



The Birthplace in England Research Programme

Background Q&A

What is the Birthplace Research Programme?

The Birthplace in England Research Programme is a multi-disciplinary research programme, jointly funded by the National Institute for Health Research (NIHR) Service Delivery and Organisation programme and the Department of Health Policy Research Programme.

Why was Birthplace carried out?

Birthplace was conducted to fill important gaps in the evidence relating to the availability, safety, organisation and costs of maternity services provided for women in labour in four birth settings: in hospital obstetric units, in midwifery units situated alongside obstetric units in hospital (AMUs), in freestanding midwifery units (FMUs), and at home.

What questions has the research addressed?

The Birthplace research programme addressed a number of questions.

- Are there differences in outcomes for the mother and baby between the different birth settings?
- Are there differences between birth settings in costs and cost-effectiveness?
- How is maternity care currently organised and is this changing?
- What are the organisational features of the maternity care system that may affect quality and safety of care in different settings?

Who carried out the research?

Birthplace was conducted by researchers from the National Perinatal Epidemiology Unit (NPEU) at the University of Oxford together with researchers from King's College London and City University. The Birthplace collaborative group, led by Professor Peter Brocklehurst, included senior academics and clinicians and representatives of various bodies including the Royal College of Midwives and the NCT (formerly National Childbirth Trust).

THE BIRTHPLACE NATIONAL COHORT STUDY

What is the Birthplace national cohort study?

The Birthplace national cohort study was designed to answer questions about the risks and benefits of giving birth in different settings, focusing in particular on birth outcomes in healthy women with straightforward pregnancies who are at 'low risk' of complications.

The study collected data on care in labour, delivery and birth outcomes for the mother and baby for over 64,000 'low risk' births in England including nearly 17,000 planned 'low risk' home births, 28,000 planned 'low risk' midwifery unit births (AMUs and FMUs) and nearly 20,000 planned 'low risk' obstetric unit births.

The study achieved an exceptionally high level of participation and coverage. Over 97% of NHS trusts providing home birth services and nearly 90% of all midwifery units in England took part. Data on births in obstetric units, which were used as a comparison group, were collected from a representative, random sample of 36 obstetric units spread across England.

The completeness and quality of the data were extremely high: most units and trusts were able to provide data on over 85% of their eligible births and fewer than 4% of the records had important information about the mother or baby missing. The high quality of the data, and other features of the study, help ensure that the findings are robust and that differences in outcome between the birth settings are likely to represent real differences.

Outcomes in the planned home and midwifery unit births were compared with planned births in the obstetric unit. To ensure that the groups were comparable, the main analysis looked only at women who, at the start of labour, were healthy and did not have known risk factors for complications, such as high blood pressure, diabetes, problems in a previous pregnancy or birth, or complications in the current pregnancy. Also, because women who choose to give birth at home or in a midwifery unit can be different from those who choose an obstetric unit, the analysis took account of differences in the maternal characteristics when making comparisons (such as age or whether this was the first pregnancy).

Why study planned place of birth?

By studying planned place of birth at the start of care in labour, Birthplace results will enable midwives and doctors to give women information that is most relevant to their decision making. This time point – the start of care in labour - is most relevant because throughout pregnancy a woman's health and aspects of her pregnancy can change. A woman can change her planned place of birth if her low risk pregnancy becomes higher risk, or vice versa. However, at the end of pregnancy, women have to decide where they want to give birth without knowing whether their labour will actually be straightforward or whether it will be prolonged or a complication will develop. For this reason, they and their midwives need information about the benefits and risks of choosing a particular birth setting, based on what can be known at the point at which they make a final decision about where the woman plans to give birth. It is useful for women to be told what proportion of women like them, in that particular kind of birth setting, have a 'normal birth' with no medical interventions; if they are considering a homebirth or birth in a midwifery unit (alongside or freestanding) to know what proportion of women need to transfer for care in an obstetric unit; and,

for each setting, to know what proportion have a baby born with a poor outcome, compared with those who plan to give birth in an obstetric unit.

Birthplace looks at births in different settings. What is the difference between an obstetric unit, an alongside midwifery unit and a freestanding midwifery unit?

There are two key differences – the person who has clinical responsibility for the care provided (midwives or obstetricians) and whether or not the unit is situated in a hospital with on-site availability of obstetric, neonatal and anaesthetic care

In an *obstetric unit (OU)*, care is provided by a team of midwives and doctors. Midwives provide care to all women in an obstetric unit, whether or not they are considered at high or low risk, and take primary responsibility for women with straightforward pregnancies during labour and birth. Obstetricians have primary professional responsibility for women at high risk of complications during labour and birth and for women who develop complications during labour and birth. Obstetric units are always situated in hospitals where diagnostic and medical treatment services - including obstetric, neonatal and anaesthetic care - are available on site. Obstetric units provide care to low and higher risk women. 'Higher risk' women – those who have health problems and/or less straightforward pregnancies - should normally be advised to give birth in an obstetric unit.

In *midwifery units*, midwives take the primary professional responsibility for labour care. This is sometimes described as midwifery-led care.

- *Alongside midwifery units (AMUs)* are situated in the same hospital or on the same site as an obstetric unit so have access to obstetric, neonatal or anaesthetic care on site, although women may need to be physically transferred to the obstetric unit if they need obstetric care.
- *Freestanding midwifery units (FMUs)* are not situated in a hospital or site with an obstetric unit or neonatal unit. This means that if the woman needs obstetric or anaesthetic care or the baby requires neonatal care they need to be transferred - typically by ambulance or car - to another hospital where these services are provided.

Midwifery units offer care to women with straightforward pregnancies.

Where and when did the cohort study take place?

The study included births in NHS hospitals and trusts in England between 1 April 2008 and 30 April 2010.

How did the study define women at 'low risk'

A woman was considered at 'low risk' of complications if she was healthy and the pregnancy was straightforward. The definition of 'low risk' was based on the National Institute for Health and Clinical Excellence (NICE) Intrapartum Care Guideline (<http://guidance.nice.org.uk/CG55>). The guideline recommends that women at 'higher risk' should normally be advised to give birth in an obstetric unit.

More common reasons for women NOT being considered 'low risk' are if they:

- have medical conditions such as high blood pressure, diabetes, epilepsy, hyperthyroidism or infections which present a potential risk to the baby
- are obese (Body Mass Index > 35 kg/m²)
- are giving birth preterm (before 37 weeks),
- have had a previous caesarean section or experienced serious complications in a previous birth,
- are expecting twins or the baby is in a breech presentation,
- know that they require a caesarean section or are having induction of labour for any reason.

The study looked at the 'safety' of birth for the baby and the mother.

How was 'safety' measured for the baby?

Safety for the baby was measured by looking at how often any baby had any of the following adverse outcomes: stillbirth during labour, death of the baby in the first week after birth, neonatal encephalopathy (disordered brain function caused by oxygen deprivation before or during birth), meconium aspiration syndrome (where the baby breathes meconium into their lungs), and physical birth injuries such as brachial plexus injury, and bone fractures.

These outcomes were chosen because differences in how often these events occurred might reflect differences in the quality of care received during the birth.

And are all these outcomes equally bad?

No. The outcomes range in severity. Some are clearly serious and tragic events such as stillbirth or death of the baby, some are potentially life-threatening, and some may result in long-term disability in a proportion of babies. But others are less severe and involve conditions which may require treatment, perhaps in a neonatal unit, but which may not necessarily result in any long-term problems for the baby.

Why did the study group together serious and less serious outcomes for the baby?

The individual outcomes are all uncommon so if they had been considered individually the numbers would have been too small to see clearly if there were any difference in outcome between the birth settings.

How were the benefits and risks for the mother assessed?

Safety for the mother was measured by looking both at poor medical outcomes, such as serious perineal tears or need for a blood transfusion, and also at whether the woman received obstetric interventions, such as an emergency caesarean section or a forceps or ventouse delivery.

The study also measured 'positive' outcomes for the mother, such as having a birth without any medical interventions – sometimes referred to as a 'normal birth' - and whether the mother breastfed her baby at least once.

What did the study show about safety of planning birth in different settings?

Giving birth is generally very safe.

- For 'low risk' women the incidence of adverse perinatal outcomes (intrapartum stillbirth, early neonatal death, neonatal encephalopathy, meconium aspiration syndrome, and specified birth related injuries including brachial plexus injury) was low (4.3 events per 1000 births).

Midwifery units appear to be safe for the baby and offer benefits for the mother.

- For planned births in freestanding midwifery units and alongside midwifery units there were no significant differences in adverse perinatal outcomes compared with planned birth in an obstetric unit.
- Women who planned birth in a midwifery unit (AMU or FMU) had significantly fewer interventions, including substantially fewer intrapartum caesarean sections, and more 'normal births' than women who planned birth in an obstetric unit.

For women having a second or subsequent baby, home births and midwifery unit births appear to be safe for the baby and offer benefits for the mother

- For women having a second or subsequent baby, there were no significant differences in adverse perinatal outcomes between planned home births or midwifery unit births and planned births in obstetric units.

For women having a first baby, a planned home birth increases the risk for the baby

- For women having a first baby, there were 9.3 adverse perinatal outcome events per 1000 planned home births compared with 5.3 per 1000 births for births planned in obstetric units, and this finding was statistically significant.

For women having a first baby, there is a fairly high probability of being transferred to an obstetric unit during labour or immediately after the birth

- For women having a first baby, the transfer rate during labour or immediately after the birth was 45% for planned home births, 36% for planned FMU births and 40% for planned AMU births

For women having a second or subsequent baby, the transfer rate is around 10%

- For women having a second or subsequent baby, the proportion of women transferred to an obstetric unit during labour or immediately after the birth was 12% for planned home births, 9% for planned FMU births and 13% for planned AMU births.

Is it safe for a woman to have a first baby at home?

The study found that a woman having a first baby at home is more likely to have a 'normal birth' but there is a fairly high probability (45%) of being transferred to hospital during labour or immediately after birth and there appears to be an increased risk of an adverse outcome for the baby (9.3 adverse perinatal outcomes per 1000 planned home births compared with 5.3 per 1000 births for births planned in obstetric units).

Are midwifery unit births as safe as births in a hospital obstetric unit?

The study cannot prove with absolute certainty that there are no differences in safety between the settings but, overall, the study found that proportions of babies with an adverse outcome were similar in births planned in midwifery units (AMUs and FMUs) compared with births planned in obstetric units. For women who did not have complications when they presented for care in labour, outcomes were almost identical in births planned in midwifery units and obstetric units (3.1 adverse perinatal outcomes per 1000 births for births planned in an obstetric unit compared with 3.2 per 1000 births in freestanding midwifery units and 3.4 per 1000 births in alongside midwifery units).

Midwifery units were also safe for the mother, and women who planned birth in a midwifery unit were significantly more likely to have a 'normal birth' without medical interventions, and were less likely to have their baby delivered by caesarean section, forceps or ventouse. For example, more than three quarters of all women in the planned home and midwifery unit groups had a 'normal birth' without medical interventions, compared with 58% of women in the obstetric unit group.

Are outcomes worse for women who are transferred?

Women transfer for many reasons during labour, sometimes for 'straightforward' reasons such as wanting an epidural, but sometimes because the midwife has concerns about the mother or baby. Because of this, women who transfer, on average, have more labour complications than women who do not transfer. So, although women who transfer have worse outcomes than those who do not, it seems probable that this is mainly due to the medical reason that led to the transfer.

For women who develop complications at home or in a midwifery unit, it is likely that transfer to an obstetric unit where they can receive additional observation, treatment or medical care, is the best way of ensuring a good outcome.

THE BIRTHPLACE COST-EFFECTIVENESS ANALYSIS

What was the Birthplace cost-effectiveness study?

The Birthplace health economic study collected additional data alongside the cohort study to enable the costs and cost-effectiveness of births planned in each setting to be estimated.

The study calculated the following measures of cost-effectiveness for each planned place of birth relative to planned birth in an obstetric unit:

- The incremental cost¹ per ‘adverse perinatal outcome’ avoided
- The incremental cost per ‘adverse maternal outcome’ avoided
- The incremental cost per additional ‘normal birth’

‘Adverse perinatal outcome’ and ‘normal’ birth were calculated as in the cohort study. ‘Adverse maternal outcome’ was defined as the woman experiencing any of the following: general anaesthetic, instrumental birth (forceps or ventouse), caesarean section, severe perineal trauma, blood transfusion, or admission to an intensive care/high dependency unit.

How do NHS costs compare in the different settings?

On average, costs per birth were highest for planned obstetric unit births and lowest for planned home births. Average costs were as follows:

£1631 for a planned birth in an obstetric unit

£1461 for a planned birth in an alongside midwifery unit (AMU)

£1435 for a planned birth in a freestanding midwifery unit (FMU)

£1067 for a planned home birth

These figures include all NHS costs associated with the birth itself – for example midwifery care during labour and immediately after the birth, the cost of any medical care and procedures needed in hospital, and the cost of any stay in hospital, midwifery unit, or neonatal unit immediately after the birth either by the mother or the baby. The costs for planned home and midwifery unit births take account of interventions and treatment that a woman may receive if she is transferred into hospital during labour or after the birth.

The costs do not include any longer term costs of care.

Why are obstetric unit births more expensive? Don't home births take up more of a midwife's time?

Women having a baby at home or in a midwifery unit typically receive more one-to-one care from a midwife but, despite this, planned birth in an obstetric unit is more expensive overall. This is because hospital overheads tend to be higher and women who plan birth in an obstetric unit tend to have more interventions, such as caesarean section, which are expensive.

Which birth setting is most cost-effective?

A cost-effectiveness analysis compares the cost and health effects of an intervention in order to decide if an intervention represents value for money. Cost-effectiveness analysis is useful when trying to decide if it is worth paying more money for a better outcome (health effect).

The analysis showed that planned birth at home, in a freestanding midwifery unit or an alongside midwifery unit were all cost-saving relative to planned birth in an obstetric unit but effectiveness,

¹ ‘Incremental costs’ for each non-obstetric unit birth setting were calculated as the additional costs over and above the average cost of care in an obstetric unit. A negative ‘incremental cost’ represents a cost saving.

and hence cost-effectiveness, depended both on whether the analysis focused on outcomes for the mother or outcomes for the baby, and on whether the woman was having a first or subsequent baby:

- For maternal outcomes ('adverse maternal outcome' avoided and 'normal birth'), planned birth at home was the most cost effective option.
- For women having a first baby, planned home birth was the most cost-effective option by standard health-economic criteria, despite the fact that outcomes for the baby were, on average, less good.
- For women having a second or subsequent baby, planned home birth was also the most cost-effective option, reflecting the fact that in this group of women, planned home births are cheaper and outcomes for the baby are broadly similar to those in an obstetric unit.

THE BIRTHPLACE MAPPING MATERNITY CARE STUDY

What was the Birthplace Mapping maternity care study?

The study used data collected from maternity units and trusts in 2007 and 2010 to describe how maternity care is organised across England and how services have changed in recent years.

What did the Birthplace mapping maternity care study find?

The number of midwifery units in England increased between 2007 and 2010, but while options for planning birth has increased in many areas, around half of all trusts currently have no midwifery units. Most of the recent increase has been in 'alongside midwifery units', which provide midwifery-led care in the same hospital as an obstetric unit.

There were marked differences in the availability of midwifery units in different geographical areas. The proportion of trusts with a midwifery unit was highest in the South-West and East Midlands and lowest in the North-West, Yorkshire and Humberside, and London.

Although the number of midwifery units has increased, midwifery units tend to be much smaller than obstetric units and hence the vast majority of births continue to occur in obstetric units. Home births account for a relatively small proportion of all births (<3%).

Are all midwifery or obstetric units the same?

There was marked variation in midwifery staffing levels and the bed capacity in all types of unit caring for women during labour and birth, and between units of the same kind, based on ratios of midwives and beds to women delivering. These differences were not related to the absolute size of maternity unit reflected in the numbers of women giving birth. The study did not explore whether these differences affected the quality of care. The Birthplace researchers plan to undertake further analysis to explore whether any of these characteristics affect birth outcomes.

Who is eligible to give birth in a midwifery unit?

Midwifery units cater for 'low risk' women but many have their own admission guidelines and exclusion criteria. The most common 'critical' exclusion criteria were: preterm labour, known breech presentation at term, twins, planned epidural. Many units also placed some restrictions on the admission of women who were obese or had had a previous caesarean section.

THE BIRTHPLACE QUALITATIVE ORGANISATIONAL CASE STUDIES

What were the Birthplace organizational case studies?

The Birthplace case studies explored the maternity care systems in four NHS trusts. The Trusts were chosen because they had been designated as providing good quality care by the Health Care Commission in 2007 and hence could provide examples of good quality services. The four trusts were also chosen to exemplify different models of service configuration – one trust had only an obstetric unit, one had an obstetric unit and an alongside midwifery unit, another an obstetric unit and a freestanding midwifery unit, and one had an obstetric unit, an alongside midwifery unit and a freestanding midwifery unit.

The researchers used qualitative methods – direct observation and interviews with staff and users – to try to tease out what might be the important features that enable these trusts to provide high quality services.

Who are the case study results aimed at?

The findings are probably of most relevance to service managers, health professionals and commissioners/policy makers, but may also be of interest to women and organizations that represent the interests of maternity services users.

What did the case studies show?

Some women were not aware that they had a choice of where to give birth, and lacked sources of evidence-based information on which to base their decision. Women's views of safe care were influenced by what was locally on offer, their previous experience and that of other women that they knew. The possibility of being transferred during labour was a major consideration when women made a decision around where to give birth, and women often cited concerns about transfer distance as reasons for planning birth in hospital.

Deployment of community midwives across multiple settings was a key challenge for managers in all four case study sites. In addition, some community midwives reported a sense of isolation and exposure when attending births at home, lack of recent experience in attending births and concerns about midwifery staff coverage for home births. In all sites this was mitigated where midwives were able to look after women in both the community and hospital settings, for example within team or caseload models. In addition, a 'hub and spoke' model (obstetric unit with an alongside midwifery unit, serving a number of freestanding midwife units) where midwives rotate through all parts of the service could offer a useful model for other services who provide a full range of birth settings, across a wide geographical area.

The management of complications during labour or immediately after birth, and transfer emerged as a key issue in all the case studies. These included avoiding delay due to time and distance taken to transfer, and ensuring smooth handover and collaboration between staff. Effective and safe transfer was judged to be dependent on good communication systems, clear guidelines that were used appropriately to support decision-making, trusting and respectful relationships between staff groups, management of conflict over resources, and the confidence and competence of professionals.

Although some women's experience of transfer and a possible need for medical intervention was characterised by feelings of worry, disempowerment or disappointment, most women interviewed in the case study sites were prepared for the unpredictability of events in childbirth. Clear and careful explanation of events by professionals was a common theme that ran through women's positive narratives about their need for medical intervention. Trust in professionals was an important aspect of feeling safe, physically and psychologically.

However, despite the fact that the case study sites were chosen because they were considered to provide high quality care, some women described difficulty in being listened to when they raised concerns about complications they had noticed themselves, and the experience of speaking up and *not* being heard was a safety issue. When the few women who felt unable to ask about their options or challenge professional views were interviewed, they experienced feelings of frustration, self-blame or anger and felt this resulted in delay in the management of complications.

ACKNOWLEDGEMENT

The Birthplace in England Research Programme combines the Evaluation of Maternity Units in England study funded in 2006 by the National Institute for Health Research Service Delivery and Organisation (NIHR SDO) programme, and the Birth at Home in England study funded in 2007 by the Department of Health Policy Research Programme (DH PRP). The views and opinions expressed by the authors do not necessarily reflect those of the NHS, NIHR, NIHR SDO, DH PRP or the Department of Health.

FURTHER INFORMATION

NPEU website: <https://www.npeu.ox.ac.uk/birthplace>

Full study reports: <http://www.sdo.nihr.ac.uk/projdetails.php?ref=08-1604-140>

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