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England

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Health of women before and during pregnancy: health behaviours, risk factors and inequalities

An initial analysis of the Maternity Services Dataset antenatal booking data

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Executive summary

A woman's maternity booking appointment should take place within the first 13 weeks of pregnancy. During the booking appointment a range of information is collected about the woman, her own and her family's health, her social support, and her pregnancy. This report presents preliminary analysis of 6 months' worth of pregnancy booking appointments data (January to June 2017) from the Maternity Services Dataset (MSDS). It provides information from all maternities in England during early pregnancy and is a valuable source of new data which is helping to build our evidence base. The data set is classed as experimental (as it is undergoing evaluation) and so this analysis should be interpreted with caution due to known issues with data quality and completeness (Table 2).

Many factors affect women's health in pregnancy and the extent to which these are modifiable varies, especially once pregnancy has already commenced. Risk factors associated with poorer outcomes are experienced at higher levels by particular groups of women and their babies, and these risk factors and their unequal distribution are the focus of this report.

Existing literature suggests maternal age is an important factor for the health of the baby, with both older and younger mothers more likely to experience poorer outcomes. Younger mothers are more likely to smoke, less likely to take folic acid, and less likely to access antenatal care in early pregnancy. In general, many risk factors are clustered and inter-related.

Analysis of the MSDS data reveals that more than one in 5 women (28%) aged under 25 years smoked at the time of their booking appointment. In addition, rates of smoking in pregnancy in the most deprived areas of England are 5 times those in the least deprived areas (20% and 4% respectively). White women and women of Mixed ethnicity are most likely to smoke. Large numbers of records do not have a smoking status recorded, and this seems to vary by deprivation decile.

Data relating to folic acid use within the MSDS is not well completed. However, the data that is available suggests that young women are the least likely to be taking folic acid at the time of their booking appointment. Folic acid use in early pregnancy also varies by level of deprivation, with more women in the most deprived areas failing to take supplements (10%) in comparison to those in least deprived areas (3%). There is also variation by ethnic group, with Black women being least likely to be taking folic acid at their booking appointment. There are a large number of records where folic acid use information is missing.

The proportion of women who are overweight and obese during pregnancy increases with age, with the highest proportion being among those aged over 40 years (40%). One in nine (11%) young women aged under 18 years is underweight at her pregnancy booking appointment. The proportion of women who are overweight or obese in early pregnancy rises as the levels of area deprivation increase, and Black women are the most likely to be overweight or obese in early pregnancy.

Young pregnant women aged 18 to 24 years attend antenatal care at a later stage than older women, although girls aged under 18 years are as likely to book 'in time' as women in their late twenties and thirties. Women in their forties are most likely to attend their antenatal booking appointment within 13 weeks of their pregnancy (88%). Late booking is also more of a risk for women living in the most deprived areas. Black women and women of 'Other' ethnicity are the ethnic groups who are most likely to book late.

In conclusion, the new dataset is a valuable new source of information about the risk factors which are associated with poorer outcomes and how those risks are distributed within different groups of women. Data quality is variable. However, findings are in accordance with what is known from the literature. This information can be used by commissioners and service leaders to investigate the detail locally in order to better understand the demographics and risk factors of women using services and analyse variation between providers.

The new dataset will continue to be monitored and analysed, with national and subnational indicators of maternal health developed as this becomes possible. This analysis of risk factors and inequalities will be updated when enough new data is available in order to track improvements in data quality and changes to maternal health and lifestyles. The data will increasingly be used, where appropriate, to inform national policy.

Introduction

A woman's maternity booking appointment should take place within the first 13 weeks of pregnancy. It is the point at which the woman meets a midwife to discuss antenatal care. During the booking appointment a range of information is collected about the mother and family's health, her social support, and her pregnancy. It is also the opportunity for a range of information to be discussed about the best way to ensure a healthy pregnancy including recommendations on folic acid, nutrition, smoking and antenatal screening.

Many factors affect women's health in pregnancy. The extent to which these are modifiable varies, for example, once a woman is already pregnant, factors such as age are fixed. However, many 'unhealthy behaviours' do not begin when a woman becomes pregnant and are often established well before pregnancy. This is the case for obesity, smoking, alcohol and substance misuse and many other factors. Effective action prior to and during pregnancy represents the chance to substantially improve outcomes for mothers, babies and their families. As with many aspects of public health, inequalities in maternal and infant outcomes exist, with poorer outcomes experienced by certain groups of women and their babies. These risk factors and their unequal distribution are the focus of this report.

The literature suggests that maternal age is an important factor for pregnancy outcomes, with maternal age of 35 years or above associated with higher rates of stillbirths¹⁻⁴, caesarean section⁵ and congenital abnormalities⁶ when compared to younger women.

Babies born to women aged under 20 have around a 20% higher risk of low birthweight⁷, which can be partly explained by their higher smoking rates in pregnancy than the national average. Women in routine and manual occupations also have higher smoking rates⁸, and in the general population rates of smoking are higher in the more deprived areas⁹. Smoking in pregnancy is generally associated with higher risk of stillbirth and of infant mortality¹⁰. Young women are also less likely to take folic acid¹¹, which protects against the risk of neural tube defects such as spina bifida.

When considering area-based deprivation, the literature suggests that babies living in the most deprived areas have a higher rate of congenital abnormalities, including neonatal mortality associated with congenital abnormalities¹².

This report analyses in detail a new source of data which flows from all maternities in England during early pregnancy: antenatal booking data from the Maternity Services Data Set (MSDS). It presents information on the mother's health, lifestyle and risks in early pregnancy as well as her age, ethnicity and the level of deprivation of the area in

which she lives, in order to begin to build on the evidence base. However, the data set is newly established and not all data items are flowing successfully from all providers. Therefore the results should be interpreted with caution, and alongside the data quality assessments.

The literature suggests that risk and inequality factors are interrelated with very little known about associations between individual factors and outcomes, independent of other factors. The findings within this report must therefore be interpreted with this limitation in mind.

Data source and methodology

The MSDS is a national dataset which collects and reports information on maternity care in England. It is in the process of being implemented by all maternity services in England, including acute trusts, foundation trusts and private services commissioned by the NHS. The dataset is currently classed as experimental, published in order to involve stakeholders in their development. More information about the dataset is available from [NHS Digital](#).

Maternity care providers began submitting data relating to activity from April 2015. However, providers have differed in how quickly and how successfully they managed to flow their data to the national dataset. For the latest month in the period covered in the analysis (June 2017) 131 providers successfully submitted data to the dataset. This includes 129 of the 132 providers identified from hospital delivery data. Data for a limited sub-set of the overall MSDS relating to information collected at a pregnancy booking appointment has been made available in an anonymised form through NHS Digital's [iViewPlus tool](#).

Data quality

In order to assess the quality of the MSDS data and its suitability for further analysis, the number of records for booking appointments for January to December 2016 were compared to similar data sources for associated time periods (Appendix 1.1). Results showed that there were fewer records than would have been expected in the MSDS maternity booking system when compared to maternity data from ONS, but more than appears in PHE-reported health visitor antenatal contacts (Appendix 1). Comparing the MSDS data to other established data sources suggests that the dataset is roughly 80-90% complete (Table 1).

Maternal age and residence (allowing deprivation decile to be calculated) were very well populated within the dataset. Ethnicity was less well populated, with approximately 14% of records having no recorded ethnicity (Table 2), comparable to other, more established data sources such as Hospital Episode Statistics.

Table 1: Maternity booking records in the NHS Digital Maternity Services Dataset, compared to other sources of pregnancy-related counts

Data source	Number of records
ONS maternities 2015	689,751
NHS Digital Maternity booking appointments 2016 (MSDS)	559,450
NHS Digital Hospital Deliveries 2015/16 (HES)	648,107

Table 2: Data quality summary for maternal demographics and risk factors used in analysis

	Data quality			
	Overall	Mother's age	Mother's ethnicity	Deprivation decile
Overall	Dataset likely to be 80-90% complete (Table 1).	<1% of records with missing maternal age	14% of records with missing maternal ethnicity	1% of records which cannot be assigned to a decile (based on residence)
Smoking status	17% of records with missing smoking status.	Approximately 17% of records in each age group with missing smoking status – no suggestion this varies by age.	16% of records for White mothers with missing smoking status, rising to 20% of records for Asian women. Records with ethnicity not known or stated also have poor recording of smoking.	15% of records in the least deprived decile with missing smoking status, rising to 20% in the most deprived decile.
Ex-smokers: point of quitting	42% of records with missing point of quitting information.	38 to 44% of records with missing point of quitting information. No clear pattern by mother's age.	68% of records for Asian mothers recorded as ex-smokers do not contain information about point of quitting. This is only 41% for White mothers and mothers of Mixed ethnicity.	No clear pattern by deprivation decile, although highest proportion of missing records in most deprived decile (51%).
Folic acid status	36% of records with missing folic acid status.	Around 35-37% of records in each age group with missing folic acid status. Slightly more missing records in younger age groups.	36-39% of records in each group with missing folic acid status. Records with ethnicity not known or stated also have poor recording of folic acid.	No clear pattern by deprivation decile.
Maternal BMI	22% of records with missing BMI information.	28% of records for young women aged under 18 with missing BMI information. 21-23% of missing records in older age groups.	Around 20-23% of records in each group with missing BMI information. Records with ethnicity not known or stated have poor recording of BMI.	No clear pattern by deprivation decile.
Alcohol use	98-99% of records have lowest alcohol use (<1 unit) recorded or missing information.	Almost half of records contain unknown alcohol information for all age groups.	Data quality considered too poor to allow further analysis.	
Antenatal booking	<1% of records with unknown date of antenatal booking in all groups.			

The distribution of appointments by the 'inequality factors' (age of mother, ethnicity, deprivation decile^{*}) were compared, where possible, to these other data sources (Appendix 1). With a small exception (maternal ethnicity, where the proportion of White women was slightly lower than would be expected), the distributions of the records in the MSDS in each group were very similar to the distributions in these other data sets, and therefore MSDS can be considered a reliable source of inequality information for these factors. Behavioural risk factors were then analysed by these inequalities for the 6 month period January to June 2017 (as improvements in data quality are so rapid that this data is likely to be much more complete than data from 2016). At all stages, data quality was assessed and noted.

* Deprivation deciles relate to the small area (LSOA 11) in which the mother lives, and are assigned by ranking each LSOA 11, based on its average deprivation score from the Indices of Multiple Deprivation 2015, and then using the ranks to calculate deciles.

Analysis of risk factors

The following summaries relate to analysis of the data within the MSDS for the 6 month period January to June 2017. Findings should be considered preliminary as the dataset is experimental. In many cases the findings confirm what is already known, but in some cases further investigation is required. Detailed findings for each risk factor can be found in Appendix 2.

Smoking

Smoking at time of booking

Smoking at time of booking was analysed by mother's age, ethnicity and deprivation (based on residence), see Appendix 2.1. Around 25,000 women who smoked at the start of their pregnancy were aged under 30, with this age group accounting for 70% of all women smoking at their booking appointment. The highest proportion of smokers were in the under 25s, with over one in five young women smoking at their booking appointment. This is consistent with the existing knowledge from literature. Around 15,000 women who smoked at their booking appointments lived in areas within the 2 nationally most deprived deciles, and these 2 deciles accounted for over 40% of all women smoking at their booking appointment. Although clustering of inequalities has not been analysed, it would be expected that there would be significant overlap between these 2 groups.

Rates of smoking in the most deprived decile were five times those in the least deprived decile (19.8% and 3.7% respectively), with a clear gradient evident across the deciles.

The largest proportion of smokers was in the White ethnic group with women of Mixed and 'Other' ethnicity also more likely to smoke than other ethnic groups. The proportion of smokers was also high in the group of unknown ethnicity, and Figure A4 suggests this is likely to include a large proportion of White women. Fewer than one in 50 Asian and Chinese women were smokers at their booking appointment (1.4% and 1.3% respectively).

The dataset contains a large number of records with unknown smoking status: there is no evidence that recording of this data item varies by age range but a suggestion that it might vary by deprivation, with women in the more deprived areas being less likely to have their smoking status recorded at their booking appointment. However, the proportion of known smokers (19.8%) in the most deprived decile is still higher than the proportion of known smokers *plus* the proportion of unknowns (18.8%) in the least deprived decile suggesting that even in the extreme hypothetical case where all the 'unknowns' in the least deprived decile were smokers, there would still remain a small

gap associated with deprivation. Smoking statuses are comparatively poorly recorded for Asian and Black women. However, the data suggests that smoking rates in these groups of pregnant women are low, compared to White women or women of Mixed ethnicity.

Smoking prior to pregnancy

At the booking appointment, women are asked about their smoking habits and history, and for those women who smoked up until becoming pregnant, it is possible to separate those who stopped before their booking appointment, and those who have continued to smoke. In all age categories, the majority of smokers were still smoking at their booking appointment, although a significant number had managed to quit (around one in 4 of the younger women and more than one third of women in their late twenties and thirties). A gradient is again apparent by deprivation decline, with over half of women who smoked up to pregnancy in the least deprived decile quitting before their booking appointment (53.8%), compared to one in five in the most deprived decile (20.4%).

Slightly under half of Asian and Black women who smoked up to pregnancy were able to quit before their booking appointments, with fewer women in other ethnic groups managing to quit; more than two thirds of White women who smoked up to their pregnancy were still smokers at the time of their booking appointment and potentially beyond.

Ex-smokers

Women who were ex-smokers at their booking appointment were asked when they had quit – in advance of pregnancy or shortly after discovering they were pregnant. Only one in 5 of the young women classed as ex-smokers had quit in advance of pregnancy, compared to over two in 5 of those in their late 30s and 40s.

When looking at the details of when known ex-smokers quit there are a significant number of missing records (more than 40%) which do not show a clear pattern by maternal age, ethnicity or deprivation, although there is poorer recording for women living in the most deprived areas.

Folic acid

Folic acid use at time of booking was also analysed by mother's age, ethnicity and deprivation (see Appendix 2.2). The data shows that young women aged under 18 were less likely to be taking folic acid at their booking appointment than older women, with 15.3% known not to be taking folic acid. However, almost half of young women in this age range were recorded as taking folic acid, and there are a large number of records where this data item is missing. For women in their thirties and above, 60% or more

women were taking folic acid by the time they attend their booking appointment, and less than 5% were recorded as not taking it.

Ten percent of mothers living in areas within the most deprived decile were recorded as not taking folic acid at their booking appointment; this drops to only 3% in the least deprived deciles. However, even in the most deprived decile, over 50% of women were recorded as taking folic acid at their booking appointment.

Black women were most likely to be recorded as not taking folic acid at their booking appointment at 8.8%, compared to only 3.6% of Chinese women. Chinese women (20.1%) and White women (19.4%) were most likely to be recorded as taking folic acid in advance of pregnancy, as opposed to only 11.5% of Black and 13.3% of Asian women.

A high proportion of records do not have folic acid status recorded. There is no strong evidence this varies by maternal age (although there are slightly more missing records for the younger age groups) and the relationship with deprivation decile is non-linear and does not visually suggest a strong trend.

Maternal BMI

Maternal body mass index (BMI) category was analysed by mother's age, ethnicity and deprivation (see Appendix 2.3).

Younger women were more likely to be underweight at their booking appointment, with one in nine (10.7%) young women aged under 18 years underweight at their booking appointment. Around 35% of young women aged 18 to 24 years were overweight or obese in early pregnancy and this rises slowly to just over 40% in pregnant women aged 40 and over.

Being overweight or obese at the booking appointment is more prevalent in areas of higher deprivation. A clear inequality gradient can be seen: 38.1% of women living in the most deprived decile were overweight or obese at their booking appointment, in comparison with 29.0% of women in the least deprived areas.

Almost half (45.9%) of Black women were overweight or obese, compared to only 16.6% of Chinese women. Women of White, Asian or Mixed ethnicities had similar rates of overweight and obesity, all at about 38 to 40%. A slightly higher proportion of Chinese women (8.3%) were underweight at their booking appointment.

Within each age group a significant proportion of BMIs are unknown – slightly over 20% within each age group, and 28% in the youngest age group (under 18 years). Within each decile a significant proportion - about 20% - of BMIs are unknown. There is no suggestion that the recording of BMI varies by deprivation. Within each ethnic group a significant proportion of BMIs categories are unknown and this does not seem to vary by ethnicity (although is higher and lower in the 'not known' category).

Alcohol

Detailed analysis is shown in Appendix 2.4. The data suggests that a tiny proportion of women drank alcohol during pregnancy. However, other evidence suggests this is an underestimate. It is generally known that people in general under report drinking habits to their GP. It is, therefore, seems extremely likely that pregnant women, knowing they are answering questions about their own health and the health of their unborn child, are likely to under report drinking habits.

The dataset suggests that questions on alcohol are not being asked, or recorded, and therefore cannot be used to draw any conclusions about pregnant women who drink alcohol.

Antenatal booking within 13 weeks of pregnancy

Booking within 13 completed weeks of pregnancy was also analysed by mother's age, ethnicity and deprivation. The detail is shown in Appendix 2.5. The data showed that more young pregnant women aged 18 to 24 attended antenatal care at a later stage than older women, which is consistent with existing knowledge from the literature. However those aged under 18 were about as likely to book within 13 completed weeks of pregnancy as women in their late twenties and thirties. This may suggest that girls aged under 18 who were pregnant were supported and encouraged to access antenatal care. Women in their forties were more likely to book 'in time', with 87.6% attending their antenatal booking appointment within 13 completed weeks of their pregnancy.

When considering deprivation, there is a clear slope across the deprivation deciles, with almost 25% of women living in the most deprived decile booking 'late', in comparison with only 13% of women in the least deprived areas.

Black women and women of 'Other' ethnicity were most likely to book late, with 27-28% booking after 13 weeks of pregnancy. Chinese women and women of Mixed ethnicity were least likely to book late, however more than one in ten still did not book within 13 completed weeks of pregnancy.

Fewer than 1% of records were missing an antenatal booking appointment date.

Conclusions

Although still in its early stages, it is clear that the MSDS is a valuable new source of information about the health behaviours of and risk factors for pregnant women, allowing analysis of those risk factors which are associated with poorer outcomes and how those risks are distributed within different groups of women. Data quality is variable, with mothers' demographics as well as topics such as smoking and early booking appearing reasonably complete and reliable, with others, such as alcohol use so poorly completed as to make it unsuitable for analysis. In some cases, it appears that recording of data items could be influenced by the mother's demographics. Data is particularly poorly recorded in the following areas:

- smoking statuses for women living in more deprived areas
- quitting details for women classed as ex-smokers
- smoking statuses for Asian and Black women
- BMI status for young women
- alcohol consumption

Despite this, the analysis and presentation of the data suggest conclusions which are in line with those from existing literature.

This information can be used by commissioners and local service leaders to investigate these factors in the [Health of women before and during pregnancy: demographic and risk factor investigation tool](#) that was published alongside this report. This will allow them to better understand the demographics and risk factors of women using services in their area, and analyse and address variation between providers. It will also highlight local data quality issues which can be raised and addressed directly.

In conjunction with the [Making the Case for Preconception](#) report published alongside this toolkit, both the national inequalities report and data in the [tool](#) can be used to support identification of local needs for the preconception population in your area (where 'preconception' relates to the health of women and/or couples of reproductive age prior to pregnancy).

The MSDS will continue to be monitored and analysed, with national and subnational indicators of maternal health developed as this becomes possible. This analysis of inequalities will be updated when enough new data is available in order to track improvements in data quality and changes to maternal health behaviours and risk factors. Data from the MSDS will increasingly be used, as appropriate, to inform national policy.

Appendix 1. Data comparisons

Appendix 1.1: Comparison of the number of MSDS booking records to other data sources

Figure A1: All maternity booking appointments in 2016 (MSDS), compared to conceptions, health visitor antenatal contacts, hospital deliveries and maternities

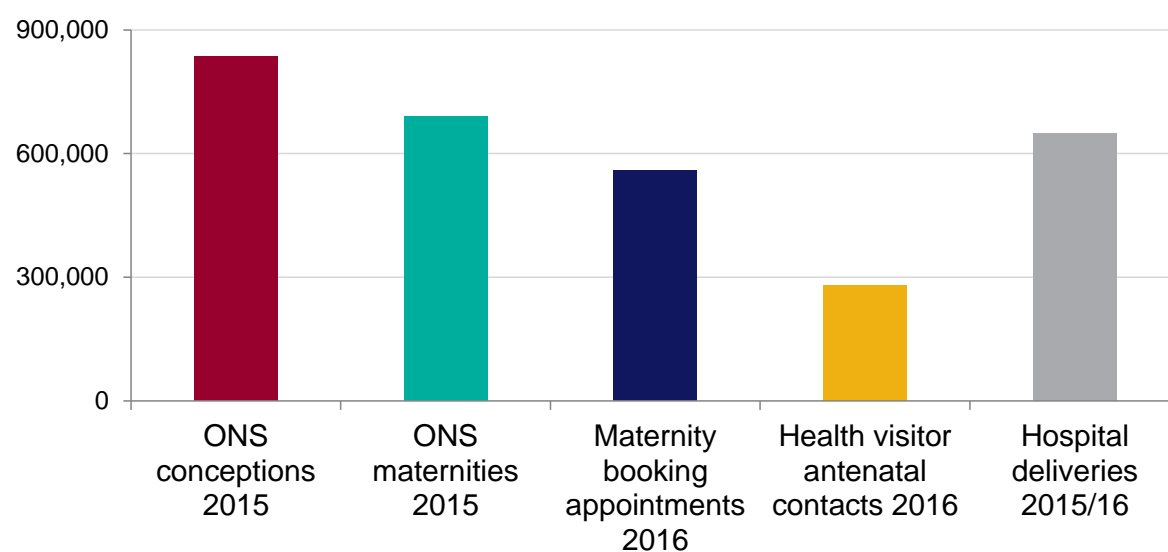


Table A1: All maternity booking appointments in 2016, compared to conceptions, health visitor antenatal contacts, hospital deliveries and maternities

ONS Conceptions Jan-Dec 2015	836,160
ONS Maternities Jan-Dec 2015	689,751
NHS Digital Maternity booking appointments Jan-Dec 2016 From the Maternity Services Data Set (MSDS)	559,450
Health visitor antenatal contacts (PHE) Jan-Dec 2016	280,133
NHS Digital Hospital deliveries (HES) April 2015 - March 2016	648,107

Figure A1 and Table A1 show the booking appointments from the MSDS compared with ONS data showing conceptions and maternities, health visitor antenatal appointments, and data from Hospital Episode Statistics showing number of women giving birth (deliveries). There are known limitations with these comparisons:

1. All are measuring different events; this will be discussed further below
2. Conception statistics, maternity statistics and hospital deliveries are not as up to date as the maternity booking appointments extracted from the MSDS. However as the MSDS is new, the data in the MSDS in 2016 is likely to be an improvement on any older data and therefore the assumption has been made that using the latest full year from MSDS (rather than trying to align the periods) is likely to provide the best basis for comparison.
3. Figures from the Maternity Services Dataset are rounded to the nearest five in the tool used to extract them. This may result in further slight fluctuations from actual when these are added together to report on groups – where possible this has been avoided.
4. There are slight differences in the geographical application of each data source; ONS conceptions and ONS maternities apply to residents of England. The maternity booking appointments and hospital deliveries data relate to providers of services in England but may include (and exclude) residents just outside or inside the English border.

For the purposes of assessing the suitability of the MSDS for examining health inequalities in women at the start of their pregnancy, limitations ii-iv are not considered critical.

Figure A1 and Table A1 show that according to ONS, there were around 840,000 conceptions in 2015, and about 690,000 ‘maternities’ (pregnancies that resulted in a birth). While these two cannot be directly compared within one calendar year, the figures are broadly consistent with the fact that around 20% of conceptions end in termination of pregnancy.

There are about 560,000 booking appointment records for 2016 within the MSDS. This implies that approximately 100,000 of pregnant women (about 14%) do not have a booking appointment, or that the record of their booking appointment is not flowing into the MSDS. As of the December MSDS monthly report[†], 123 maternity providers of an estimated 134 successfully submitted booking appointment information to the MSDS; about 92%. Since data coverage is likely to have risen throughout the year, it therefore seems reasonable that the 14% deficit throughout the year is as a result of non-submissions, and tentatively, we can conclude that providers who are submitting are recording the majority of the booking appointments in the system.

A woman’s engagement with maternity services enables a referral to be made to the local health visiting service so they can offer an antenatal face-to-face visit in the home. It seems that only half of pregnancies are receiving an antenatal visit, and there is

[†] www.content.digital.nhs.uk/catalogue/PUB23944

therefore a missed opportunity to provide support and health promotion advice to parents before the baby is born.

The number of deliveries is then slightly lower than the number of original pregnancies (just under 95%). Some pregnancies will result in later pregnancy loss or termination, and as described earlier, the 2 numbers are not drawn from the same period and are therefore not directly comparable. The number of deliveries therefore seems highly accurate in comparison with pregnancies.

Appendix 1.2: Comparison of the distribution of MSDS booking records across inequality factors to other data sources

Figure A2: Maternity booking appointments in 2016, compared to conceptions, hospital deliveries (2015/16) and maternities, by age of mother

Note: age categories are not mutually exclusive but relate to available data groupings – missing bars do not represent missing data

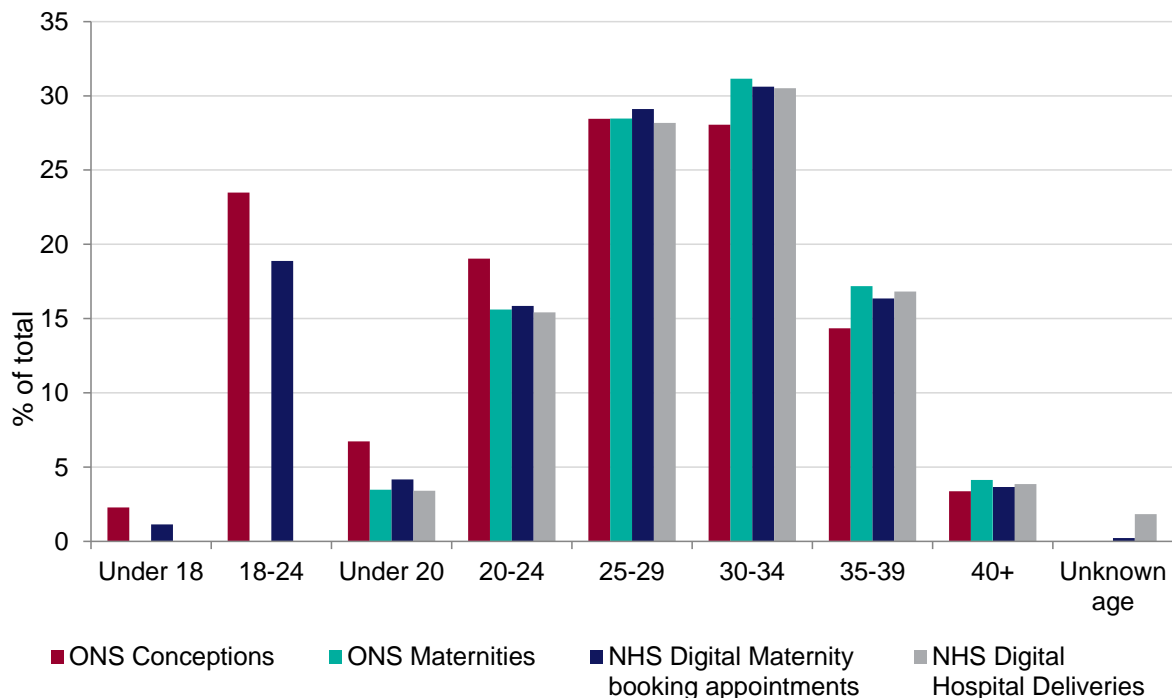


Table A2: All maternity booking appointments in 2016, compared to conceptions, hospital deliveries (2015/16) and maternities, by age of mother

Note: age categories are not mutually exclusive.

	ONS Conceptions	%	ONS Maternities	%	NHS Digital Maternity booking appointments (MSDS)	%	NHS Digital Hospital Deliveries (HES)	%
Under 18	19,080	2.3	N/A	N/A	6,370	1.1	N/A	N/A
18-24	196,376	23.5	N/A	N/A	106,550	18.9	N/A	N/A
Under 20	56,250	6.7	23,925	3.5	23,495	4.2	22,032	3.4
20-24	159,206	19.0	107,603	15.6	89,425	15.8	99,897	15.4
25-29	237,937	28.5	196,363	28.5	164,350	29.1	182,584	28.2
30-34	234,627	28.1	214,870	31.2	172,775	30.6	197,741	30.5
35-39	119,977	14.3	118,524	17.2	92,320	16.4	109,059	16.8
40+	28,163	3.4	28,466	4.1	20,785	3.7	24,942	3.8
Unknown age	N/A	N/A	N/A	N/A	1,270	0.2	11,852	1.8

Figure A2 and Table A2 show booking appointments from MSDS compared with conceptions, pregnancies and deliveries as before, all split by age with the proportion of the total in each age band shown (so for example 28.5% of all ONS maternities were to women aged 25-29 years).

Publications varied in how they grouped the ages into age bands and therefore all the available options are shown. Where a bar is not shown for an age band it indicates this split was not available for that data source (and should not be interpreted as zero). These data are subject to the same limitations described above; however comparisons of proportions (rather than counts) by age band will help to reduce the effects of different magnitudes, with specifics described below.

On the whole, the 'age profile' of each data source look visually similar to one another, with proportionately more conceptions than booking appointments in the younger age bands (and correspondingly lower in the older age groups), and this reflects the higher rates of termination of pregnancy in younger age groups. In comparison with the deliveries data source, the proportion of records with unknown age in the MSDS was low (the maternity booking appointment is the point at which the mother's demographic and socio-economic details are usually collected and recorded, so this is as expected).

As data from the MSDS shows a very similar age profile to other, well-established data sources, and as the number of records where the mother's age is unknown is very low,

maternal age in the MSDS is therefore suitable to be used as a demographic factor for further analysis of health inequalities using the MSDS. The woman’s postcode allows the small administrative area in which she lives (lower layer super output area, LSOA) to be assigned and each has a deprivation ‘score’ based on the Indices of Multiple Deprivation for England 2015. This allows LSOAs to be divided into 10, based on their relative scores, and assigned to a decile.

Figure A3: All maternity booking appointments in 2016, compared to hospital deliveries (2015/16) by decile of deprivation of the area in which the mother lives

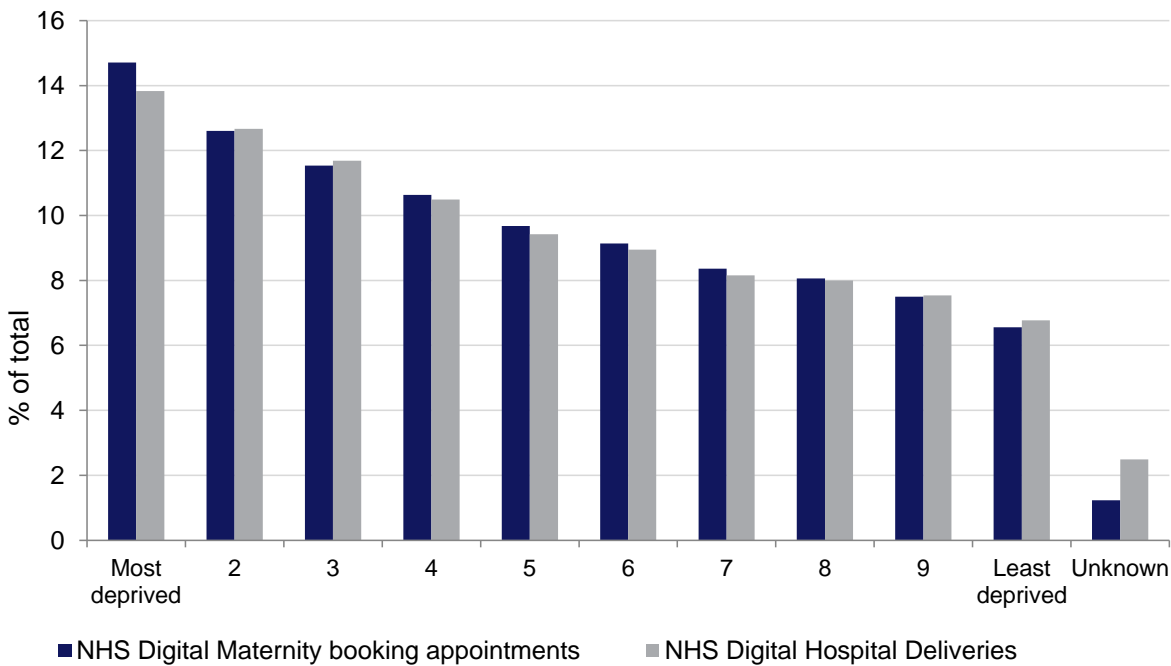


Table A3: All maternity booking appointments in 2016, compared to hospital deliveries (2015/16) by decile of deprivation of the area in which the mother lives

	NHS Digital Maternity booking appointments (MSDS)	%	NHS Digital Hospital Deliveries (HES)	%
Most deprived	85,330	14.7	89,640	13.8
2	73,120	12.6	82,090	12.7
3	66,885	11.5	75,725	11.7
4	61,690	10.6	68,013	10.5
5	56,130	9.7	61,072	9.4
6	52,990	9.1	57,973	8.9
7	48,505	8.4	52,842	8.2
8	46,740	8.1	51,846	8.0
9	43,475	7.5	48,846	7.5
Least deprived	38,020	6.6	43,904	6.8
Unknown	7,145	1.2	16,156	2.5

Figure A3 and Table A3 show booking appointments from MSDS compared with hospital deliveries as before, all split by deprivation decile with the proportion of the total in each deprivation decile. Information about deprivation is not available for other data sources.

The ‘deprivation profile’ of the 2 data sources are extremely visually similar to one another, with proportionately more booking appointments than deliveries for women living in the most deprived areas of the country. The biggest difference is in the ‘unknowns’ (which would include women whose postcode is unknown), with the MSDS having far fewer unknowns than the hospital data. Again, this is likely to be due to the structure and purpose of the booking appointment, which is to record the mother’s information, including residence.

Deprivation decile in the MSDS is therefore suitable to be used as a demographic factor for further analysis of health inequalities using the MSDS.

Figure A4: All maternity booking appointments in 2016, compared to hospital deliveries (2015/16) by mother’s ethnicity

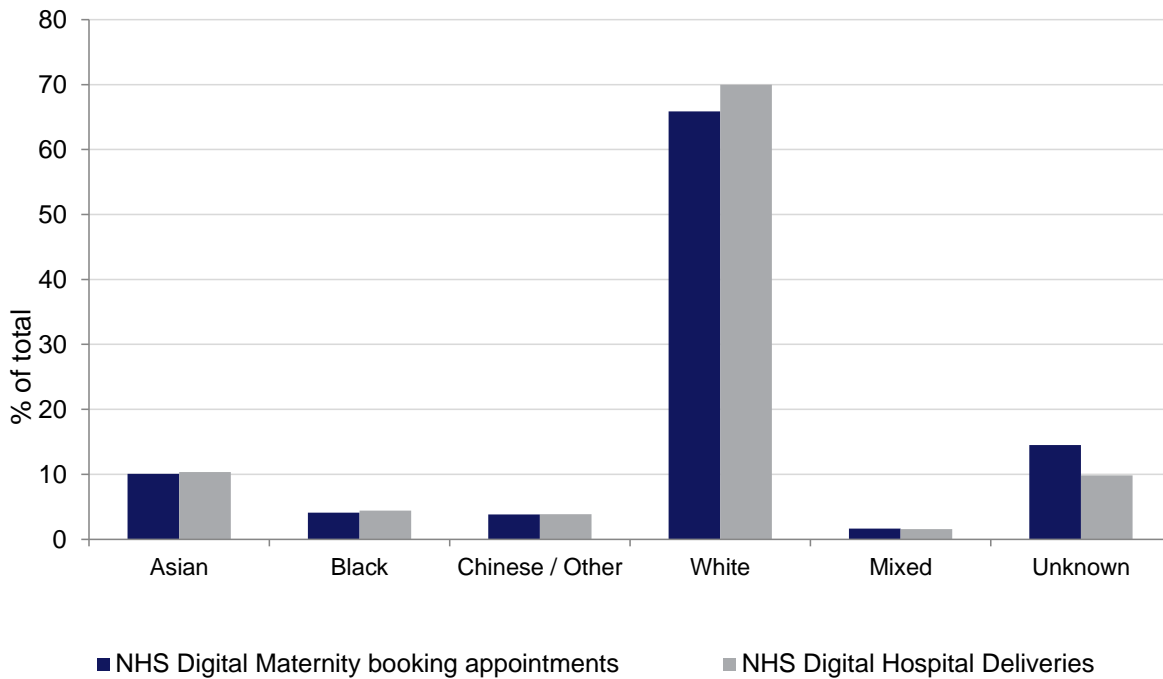


Table A4: All maternity booking appointments in 2016, compared to hospital deliveries (2015/16) by mother’s ethnicity

	NHS Digital Maternity booking appointments (MSDS)	%	NHS Digital Hospital Deliveries (HES)	%
Asian	57,480	10.1	67,044	10.3
Black	23,320	4.1	28,697	4.4
Chinese / Other	21,925	3.8	24,964	3.9
White	376,575	65.9	453,521	70.0
Mixed	9,450	1.7	10,207	1.6
Unknown	83,010	14.5	63,674	9.8

Figure A4 and Table A4 show booking appointments from MSDS compared with hospital deliveries as before, all split by ethnicity with the proportion of the total in each group. Information about ethnicity is not available from other data sources. The ethnicity profiles of the 2 data sources are visually similar to one another, other than the proportionately fewer booking appointments than deliveries for White women.

In this instance there are proportionately more 'unknown' values in the MSDS than in the deliveries data (this category includes 'not stated'), and it seems likely, based on the similarity to the hospital deliveries that these mostly relate to people whose ethnicity is White. Ethnicity is, therefore, suitable for use as a demographic factor for further analysis of health inequalities using the MSDS, with caution around interpretation of the 'White' group.

Appendix 2: Detailed analysis

Appendix 2.1. Smoking

Figure A5a: Smoking status at booking by age of mother, maternity booking appointments January to June 2017

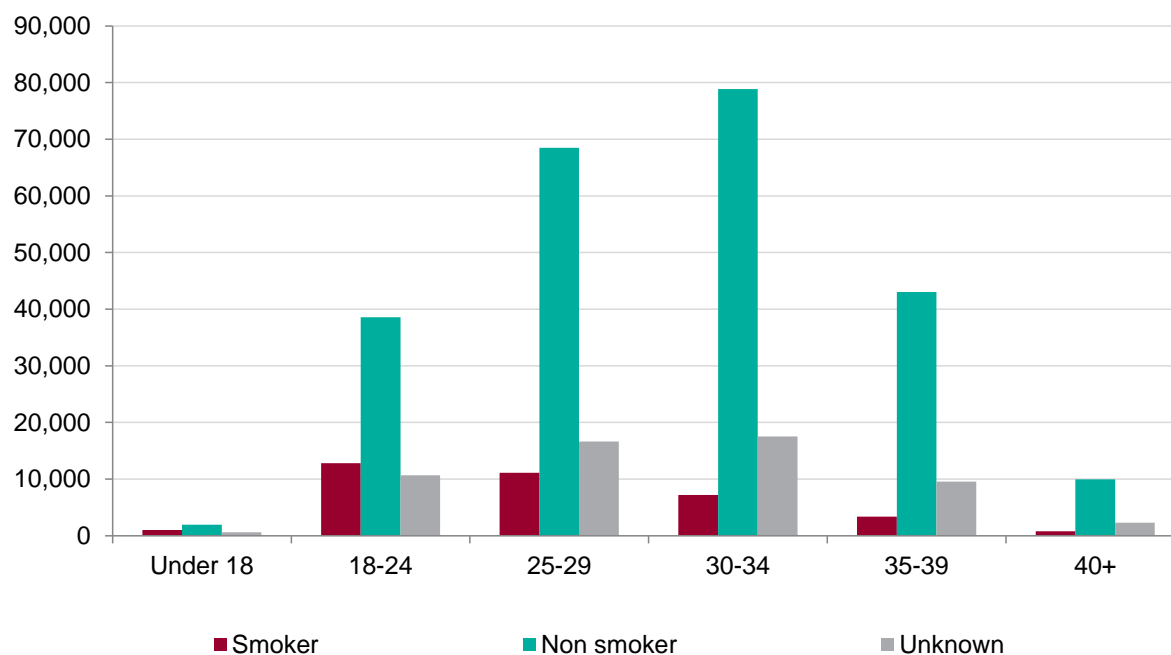


Table A5a: Smoking status at booking by age of mother, maternity booking appointments January to June 2017

Age	Smoker	Non smoker	Unknown
Under 18	1,000	1,930	600
18-24	12,815	38,580	10,660
25-29	11,090	68,505	16,620
30-34	7,175	78,855	17,535
35-39	3,355	43,040	9,545
40+	770	9,955	2,275

Figure A5b: Smoking status at booking by age of mother, maternity booking appointments January to June 2017 (smoking status by proportion of total in age range)

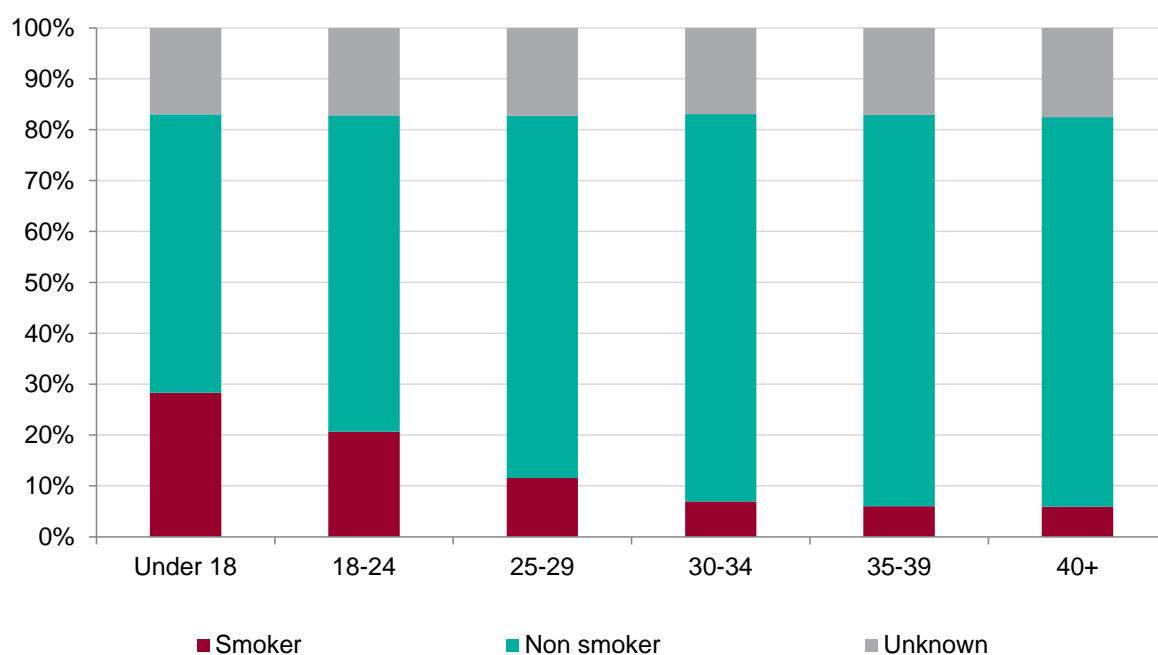


Table A5b: Smoking status at booking by age of mother, maternity booking appointments January to June 2017 (smoking status by proportion of total in age range)

Age	Smoker	Non smoker	Unknown	All smoking statuses
Under 18	28.3%	54.7%	17.0%	100%
18-24	20.7%	62.2%	17.2%	100%
25-29	11.5%	71.2%	17.3%	100%
30-34	6.9%	76.1%	16.9%	100%
35-39	6.0%	76.9%	17.1%	100%
40+	5.9%	76.6%	17.5%	100%

Figure A6a: Known smokers at start of pregnancy by age of mother, maternity booking appointments January to June 2017

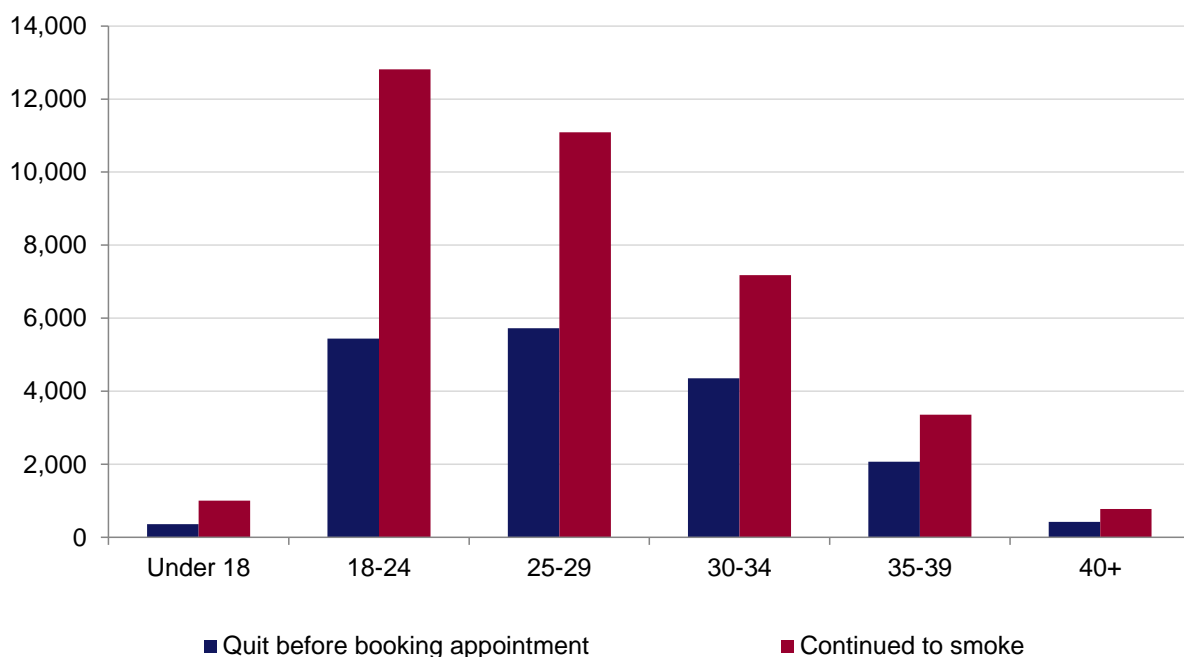


Table A6a: Known smokers at start of pregnancy by age of mother, maternity booking appointments January to June 2017

Age	Quit before booking appointment	Continued to smoke
Under 18	355	1,000
18-24	5,440	12,815
25-29	5,720	11,090
30-34	4,355	7,175
35-39	2,065	3,355
40+	420	770

Figure A6b: Known smokers at start of pregnancy by age of mother, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in age range)



Table A6b: Known smokers at start of pregnancy by age of mother, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in age range)

Age	Quit before booking appointment	Continued to smoke	All known quitting statuses
Under 18	26.2%	73.8%	100%
18-24	29.8%	70.2%	100%
25-29	34.0%	66.0%	100%
30-34	37.8%	62.2%	100%
35-39	38.1%	61.9%	100%
40+	35.3%	64.7%	100%

Figure A7a: Ex-smokers at booking by age of mother, maternity booking appointments January to June 2017

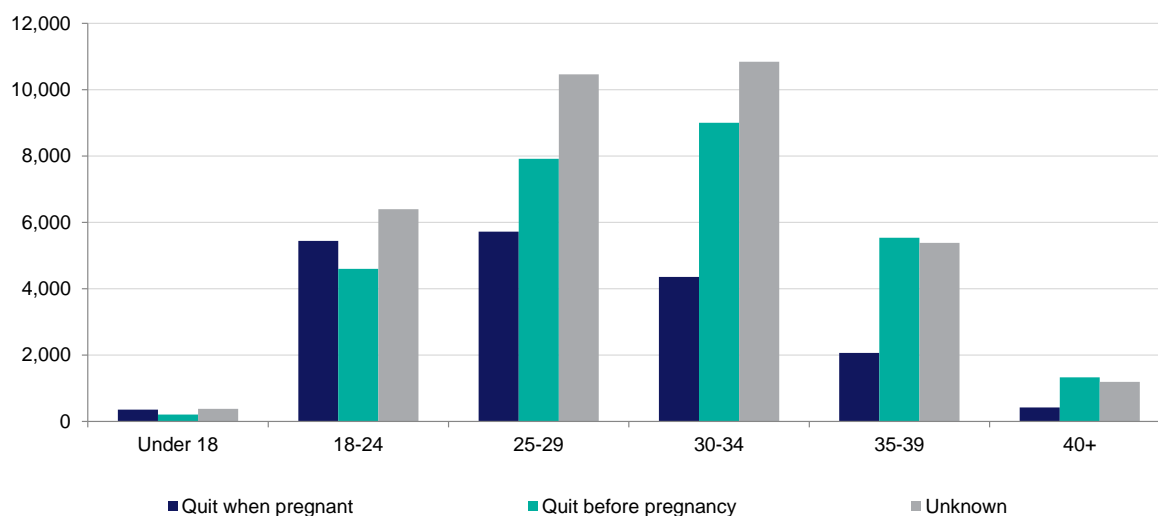


Table A7a: Ex-smokers at booking by age of mother, maternity booking appointments January to June 2017

Age	Quit when pregnant	Quit before pregnancy	Unknown
Under 18	355	205	375
18-24	5,440	4,600	6,395
25-29	5,720	7,915	10,460
30-34	4,355	9,000	10,840
35-39	2,065	5,535	5,380
40+	420	1,325	1,190

Figure A7b: Ex-smokers at booking by age of mother, maternity booking appointments January to June 2017 (point of quitting by proportion of total in age range)

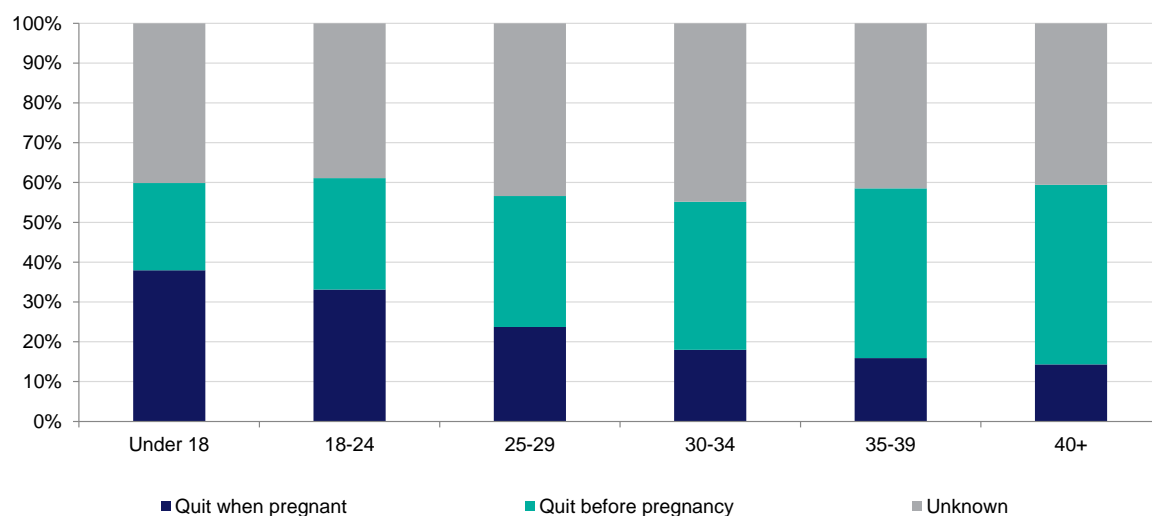


Table A7b: Ex-smokers at booking appointment by age of mother, maternity booking appointments January to June 2017 (point of quitting by proportion of total in age range)

Age	Quit when pregnant	Quit before pregnancy	Unknown	All smoking statuses
Under 18	38.0%	21.9%	40.1%	100%
18-24	33.1%	28.0%	38.9%	100%
25-29	23.7%	32.8%	43.4%	100%
30-34	18.0%	37.2%	44.8%	100%
35-39	15.9%	42.6%	41.4%	100%
40+	14.3%	45.1%	40.5%	100%

Figure A8a: Smoking status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

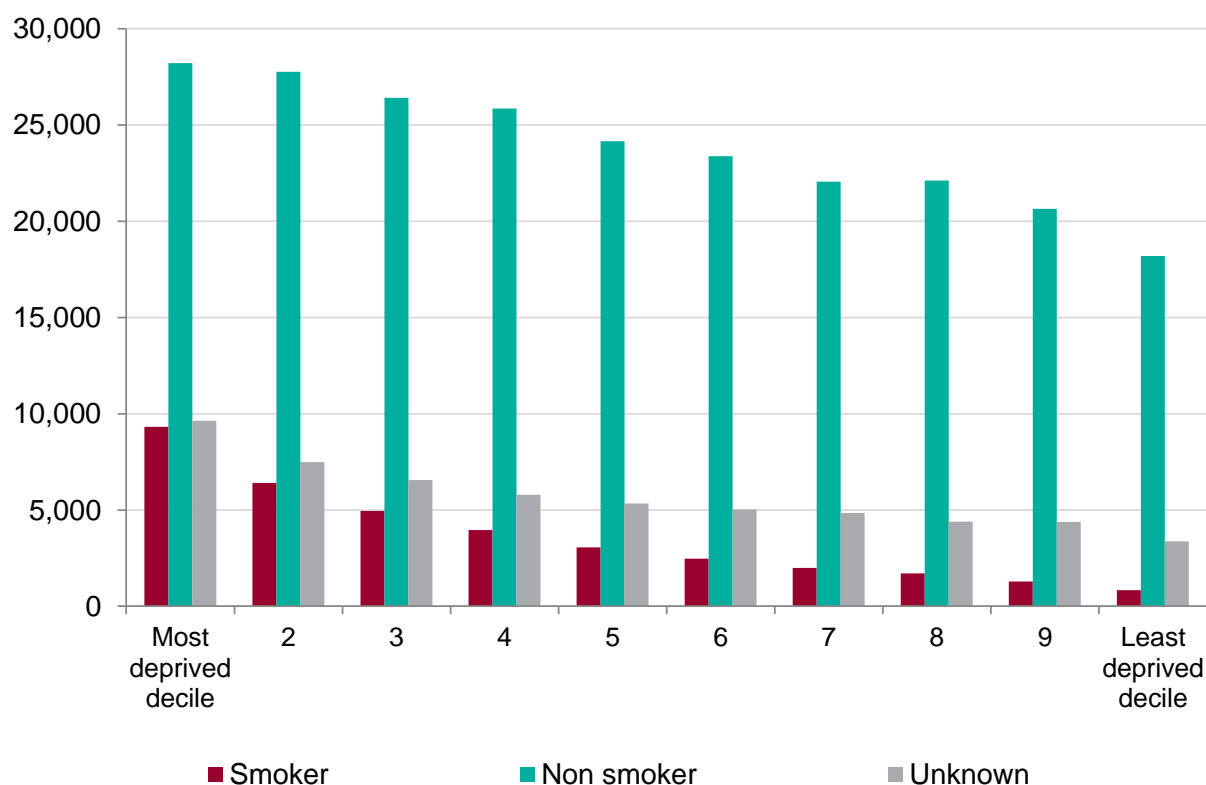


Table A8a: Smoking status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

Deprivation decile	Smoker	Non smoker	Unknown
Most deprived	9,325	28,205	9,630
2	6,405	27,755	7,490
3	4,950	26,405	6,550
4	3,960	25,855	5,785
5	3,055	24,155	5,345
6	2,465	23,380	5,030
7	1,995	22,045	4,850
8	1,710	22,105	4,385
9	1,285	20,640	4,375
Least deprived	840	18,200	3,365

Figure A8b: Smoking status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (smoking status by proportion of total in decile)

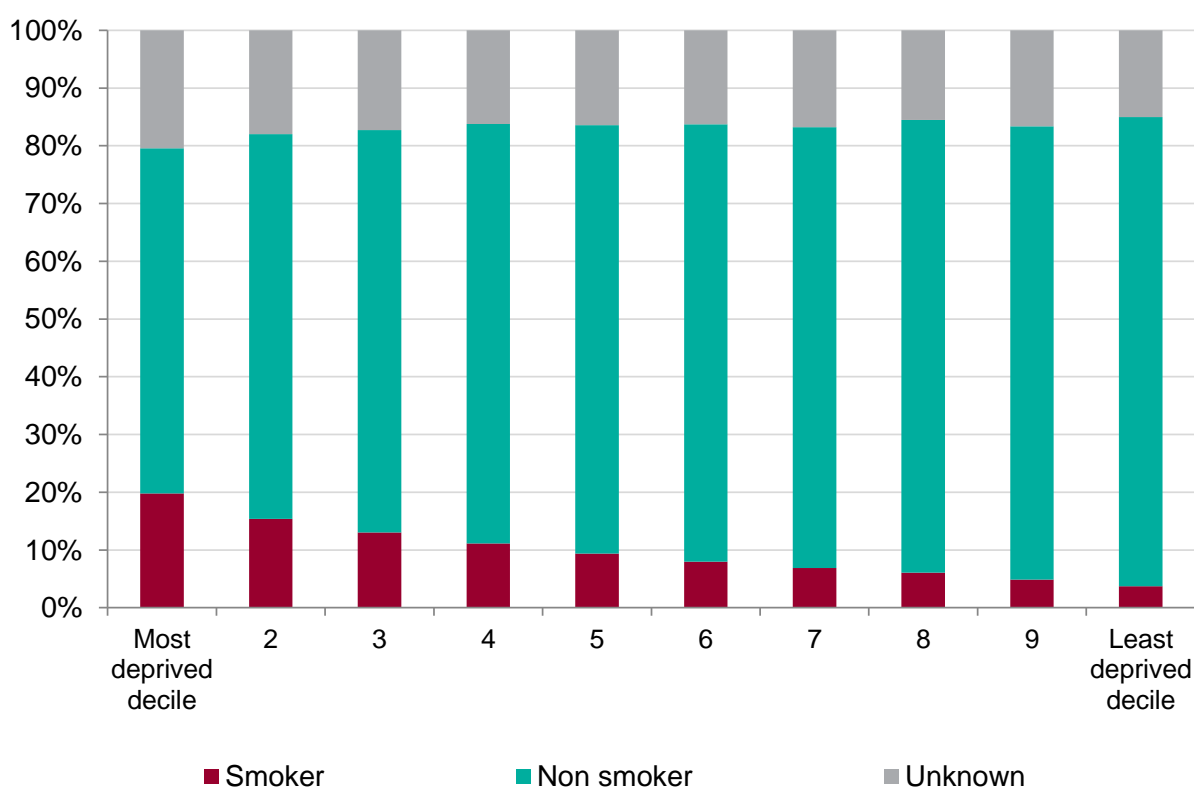


Table A8b: Smoking status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (smoking status by proportion of total in decile)

Deprivation decile	Smoker	Non smoker	Unknown	All smoking statuses
Most deprived	19.8%	59.8%	20.4%	100%
2	15.4%	66.6%	18.0%	100%
3	13.1%	69.7%	17.3%	100%
4	11.1%	72.6%	16.3%	100%
5	9.4%	74.2%	16.4%	100%
6	8.0%	75.7%	16.3%	100%
7	6.9%	76.3%	16.8%	100%
8	6.1%	78.4%	15.5%	100%
9	4.9%	78.5%	16.6%	100%
Least deprived	3.7%	81.2%	15.0%	100%

Figure A9a: Known smokers at start of pregnancy by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

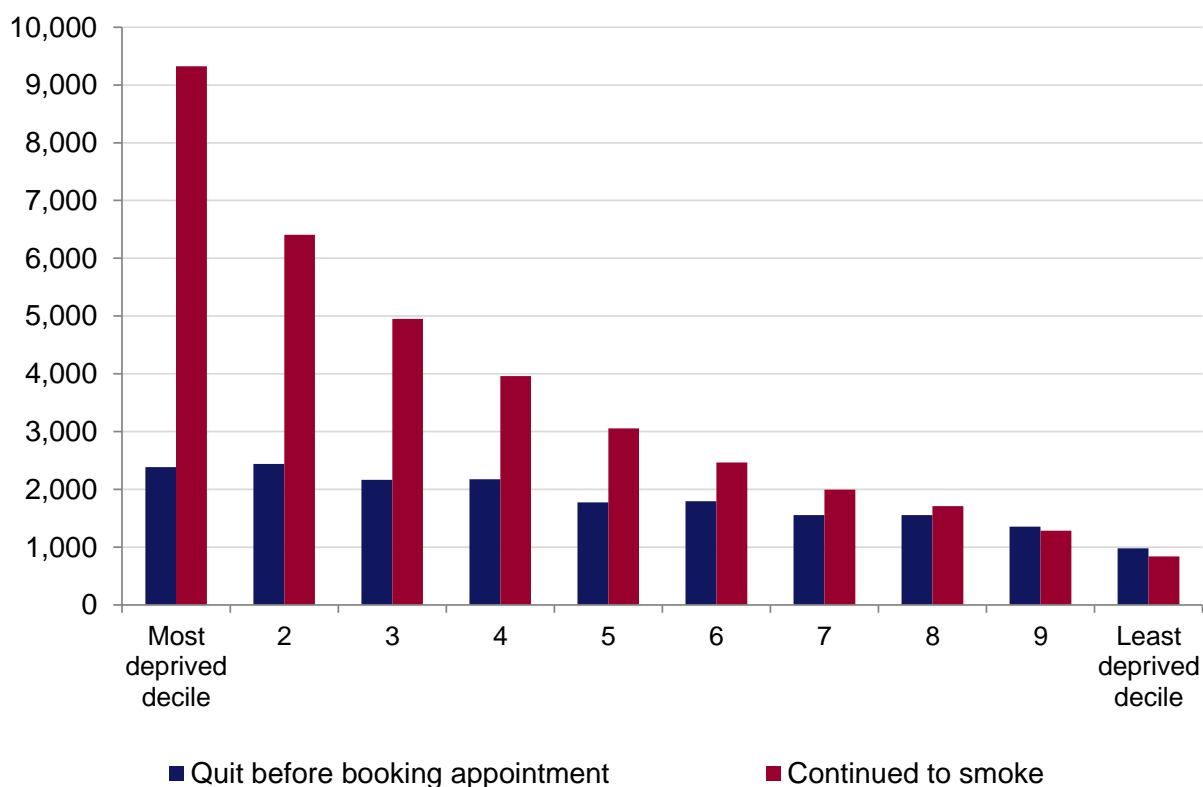


Table A9a: Known smokers at start of pregnancy by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

Age	Quit before booking appointment	Continued to smoke
Most deprived	2,385	9,325
2	2,440	6,405
3	2,165	4,950
4	2,175	3,960
5	1,775	3,055
6	1,795	2,465
7	1,555	1,995
8	1,555	1,710
9	1,355	1,285
Least deprived	980	840

Figure A9b: Known smokers at start of pregnancy by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in decile)

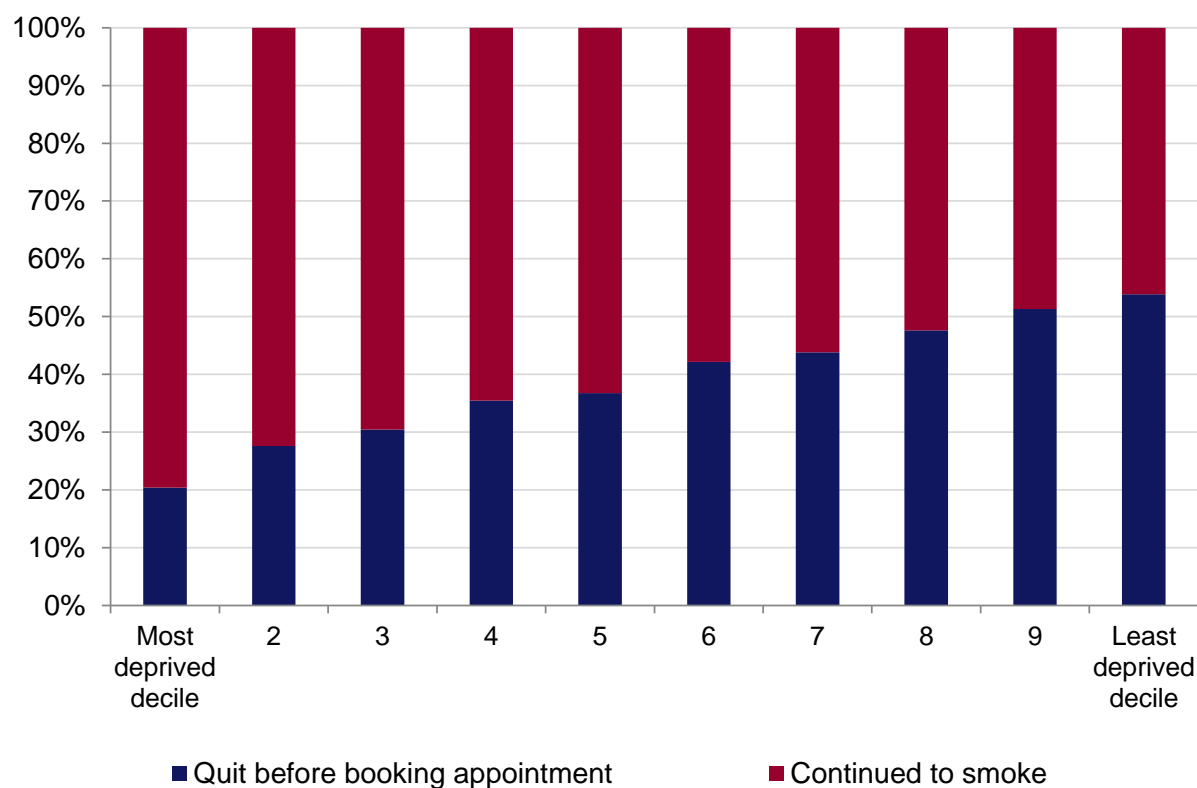


Table A9b: Known smokers at start of pregnancy by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in decile)

Age	Quit before booking appointment	Continued to smoke	All quitting statuses
Most deprived	20.4%	79.6%	100%
2	27.6%	72.4%	100%
3	30.4%	69.6%	100%
4	35.5%	64.5%	100%
5	36.7%	63.3%	100%
6	42.1%	57.9%	100%
7	43.8%	56.2%	100%
8	47.6%	52.4%	100%
9	51.3%	48.7%	100%
Least deprived	53.8%	46.2%	100%

Figure A10a: Ex-smokers at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

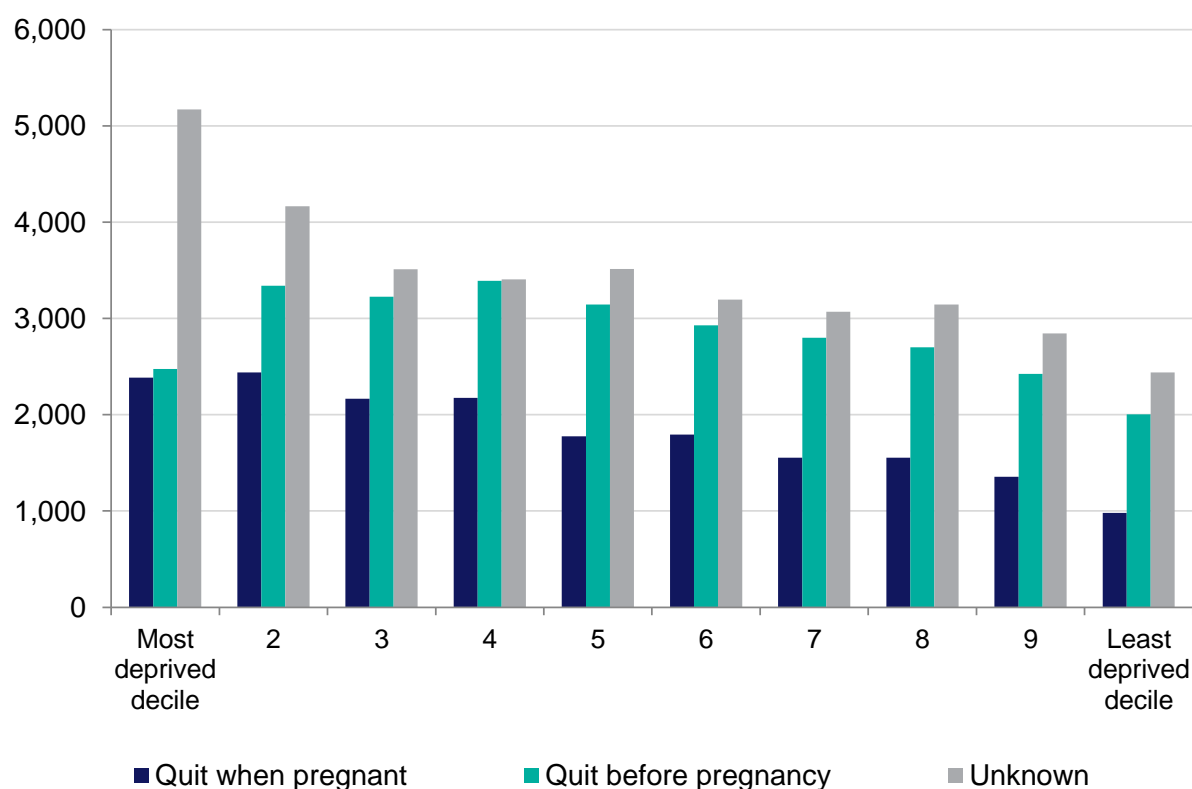


Table A10a: Ex-smokers at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

Deprivation decile	Quit when pregnant	Quit before pregnancy	Unknown
Most deprived	2,385	2,475	5,170
2	2,440	3,340	4,165
3	2,165	3,225	3,510
4	2,175	3,390	3,405
5	1,775	3,145	3,515
6	1,795	2,930	3,195
7	1,555	2,800	3,070
8	1,555	2,700	3,145
9	1,355	2,425	2,845
Least deprived	980	2,005	2,440

Figure A10b: Ex-smokers at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (point of quitting by proportion of total in decile)

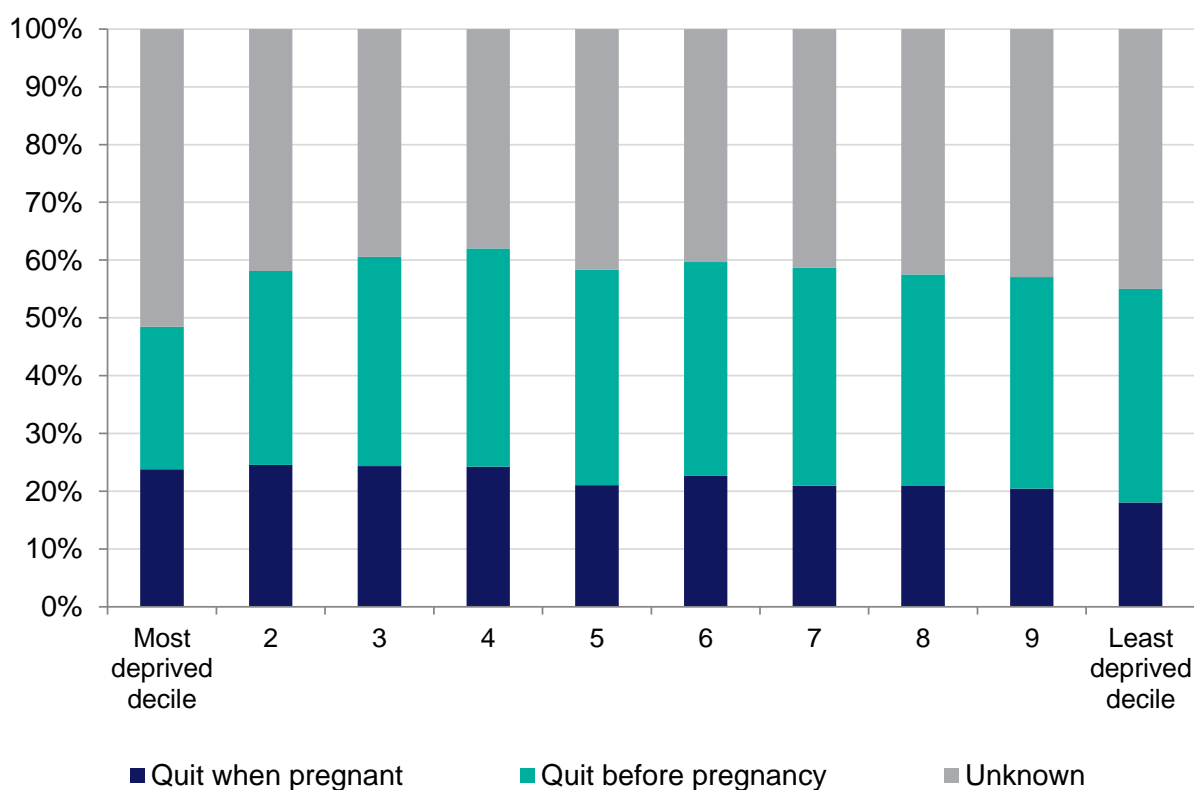


Table A10b: Ex-smokers at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (point of quitting by proportion of total in decile)

Deprivation decile	Quit when pregnant	Quit before pregnancy	Unknown	All ex-smoking statuses
Most deprived	23.8%	24.7%	51.5%	100%
2	24.5%	33.6%	41.9%	100%
3	24.3%	36.2%	39.4%	100%
4	24.2%	37.8%	38.0%	100%
5	21.0%	37.3%	41.7%	100%
6	22.7%	37.0%	40.3%	100%
7	20.9%	37.7%	41.3%	100%
8	21.0%	36.5%	42.5%	100%
9	20.5%	36.6%	42.9%	100%
Least deprived	18.1%	37.0%	45.0%	100%

Figure A11a: Smoking status at booking by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

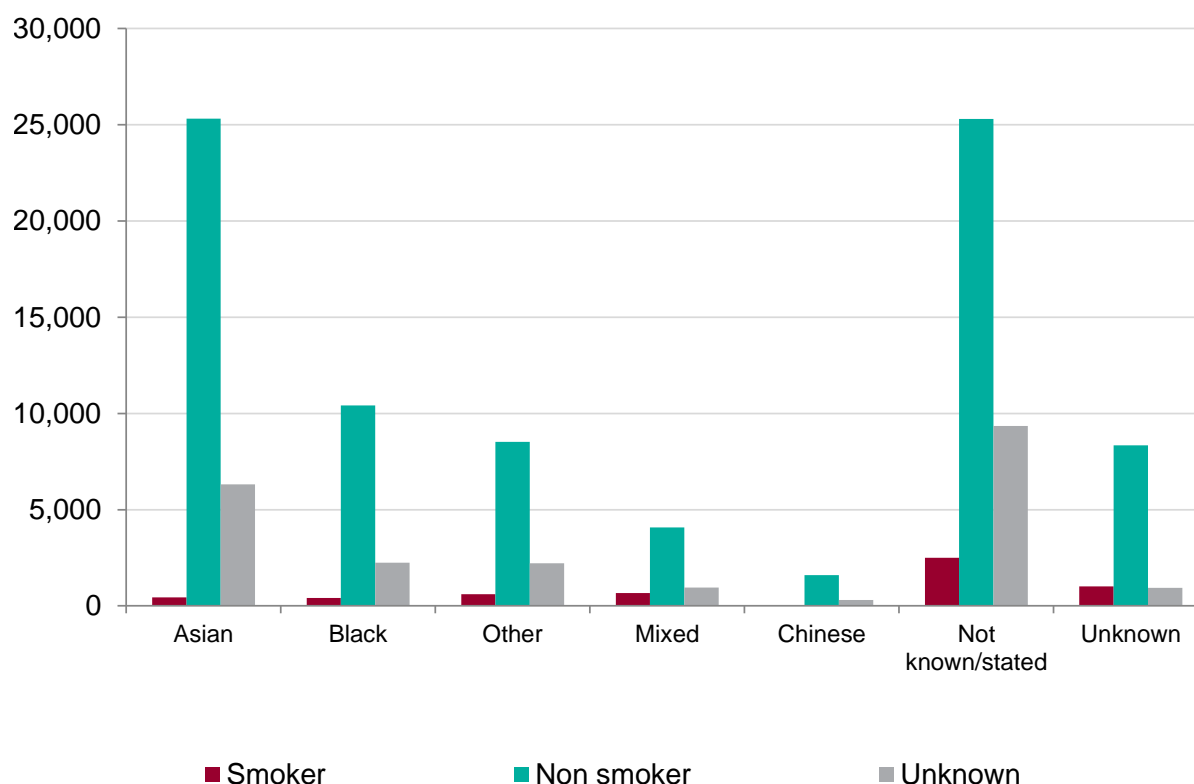


Table A11a: Smoking status at booking by ethnicity of mother, maternity booking appointments January to June 2017

Ethnicity	Smoker	Non smoker	Unknown
Asian	445	25,315	6,320
Black	415	10,410	2,250
Other	605	8,520	2,210
Mixed	665	4,075	955
Chinese	25	1,595	310
Not known/stated	2,505	25,295	9,350
Unknown	1,015	8,345	940
White (not shown on chart)	30,790	158,800	35,040

Figure A11b: Smoking status at booking by ethnicity of mother, maternity booking appointments January to June 2017 (smoking status by proportion of total in ethnic group)

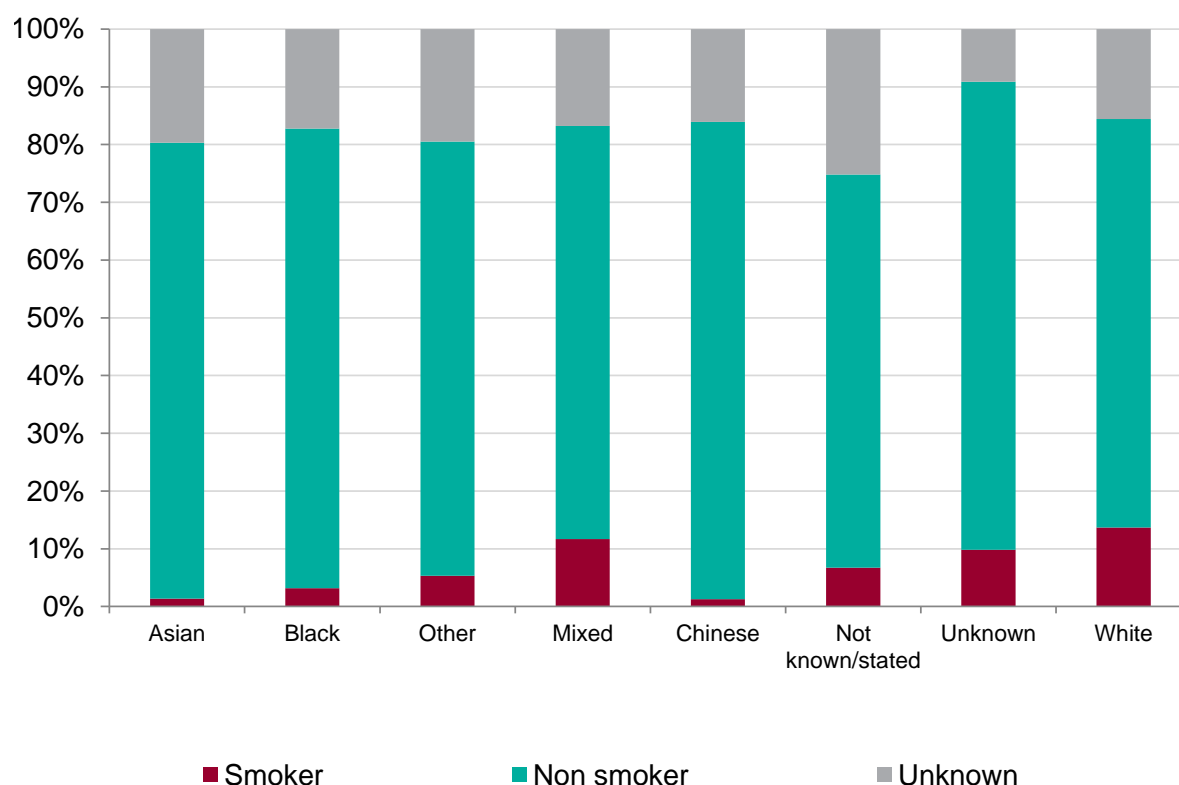


Table A11b: Smoking status at booking by ethnicity of mother, maternity booking appointments January to June 2017 (smoking status by proportion of total in ethnic group)

Ethnicity	Smoker	Non smoker	Unknown	All smoking statuses
Asian	1.4%	78.9%	19.7%	100%
Black	3.2%	79.6%	17.2%	100%
Other	5.3%	75.2%	19.5%	100%
Mixed	11.7%	71.6%	16.8%	100%
Chinese	1.3%	82.6%	16.1%	100%
Not known/stated	6.7%	68.1%	25.2%	100%
Unknown	9.9%	81.0%	9.1%	100%
White	13.7%	70.7%	15.6%	100%

Figure A12a: Known smokers at start of pregnancy by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

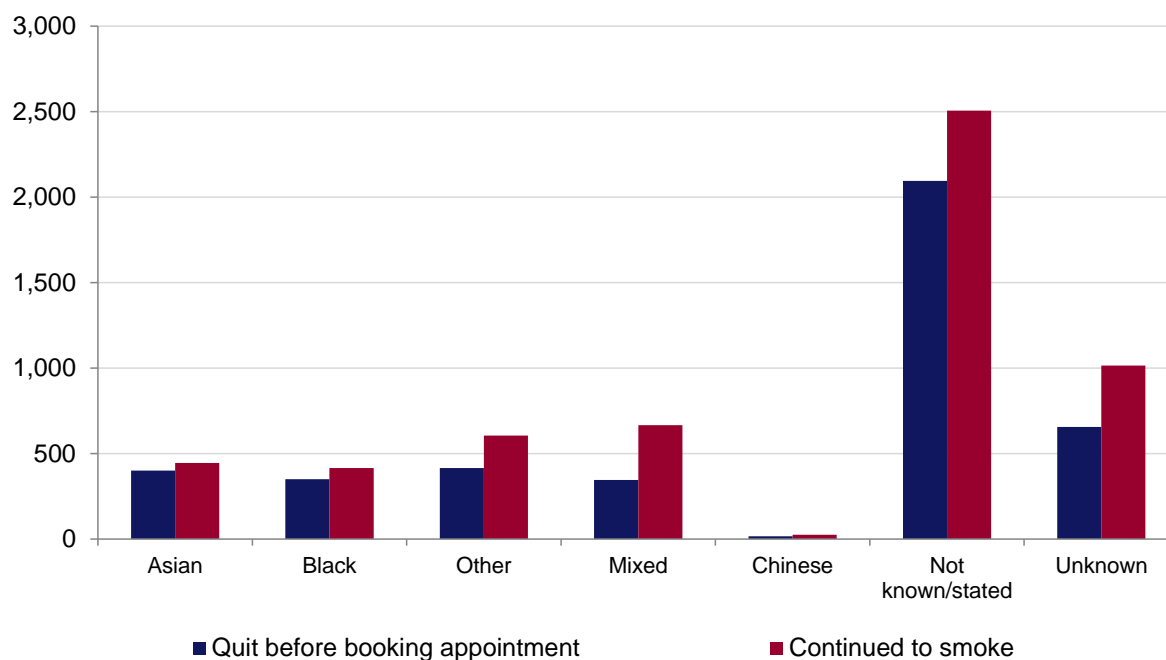


Table A12a: Known smokers at start of pregnancy by ethnicity of mother, maternity booking appointments January to June 2017

Ethnicity	Quit before booking appointment	Continued to smoke
Asian	400	445
Black	350	415
Other	415	605
Mixed	345	665
Chinese	15	25
Not known/stated	2,095	2,505
Unknown	655	1,015
White (not shown on chart)	14,130	30,790

Figure A12b: Known smokers at start of pregnancy by ethnicity of mother, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in ethnic group)

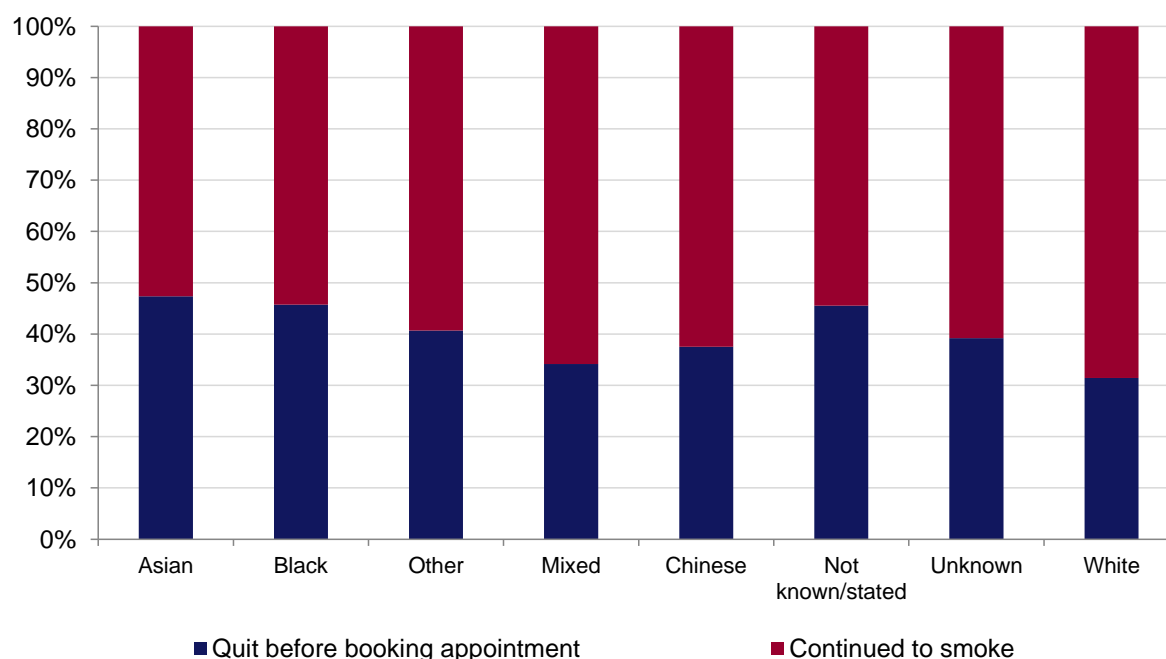


Table A12b: Known smokers at start of pregnancy by ethnicity of mother, maternity booking appointments January to June 2017 (smoking continuation status by proportion of total in ethnic group)

Ethnicity	Quit before booking appointment	Continued to smoke	All quitting statuses
Asian	47.3%	52.7%	100%
Black	45.8%	54.2%	100%
Other	40.7%	59.3%	100%
Mixed	34.2%	65.8%	100%
Chinese	37.5%	62.5%	100%
Not known/stated	45.5%	54.5%	100%
Unknown	39.2%	60.8%	100%
White	31.5%	68.5%	100%

Figure A13a: Ex-smokers at booking by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

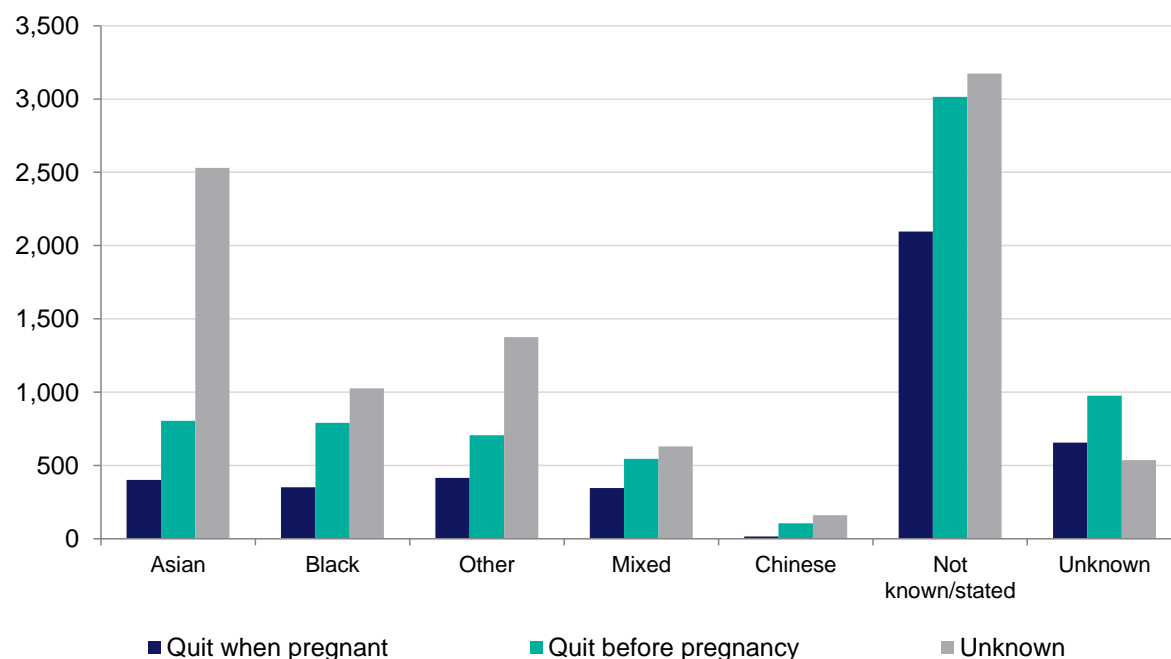


Table A13a: Ex-smokers at booking by ethnicity of mother, maternity booking appointments January to June 2017

Ethnicity	Quit when pregnant	Quit before pregnancy	Unknown
Asian	400	805	2,530
Black	350	790	1,025
Other	415	705	1,375
Mixed	345	545	630
Chinese	15	105	160
Not known/stated	2,095	3,015	3,175
Unknown	655	975	535
White (not shown on chart)	14,130	21,710	25,280

Figure A13b: Ex-smokers at booking by age of mother, maternity booking appointments January to June 2017 (point of quitting by proportion of total in ethnic group)

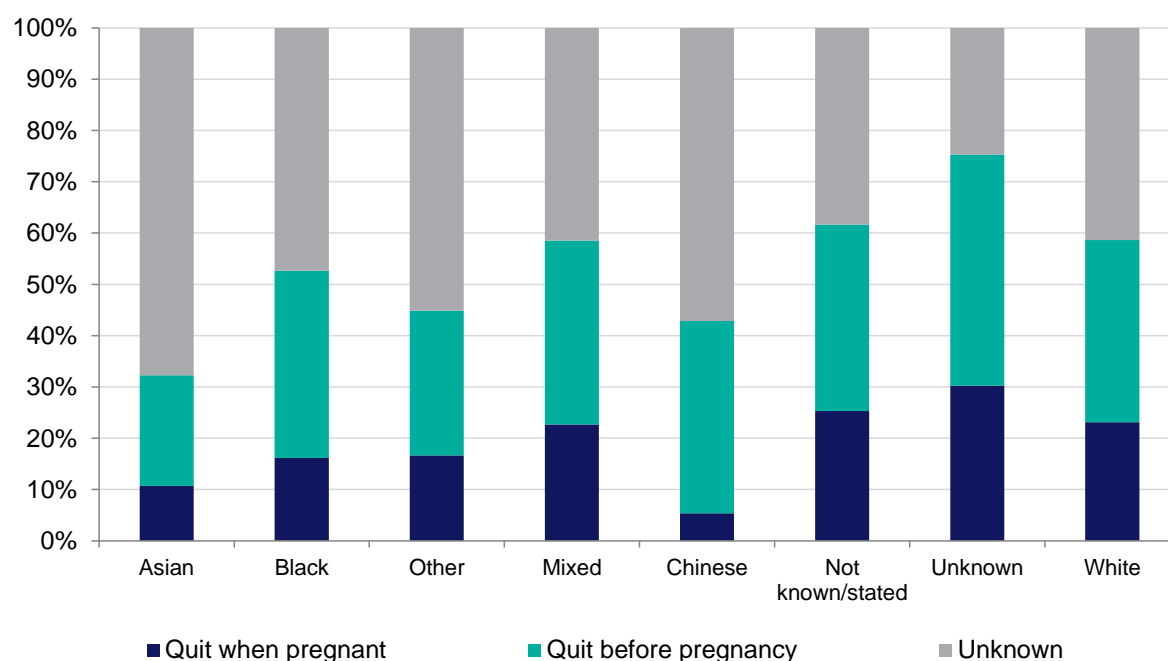


Table A13b: Ex-smokers at booking appointment by ethnicity of mother, maternity booking appointments January to June 2017 (point of quitting by proportion of total in ethnic group)

Ethnicity	Quit when pregnant	Quit before pregnancy	Unknown	All ex-smoking statuses
Asian	10.7%	21.6%	67.7%	100%
Black	16.2%	36.5%	47.3%	100%
Other	16.6%	28.3%	55.1%	100%
Mixed	22.7%	35.9%	41.4%	100%
Chinese	5.4%	37.5%	57.1%	100%
Not known/stated	25.3%	36.4%	38.3%	100%
Unknown	30.3%	45.0%	24.7%	100%
White	23.1%	35.5%	41.4%	100%

Appendix 2.2: Folic acid

Figure A14a: Folic acid status at booking by age of mother, maternity booking appointments January to June 2017

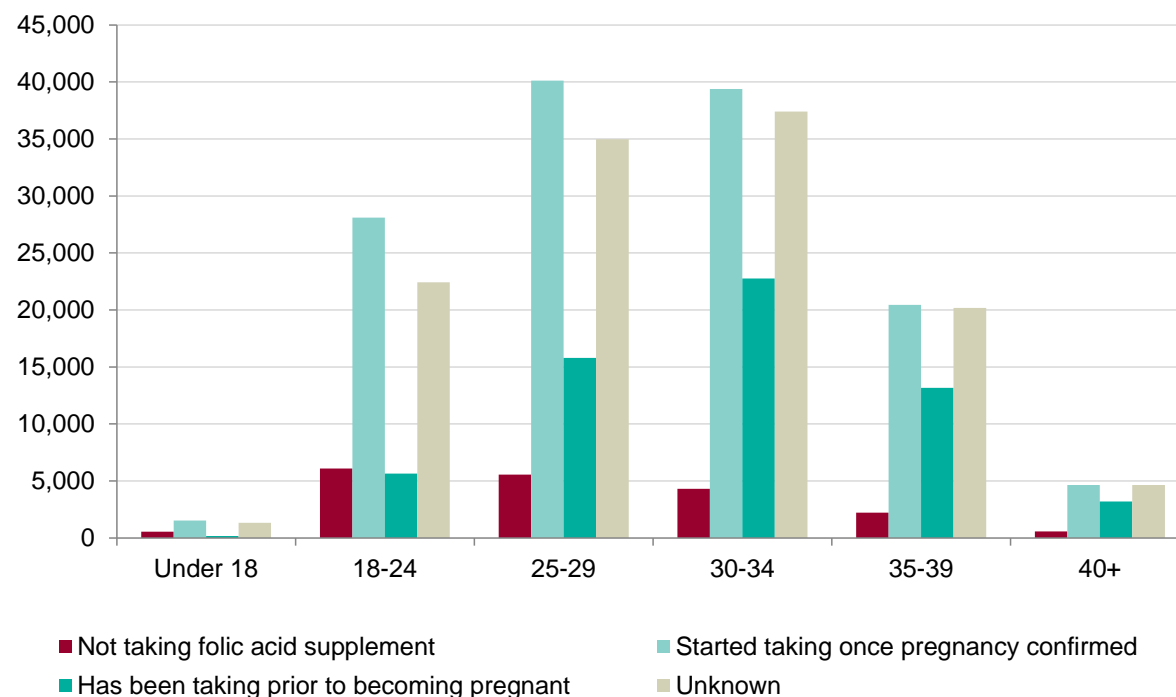


Table A14a: Folic acid status at booking by age of mother, maternity booking appointments January to June 2017

Age	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown
Under 18	545	1,530	160	1,330
18-24	6,080	28,105	5,650	22,430
25-29	5,555	40,130	15,785	34,985
30-34	4,300	39,385	22,760	37,405
35-39	2,210	20,450	13,160	20,185
40+	565	4,635	3,195	4,640

Figure A14b: Folic acid status at booking by age of mother, maternity booking appointments January to June 2017 (folic acid status by proportion of total in age range)

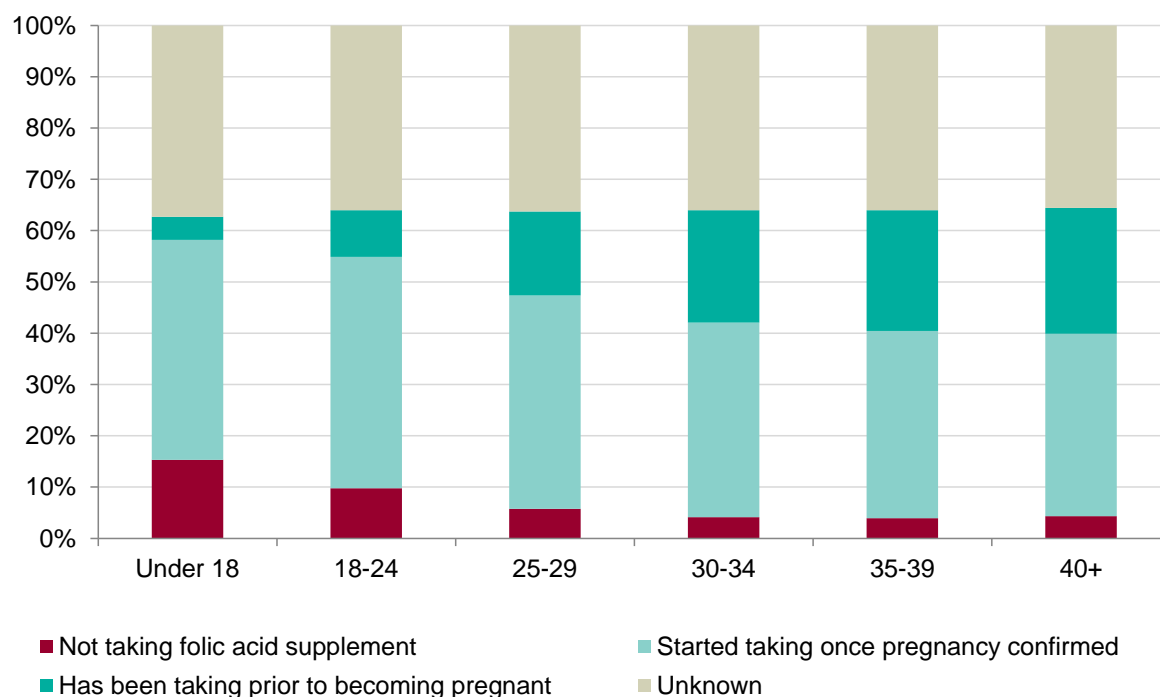


Table A14b: Folic acid status at booking by age of mother, maternity booking appointments January to June 2017 (folic acid status by proportion of total in age range)

Age	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown	All folic acid statuses
Under 18	15.3%	42.9%	4.5%	37.3%	100%
18-24	9.8%	45.1%	9.1%	36.0%	100%
25-29	5.8%	41.6%	16.4%	36.3%	100%
30-34	4.1%	37.9%	21.9%	36.0%	100%
35-39	3.9%	36.5%	23.5%	36.0%	100%
40+	4.3%	35.6%	24.5%	35.6%	100%

Figure A15a: Folic acid status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

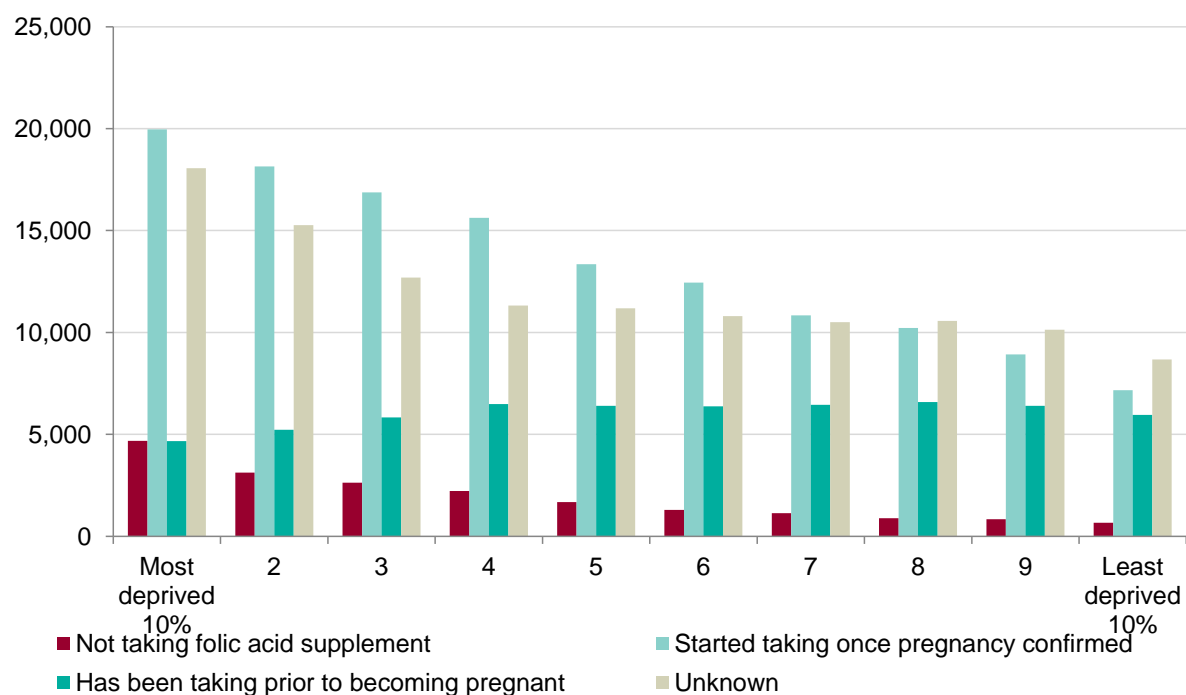


Table A15a: Folic acid status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

Deprivation decile	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown
Most deprived	4,675	19,970	4,665	18,065
2	3,120	18,150	5,225	15,260
3	2,625	16,870	5,825	12,695
4	2,215	15,630	6,480	11,315
5	1,670	13,350	6,395	11,180
6	1,295	12,445	6,375	10,800
7	1,135	10,835	6,455	10,510
8	885	10,225	6,580	10,565
9	830	8,925	6,400	10,140
Least deprived	665	7,160	5,955	8,675

Figure A15b: Folic acid status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (folic acid status by proportion of total in decile)

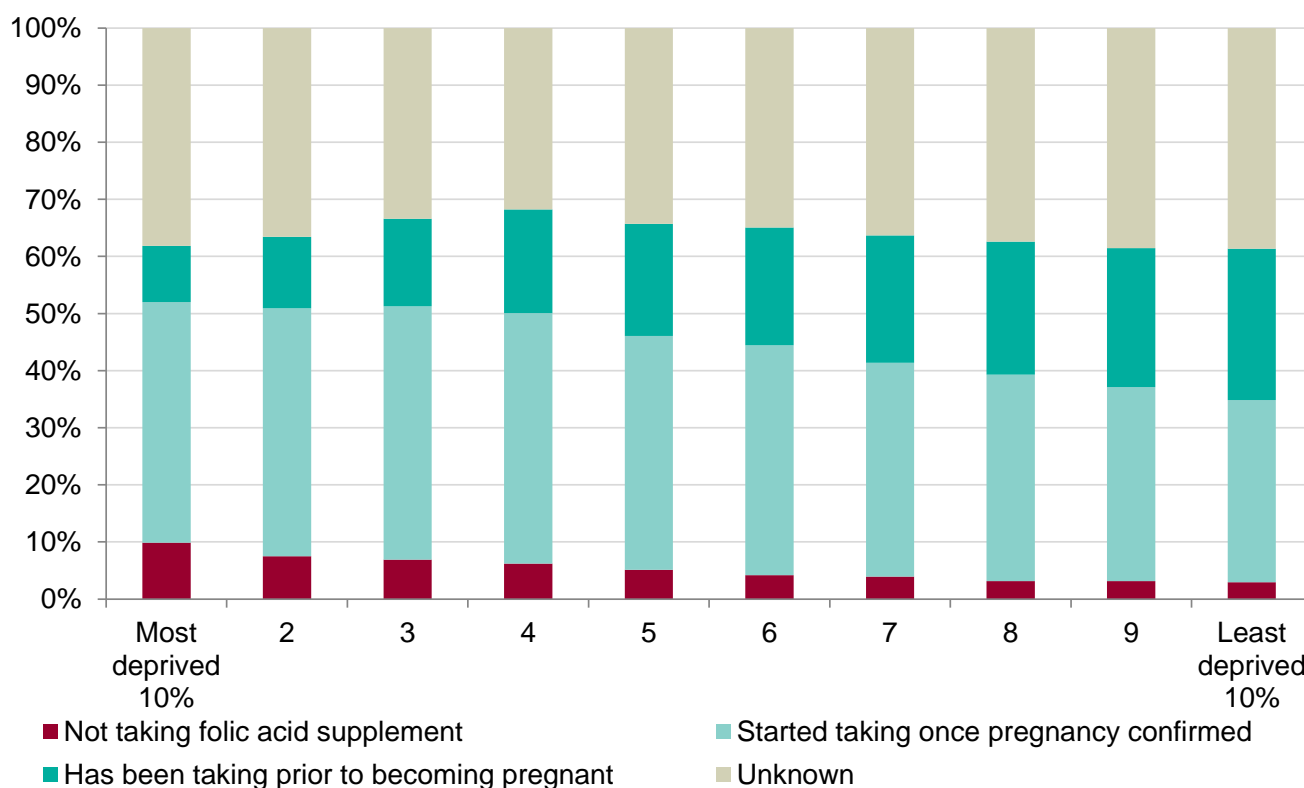


Table A15b: Folic acid status at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017 (folic acid status by proportion of total in decile)

Deprivation decile	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown	All folic acid statuses
Most deprived	9.9%	42.2%	9.8%	38.1%	100%
2	7.5%	43.5%	12.5%	36.5%	100%
3	6.9%	44.4%	15.3%	33.4%	100%
4	6.2%	43.9%	18.2%	31.7%	100%
5	5.1%	41.0%	19.6%	34.3%	100%
6	4.2%	40.3%	20.6%	34.9%	100%
7	3.9%	37.4%	22.3%	36.3%	100%
8	3.1%	36.2%	23.3%	37.4%	100%
9	3.2%	33.9%	24.3%	38.6%	100%
Least deprived	3.0%	31.9%	26.5%	38.6%	100%

Figure A16a: Folic acid status at booking by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

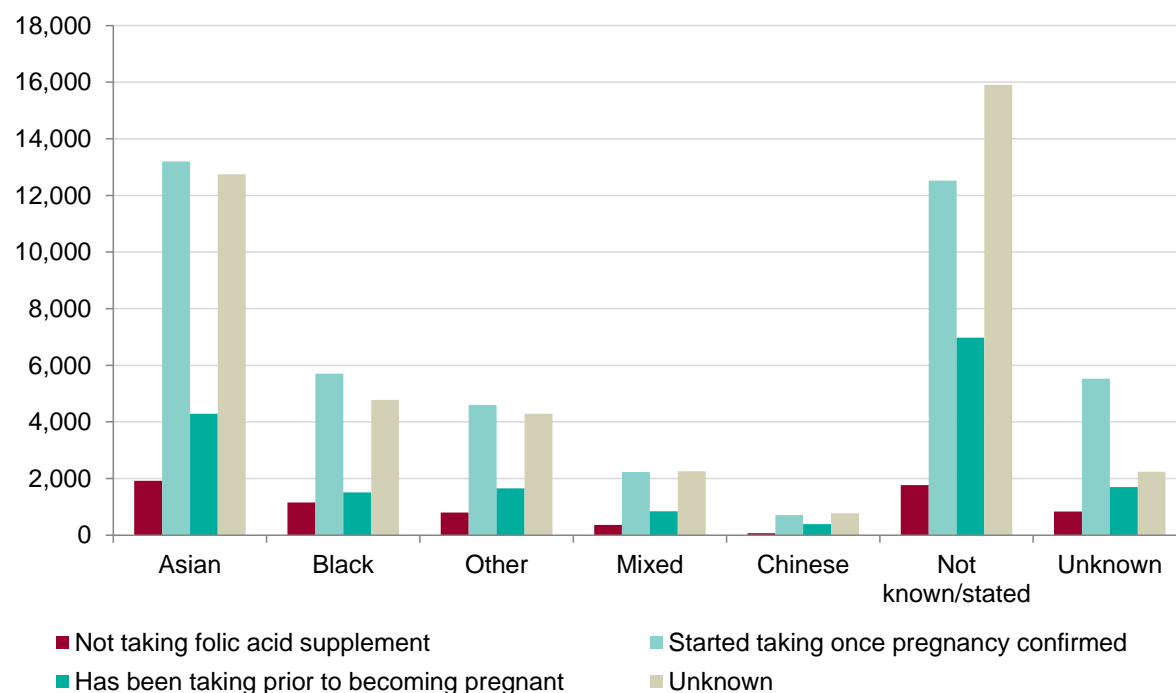


Table A16a: Folic acid status at booking by ethnicity of mother, maternity booking appointments January to June 2017

Ethnicity	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown
Asian	1,915	13,195	4,290	12,745
Black	1,155	5,700	1,510	4,775
Other	795	4,595	1,655	4,290
Mixed	365	2,230	840	2,255
Chinese	70	710	390	770
Not known/stated	1,765	12,520	6,975	15,905
Unknown	835	5,525	1,700	2,240
White (not shown on chart)	12,405	90,235	43,570	78,780

Figure A16b: Folic acid status at booking by ethnicity of mother, maternity booking appointments January to June 2017 (folic acid status by proportion of total in ethnic group)

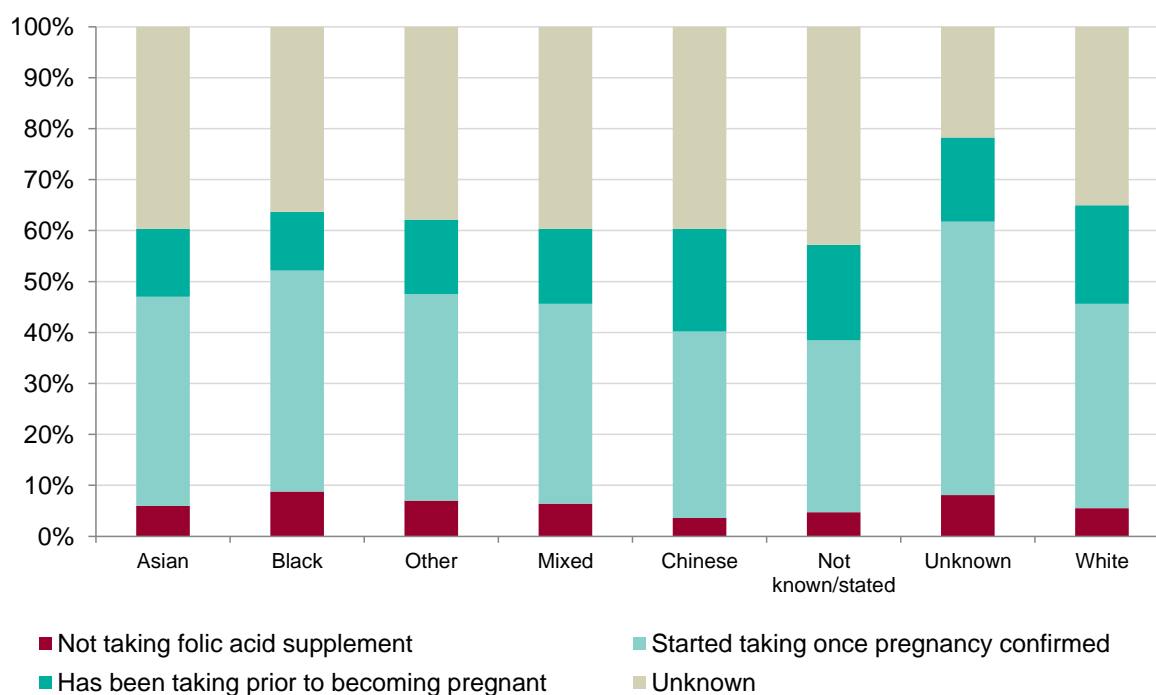


Table A16b: Folic acid status at booking by ethnicity of mother, maternity booking appointments January to June 2017 (folic acid status by proportion of total in ethnic group)

Ethnicity	Not taking folic acid supplement	Started taking once pregnancy confirmed	Has been taking prior to becoming pregnant	Unknown	All folic acid statuses
Asian	6.0%	41.0%	13.3%	39.6%	100%
Black	8.8%	43.4%	11.5%	36.3%	100%
Other	7.0%	40.5%	14.6%	37.8%	100%
Mixed	6.4%	39.2%	14.8%	39.6%	100%
Chinese	3.6%	36.6%	20.1%	39.7%	100%
Not known/stated	4.7%	33.7%	18.8%	42.8%	100%
Unknown	8.1%	53.6%	16.5%	21.7%	100%
White	5.5%	40.1%	19.4%	35.0%	100%

Appendix 2.3: Maternal BMI

BMI is calculated as $\text{Weight} / \text{Height}^2$, and the following groupings are applied:

- Underweight: BMI < 18.5
- Healthy weight: BMI ≥ 18.5 AND BMI < 25
- Overweight: BMI ≥ 25 AND BMI < 30
- Obese: BMI ≥ 30 AND BMI < 40
- Severely obese: BMI ≥ 40

Figure A17a: Maternal weight by age of mother, maternity booking appointments January to June 2017

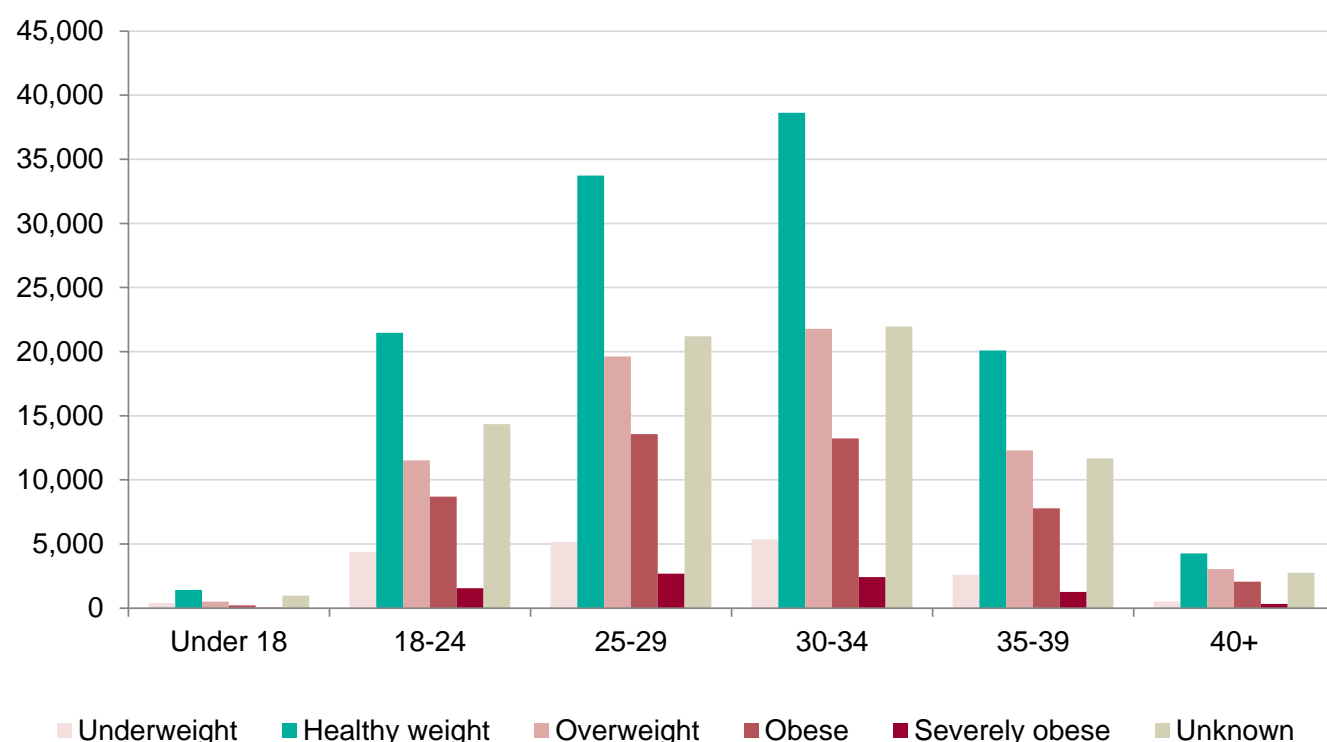


Table A17a: Maternal weight by age of mother, maternity booking appointments January to June 2017

Age	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown
Under 18	380	1,420	505	220	35	975
18-24	4,365	21,470	11,530	8,685	1,540	14,340
25-29	5,150	33,735	19,620	13,565	2,680	21,205
30-34	5,350	38,635	21,790	13,230	2,405	21,960
35-39	2,595	20,080	12,295	7,785	1,260	11,675
40+	515	4,255	3,045	2,065	330	2,755

Figure A17b: Maternal weight by age of mother, maternity booking appointments January to June 2017 (BMI category by proportion of total in age range)

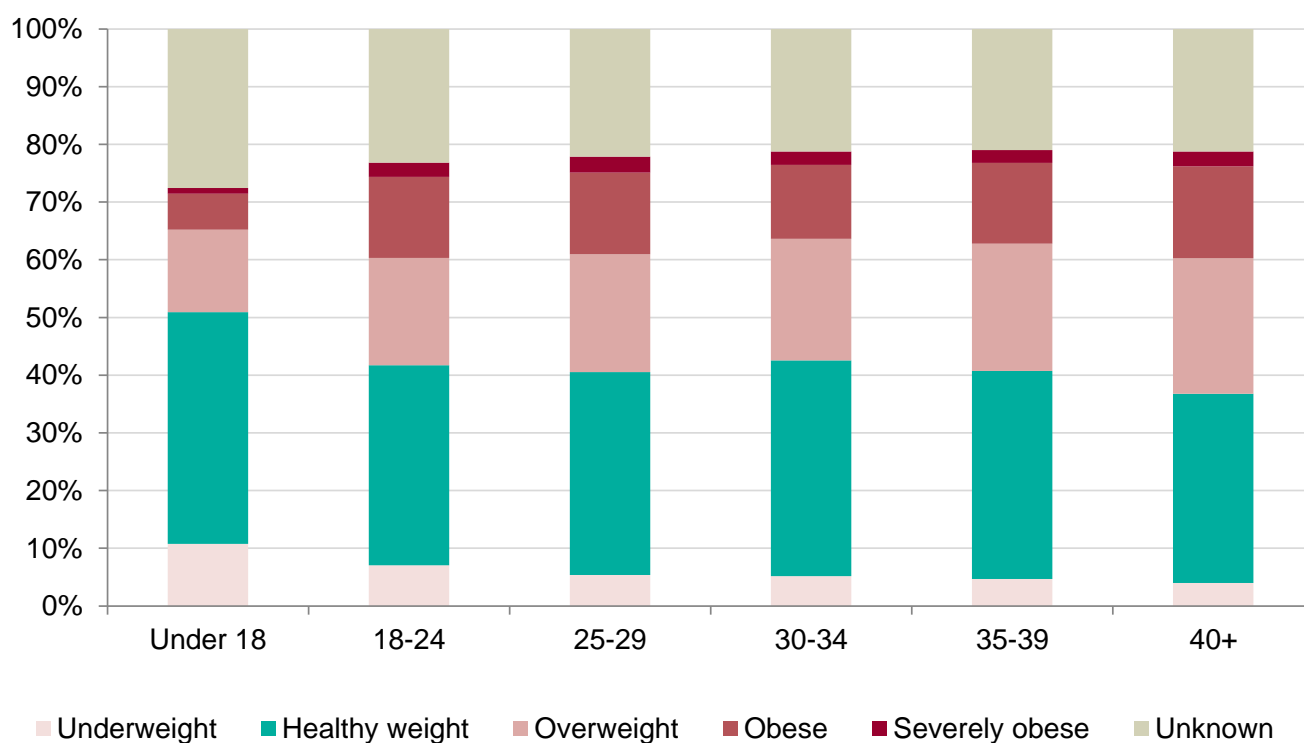


Table A17b: Maternal weight by age of mother, maternity booking appointments January to June 2017 (BMI category by proportion of total in age range)

Age	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown	All BMI categories
Under 18	10.7%	40.2%	14.3%	6.2%	1.0%	27.6%	100%
18-24	7.0%	34.7%	18.6%	14.0%	2.5%	23.2%	100%
25-29	5.4%	35.2%	20.4%	14.1%	2.8%	22.1%	100%
30-34	5.2%	37.4%	21.1%	12.8%	2.3%	21.2%	100%
35-39	4.7%	36.1%	22.1%	14.0%	2.3%	21.0%	100%
40+	4.0%	32.8%	23.5%	15.9%	2.5%	21.2%	100%

Figure A18a: Maternal weight at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

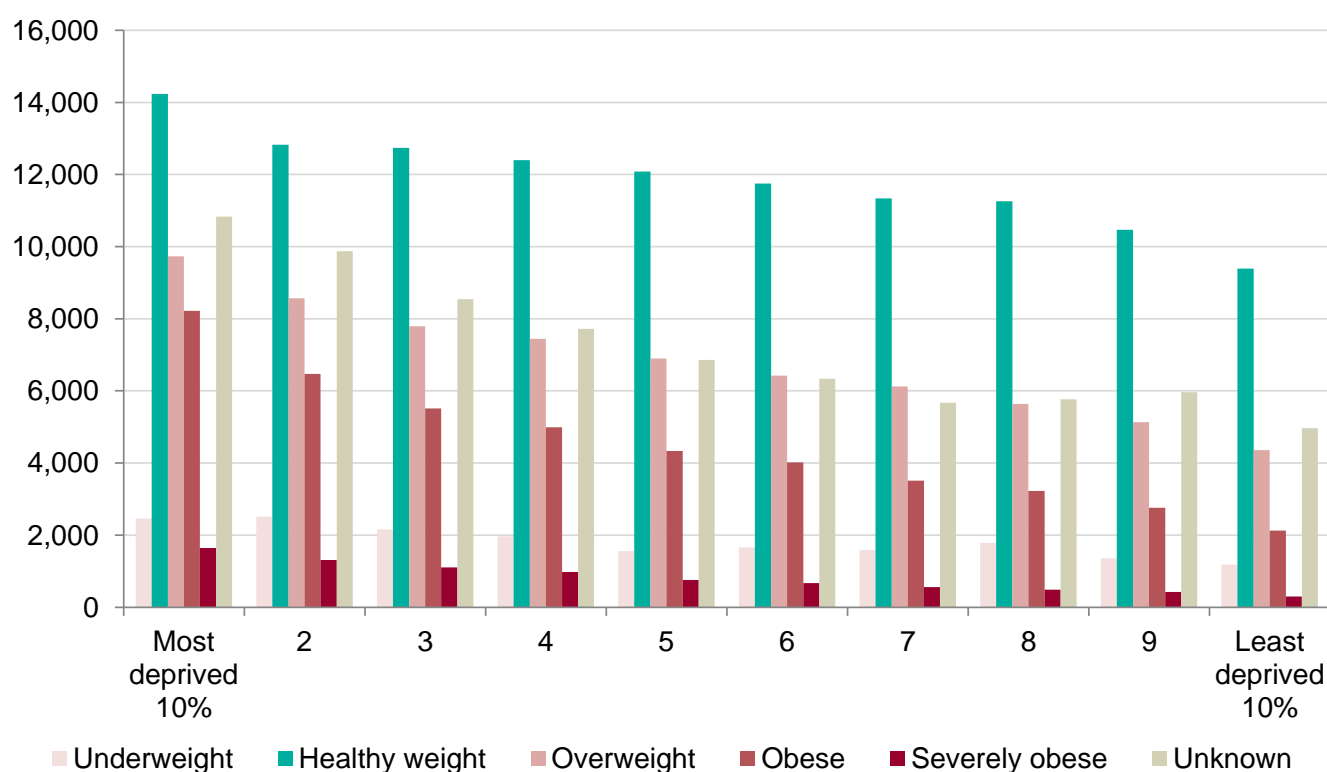


Table A18a: Maternal weight at booking by decile of deprivation of mother's residence, maternity booking appointments January to June 2017

Deprivation decile	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown
Most deprived	2,455	14,235	9,730	8,220	1,640	10,830
2	2,515	12,825	8,565	6,470	1,310	9,870
3	2,160	12,735	7,795	5,510	1,105	8,545
4	1,970	12,400	7,445	4,990	980	7,720
5	1,555	12,080	6,895	4,335	755	6,860
6	1,655	11,745	6,420	4,020	670	6,335
7	1,590	11,340	6,125	3,510	555	5,670
8	1,785	11,255	5,640	3,225	485	5,765
9	1,355	10,470	5,130	2,760	425	5,965
Least deprived	1,185	9,390	4,355	2,125	295	4,970

Figure A18b: Maternal weight at booking by decile of deprivation of mother’s residence, maternity booking appointments January to June 2017 (BMI category by proportion of total in decile)

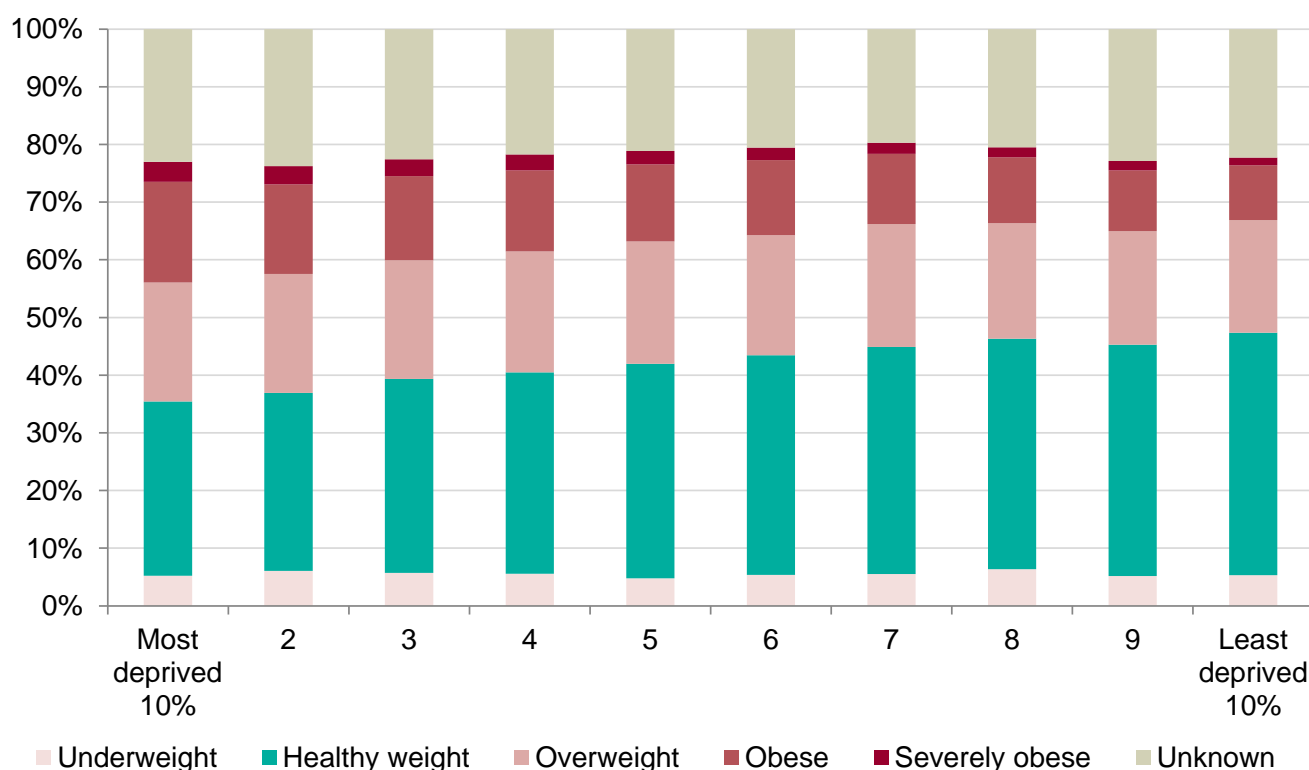


Table A18b: Maternal weight at booking by decile of deprivation of mother’s residence, maternity booking appointments January to June 2017 (BMI category by proportion of total in decile)

Deprivation decile	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown	All BMI categories
Most deprived	5.2%	30.2%	20.7%	17.4%	3.5%	23.0%	100%
2	6.1%	30.9%	20.6%	15.6%	3.2%	23.8%	100%
3	5.7%	33.6%	20.6%	14.6%	2.9%	22.6%	100%
4	5.5%	34.9%	21.0%	14.1%	2.8%	21.7%	100%
5	4.8%	37.2%	21.2%	13.3%	2.3%	21.1%	100%
6	5.4%	38.1%	20.8%	13.0%	2.2%	20.5%	100%
7	5.5%	39.4%	21.3%	12.2%	1.9%	19.7%	100%
8	6.3%	40.0%	20.0%	11.5%	1.7%	20.5%	100%
9	5.2%	40.1%	19.7%	10.6%	1.6%	22.9%	100%
Least deprived	5.3%	42.1%	19.5%	9.5%	1.3%	22.3%	100%

Figure A19a: Maternal weight at booking by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

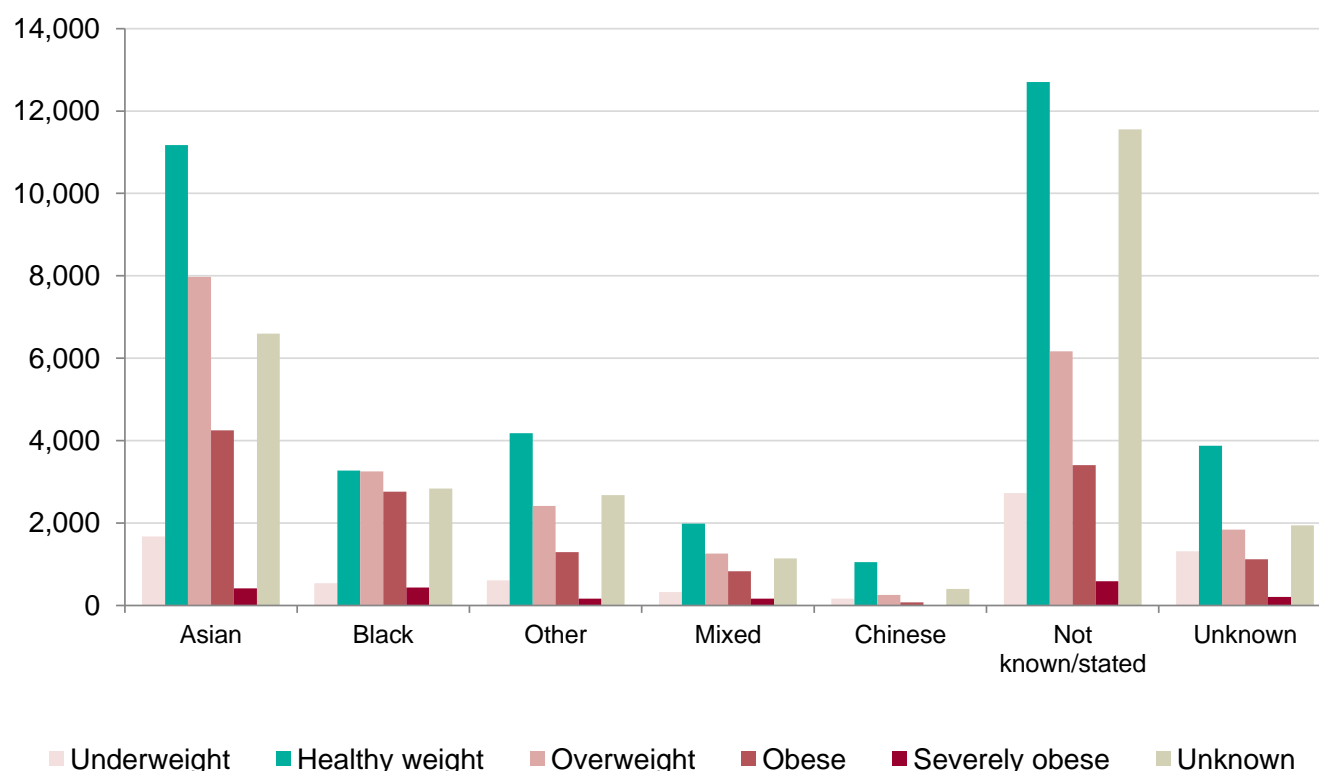


Table A19a: Maternal weight at booking by ethnicity of mother (excluding White for ease of interpretation), maternity booking appointments January to June 2017

Ethnicity	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown
Asian	1,670	11,170	7,975	4,250	410	6,595
Black	540	3,275	3,250	2,760	435	2,835
Other	605	4,180	2,410	1,295	165	2,680
Mixed	325	1,985	1,255	825	160	1,140
Chinese	160	1,050	250	70	0	400
Not known/stated	2,725	12,705	6,170	3,405	585	11,555
Unknown	1,310	3,875	1,840	1,120	205	1,945
White (not shown on chart)	11,085	82,150	46,030	32,145	6,350	46,185

Figure A19b: Maternal weight at booking by ethnicity of mother, maternity booking appointments January to June 2017 (BMI category by proportion of total in ethnic group)

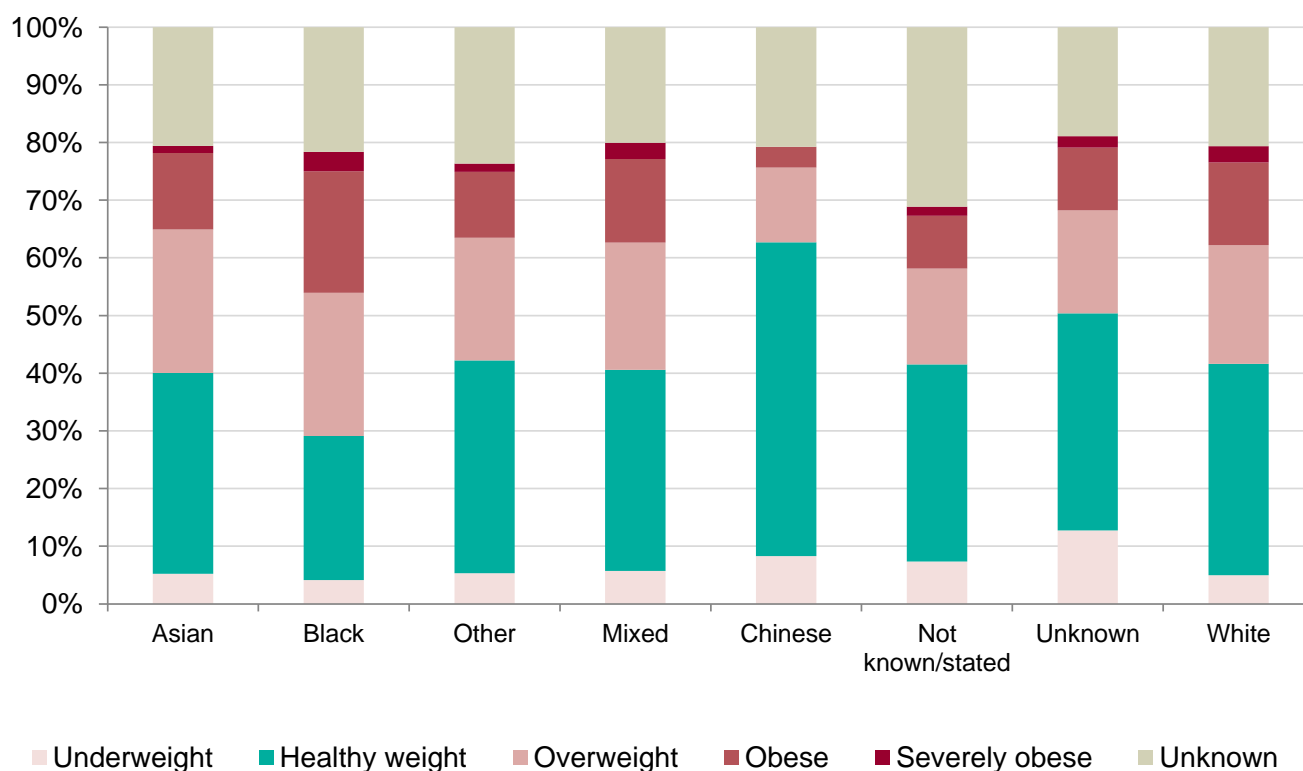


Table A19b: Maternal weight at booking by ethnicity of mother, maternity booking appointments January to June 2017 (BMI category by proportion of total in ethnic group)

Ethnicity	Under weight	Healthy weight	Over weight	Obese	Severely obese	Unknown	All BMI categories
Asian	5.2%	34.8%	24.9%	13.3%	1.3%	20.6%	100%
Black	4.1%	25.0%	24.8%	21.1%	3.3%	21.6%	100%
Other	5.3%	36.9%	21.3%	11.4%	1.5%	23.6%	100%
Mixed	5.7%	34.9%	22.1%	14.5%	2.8%	20.0%	100%
Chinese	8.3%	54.4%	13.0%	3.6%	0.0%	20.7%	100%
Not known/stated	7.3%	34.2%	16.6%	9.2%	1.6%	31.1%	100%
Unknown	12.7%	37.6%	17.9%	10.9%	2.0%	18.9%	100%
White	4.9%	36.7%	20.6%	14.4%	2.8%	20.6%	100%

Appendix 2.4: Alcohol

Figure A20a: Alcohol use by age of mother, maternity booking appointments January to June 2017

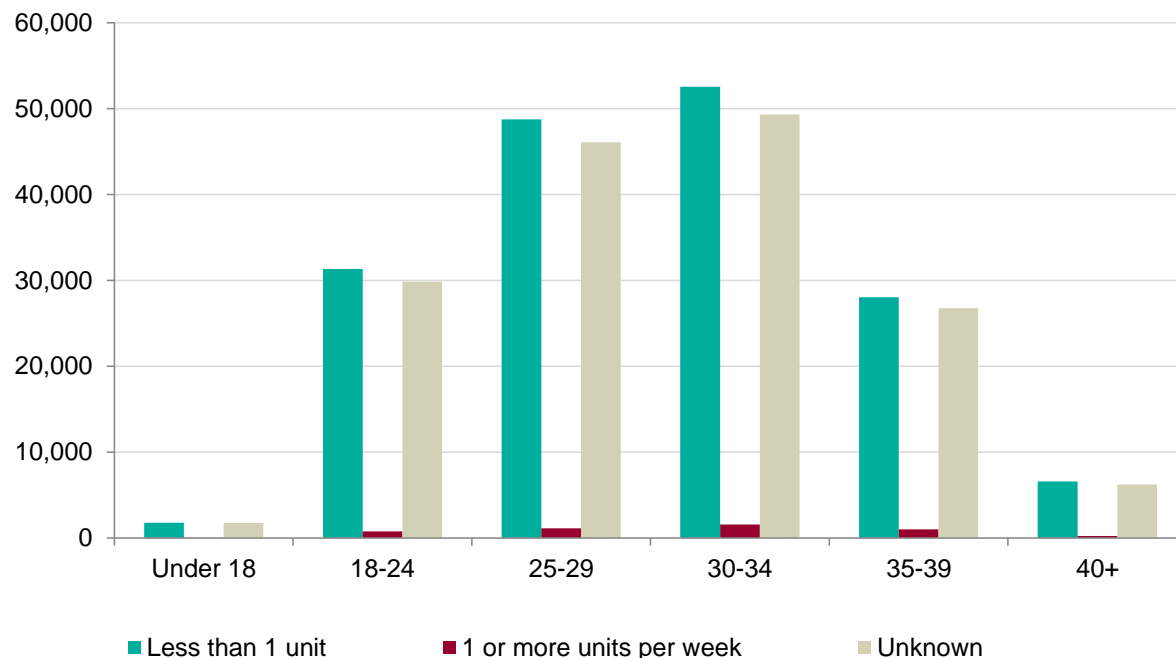


Table A20a: Alcohol use by age of mother, maternity booking appointments January to June 2017

Age	Less than 1 unit	1 or more units per week	Unknown
Under 18	1,755	25	1,750
18-24	31,325	755	29,835
25-29	48,750	1,125	46,075
30-34	52,550	1,565	49,305
35-39	28,025	985	26,745
40+	6,570	215	6,210

Figure A20b: Alcohol use by age of mother, maternity booking appointments January to June 2017 (alcohol use by proportion of total in age range)

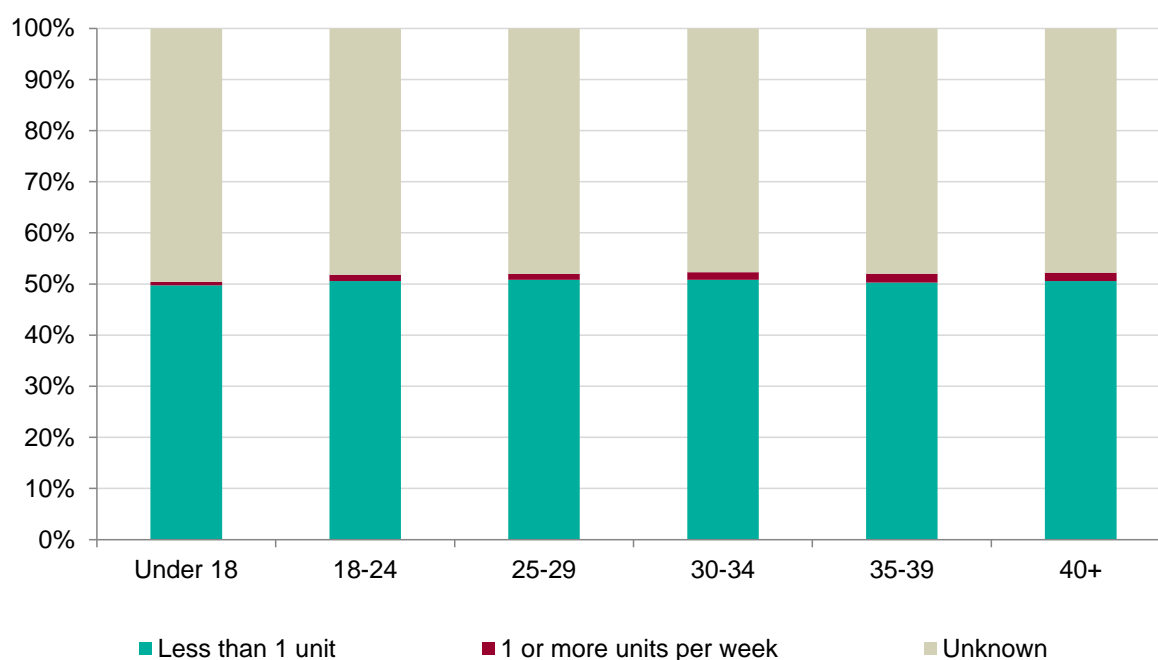


Table A20b: Alcohol use by age of mother, maternity booking appointments January to June 2017 (alcohol use by proportion of total in age range)

Age	Less than 1 unit	1 or more units per week	Unknown	All unit categories
Under 18	49.7%	0.7%	49.6%	100%
18-24	50.6%	1.2%	48.2%	100%
25-29	50.8%	1.2%	48.0%	100%
30-34	50.8%	1.5%	47.7%	100%
35-39	50.3%	1.8%	48.0%	100%
40+	50.6%	1.7%	47.8%	100%

Appendix 2.5: Antenatal booking within 13 weeks of pregnancy

Figure A21a: Timing of maternity booking appointment by age of mother, appointments January to June 2017

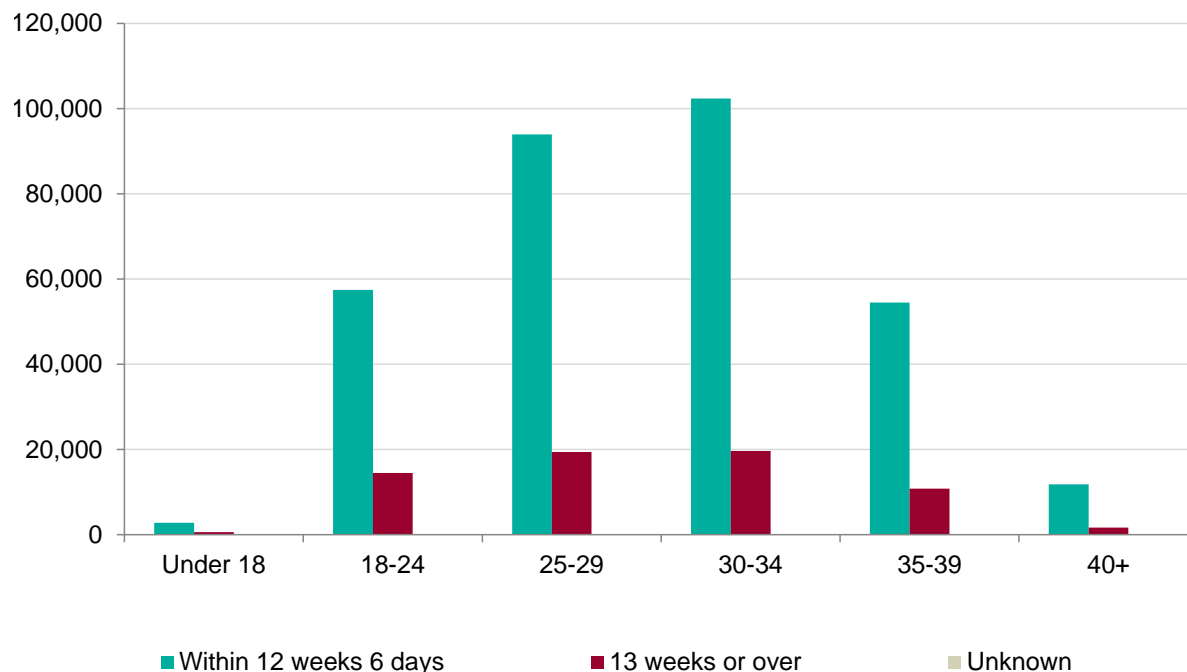


Table A21a: Timing of maternity booking appointment by age of mother, appointments January to June 2017

Age	Within 12 weeks 6 days	13 weeks or over	Unknown
Under 18	2,775	585	0
18-24	57,450	14,465	55
25-29	93,915	19,355	100
30-34	102,365	19,600	100
35-39	54,485	10,770	60
40+	11,760	1,655	5

Figure A21b: Timing of maternity booking appointment by age of mother, appointments January to June 2017 (as proportion of total in age range)

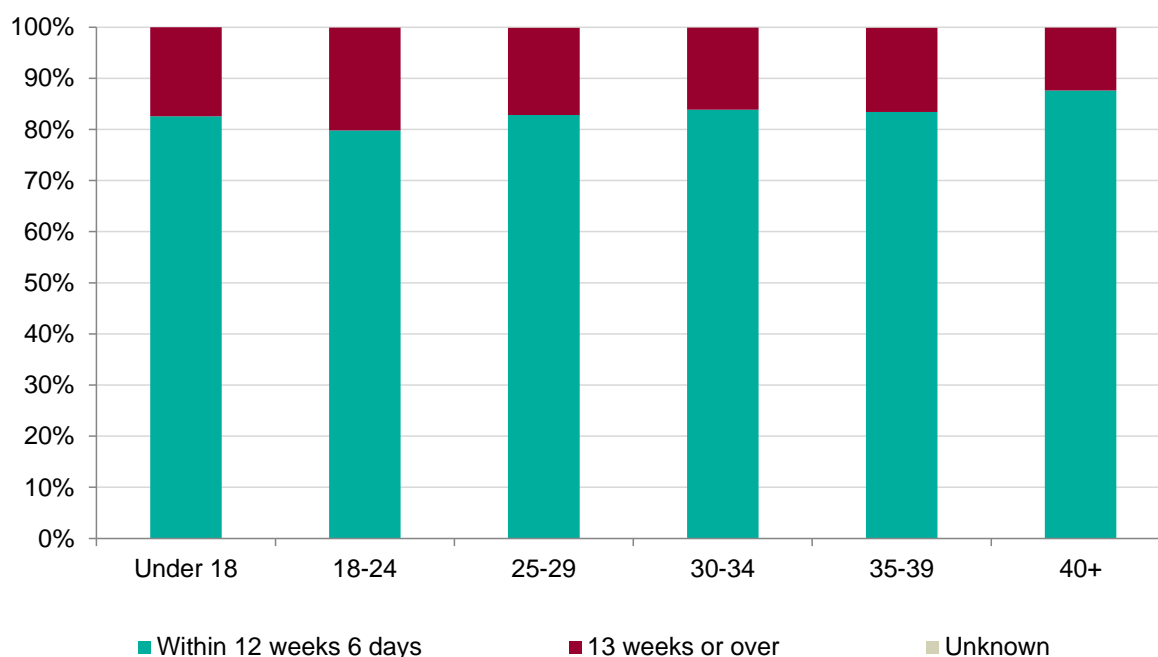


Table A21b: Timing of maternity booking appointment by age of mother, appointments January to June 2017 (as proportion of total in age range)

Age	Within 12 weeks 6 days	13 weeks or over	Unknown	All timing categories
Under 18	82.6%	17.4%	0.0%	100%
18-24	79.8%	20.1%	0.1%	100%
25-29	82.8%	17.1%	0.1%	100%
30-34	83.9%	16.1%	0.1%	100%
35-39	83.4%	16.5%	0.1%	100%
40+	87.6%	12.3%	0.0%	100%

Figure A22a: Timing of maternity booking appointment by decile of deprivation of mother's residence, appointments January to June 2017

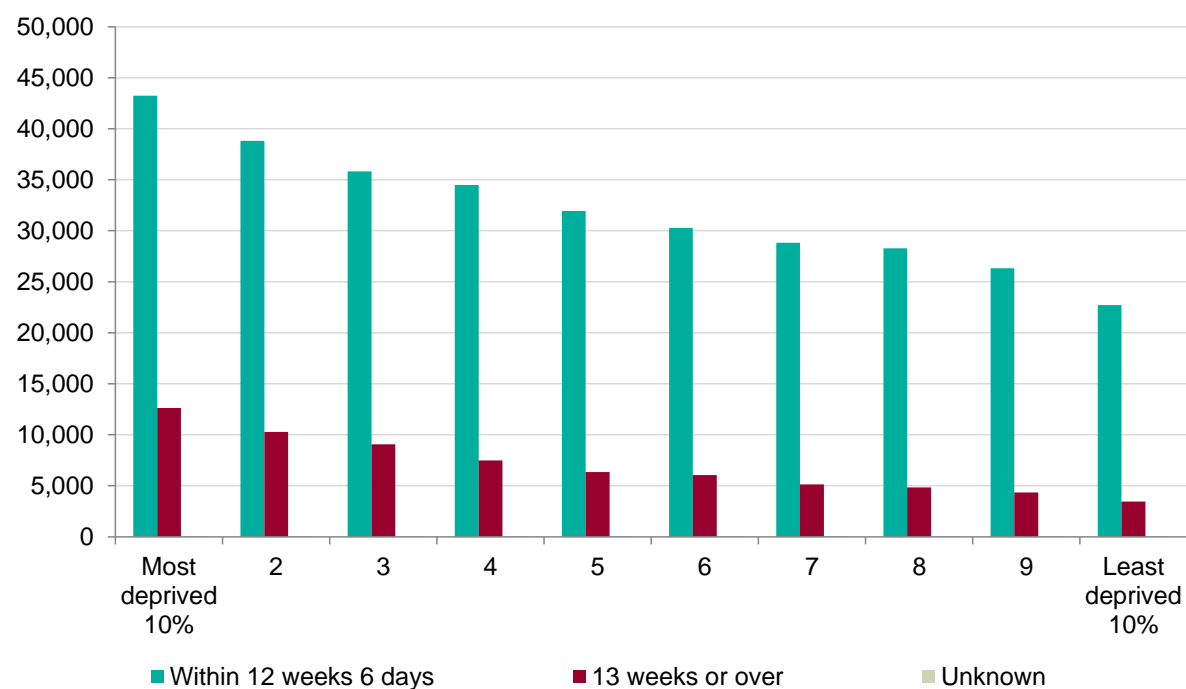


Table A22a: Timing of maternity booking appointment by decile of deprivation of mother's residence, appointments January to June 2017

Deprivation decile	Within 12 weeks 6 days	13 weeks or over	Unknown
Most deprived	43,235	12,635	70
2	38,820	10,275	25
3	35,825	9,065	50
4	34,480	7,490	40
5	31,935	6,355	25
6	30,275	6,035	25
7	28,820	5,125	20
8	28,275	4,840	20
9	26,335	4,330	25
Least deprived	22,710	3,460	25

Figure A22b: Timing of maternity booking appointment by decile of deprivation of mother's residence, appointments January to June 2017 (as proportion of total in decile)

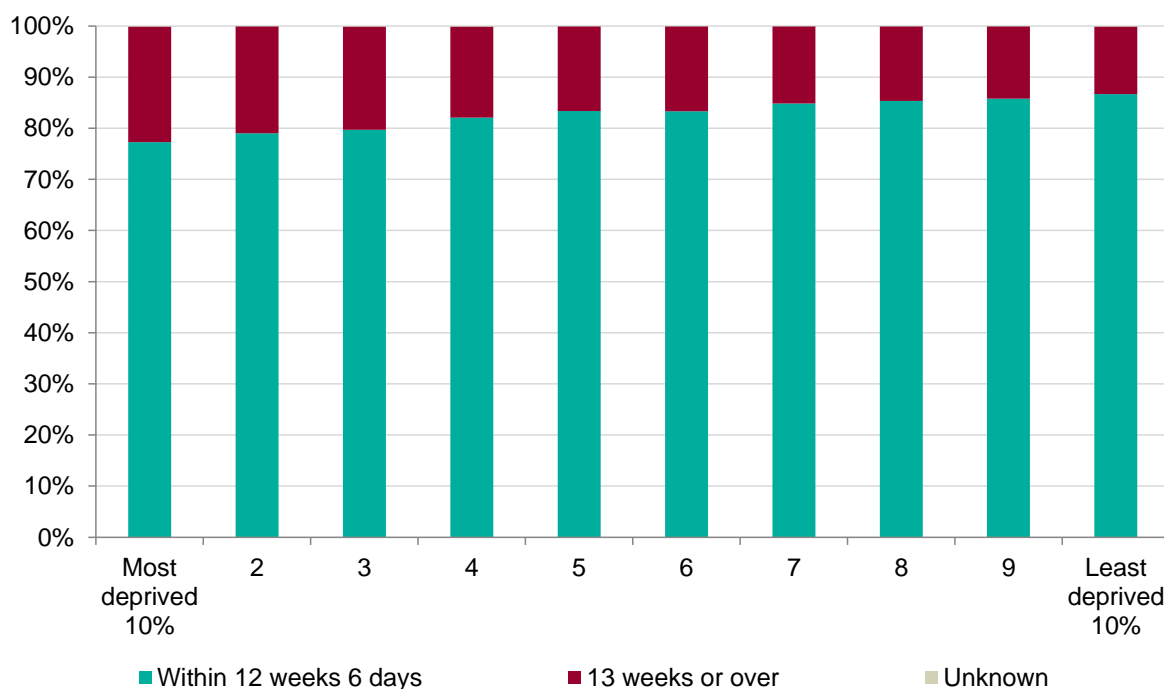


Table A22b: Timing of maternity booking appointment by decile of deprivation of mother's residence, appointments January to June 2017(as proportion of total in decile)

Deprivation decile	Within 12 weeks 6 days	13 weeks or over	Unknown	All timing categories
Most deprived	77.3%	22.6%	0.1%	100%
2	79.0%	20.9%	0.1%	100%
3	79.7%	20.2%	0.1%	100%
4	82.1%	17.8%	0.1%	100%
5	83.3%	16.6%	0.1%	100%
6	83.3%	16.6%	0.1%	100%
7	84.9%	15.1%	0.1%	100%
8	85.3%	14.6%	0.1%	100%
9	85.8%	14.1%	0.1%	100%
Least deprived	86.7%	13.2%	0.1%	100%

Figure A23a: Timing of maternity booking appointment by mother's ethnicity (excluding White for ease of interpretation), appointments January to June 2017

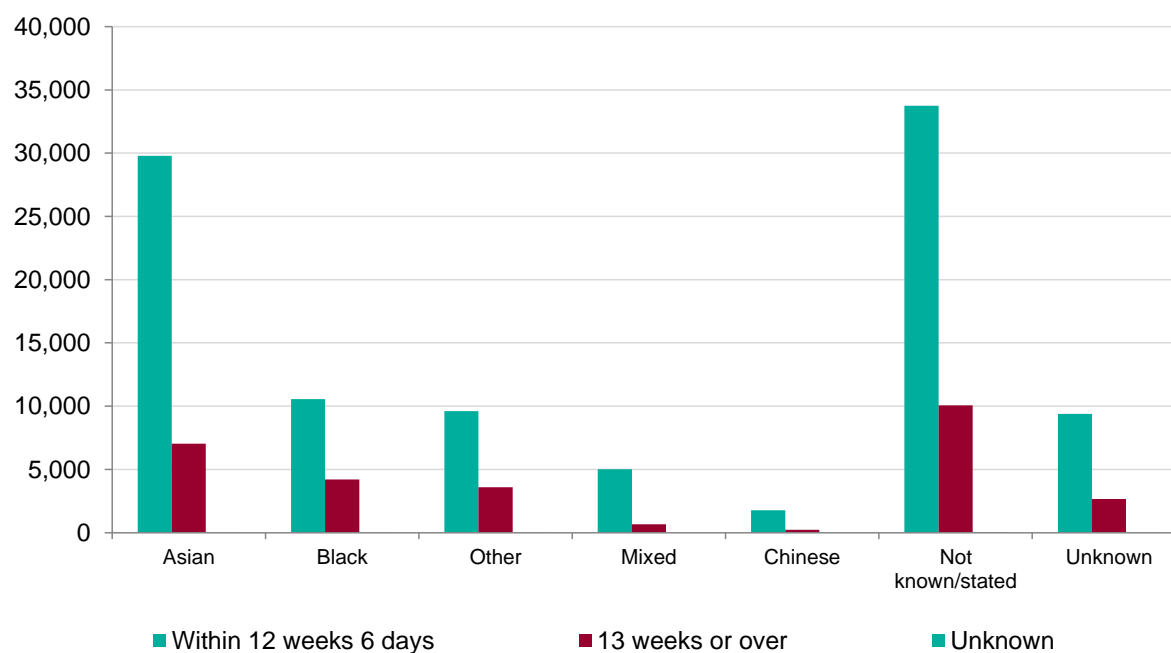


Table A23a: Timing of maternity booking appointment by mother's ethnicity, appointments January to June 2017

Ethnicity	Within 12 weeks 6 days	13 weeks or over	Unknown
Asian	29,795	7,030	35
Black	10,555	4,210	10
Other	9,600	3,595	5
Mixed	5,020	655	0
Chinese	1,765	225	0
Not known/stated	33,745	10,070	40
Unknown	9,385	2,665	10
White (not shown on chart)	224,835	39,305	220

Figure A23b: Timing of maternity booking appointment by mother's ethnicity, appointments January to June 2017 (as proportion of total in ethnic group)

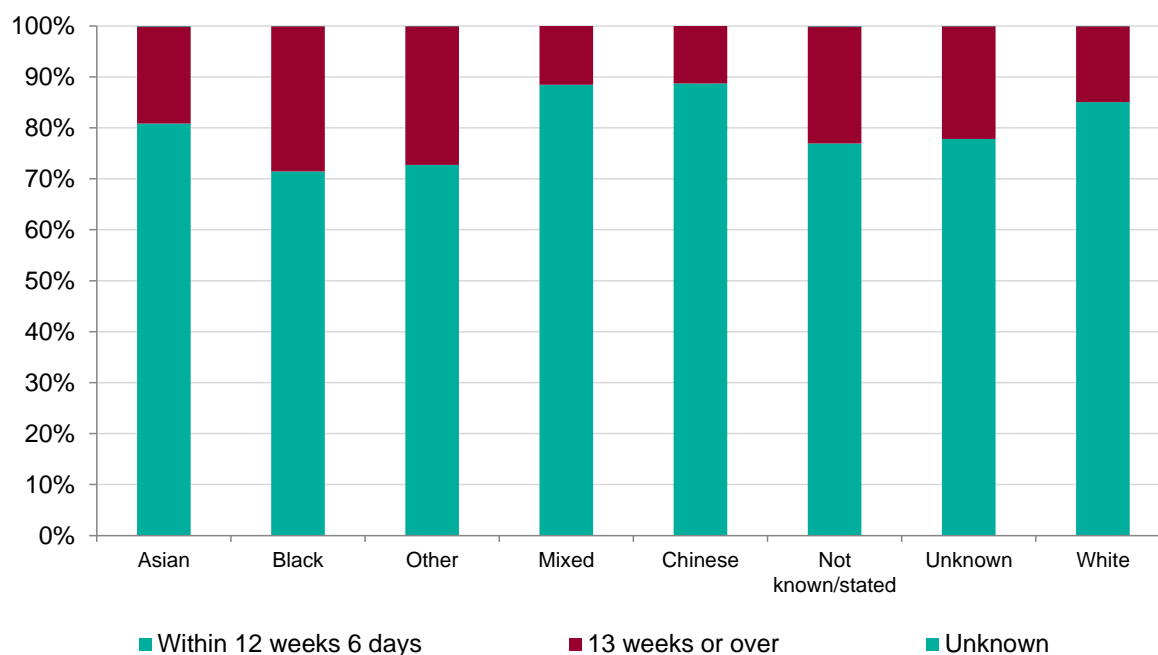


Table A23b: Timing of maternity booking appointment by mother's ethnicity, appointments January to June 2017 (as proportion of total in ethnic group)

Ethnicity	Within 12 weeks 6 days	13 weeks or over	Unknown	All timing categories
Asian	80.8%	19.1%	0.1%	100%
Black	71.4%	28.5%	0.1%	100%
Other	72.7%	27.2%	0.0%	100%
Mixed	88.5%	11.5%	0.0%	100%
Chinese	88.7%	11.3%	0.0%	100%
Not known/stated	76.9%	23.0%	0.1%	100%
Unknown	77.8%	22.1%	0.1%	100%
White	85.0%	14.9%	0.1%	100%

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