Contents

Introduction ........................................................................................................................................... 2
Main points ............................................................................................................................................ 4
Results and Commentary .................................................................................................................. 5
NRS birth registrations and SMR02 .................................................................................................. 5
Maternal age ......................................................................................................................................... 8
Maternal smoking at booking .............................................................................................................. 10
Maternal BMI at booking .................................................................................................................. 14
Maternal time to first booking appointment ....................................................................................... 17
Method of delivery ........................................................................................................................... 20
Baby gestation .................................................................................................................................... 23
Baby birthweight ............................................................................................................................... 25
Baby admission to neonatal care ....................................................................................................... 26
References .......................................................................................................................................... 27
Glossary ................................................................................................................................................ 31
List of Tables ....................................................................................................................................... 32
Contact ............................................................................................................................................... 33
Further Information ........................................................................................................................... 33
Rate this publication ........................................................................................................................... 33
Introduction

The health of a pregnant woman and her baby are closely linked and are influenced by a number of different factors during pregnancy, childbirth and the early period after a baby is born. These include the mother’s social and economic circumstances, her previous health and current health related behaviours such as diet, exercise and smoking, and the medical care provided.

This publication presents data for the year ending 31 March 2017 in relation to a number of measures relating to pregnancy, childbirth and the early care of babies born in Scotland:

- Live births and stillbirths.
- Maternal age.
- Maternal smoking at booking.
- Maternal Body Mass Index (BMI) at booking.
- Time to first booking.
- Method of delivery.
- Gestation and birthweight at delivery.
- Admission to neonatal care.

Scottish policies relating to maternal and neonatal care

Interested individuals may wish to read more on Scottish policies and reviews which are of relevance to maternal and neonatal care. These include the following:

- Chief Medical Officer for Scotland Annual Report 2015/16, Realising Realistic Medicine [http://www.gov.scot/Publications/2017/02/3336]

Information used in this publication

The data presented here are mainly obtained from the Scottish Morbidity Record 02 (SMR02) submitted by maternity hospitals to the Information Services Division (ISD). A wide range of information is collected on the SMR02 - some of which is detailed below:

- Mother - age, height, weight, smoking history and previous obstetric history.
- Birth - induction, analgesia, method of delivery and outcome.
- Baby - sex, Apgar score, gestation and weight.

Although there is no legal requirement to submit these data to ISD, the level of submission falls only slightly short of the known total number of births registered by National Records of Scotland (NRS) each year. Further details on SMR02 are provided in the NRS birth registrations and SMR02 section in this publication.

Data for the most recent time period (1 April 2016 to 31 March 2017) were reported to be 99% complete at a national level at the time the data were extracted for the publication. Historically, births recorded on SMR02 represent approximately 98% of the births recorded by NRS. Some of this shortfall will be due to data on home births not being available from SMR02.

Unless stated otherwise, all charts presented in this report are sourced from SMR02, with data for financial year 2016/17 being considered provisional. Home births and births at non-NHS
hospitals are excluded. Where four or more babies are involved in a pregnancy, birth details are recorded only for the first three babies delivered. Further information on data and tables presented in this report can be found in the downloadable technical document.

Interactive Visual Content
For the second time in this publication we have included some interactive visual content for viewers in the Births in Scottish Hospitals Dashboard. Information on live births is presented over time, by deprivation area, maternal age group, smoking status, gestation and method of delivery. We would welcome any feedback on this visual content.

Changes to the publication for 2016/17
ISD is committed to producing information that best meets the needs of our customers. We have made a number of changes to our 'Births in Scottish Hospitals' publication and associated resources this year including the following:

- Providing more interactive visual content.
- Providing supporting summary data tables in a more consistent format.
- Providing additional detailed supporting data tables in a format so that interested individuals can perform their own analyses.
- Providing more background information for a variety of users including members of the public.
- Providing more referenced sources of evidence and data intelligence.
- Providing more sources of additional information which the public may find useful.
- No longer publishing data on miscarriages as these data are incomplete and are of low clinical value.
- No longer publishing data on maternal smoking at health visitor's first visit
- Technical information such as details of data sources, data quality, changes in methodology and metadata will be provided in a separate technical supporting document.

We welcome any comments on the changes we have made to the published data, visual dashboard or any other suggestions for improvements. If you wish to be involved please email nss.isdmaternity@nhs.net by 31 March 2018.
Main points

- Deprivation continues to influence the health of mothers and babies across Scotland. In 2016/17 mothers from deprived areas were more likely to smoke, be overweight or obese, book late for antenatal care and deliver their babies early compared to mothers from less deprived areas. Although there is evidence of a narrowing in the inequalities gap for smoking over time, the gap is increasing for maternal Body Mass Index (BMI).

- Fewer women are smoking in pregnancy. In 2016/17 the percentage of women who were current smokers at the time of their antenatal booking appointment was 15%, down from 29% in 1997/98.

- More mothers are overweight or obese. In 2016/17 fewer than half of pregnant women (45%) had a BMI within the healthy range at their booking appointment and more than half (51%) were overweight or obese.

- Caesarean sections continue to increase. In 2016/17 the percentage of live singleton babies delivered by caesarean section was 32%, up from 9% in 1975/76.

- Preterm multiple births are increasing while preterm singleton births show little change. In 2016/17 6% of singleton babies and 68% of babies from a multiple pregnancy were born preterm.
Results and Commentary

NRS birth registrations and SMR02
In Scotland, births are recorded in different ways. Any birth which occurs in Scotland must be registered within twenty-one days by the Registrar of Births, Deaths and Marriages. This is the civil registration system administered by the National Records of Scotland (NRS) and is a legal requirement, therefore NRS numbers give the most reliable and accurate measure of the number of births in Scotland. In addition, when a mother is discharged from hospital after delivering a baby, a record containing information on the pregnancy and birth is completed by the hospital and sent to Information Services Division (ISD) who have collected this information since 1975. These records are called Scottish Morbidity Record 02 (SMR02) records.

In contrast to civil registrations, there is no legal requirement to submit these records to ISD, however usually the numbers of births recorded on NRS and SMR02 are very similar. Comparing the birth numbers between the two sources of data can be very useful to assess the quality and completeness of the SMR02 data that we receive in ISD. There will, however, be differences between the two numbers, for reasons such as the fact that SMR02 only records births which have taken place in an NHS setting and not home births.

Both live and stillbirths are recorded on NRS and SMR02. A stillbirth is the birth of a baby who is born without any signs of life after 24 weeks of pregnancy. A baby may have died during late pregnancy or, more unusually, a baby may have died during labour or birth. Around a half of all stillbirths are linked to placental complications. This means that for some reason the placenta (the organ that links the baby’s blood supply to the mother’s and nourishes the baby in the womb) isn’t functioning properly.

About 10% of stillborn babies have some kind of birth defect that contributed to their death. A small percentage of stillbirths are caused by problems with the mother’s health, for example pre-eclampsia, or other problems, including cord accidents and infections. There are also a number of things that may increase the risk of having a stillborn baby, including:

- Having twins or a multiple pregnancy.
- Having a baby who doesn't reach his or her growth potential in the womb.
- Being over 35 years of age.
- Smoking, drinking alcohol or misusing drugs while pregnant.
- Being obese (having a body mass index (BMI) of 30+).
- Having some pre-existing physical health conditions.

Although not all stillbirths can be prevented, it is important that we measure the number of stillbirths in Scotland over time and try to reduce these as much as we can.

In 2016/17 in Scotland there were 53,524 recorded live births on SMR02 and 54,199 recorded live births on NRS.

Numbers of both SMR02 and NRS recorded live births have fallen by approximately 2% when compared with 2015/16, which continues the trend of decreasing live births in Scotland since the last peak in 2009. There were 696,271 live births in England and Wales in 2015/16, a decrease of 0.2% from 2014/15.
The numbers of recorded stillbirths, however, rose in 2016/17 on both NRS and SMR02 with total numbers of 232 and 209 respectively. For NRS data this was the second year of an increase in recorded stillbirth numbers. As there are many potential causes and contributing factors to stillbirths it isn’t yet clear which may be contributing to this very recent increase. The number of stillbirths in England and Wales fell by 1.1% to 3,112 in 2015/16, from 3,147 in 2014/15\(^2\). The 2016/17 stillbirth numbers for England and Wales have not yet been reported.
Data quality for live births on SMR02 tends to be good. In Scotland in 2016/17, all NHS Boards achieved greater than 95% recording of live births on SMR02 as a percentage of the number on NRS (Table 1.3). However, the recording of stillbirth numbers on SMR02 is more variable across Boards (Table 1.4).

Further information on stillbirth is available at: [https://www.nhsinform.scot/illnesses-and-conditions/pregnancy-and-childbirth/stillbirth](https://www.nhsinform.scot/illnesses-and-conditions/pregnancy-and-childbirth/stillbirth)

Further information on NRS v SMR02 is available in Table1.
Maternal age

The age at which women have their first baby has been gradually increasing in Western countries\(^3\). This is important because we know that having a baby at an older maternal age is associated with a number of adverse outcomes for both mother and baby including a greater risk of premature birth, stillbirth, caesarean section and higher neonatal mortality\(^3\).

In 2016/17 in Scotland overall, the trend towards women having their first baby at an older age continued, with increasing numbers of maternities in those mothers over 30 years of age (28,273; 53%) and decreasing numbers to those under 30 (24,654; 47%) when compared with the previous year (Table 2.1).

The National Maternity and Perinatal Audit (NMPA) is a national audit of the NHS maternity services across all of England, Scotland and Wales. The 2017 report from the NMPA (which looks at births for the year ending 31 March 2016) showed that, overall, the median age of women in Britain having their first baby was 28 and varied across regions, with the highest median ages in the Southern regions of England. In Britain, 52.5% of women giving birth in this year were aged 30 or more, a slightly lower proportion overall than the 2016/17 figures for Scotland alone (53.4%)\(^4\).

Maternal age at first birth is also associated with the sort of area mothers live in. In Scotland, we use the Scottish Index of Multiple Deprivation (SIMD) to identify areas with higher or lower levels of deprivation by combining several different aspects of deprivation into a single index. Concentrations of deprivation are identified in SIMD at Data Zone level and can be analysed using this small geographical unit. By identifying areas where there are concentrations of multiple deprivation, the SIMD can be used to target policies and resources at the places with greatest need. The SIMD identifies deprived areas, not deprived individuals.

In Scotland in 2016/17, more births continue to occur in women from the most deprived areas (deprivation categories 1-2, 24,548; 46% of maternities versus categories 4-5, 18,637; 35% of maternities) (Table 2.2). The peak maternal age at first birth is also substantially lower in the most deprived areas (age 23), than in the least deprived areas (age 31).

**Figure 3: Number of maternities by maternal age at first birth and deprivation category\(^1\), Year ending 31 March 2017**

1. Scottish Index of Multiple Deprivation (SIMD). Appropriate SIMD for year has been used (further information in technical document).
Data Quality on SMR02 for maternal age is excellent, with no missing data in 2016/17 (Table 2.1). In terms of deprivation scoring, data quality continues to improve year on year with only 0.2% of maternities unable to be assigned a SIMD rank in 2016/17 (Table 2.2).

The pattern of increasing maternal age over time is important in terms of service planning, as older mothers are at greater risk of complications and surgical interventions during pregnancy and childbirth. Early education of women of reproductive age in terms of the risks associated with later maternities is also vital so that they can take this into consideration when planning timing of their pregnancies.

Further information on maternal age is available in Table 2.
Maternal smoking at booking

Smoking during pregnancy can cause serious health problems for both mother and baby. These include: complications during labour and an increased risk of miscarriage, premature birth, stillbirth, low birthweight and sudden unexpected death in infancy\textsuperscript{5}. Given the maternal and fetal risks associated with smoking during pregnancy, pregnant women are strongly advised not to smoke\textsuperscript{6}. Known risk factors for smoking during pregnancy include young maternal age and lower socioeconomic status\textsuperscript{7}.

Smoking behaviour in pregnancy is collected at a woman's first antenatal booking appointment which usually takes place within the first three months of pregnancy. These booking appointments take place either at hospital or in the community and are recorded on the Scottish Woman Held Maternity Record, with data being subsequently transcribed onto the SMR02. Women are asked about their smoking history; however, a more reliable measure can be obtained by carbon monoxide breath testing to encourage accurate reporting. Carbon monoxide is a poisonous gas which you can't see or smell and is dangerous to both the mother and the baby. National guidelines recommend that all women are offered carbon monoxide testing during pregnancy. Monitors are used to establish how much carbon monoxide is in the body and it is measured through a quick and simple breath test. In smokers, or those exposed to high levels of second hand smoke, carbon monoxide levels will be higher. Midwives will discuss the result with the woman and where applicable will refer her on to support from the stop smoking services.

Over the past 2 decades, smoking among pregnant women has declined by about 60–75\% in developed countries\textsuperscript{8}. However, generally Scotland reports higher rates of smoking during pregnancy than many of our European counterparts. The Euro-Peristat Network was established in 1999 to produce perinatal data in relation to selected indicators from European countries in order to facilitate comparison and learning in order to improve outcomes for mothers and babies.

Euro-Peristat now has official representation from 29 European countries. The most recent Euro-Peristat Perinatal Health Report (2010)\textsuperscript{9} showed smoking during pregnancy or in the last trimester varied from under 5\% in Lithuania and Sweden to 14\% in Catalonia, 15\% in Northern Ireland, 16\% in Wales, 17\% in France, and 19\% in Scotland (at the time). More recent data from the NMPA report for the year 2015/16 reported that, of women whose smoking status at booking was recorded, 14\% were smoking at the time of booking in England, 16\% in Scotland and 18\% in Wales\textsuperscript{4}.

In Scotland, the number of women who are recorded as current smokers at the time of their booking appointment has steadily decreased year on year since 1998 (Table 3.1). In 2016/17 the proportion of women who were current smokers at the time of their booking appointment continued to decrease (7,809; 15\%) and in keeping with this, the proportion of women who had never smoked continued to increase (37,923; 72\%).
We have to remember, however, that smoking status at antenatal booking is also related to the age of the mother, being more common in younger than older women. As we know from the earlier data presented, in Scotland over time women are having their first babies later in their lives so correspondingly fewer will be smokers. Overall though, smoking behaviour has actually declined again across all age groups in 2016/17 (Table 3.2).

There is also a strong relationship between a mother’s deprivation area and smoking as shown in Figure 6 (below). Women who live in areas with a higher deprivation score are still more likely to be current smokers in 2016/17, but we can also observe that smoking behaviour has decreased in mothers across all deprivation areas over time. In fact, smoking behaviour has declined more in those areas of higher deprivation, which means that although a clear gradient still exists in terms of smoking and deprivation, the gap between the most and least deprived has actually become smaller over time.
It should be noted, however, that there are issues with data related to smoking in pregnancy which may affect the overall accuracy and quality of national figures. Firstly, smoking status is largely based on a verbal report from pregnant women which may be influenced by the negative perception of smoking in pregnancy. Secondly, although the numbers of women for whom smoking status is ‘unknown’ has decreased over the last 7 years, prior to this there were larger and more variable amounts of ‘missing’ data which may make long term trends more difficult to interpret with certainty. Finally, even in 2016/17 there remains variability across NHS Boards in Scotland in terms of data completeness for smoking status at booking.

Wider policies to control tobacco use, e.g. banning smoking in public places, are likely to have had an impact on the numbers of women smoking both before and during pregnancy. In terms of possible additional interventions to further reduce the levels of smoking during pregnancy, the National Institute for Health and Care Excellence (NICE) have produced a guideline which covers support to help women stop smoking during pregnancy and in the first year after childbirth. It includes identifying women who need help to quit, referring them to stop smoking services and providing intensive and ongoing support to help them stop.

The guideline also advises how to tailor services for women from disadvantaged groups in which smoking rates are high. Effective interventions listed in the guideline include:

- Cognitive behaviour therapy.
- Motivational interviewing.
- Structured self-help and support from NHS Stop Smoking Services.

In addition, in other countries the provision of incentives to quit has been shown to be effective with this group (research is required to determine whether it would work in the UK). The guideline reports mixed evidence on the efficacy of nicotine replacement therapy in helping smoking cessation in pregnant women and in preventing adverse fetal outcomes.

Further information is available for the public on smoking during pregnancy. The Royal College of Obstetricians and Gynaecologists (RCOG) have produced a helpful patient information sheet about smoking in pregnancy and NHS Inform also have helpful information for those...
wanting help to stop smoking\textsuperscript{13}. Finally, NHS Health Scotland also have a specific ‘I Quit’ booklet for women who want to stop smoking during pregnancy: 
\url{http://www.healthscotland.com/documents/26973.aspx}.

Further information on maternal smoking is available in Table 3.
Maternal BMI at booking

BMI stands for Body Mass Index, and is one of the most widely used methods to assess body composition in adults. It is calculated by dividing an individual’s weight (in kilograms) by their height (in metres) squared and gives an indication of whether weight is in proportion to height or whether a person is likely be over or underweight.

In adults there are specified ‘cut off’ values for BMI which indicate whether a person is underweight (<18.5), healthy weight (18.5-24.9), overweight (25-29.9) or obese (30+). As a mother’s height and weight have been routinely recorded on SMR02 since 2011, we can calculate the BMI of pregnant women. This is important because obesity in pregnancy is associated with an increased risk of a number of serious adverse outcomes, including miscarriage\(^\text{14}\), birth defects\(^\text{15}\), thromboembolism\(^\text{16,17}\), gestational diabetes\(^\text{18}\), pre-eclampsia\(^\text{19}\), dysfunctional labour\(^\text{20}\), postpartum haemorrhage\(^\text{18}\), wound infections\(^\text{18}\), stillbirth\(^\text{21,22}\), and neonatal death\(^\text{22-24}\). There is a higher caesarean section rate\(^\text{25}\) and lower breastfeeding rate\(^\text{26}\) in this group of women compared to women with a healthy BMI. There is also evidence to suggest that obesity may be a risk factor for maternal death\(^\text{27}\). Increasing maternal age and deprivation are both known to be risk factors for a higher maternal BMI\(^\text{28,29}\).

Over recent years, there have been national and international trends of increasing maternal BMI\(^\text{24-27}\) (from NMPPA). The Euro-Peristat Perinatal Health Report (2010)\(^\text{9}\) which published data on pre-pregnancy BMI in European women found Scotland to have one of the lowest proportions of underweight women at booking at 2.6%. The proportion of overweight or obese women in contributing countries was typically about 30-37% but it was much higher in Scotland, where it reached 48% and Scotland also had the highest proportion of obese women at 21%.

In keeping with this the NMPA data from 2015/16 reported that, in Britain overall, fewer than half of pregnant women had a normal BMI at booking (47%). By contrast, 21% of women had a BMI of 30 or over. This high level of maternal obesity has implications for maternity and neonatal service provision. In the NMPA report the proportion of women who were obese (BMI of 30 or over) and morbidly obese (BMI of 40 or over) differed between the three countries with Scotland between England and Wales with a median BMI of 25, 23% of women classified as obese and 3% of women as morbidly obese at booking\(^\text{4}\).

In Scotland, in 2016/17, overall 2.7% of women delivering were known to be underweight at the time of booking, 45% were healthy weight, 27% were overweight and 23% were obese (with the remaining 1.9% having an unknown body mass index) (Table 4.1). The proportion of women known to be underweight, healthy weight, overweight or obese was broadly consistent between NHS Boards (Table 4.4).

In keeping with other countries, the risk of unhealthy weight varied by maternal age in Scotland in 2016/17 (Table 4.2). The proportion of women who were overweight or obese ranged from 36% in women under 20 years old to 59% in women who were aged 40 or above. Although the relationship between age and BMI has remained fairly stable in Scotland over the last 4 years in women aged 40 or over, there has been a consistent creeping increase in the proportion of overweight and obese women in all the age groups under 40.
In 2016/17 the relationship between maternal BMI and deprivation score continued in Scotland (Table 4.3). In 2016/17 the proportion of women overweight or obese at the time of antenatal booking ranged from 44% in the least deprived areas to 56% in the most deprived areas. Furthermore, although the proportion of women who were overweight or obese has increased in all deprivation categories year on year since 2014, the increase has been steeper in women from the most deprived areas hence we are seeing a widening of the deprivation gap related to maternal BMI over time rather than a narrowing.

Data quality for maternal BMI in Scotland has improved markedly from 2014 onwards as the proportion of those women recorded with an ‘unknown’ BMI dropped. (Table 4.1) However,
differences remain in 2016/17 in terms of the amount of missing data according to NHS Board (Table 4.4).

Obesity levels in the general population are rising and a complex response is required across many levels and sectors to address this, as described in the Scottish Government’s Obesity Strategy: [http://www.gov.scot/Publications/2010/02/17140721/0](http://www.gov.scot/Publications/2010/02/17140721/0). Furthermore, the Scottish Government have also published a framework for improving maternal and infant nutrition: [http://www.gov.scot/Publications/2011/01/13095228/0](http://www.gov.scot/Publications/2011/01/13095228/0).

Given the risks for both mother and baby associated with rising BMI, the RCOG have published guidance on the management of women with obesity in pregnancy\textsuperscript{30}. This joint guideline with the Centre for Maternal and Child Enquiries (CMACE) assesses the quality of evidence and provides guidance on pre-pregnancy care, antenatal care, risk assessment, planning childbirth, care during childbirth and postnatal care.

Members of the public wishing to read more about obesity in general may find the webpages of the Scottish Public Health Observatory helpful\textsuperscript{31}. Furthermore, the RCOG have produced a patient leaflet specifically related to BMI and pregnancy\textsuperscript{32}. Finally, NHS Health Scotland have information for women on keeping fit and healthy and eating well during pregnancy as part of the ‘Ready, Steady, Baby’ resource: [http://www.readysteadybaby.org.uk/you-and-your-pregnancy/looking-after-yourself-during-pregnancy/index.aspx](http://www.readysteadybaby.org.uk/you-and-your-pregnancy/looking-after-yourself-during-pregnancy/index.aspx).

Further information on maternal BMI is available in Table 4.
Maternal time to first booking appointment

Antenatal care is the care a woman receives from healthcare professionals during her pregnancy. Women are offered a series of appointments with a midwife, or sometimes with a doctor who specialises in pregnancy and birth (an obstetrician). Many women will now initially test for pregnancy at home, and then make an appointment with a midwife (or occasionally their GP) when they have a positive pregnancy test. At this first appointment women will usually be given information on keeping healthy during pregnancy, and the person seeing them may also ask questions about whether they have had any previous health or pregnancy issues.

The next appointment a woman usually has is when she is 8-12 weeks pregnant and this is called the booking appointment. It lasts for up to two hours, and could take place either at a hospital or in the community, for example in a clinic at a health centre or GP surgery. At this point most women see a midwife but some may see a doctor, and they are also usually offered an ultrasound scan. The booking appointment is important for giving women further information about how they can keep themselves and their baby healthy during pregnancy, and to help them plan labour and birth. It is also the time when certain antenatal screening tests are offered.

The National Institute for Health and Care Excellence (NICE) guideline on antenatal care recommends that the booking appointment should ideally take place before 10 weeks and current policy supports this. The main rationale behind these recommendations is to allow women to participate in antenatal screening programmes for certain blood disorders (haemoglobinopathies) and Down's syndrome in a timely fashion, to have their pregnancies accurately dated using ultrasound scan, to allow the early detection of any risks for mother and baby, and to develop a plan of care for the pregnancy which sets out the number of visits required and additional appointments that may need to be made.

Access to high quality, relationship-based antenatal care with a strong focus on prevention, promotion of health, early intervention and support as early as possible in pregnancy is therefore vitally important. Pregnant women with complex social factors are known to book later, on average, than other women and young women aged under 20 are also more likely to book ‘late’ for antenatal care. This may be for a variety of reasons, including not realising that they are pregnant, or taking time to come to terms with a pregnancy. For those women in more difficult circumstances, prioritising other issues such as housing/homelessness or income may make attending appointments and maintaining contact with services hard. Late booking is known to be associated with poorer outcomes for mothers and babies.

For these reasons, ‘early access to antenatal services’ is currently being used by the Scottish Government as a Local Delivery Plan (LDP) standard. LDP standards are priorities that are set and agreed between the Scottish Government and NHS Boards. The ‘early access to antenatal services’ standard states that at least 80% of pregnant women in each deprivation area, based on the Scottish Index of Multiple Deprivation (SIMD), will have booked for antenatal care by the 12th week of gestation.

In 2016/17, the Scottish LDP standard was again met at the national level. Overall, 89% of women in Scotland booked before 12 weeks (Table 5.1) and the lowest performance in any deprivation area at the national level was 87% (ie 87% of pregnant women in the most deprived areas had booked for antenatal care by the 12th week of gestation for the year ending March 2017).
Figure 9: Antenatal bookings within 12 weeks by deprivation category\textsuperscript{1, 2}, Year ending 31 March

Furthermore, in 2016/17 all NHS Boards reported that more than 80\% of their antenatal bookings took place by the 12\textsuperscript{th} week of pregnancy (Table 5.4). It’s clear, however that there is still work to do in this area given that women from the most deprived areas remain the least likely to book early.

Overall, data quality in Scotland for booking appointment timings is good and has improved greatly over the last 4 years. In 2016/17 only 0.9\% of SMR02 returns had an unknown booking date (Table 5.1). There does, however, remain some variation between NHS Boards in terms of incomplete data (Table 5.4). In terms of where Scotland sits in relation to other countries on timeliness of the booking appointment, the most recent Euro-Peristat Perinatal Health Report (2010)\textsuperscript{9} confirms that although the vast majority of women began care before 15 weeks, care began later than this for between 2\% and 33\% of women from contributing countries at that time.

NICE have published a guideline which offers best practice advice on the care of pregnant women with complex social factors, including elements of deprivation such as poverty and homelessness\textsuperscript{37}. Amongst the general recommendations are:

- Women with complex social factors presenting for antenatal care should be asked about their satisfaction with the services provided, and these responses used to guide service development.
- For women who do not have a booking appointment at the first contact with any healthcare professional:
  - discuss the need for antenatal care.
  - offer the woman a booking appointment in the first trimester, ideally before 10 weeks.
- At the first contact and at the booking appointment, ask the woman to tell her healthcare professional if her address changes, and ensure that she has a telephone number for this purpose. Also, give the woman a telephone number to enable her to contact a healthcare professional outside of normal working hours.

\textsuperscript{1} Deprivation in Scotland is based on SIMD Scotland quintiles.
\textsuperscript{2} SIMD based on datazone populations has been used for consistency with other Scottish Government targets.
In terms of trying to increase the numbers of very young women accessing antenatal care early, there is review-level evidence to suggest that attitudes of staff can act as a barrier for young people to access reproductive and sexual health, antenatal and maternity services\textsuperscript{38-41}. Review-level evidence and WHO and NICE guidance suggest that staff training is a key factor in successful delivery of reproductive and sexual health, antenatal and other service provision for young people\textsuperscript{37, 42-45}.

The NICE clinical guideline mentioned above also recognises the need for many young pregnant women to access a range of services across health and social care and highlights the importance of effective communication between agencies to ensure women have their needs met through best use of all available services and support\textsuperscript{37}. The guidance recommends:

- Local data is used to tailor services to meet the needs of pregnant women with complex social factors (including pregnant young women).
- Young pregnant women are involved in the development of antenatal care through monitoring their experience of care and engaging them in determining local needs and how these may be met.
- Partnership working with local education authorities and third sector organisations to contribute to improved access to and continuing contact with antenatal services.

Further information about antenatal care and appointments can be found on the NHS Inform website\textsuperscript{33} and further details about the Scottish early access to antenatal services LDP can be found on the ‘Scotland Performs’ Antenatal LDP webpage\textsuperscript{36}. Younger parents and their families can also find more information in the Scottish Governments Pregnancy and Parenthood in Young People Strategy\textsuperscript{46}.

Further information on maternal booking appointment is available in Table 5.
Method of delivery

When giving birth, women may give birth vaginally without surgical intervention, vaginally but with obstetric instruments to help remove the baby (forceps or suction/ventouse) or the baby may be removed operatively through the woman’s abdomen via a caesarean section. Emergency delivery during labour occurs either by caesarean section or with the assistance of an instrument. Indications for emergency delivery include prolonged labour, concern about the wellbeing of the baby, and maternal illness. An elective caesarean section refers to a caesarean section which has been planned in advance and is usually carried out before labour starts. In many cases it will have been recommended for clinical reasons such as breech, multiple births or previous caesarean section. It may also be the case that the woman will have chosen this method of delivery for non-clinical reasons.

A substantial rise in ‘obstetric intervention’ (ie instrumental deliveries and caesarean sections) has been seen in most developed countries since the 1970’s and is a continuing cause for concern\(^\text{47-49}\). Caesarean sections are effective in saving maternal and infant lives, but only when they are required for medically indicated reasons (see the WHO statement on caesarean section rates: [http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/)).

Spontaneous vaginal birth is associated with better outcomes for both mother and baby than instrumental or caesarean birth\(^\text{15, 47}\). Consequences of the rise in caesarean rates in both high and middle income countries include elevated risks of serious problems for the mother such as anaesthetic risk, wound infection, placental problems, and issues with delivery in subsequent pregnancies. Several factors have been cited as possible explanations for the increase in caesarean sections, including fear of litigation, women’s requests for caesarean births\(^\text{52}\), and the perception that a caesarean section is a safe procedure\(^\text{53}\). Countries also vary in their use of operative vaginal delivery, either with forceps or vacuum extraction\(^\text{48}\).

The Europeristat report from 2010 demonstrated that mode of delivery showed marked variations across European countries, with relatively low levels of interventions in Slovenia, the Nordic countries, and the Netherlands, and higher levels in the more southern countries. There were also considerable differences in the relative contribution of caesarean sections and operative vaginal deliveries to the overall rate of operative births. Equally marked differences were apparent between rates of caesarean sections where the decision was made or the caesarean undertaken before labour\(^\text{9}\).

This variation in rates of operative deliveries between countries was again highlighted in the more recent NMPA report for 2015/16\(^\text{4}\). For singleton babies with a normal presentation there were differences in the proportions of women in England, Scotland and Wales who had spontaneous, instrumental or caesarean deliveries. In this report, Scotland had an overall rate (for all women giving birth that year) of 8% for elective caesarean sections and the highest rate of instrumental delivery of all the three nations. Caesarean sections in women having their first baby were also high for Scotland at 20% although this included both emergency and elective sections.

It is because of these variations in practice, and the potential health consequences for both mother and baby that we record method of delivery and measure the numbers of operative interventions. However because operative delivery, especially caesarean section, may increase the risk of repeated operative delivery in subsequent pregnancies, it is useful to compare caesarean section rates among women in their first pregnancies. Furthermore, as a pregnancy containing more than one baby can also increase the risk of operative delivery, we
tend to measure the rates of intervention in singleton pregnancies. Further details on the classification of caesarean sections may be found at the following links:
http://www.perinatal.nhs.uk/reviews/cs/cs_classification.htm
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0097769

Other known risk factors for operative delivery in pregnancy include the following:
- Older maternal age\textsuperscript{54}
- Increased maternal BMI\textsuperscript{55}
- Heavier infant birthweight\textsuperscript{54}
- Long labour\textsuperscript{54}

For singleton births in Scotland, the percentage of normal vaginal (spontaneous cephalic) deliveries has fallen steadily from 76\% in 1975/76 and has decreased again in 2016/17 to 56\% (Table 6.1). This is shown in Figure 10 (below) which also demonstrates that, in 2016/17, the percentage of women delivering by elective caesarean section increased again, as did the percentage of women who had an induction of delivery.

\textbf{Figure 10: Live singleton births by method of delivery, Year ending 31 March}

For the year 2016/17, the data from Scotland also show the expected pattern of increasing caesarean deliveries with increasing maternal age (Table 6.2) however in all age groups there has been an increasing trend over time to a greater proportion of caesarean sections.
Women from all areas of deprivation also display an increasing proportion of caesarean sections over time, although there does not appear to be a large deprivation gradient associated with caesarean section delivery over recent years (Table 6.3).

Data quality for method of delivery appears to be very good, with data missing for this variable only rarely on SMR02 returns (Table 6.4). However, there appears to be considerable variation across NHS Boards in terms of method of delivery (Table 6.4), which is unlikely to be fully explained by differences in patient populations between Boards. This warrants further investigation to understand and seek to reduce any unnecessary geographical variation in method of delivery for women across Scotland.

The RCOG have published a guideline on operative vaginal delivery which suggests some relative indications for operative vaginal delivery, but also a number of measures which may help to reduce operative vaginal delivery rates:\textsuperscript{56}

Furthermore, NICE have also produced a clinical guideline in relation to caesarean section evidence-based information for healthcare professionals and women which includes information on specific indications for caesarean section, effective management strategies to avoid caesarean section and organisational and environmental factors that affect caesarean section rates:\textsuperscript{57}

Members of the public seeking further information about modes of delivery may wish to consult the following patient information:

- Choosing to have a caesarean section (RCOG).\textsuperscript{58}
- An assisted vaginal birth (ventouse or forceps) (RCOG).\textsuperscript{59}
- Induction of labour: information for the public (NICE).\textsuperscript{60}

Further information on method of delivery is available in Table 6.
Baby gestation

Gestation refers to the number of weeks pregnant a woman is when she delivers her baby. Babies are ‘due’ at 40 weeks gestation. Babies born between 37 and 41 weeks gestation are considered to be born ‘at term’. Babies born at less than 37 weeks gestation (that is more than 3 weeks before their due date) are considered preterm or premature. Babies born at 42 weeks or over (that is more than 2 weeks after their due date) are considered post-term or over-due.

Gestation at delivery strongly influences babies’ health. Babies born preterm can have multiple difficulties in the days and weeks following their birth and the consequences of being born too early can continue to affect health and development throughout childhood and adult life. In Scotland, being born too soon is the single biggest reason babies require admission to neonatal care and the single biggest cause of death in early infancy. The more preterm a baby is, the higher the risks.

In Scotland, around two thirds of preterm deliveries are unexpected (or ‘spontaneous’) as the mother goes into labour, or her waters break, before 37 weeks gestation. The remaining third of preterm deliveries are ‘non-spontaneous’ as they follow induction of labour or a planned Caesarean section. These non-spontaneous preterm deliveries follow concerns about the health of the baby or mother and a decision that it is safer to deliver the baby than let the pregnancy continue.

Known risk factors for preterm delivery include:

- Maternal poverty, deprivation, and stress.
- Low or high maternal age.
- Maternal smoking.
- Maternal alcohol or drug misuse.
- Maternal under- or over-weight.
- Previous preterm deliveries.
- Multiple pregnancy (twins or more).
- A wide range of maternal health problems and complications or infections arising during the pregnancy.

In 2016/17, 6.4% of singleton babies were born preterm. The preterm birth rate among singletons increased steadily from around 4.5% in the mid-1970s to 6.4% in the mid-2000s then has shown little change since.
In 2016/17, 3.0% of all live births were from a multiple pregnancy of twins or more, up from around 1.8% in the mid-1970s. Babies from a multiple pregnancy are much more likely to be born preterm than singletons. In 2016/17, 68% of babies from a multiple pregnancy were born preterm. The preterm birth rate among multiples is continuing to increase over time, up from around 30% in the mid-1970s.

Preterm birth rates vary widely across the world. Scotland’s rate is similar to that seen elsewhere in the UK and lies midway between that seen in other Western and Northern European countries. The pattern of increasing then (somewhat) stabilising preterm birth rates seen in Scotland has also been seen in many other high-income countries. Underlying reasons are likely to include more women having babies at older ages and increasing use of assisted reproduction techniques such as in vitro fertilisation (IVF) bringing associated increases in multiple births. In addition, developments in maternity and neonatal care have led to increases in non-spontaneous preterm deliveries.

In Scotland, preterm birth rates are highest among mothers in the youngest (<20 years) and oldest (40+ years) age groups. Rates are also higher in mothers from the most deprived areas compared to those from less deprived areas. Reducing the harm arising from preterm birth is an important public health aim. This will involve action across different levels, including:

- Reducing spontaneous preterm birth through population wide actions such as reducing smoking, promoting maternal healthy weight, and minimising the risk of multiple pregnancy associated with assisted reproduction techniques such as IVF.
- Reducing spontaneous preterm birth through additional antenatal care for women at high risk.
- Reducing non-spontaneous preterm birth to the lowest safe level.
- Ensuring that women who are going to deliver preterm receive treatment shown to protect the health of their baby after birth.
- Ensuring that babies born preterm receive high quality neonatal care.

Families affected by the birth of a preterm baby can get information and support from charities such as Bliss (https://www.bliss.org.uk).

Further information on gestation is available in Table 7.
Baby birthweight

Babies weighing between 2500g and 3999g at birth are considered to have a ‘normal’ birthweight. A birthweight of less than 2500g is considered low, and a birthweight of 4000g or more is considered high.

A baby’s weight at birth reflects both their gestation and how well they have grown whilst in the womb. Babies who are both preterm and small for their gestational age are at particular risk of short and long term health problems. Many factors that increase the risk of preterm birth also increase the risk of poor growth in the womb and low birthweight.

In 2016/17, 5.4% of singleton babies had low birthweight. Although the proportion of singleton babies that are born preterm has increased over time as noted in the previous section, the proportion with low birthweight has shown little change since records began in the mid-1970s. This reflects the fact that babies born at any given gestation have got, on average, slightly heavier over recent decades.

High birthweight also carries risks. Particular risk factors for high birthweight include maternal obesity, excessive weight gain during pregnancy, and maternal diabetes. In 2016/17, 13% of singleton babies had high birthweight, up from around 8% in the mid-1970s.

Further information on birthweight is available in Table 8.
**Baby admission to neonatal care**

Babies who are unwell after birth are admitted to a neonatal unit to receive intensive, high dependency or special neonatal care depending on their level of need. Babies who do not require admission to a neonatal unit, but still require some additional care, can receive transitional neonatal care whilst remaining with their mother on a dedicated transitional care ward or a ‘normal’ postnatal ward.

ISD gets information on the number of babies receiving neonatal care from the Scottish Birth Record (SBR) system. SBR provides basic details on healthy babies, and more in depth information on babies receiving neonatal care.

The Scottish Birth Record was introduced in 2002. In general, SBR records are thought to be reasonably complete for babies admitted to neonatal care from around 2004 onwards, and for all babies from around 2010 onwards. Some NHS Boards have recently had difficulty completing their SBR records however. In particular, NHS Forth Valley and NHS Dumfries & Galloway have recorded very little information on babies receiving neonatal care from September and October 2016 respectively. This means that the figures for the number of babies admitted to neonatal care for these areas for 2016/17 are incomplete and should be interpreted with caution. In addition, the recording of transitional care on SBR is likely to be less complete than recording of formal admission to a neonatal unit. Figures for provision of transitional care for all years and all areas should therefore also be interpreted with caution.

In 2016/17, 10.7% of babies were admitted to a neonatal unit and an additional 0.5% were recorded as receiving transitional neonatal care as their highest level of neonatal care. The proportion of babies receiving neonatal care has shown little change over the last 10 years.

Further information on neonatal care is available in **Table 9**.
References

1. NHS Choices: [https://www.nhs.uk/conditions/stillbirth/causes/](https://www.nhs.uk/conditions/stillbirth/causes/)
13. [https://www.nhsinform.scot/healthy-living/stopping-smoking](https://www.nhsinform.scot/healthy-living/stopping-smoking)
37. Pregnancy and complex social factors: a model for service provision for pregnant women with complex social factors. NICE Clinical guideline [CG110] Published date: September 2010 https://www.nice.org.uk/guidance/cg110
38. Cameron, S., Glasier, A., Chen, Z., Johnstone, A., Dunlop, C. and Heller, R. (2012), Effect of contraception provided at termination of pregnancy and incidence of


56. The Royal College of Obstetricians and Gynaecologists. Green Top Guideline ‘Operative Vaginal Delivery’
58. The Royal College of Obstetricians and Gynaecologists. Patient information leaflet. Choosing to have a caesarean section.
59. The Royal College of Obstetricians and Gynaecologists. Patient information leaflet. An assisted vaginal birth (ventouse or forceps).
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>All births</td>
<td>When four or more babies are born, only details about the first three are recorded on SMR02.</td>
</tr>
<tr>
<td>Analgesia</td>
<td>Can be used to relieve pain during labour.</td>
</tr>
<tr>
<td>Antenatal</td>
<td>Occurring before birth.</td>
</tr>
<tr>
<td>Apgar score</td>
<td>The common scoring method of the baby's well being after the birth. It's based on a combination of the heartbeat, respiration, skin colour, muscle tone and movement.</td>
</tr>
<tr>
<td>Delivery</td>
<td>A delivery is a pregnancy resulting in a live or stillbirth.</td>
</tr>
<tr>
<td>Deprivation</td>
<td>The Scottish Index of Multiple Deprivation (SIMD) has seven domains (income, employment, education, housing, health, crime, and geographical access) which have been combined into an overall index, which allows areas to be ranked from most to least deprived.</td>
</tr>
<tr>
<td>Elective caesarean</td>
<td>Caesarean section which has been planned in advance and in most cases will have been recommended for clinical reasons such as breech, multiple births or previous caesarean section. Woman may also choose this method of delivery for non-clinical reasons.</td>
</tr>
<tr>
<td>Full term</td>
<td>If the delivery occurs during or after the 37th week of gestation.</td>
</tr>
<tr>
<td>Gestation</td>
<td>Gestation is the period of time between conception and birth.</td>
</tr>
<tr>
<td>Induction</td>
<td>When labour is started artificially.</td>
</tr>
<tr>
<td>In vitro fertilisation</td>
<td>A method of assisted reproductive technology used to treat infertility.</td>
</tr>
<tr>
<td>Live birth</td>
<td>Where the baby was born breathing or showing other signs of life.</td>
</tr>
<tr>
<td>Low birthweight</td>
<td>Babies with a birthweight of less than 2,500 grams.</td>
</tr>
<tr>
<td>Macrosomic</td>
<td>Babies with an abnormally large body size.</td>
</tr>
<tr>
<td>Maternity</td>
<td>A pregnancy resulting in a live or stillbirth, with multiple births being counted only once.</td>
</tr>
<tr>
<td>Multiple birth</td>
<td>A baby from a pregnancy resulting in more than one live or stillbirth.</td>
</tr>
<tr>
<td>Parity</td>
<td>The number of previous pregnancies resulting in a live or stillbirth.</td>
</tr>
<tr>
<td>Postnatal</td>
<td>Occurring after birth.</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>The period during which a woman is pregnant.</td>
</tr>
<tr>
<td>Preterm</td>
<td>When delivery occurs before the 37th completed week of gestation.</td>
</tr>
<tr>
<td>Singleton birth</td>
<td>A baby from a pregnancy resulting in only one live or stillbirth.</td>
</tr>
<tr>
<td>Stillbirths</td>
<td>The Registration of Births, Deaths and Marriages (Scotland) Act 1965 defines a stillbirth as a child which was born after the 24th week of pregnancy and which did not breathe or show any other sign of life.</td>
</tr>
<tr>
<td>Very low birthweight</td>
<td>Babies with a birthweight of less than 1,500 grams.</td>
</tr>
</tbody>
</table>
# List of Tables

<table>
<thead>
<tr>
<th>Summary Table No.</th>
<th>Name</th>
<th>Time period</th>
<th>File &amp; size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NRS v SMR02</td>
<td>1976 - 2017</td>
<td>Excel [107kb]</td>
</tr>
<tr>
<td>2</td>
<td>Maternal age</td>
<td>1976 - 2017</td>
<td>Excel [77kb]</td>
</tr>
<tr>
<td>3</td>
<td>Maternal smoking</td>
<td>1998 - 2017</td>
<td>Excel [123kb]</td>
</tr>
<tr>
<td>4</td>
<td>Maternal BMI</td>
<td>2011 - 2017</td>
<td>Excel [52kb]</td>
</tr>
<tr>
<td>5</td>
<td>Maternal booking appointment</td>
<td>1998 - 2017</td>
<td>Excel [69kb]</td>
</tr>
<tr>
<td>6</td>
<td>Method of delivery</td>
<td>1976 - 2017</td>
<td>Excel [81kb]</td>
</tr>
<tr>
<td>7</td>
<td>Gestation</td>
<td>1976 - 2017</td>
<td>Excel [97kb]</td>
</tr>
<tr>
<td>8</td>
<td>Birthweight</td>
<td>1976 - 2017</td>
<td>Excel [74kb]</td>
</tr>
<tr>
<td>9</td>
<td>Neonatal care</td>
<td>2008 - 2017</td>
<td>Excel [42kb]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CSV Table No.</th>
<th>Name</th>
<th>Time period</th>
<th>File &amp; size</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1</td>
<td>Female populations</td>
<td>1997 - 2016 (Calendar year)</td>
<td>CSV [49kb]</td>
</tr>
<tr>
<td>10.2</td>
<td>NRS v SMR02</td>
<td>1998 - 2017</td>
<td>CSV [115kb]</td>
</tr>
<tr>
<td>10.3</td>
<td>Births by hospital</td>
<td>1998 - 2017</td>
<td>CSV [1360kb]</td>
</tr>
<tr>
<td>11.1</td>
<td>Maternal parity</td>
<td>1998 - 2017</td>
<td>CSV [2912kb]</td>
</tr>
<tr>
<td>11.2</td>
<td>Maternal booking appointment</td>
<td>1998 - 2017</td>
<td>CSV [3259kb]</td>
</tr>
<tr>
<td>11.3</td>
<td>Maternal BMI</td>
<td>2011 - 2017</td>
<td>CSV [1822kb]</td>
</tr>
<tr>
<td>11.4</td>
<td>Maternal smoking</td>
<td>1998 - 2017</td>
<td>CSV [4348kb]</td>
</tr>
<tr>
<td>11.5</td>
<td>Maternal alcohol consumption</td>
<td>2011 - 2017</td>
<td>CSV [270kb]</td>
</tr>
<tr>
<td>11.6</td>
<td>Maternal drug misuse</td>
<td>2011 - 2017</td>
<td>CSV [54kb]</td>
</tr>
<tr>
<td>12.1</td>
<td>Method of delivery</td>
<td>1998 - 2017</td>
<td>CSV [24772kb]</td>
</tr>
<tr>
<td>12.2</td>
<td>Birthweight and gestation</td>
<td>1998 - 2017</td>
<td>CSV [57118kb]</td>
</tr>
<tr>
<td>12.3</td>
<td>Neonatal care</td>
<td>2011 - 2017</td>
<td>CSV [609kb]</td>
</tr>
<tr>
<td>12.4</td>
<td>Births affected by drugs</td>
<td>2011 - 2017</td>
<td>CSV [92kb]</td>
</tr>
</tbody>
</table>
Contact
Celina Davis
Principal Information Analyst
nss.isdmaternity@nhs.net
0131 275 6199

Stuart Wrigglesworth
Senior Information Analyst
nss.isdmaternity@nhs.net
0131 275 7128

Further Information
Further information can be found in the full Births in Scottish Hospitals Report and the interactive Births in Scottish Hospitals Dashboard. Information on live births is presented over time, by deprivation area, maternal age group and method of delivery.

The Information Services Division publishes a wide range of information on birth, pregnancy and sexual health including teenage pregnancies and terminations of pregnancy in Scotland. Further information can be found on our Maternity and Births and Sexual Health pages.

Rate this publication
Please provide feedback on this publication to help us improve our services.