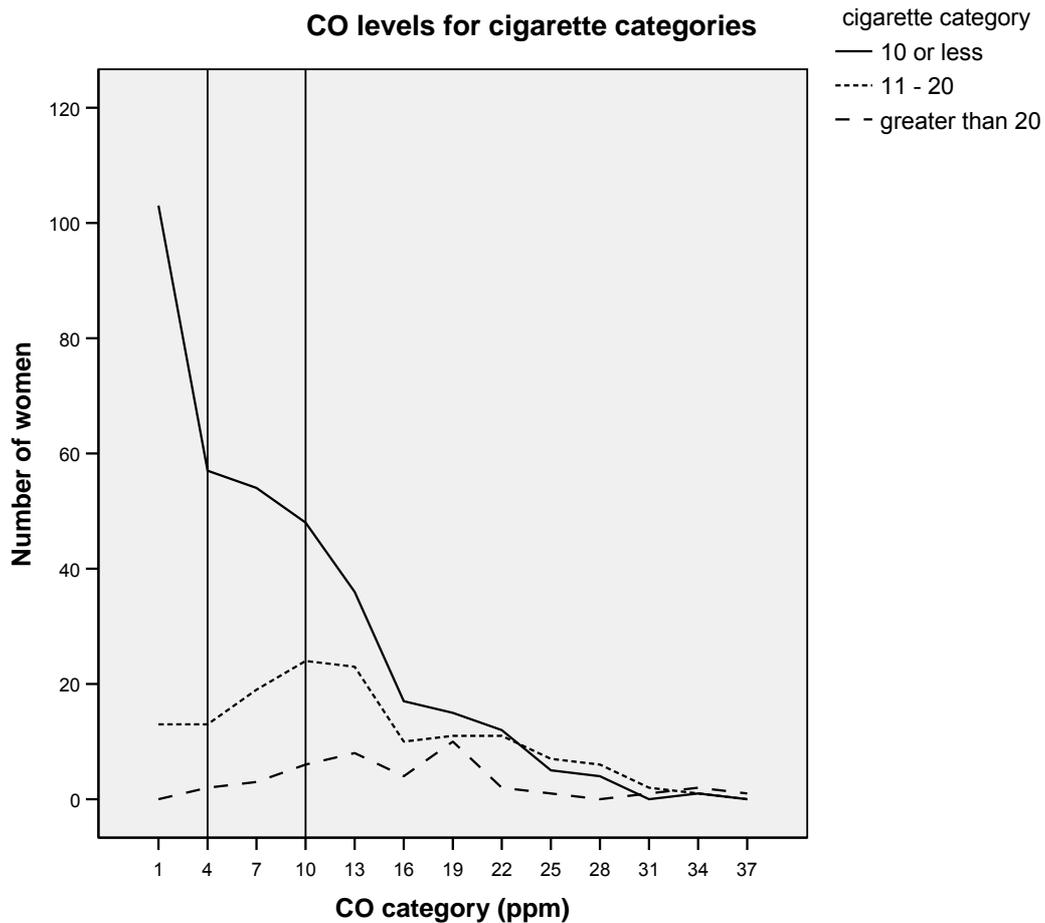
CO measurements were also assessed in relation to the number of cigarettes smoked per day to see how sensitive the test was to different levels of smoking. Table 13 shows the breakdown of self-reported smokers into three categories (light, medium and heavy smokers) separately for those with CO readings above and below 8ppm. The findings indicate that the 8ppm threshold is poor at detecting light smokers, since three-quarters of the smokers with a CO reading below 8ppm were light smokers, consuming 10 or fewer cigarettes per day.

Table 13: Smoking Intensity Above & Below the CO Threshold

| | <i>% Smokers (col. pct)</i> | |
|--------------------------------------|-----------------------------|------------------------------------|
| | <i>CO = < 8ppm</i> | <i>CO = \geq 8ppm</i> |
| Light Smoker (10 or less per day) | 77% | 54% |
| Medium Smoker (11-20 per day) | 15% | 32% |
| Heavy Smoker (21 or more per day) | 2% | 9% |

Figure 5 shows the overlap in CO readings between light, medium and heavy smokers. It is possible for women in each category to have similar CO readings. For heavy smokers in particular, the distribution of women across CO levels is fairly flat. Once again it would appear that the intensity of smoking is not reflected very well in CO readings.

Figure 5: Distribution of CO Levels for Light, Medium and Heavy Smokers



Note: the CO levels have been merged into groups of 3 to make the lines smoother and easier to read. 1ppm = results for 1-3ppm. 4ppm = results for 4-6ppm and so on.

An Alternative CO Threshold

In order to investigate the best possible alternative CO threshold, the sensitivity and specificity values were calculated from the data-set at different CO cut-offs. The results shown in Table 14 illustrate how sensitivity increases and specificity decreases as the CO cut-off is lowered. The findings indicate that the best combined level of sensitivity and specificity is achieved at a CO cut-off value of 2ppm and 3ppm. If the two statistics are plotted, as in Figure 6, the lines overlap somewhere between 2 and 3 ppm. This finding chimes with that of Javors et al (2005) who recently suggested a cut-off of between 2 and 3 ppm for detecting smokers in the general population.

Table 14: Combined Sensitivity and Specificity at Various CO Levels

| CO cut-off (ppm) | Sensitivity | Specificity | Sensitivity + specificity / 2 |
|------------------|-------------|-------------|-------------------------------|
| 0 | 1 | 0 | 0.5 |
| 1 | 1 | 0.2 | 0.6 |
| 2 | 0.857 | 0.897 | 0.88 |
| 3 | 0.832 | 0.930 | 0.88 |
| 4 | 0.777 | 0.960 | 0.87 |
| 5 | 0.729 | 0.974 | 0.85 |
| 6 | 0.685 | 0.982 | 0.83 |
| 7 | 0.643 | 0.984 | 0.81 |
| 8 | 0.599 | 0.987 | 0.79 |
| 9 | 0.559 | 0.989 | 0.77 |
| 10 | 0.502 | 0.990 | 0.75 |
| 11 | 0.465 | 0.992 | 0.73 |
| 12 | 0.408 | 0.995 | 0.70 |

Figure 6: Plot of Sensitivity and Specificity at Various CO Levels

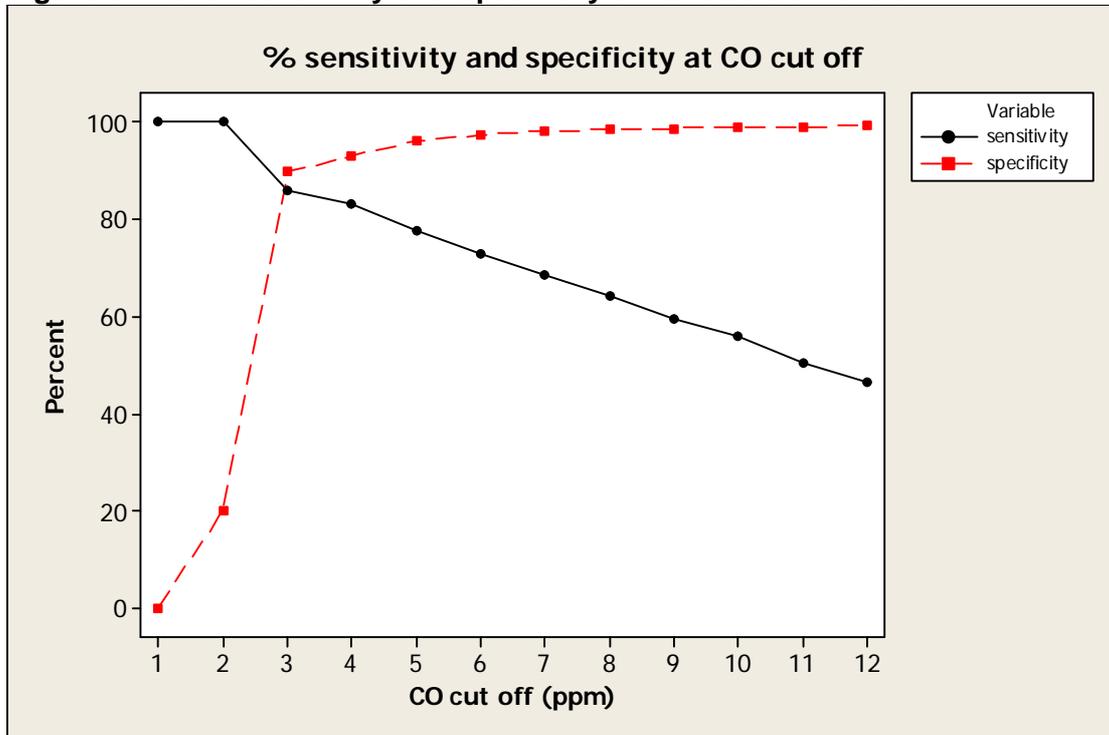
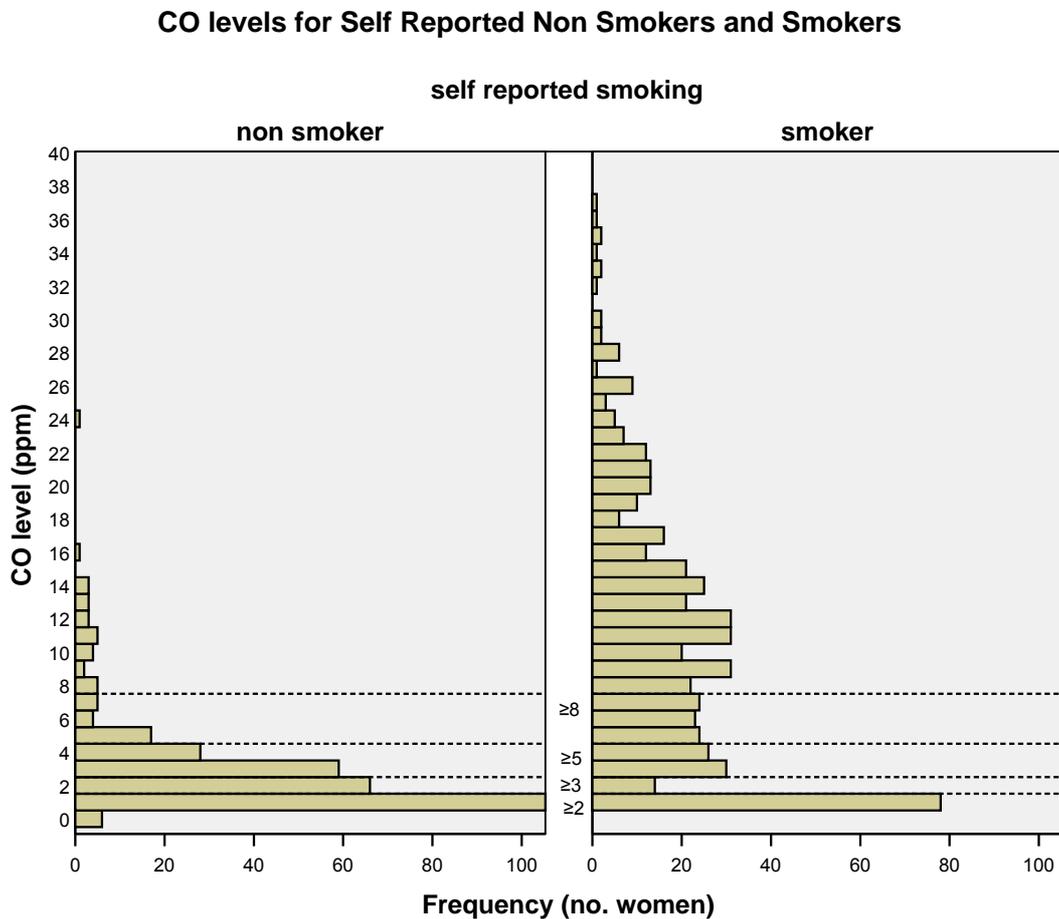


Figure 7 shows the distribution of CO levels for smokers and non-smokers within the current data-set and allows us to visualise the number of women who would be identified for treatment at the present and alternative CO thresholds.

Figure 7: Distribution of CO Levels for Smokers and Non-Smokers



Note: The four lines indicate 8ppm: the current cut-off point. 5ppm: the new cut off for the *Breathe* programme and 2 and 3ppm: the cut-off points with highest sensitivity and specificity. It is possible to visualise the increase and decrease in number of subjects at various cut-off points. The scale for the frequency of women has been truncated so as to remove the large peak of non smokers at 1ppm.

The Accuracy of Self-Reported Smoking

In the current study, 21% of pregnant women identified themselves as smokers. This compares to a rate for Scotland as a whole of 25% of women smoking at booking, and a figure for Glasgow of 31%, according to ISD data (Information and Statistics Division, NHS Scotland). The ISD data on smoking behaviour are based on self-reported information from both the antenatal booking and the health visitor's first visit. The lower prevalence of smoking during pregnancy found in this study may therefore indicate that self-report in the antenatal clinic setting is unreliable. Using Scottish and Glasgow prevalence rates, somewhere between 4% and 10% of pregnant women in the current study (102 to 255 women) may have failed to identify themselves as smokers when in reality they do indeed smoke. At least twenty-seven women in the present study who said they did not smoke had CO levels above 8ppm, and in all

likelihood are smokers, but the numbers of undetected smokers may be much higher than this. Self-report alone is not an accurate identifier of smokers during pregnancy as women may feel under pressure not to say they are smokers, either because smoking may reflect badly upon them (e.g. in terms of their degree of responsibility for their own health as a mother and that of their foetus), or in order to avoid facing any further inquiries or discussions about their smoking, particularly if they feel unable to give up or reduce their smoking.

Potential Inefficiency in Targeting Resources Through the CO Test?

Although a lower CO cut-off would have higher combined sensitivity and specificity, there will remain difficulties in distinguishing between smokers and non-smokers. At a CO cut-off of 3ppm, the CO test would identify 83% of smokers (rather than the current positive rate of 60%) but would also identify 7% of non-smokers as potentially smokers. Thus, nearly a fifth of smokers would still be missed, and around a quarter (24%) of those above the threshold and referred for smoking cessation services would be people who report being non-smokers. Clearly, the declared smokers who are missed is still inefficient (though not as inefficient as the current threshold of 8ppm), but whether or not the 'non-smokers' who are referred at a cut-off of 3ppm represents an inefficient use of support services depends upon how many of them might indeed be undeclared smokers. Given what we have said already about the low rates of self-reported smoking in the current study, this inefficiency may not be as great as it seems and in fact far fewer than a quarter of those referred are likely to be non-smokers.

SUMMARY

Smoking services cannot rely on self-report alone to identify smokers as between 4 and 10% of women who are smokers may not be declaring their habit in the antenatal setting. But equally, services cannot rely upon the use of the CO test at its current threshold of 8ppm, as up to 40% of smokers have CO levels below this cut-off, either because the test is weak in detecting light smokers or due to the short half-life of CO in the body of 1-4 hours (Frederikson and Martin, 1979). One alternative is to lower the CO threshold to 3 ppm, where the efficiency of the test is maximised¹³. Another option would be to use a blood sample to test for the presence of cotinine, a metabolite of nicotine; whilst this would be more accurate, it may also be more complicated and expensive to administer than the CO test.

¹³ The CO cut-off in Glasgow antenatal clinics has since been changed to 5ppm.