Women’s birth place preferences in the United Kingdom: a systematic review and narrative synthesis of the quantitative literature

Jennifer Hollowell¹, Yangmei Li¹, Reem Malouf¹, James Buchanan²

¹ Policy Research Unit in Maternal Health and Care, National Perinatal Epidemiology Unit, Nuffield Department of Population Health, University of Oxford, Oxford, UK

² Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford, Oxford, UK

Corresponding author

Jennifer Hollowell PhD, Policy Research Unit in Maternal Health and Care, National Perinatal Epidemiology Unit, Nuffield Department of Population Health, University of Oxford, Old Road Campus, Headington, Oxford, OX3 7LF, United Kingdom

Tel: +44 (0)1865 289452 (direct)/289700 (messages)

Fax: +44 (0)1865 289701

Email: jennifer.hollowell@npeu.ox.ac.uk
Keywords: Pregnancy, Systematic review, Midwifery, Place of birth choice, Low-risk pregnancy, Preferences
Abstract

Background

Current clinical guidelines and national policy in England support offering ‘low risk’ women a choice of birth setting, but despite an increase in provison of midwifery units in England the vast majority of women still give birth in obstetric units and there is uncertainty around how best to configure services. There is therefore a need to better understand women’s birth place preferences. The aim of this review was to summarise the recent quantitative evidence on UK women’s birth place preferences with a focus on identifying the service attributes that ‘low risk’ women prefer and on identifying which attributes women prioritise when choosing their intended maternity unit or birth setting.

Methods

We searched Medline, Embase, PsycINFO, Science Citation Index, Social Science Index, CINAHL and ASSIA to identify quantitative studies published in scientific journals since 1992 and designed to describe and explore women’s preferences in relation to place of birth. We included experimental stated preference studies, surveys and mixed-methods studies containing relevant quantitative data, where participants were ‘low risk’ or ‘unselected’ groups of women with experience of UK maternity services.

Results

We included five experimental stated preference studies and four observational surveys, including a total of 4201 respondents. Most studies were old with only three conducted since 2000. Methodological quality was generally poor. The attributes and preferences most commonly explored related to pain relief, continuity of midwife, involvement/availability of medical staff, ‘homely’
environment/atmosphere, decision-making style, distance/travel time and need for transfer. Service attributes that were almost universally valued by women included local services, being attended by a known midwife and a preference for a degree of control and involvement in decision-making. A substantial proportion of women had a strong preference for care in a hospital setting where medical staff are not necessarily involved in their care, but are readily available.

Conclusions

The majority of women appear to value some service attributes while preferences differ for others. Policy makers, commissioners and service providers might usefully consider how to extend the availability of services that most women value while offering a choice of options that enable women to access services that best fit their needs and preferences.
Introduction

The most recent update of the NICE Guideline for Intrapartum Care [1] recommends that healthy women with straightforward pregnancies should be free to choose the birth setting of their choice and that commissioners and providers should ensure that all four birth settings (home, freestanding midwifery unit (FMU), alongside midwifery unit (AMU) and obstetric unit (OU)) are available to all women. Maternity services in the United Kingdom (UK) are provided by the National Health Service (NHS), a tax-funded healthcare system that provides universal access to services that are free at the point of use. Responsibility for the NHS is devolved to the four constituent countries, so policies can differ across the UK. In England, there is a national policy of offering women a choice of birth setting [2, 3]. Policies differ in Scotland, Wales and Northern Ireland but a choice of birth setting is available in all three countries [4-6].

In England, the largest of the four countries of the UK, the provision of midwifery units, particularly AMUs, has increased substantially in recent years [7]. In 2013, 79% of women in England lived within a 30 minute drive of both an OU and a midwifery unit [7] and more recently a national survey of women’s experiences of maternity care found that 41% of women were offered a choice of giving birth in a midwifery unit and 18% were offered the option of a home birth [8]. Notwithstanding this, recent data show that the vast majority of women (87% in 2013) still give birth in an OU [7]; the home birth rate is static at around 2.3% of births [9]; and although the number of FMUs has increased slightly in recent years, the proportion of women giving birth in FMUs in England is static and remains below 2% [10]. There is therefore a need for a better understanding of women’s birth place preferences and of the broader factors that influence where women choose to give birth.

The purpose of this systematic review is to summarise the quantitative evidence on UK women’s birth place preferences with a particular focus on identifying the service attributes that women prefer and on identifying which attributes women prioritise when making a choice between different maternity units and different birth settings. The review focuses on evidence relating to the preferences of healthy women with straightforward pregnancies (‘low risk’ women) since this group
should be offered a choice of birth setting according to current clinical guideline [1] and national policy [2].

To our knowledge the evidence on women’s birth place preferences and decision making has not previously been systematically synthesised.

Methods

This paper reports on one component of a broader systematic review which also encompasses the qualitative evidence relating to factors that may affect women’s choice of place of birth, including beliefs, preferences, knowledge and experience. A joint protocol was developed for the present review and the linked qualitative review. Some aspects of the methods reflect the fact that searches were common to the two reviews.

Eligibility criteria

Eligibility criteria for the present review were as follows:

Type of report

- Full primary research reports, published in a scientific journal between January 1992 and February 2015, in English.

Topic of research

- Studies designed to describe and explore women’s preferences in relation to place of birth.

Research design

- Quantitative studies including experimental stated preference studies, surveys and other quantitative studies designed to describe or explore women’s preferences, and, mixed methods studies that included an eligible quantitative study. For mixed methods studies, eligibility criteria were applied solely to the quantitative component of the study.

Study population and setting
Studies conducted in the UK where the study participants were ‘low risk’ or ‘unselected’ groups of women (i.e. women included irrespective of risk status) who had direct experience of UK maternity services, that is women who were either pregnant or had previously given birth in the UK.

We excluded:

- Studies that collected data from other groups such as partners, healthcare professionals or women of childbearing age irrespective of pregnancy history.
- Studies that contained only incidental quantitative data on women’s preferences.
- Studies that reported only descriptive data on women’s reasons for choosing or not choosing a particular maternity unit or setting where the quantitative component of the study was not explicitly designed to describe or explore women’s preferences.

Search strategy

We searched Medline, Embase, PsycINFO, Science Citation Index, Social Science Index, CINAHL and ASSIA using a search strategy based on the SPIDER tool [11]. For the reasons explained above, the search strategy (see additional file 1) was deliberately broad and designed to encompass both the quantitative evidence on preferences required for the present review and also the qualitative evidence relating to factors that may affect women’s choice of place of birth, including beliefs, preferences, knowledge and experience. The searches were run in March 2015.

Study selection

Two reviewers independently screened titles and abstracts followed by double screening of full-text articles where needed. Because this review was conducted as one component of a broader systematic review, the screening was conducted by sequentially applying the criteria applicable to each component of the review, with reviewers working in pairs. At each stage discrepancies were
resolved by discussion, with a third reviewer involved as required (see additional file 1 for further
details). We also searched bibliographies of included studies to identify additional eligible studies.

Quality assessment

We were unable to identify a single critical assessment tool that could be applied across
methodologies and found that many of the available tools were unsuitable for assessing surveys. We
therefore used a modified version of the Centre for Evidence-Based Management tool [12] to
appraise the included surveys and additionally appraised the experimental stated preference studies
using a checklist developed by the International Society for Pharmacoeconomics and Outcomes
Research (ISPOR) [13]. Surveys were assessed by YL and RM; stated preference studies were
appraised by JB. Eligible studies were included irrespective of quality.

Data extraction and analysis

Using a data extraction form designed by the authors, JH extracted descriptive data on study context
and study objectives, study methods, sample characteristics, sample size, response rate, study
period and choices available to study participants, and also wrote a text description summarising the
preference-related findings in each report. These data were cross-checked by YL against the full-text
articles and any queries regarding the data or interpretation were discussed and resolved. In order
to facilitate the production of a narrative summary, findings relating to preferences were coded
using a set of keywords e.g. continuity of care, pain relief in labour, decision making, ‘home-like’.
These keywords were refined as coding progressed and papers were iteratively recoded where
necessary. Eppi-Reviewer 4 software [14] was used for data extraction, coding and data
management.

Results

Results of the search

Our search identified 2983 unique references. Following screening and checking of reference lists of
articles eligible for inclusion we identified a total of 10 eligible reports (see Figure 1 for screening
flow chart). These included two pairs of linked papers: the two papers by Hundley [15, 16] reported on different analyses so were included as separate studies while the methodological report by Ratcliffe [17] covered the findings also reported in Longworth [18]. We therefore consider these two as a single study and only included the report by Longworth. The following synthesis is therefore based on nine studies, including 4201 respondents in total.

**Description of included studies**

The included studies are described in Table 1 (see additional file 2 for additional details of study methods).

Information on preferences was elicited in various ways. Five studies used discrete choice or other experimental stated preference methods [15, 16, 18-20]; five asked women to rate the aspects of maternity services that were important to them [15, 16, 21-23]. One study reported women’s reasons for choosing a specific unit or setting [24]; and one study asked women to state what factors had affected their booking decision [21].

Five studies [15, 16, 19, 21, 23] were conducted in the same region in and around Aberdeen in Scotland (Grampian). Services in this area included an OU and AMU in Aberdeen, an FMU around 35 miles away and an OU without an epidural service approximately 65 miles from the main OU. Two of these studies used samples of women booking at the main OU/AMU [19, 23]; one study recruited women resident in the catchment area of the FMU [21]; and the two ‘linked’ studies by Hundley [15, 16] recruited ‘low risk’ women booking in three units (OU/AMU, FMU and OU without an epidural service).

One further Scottish study was conducted in remote and rural areas in the North of Scotland where services were provided by small community hospitals (<300 births per year) with a mix of OUs (some without neonatal services) and FMUs [20].

Two studies were conducted in London [18, 24]. In one of these, the evaluation was conducted in an area that was considering shutting its OU and converting the local AMU to an FMU [24] and the
study was designed to evaluate whether current AMU users would consider birth in the unit if it became an FMU. The other was a stated preference study conducted in areas with high home birth rates, comparing preferences in women booked for a home birth with ‘low risk’ women booked for a hospital birth [18].

Only one study was carried out in a national sample [22]. This recruited a cross-sectional sample of women from a purposive sample of maternity units selected to provide socioeconomic, ethnic and urban/rural diversity and a mixture of available birth settings (home, FMU, AMU, OU) across England.

Most of the studies were relatively old: only three of the studies [20, 22, 24] had collected data since 2000. The most recent included study [24] was carried out in 2009.

Methodological quality of included studies

The quality of the surveys was generally fairly low (additional file 3). Most of the surveys were conducted in single units or small geographical areas. The exception was the survey by Lavender [22], which collected data from a nationally representative sample of units in England. Additionally many of the surveys had low response rates and most of the surveys were small and did not report confidence intervals. Thus many of the descriptive findings reported in these studies have a high risk of bias, estimates of the prevalence of particular preferences are based on small potentially unrepresentative samples, and the generalisability of findings is uncertain.

The five stated preference studies were found to be of mixed but generally average quality (additional file 4). Almost all appropriately justified the sampling strategy that was used, and study limitations, generalisability and implications were generally adequately discussed. However, several quality criteria were met by very few studies. No studies justified the number of attributes or profiles in each choice task, only one study partially described the study data collection instrument and methods [19] and only one study partially evaluated the properties of the experimental design (e.g. efficiency score, cognitive difficulty) [16]. Other general weaknesses included a lack of
justification for attribute selection, limitations relating to experimental design or mode of administration and little consideration of the quality of responses.

Women’s preferences and service attributes influencing choice

The attributes and preferences most commonly explored related to pain relief (including availability of a birthing pool) [15, 16, 18, 21-23], continuity of midwife [15, 16, 18, 21-23], involvement/availability of medical staff [15, 16, 21, 22, 24], ‘homely’ environment/atmosphere [15, 16, 18, 21, 24], decision-making style [15, 16, 18, 21, 23]. Other factors investigated included distance/travel time [20-22, 24] and need for transfer [18, 22, 24]. One study explored women’s preferences for care in a labour ward vs. a midwifery unit [19] and one explored preferences for midwife-managed vs. consultant-led ‘staffing’ [20]. Pitchforth’s study also dealt with methods of pain relief and involvement of medical staff but these attributes were varied in tandem in the discrete choice experiment to ensure that respondents realised that an epidural was only available with consultant-led care [20]. Relevant findings from this study are therefore only presented under the ‘Distance’ and ‘Obstetric unit vs. midwifery unit’ sections below.

Table 2 lists the attributes and preferences evaluated in each of the studies. Findings relating to specific preferences are summarised below and are also tabulated in additional file 5.

Methods of pain relief, including availability of birthing pool

In Hundley’s primary study, 84% of respondents indicated a preference for having all methods of pain relief available and this appeared to be the second most important attribute to participants (after style of decision-making) [16]. However, further analysis [15] found that ‘pain relief’ did not impact on the preferences of women who lived in areas where the local maternity unit (FMU or OU) did not have an epidural service. The authors comment that their findings are consistent with an ‘endowment effect’, that is, expectations influence preferences [15].

Longworth’s study found that women with a dominant preference for hospital birth exhibited a significant preference for access to all forms of pain relief, whereas (as might be expected) this was
not important to women with a dominant preference for home birth. Pain relief options did not appear to be of importance to ‘traders’ who were potentially willing to switch setting in order to access services better meeting their preferences [18].

In Lavender’s national survey, half of respondents agreed or strongly agreed with the statement “It is important to me to be able to have an epidural at any time of day or night”, although the authors noted that this did not necessarily mean that they were intending to have one. Availability of a birthing pool elicited a more uncertain response: 46% of respondents neither agreed nor disagreed with the statement “It is important to me that a pool is available for my labour/birth”. Around a quarter agreed or strongly agreed with this statement [22].

In Emslie’s study, women living in an FMU catchment area rated the importance of ‘choices in pain relief’ fairly highly, with importance increasing in later pregnancy (81% considered ‘choices in pain relief’ important at 14 weeks increasing to 95% at 36 weeks). However, more than half of the respondents were booked to give birth in an FMU and it should be noted that the responses related to ‘choices in pain relief’ and not necessarily to the availability of all options or of epidural. The authors noted that “a sizeable percentage of women would have liked to have known more [about pain relief], especially about natural methods such as massage, breathing, and the role of different positions” [21, p203].

In Rennie’s study of women booked for birth in a hospital with an OU and AMU, most women (69%) rated ‘minimum drugs’ as quite important or very important at 34 weeks with only 14% rating ‘pain free with drugs’ as quite important or very important and 11% rating ‘drug free labour/other’ as quite important or very important. When asked in the postnatal period, almost all women (95%) said that ‘effective pain relief’ in labour was quite important or very important [23].
Continuity of midwife

Two aspects of continuity were explored: first, preferences relating to being attended in labour by a known midwife; and second preferences relating to having the same midwife throughout labour.

In Hundley’s primary study [16], ‘continuity of midwife’ was considered an important attribute by the vast majority of women (95% considered this quite important or very important), and the majority of women stated a preference for having a known midwife for labour and the same midwife throughout labour and delivery: 69% chose the option ‘you meet the midwife during your pregnancy and the same midwife is present throughout labour and delivery’ and 23% expressed a preference for ‘you meet a team of midwives during pregnancy, one of whom is present throughout labour and delivery’. The discrete choice regression analyses confirmed that women tended to prefer scenarios with more continuity of midwife. However, when asked to state which was the most important attribute if they could only be certain of getting one of their choices, ‘midwife’ was considered the preferred attribute by only 17% of study respondents (after ‘decision-making’ (40%) and ‘pain relief’ (23%)).

Further analysis [15] that explored whether women’s preferences were influenced by the services that women had available in their local areas found that in the study area with least continuity available, women were significantly less likely to prefer the option of labour care from a midwife that they had met during pregnancy (52% vs. 72-75% in other areas). This is consistent with an ‘endowment effect’, that is expectations influence preferences.

In Longworth’s study women with a dominant preference for hospital birth and women with a dominant preference for home birth both had a significant preference for higher levels of continuity of carer. Amongst ‘traders’ - women prepared to switch setting according to the services and attributes available - continuity of midwife was the only attribute that significantly influenced which setting the woman chose, with higher levels of continuity being preferred [18].
However, in Lavender’s national survey, a statement regarding the importance of care by a ‘midwife I know’ for the baby’s birth did not elicit strong responses: few strongly agreed or strongly disagreed and respondents were fairly equally divided between agreeing, disagreeing and neither agreeing nor disagreeing [22]. Emslie’s study also found that being cared for by a ‘named midwife’ in labour was rated as important by only 18% of women and being ‘cared for by known staff’ was considered important by 28% of respondents at 36 weeks [21].

Rennie’s study found that the importance of having a ‘known midwife’ differed antenatally and postnatally. Antenatally, around half of study participants rated having a ‘known midwife’ as quite or very important and 39% didn’t mind. Postnatally, the proportion of women considering this important fell, with only 29% of women considering this important, almost half saying they didn’t mind, and 22% saying it wasn’t important. However, participants attached a higher importance to having the ‘same midwife in labour’ with 69% and 66% respectively saying this was quite or very important antenatally and postnatally. With regard to access to a midwife during labour, ‘easy access’ rather than ‘all the time’ or ‘only when I say’ appeared to be the preferred option antenatally. Postnatally, 74% of women thought that ‘constant attendance of the midwife (during labour)’ was important [23].

**Medical staff involvement/availability of specialist clinical services**

Hundley’s primary study explored women’s preferences for medical staff involvement (involved in care vs. only involved if complications develop). When asked to state a preference, two thirds of participants (67%) said that they preferred to have ‘medical staff (doctors) only involved if required (i.e., a complication occurs)’ and when asked to state what was the most important attribute if they could only be certain of getting one of their choices, only 13% chose the ‘medical staff’ attribute. However, the discrete choice regression analysis findings indicated that women were more likely to prefer maternity units that offered routine involvement of medical staff [16]. Hundley’s further
analysis indicated that women’s preferences for medical staff involvement did not appear to be affected by the services available to them [15].

In Lavender’s national survey, 62% of women agreed or strongly agreed with the statement ”I would feel unsafe if a specially trained doctor was not immediately available when I am in labour”; while 20% agreed or strongly agreed with the statement “I want to be looked after by midwives and not have doctors involved” [22].

In Emslie’s study, ‘availability of specialist staff/equipment’ was considered important by 65% of women at 36 weeks, with only ‘partner being there’ considered more important [21].

In Rogers’ study which investigated whether AMU-users would choose to have their baby in the unit if it became an FMU, 57% of nulliparous women and 71% of multiparous women said that they would choose to have the baby in the unit if the OU closed and the AMU became an FMU. Amongst women (n=21) who said that they would not choose the unit if it became an FMU, 81% said that they would prefer a midwife-led unit on the same site as an OU and 67% stated that they would ‘feel safer’ elsewhere [24].

‘Homely’ environment and atmosphere

In Hundley’s primary study, 92% of women expressed a preference for a unit that had a ‘homely or homelike appearance’, rather than a ‘clinical appearance’. The discrete choice analysis confirmed that women tended to choose options that provided a ‘homely or homelike’ room. However, when asked to state what was the most important attribute if they could only be certain of getting one of their choices (see Table 2 for list), less than 2% considered the ‘appearance of room’ to be the most important attribute [16]. Further analysis of the data did not suggest that women’s preferences for a homely room were affected by the characteristics of the local services available to them [15].
Longworth’s study explored women’s preferences for ‘location’ options including ‘maternity unit with a home-like environment’, ‘hospital labour ward’ and ‘home’. The findings did not strongly suggest that a ‘homely environment’ was important to ‘traders’ who might be prepared to switch setting in order to access services that better met their preferences [18].

In Rogers’ study, the majority of AMU-users said that they would choose to have their baby in the unit if it became an FMU, with ‘homely/small’ being one of the most commonly cited reasons for using the FMU (cited by 67% of those who said they would choose the FMU) [24].

In Emslie’s study, a ‘homely atmosphere’ was stated to be important by 18% of women while a ‘quiet atmosphere’ was considered important by the vast majority of women [21].

**Style of decision-making**

In Hundley’s primary study, the vast majority of women expressed a preference for being involved in decision-making: 48% preferred the option ‘the staff give you their assessment, but you are in control of the decision’ and 42% preferred ‘the staff discuss things with you before reaching a decision’. When asked to state which was the most important attribute if they could only be certain of getting one of their choices, decision-making was the most frequently chosen attribute, with 40% of women selecting this as the most important [16]. Further analysis indicated that decision-making preference did not appear to be affected by the services available to the women [15].

Women in Longworth’s study also expressed a preference for more autonomy in decision-making [18].

Rennie’s study found that antenatally, around two thirds of women considered reaching a decision together with health care staff to be ‘very’ or ‘quite’ important, with other respondents almost equally split between ‘staff decides’ and ‘woman decides’ [23].
In Emslie’s study, 53% of women stated at 36 weeks that ‘being involved in decisions’ was important to them [21].

**Distance**

In Pitchforth’s study, conducted in women living in remote and rural areas in Northern Scotland, women preferred to deliver in maternity units rather than at home and preferred shorter travel times to access intrapartum care. However, the analysis also revealed that women were prepared to travel up to 133 minutes from home to receive consultant (OU) care and that they would travel 16 minutes further to receive consultant-led care vs. alternatives. Remoteness clearly influenced women’s willingness to travel with women living in particularly remote areas willing to travel further [20].

In Lavender’s national survey, one of the statements that elicited the strongest agreement related to distance: 68% agreed or strongly agreed with the statement “I would be willing to travel if it meant I would receive higher quality care for my baby and me around the time of birth”[22].

In Rogers’ study investigating whether AMU-users would choose to have their baby in the unit if it became an FMU, the majority said that they would, with ‘easy to get to’ being the fourth most commonly cited reason for using the FMU (cited by 54% of those who said they would choose the FMU) [24].

In Emslie’s study, ‘distance from home’ and ‘convenience for family’ were the two most frequently cited reasons nulliparous women gave for choosing a unit (59% and 51% respectively). For multiparous women ‘previous experience’ was the most common reason but ‘distance from home’ and ‘convenience for family’ were jointly the second most commonly cited reasons (44% in both cases) [21].
Transfer

Longworth’s study found that women with a ‘dominant preference for hospital birth’ had a significant preference for somewhere without the need for transfer, whereas this was not significant for women with a ‘dominant preference for home birth’ or amongst ‘traders’ [18]; and the findings of Rogers’ study were broadly consistent with this [24]. In Lavender’s survey 28% of respondents agreed or strongly agreed with the statement “I would not want to transfer to a hospital a few miles away if my baby or I develop a problem” and around half disagreed or strongly disagreed with the statement [22]. However, because of the complex and potentially ambiguous wording of this negative statement it is unclear whether those disagreeing are indicating that they would consider a setting where transfer would be required in the event of complications or merely saying that if complications arose they would want to be transferred to hospital.

Obstetric unit vs. midwifery unit

Donaldson’s study asked low risk women booked at a hospital with an OU and AMU to choose between two vignettes characterising care in a labour ward vs. care in a midwifery unit (see Table 1): 33% did not express a preference, 55% preferred the midwifery unit and 11% the labour ward [19]. The discrete choice experiment by Pitchforth in remote and rural areas of Scotland found that women preferred consultant-led care over midwife-managed care and were prepared to travel further to access their preferred choice, but that preferences varied by geographical location, with island residents preferring midwifery-led care. Women with ‘high-risk’ episodes during pregnancy were also more likely to prefer consultant-led care. Respondents tended to prefer the model of care that they had experienced during their most recent birth [20].
Other preferences

Other attributes not noted above that were important to at least 50% of survey respondents included: having a birth companion present [21, 23], information and being kept informed [21, 23], and having a special care baby unit (SCBU) on site [22].

In one study of AMU users, ‘wants natural childbirth’ and ‘family can be involved’ were reasons mentioned by two thirds of women who had said that they would still choose the unit if it became an FMU [24].

Hundley’s studies explored preferences for intermittent vs. continuous fetal monitoring but findings were contradictory: 78% of women expressed a preference for intermittent fetal monitoring, but the discrete choice experiment findings suggested that women tended to prefer scenarios with continuous fetal heart rate monitoring [15, 16]. The reasons for this are unclear. Hundley and colleagues suggest that a possible explanation is that respondents may be more likely to give a “socially acceptable” response to a direct question while revealing their true attitudes when trading attributes in the context of a discrete choice experiment, but they also discuss a range of other possible explanations [15].

Variations in preferences by parity, ethnicity, and level of area deprivation

The included studies provided limited data on whether preferences differed according to the women’s characteristics. In Lavender’s survey women’s views did not differ by age or level of area deprivation. Nulliparous women were more likely to say that the availability of a pool was important to them (32% vs. 19%). Compared with white European women, ethnic minority women were significantly more likely to feel unsafe if a doctor was not immediately available (78% vs. 60%) and were more likely to consider it important to have a SCBU available where they gave birth (84% vs. 73%) [22]. Donaldson’s findings suggested that women across social classes were more likely to prefer a midwifery unit to a labour ward but with a possible trend towards more women in higher social classes having a preference for midwifery unit birth [19]. Several studies found that
multiparous women’s choices appeared to be influenced by their previous birth experience [20, 21, 24].

Discussion

Main findings

The main findings are summarised in Table 3.

Findings from other countries

The preferences summarised in Table 3 were elicited from women in the UK, but these findings appear to be broadly consistent with findings from similar quantitative studies in other countries with established midwifery-led birth options.

In the Netherlands, three discrete choice experiments - two linked studies [25, 26] and a small pilot study [27] - have been conducted in a cohort of low-risk nulliparous women. These investigated seven attributes, many of which were informed by the attributes considered in the UK studies covered in this review [16, 18]. These attributes included: assistance by a midwife versus an obstetrician during birth, home-like versus clinical ‘ambience’, possibility of influencing decision making during birth, possibility of ‘pain-relief treatment during birth’, place of birth (home vs. hospital), need for transport in case of complications. Consistent with our findings for UK women, influence on decision-making was important to women irrespective of their planned birth setting, as was the availability of pain-relief treatment. Giving birth in hospital was strongly preferred by women planning an obstetric-led hospital birth. Women planning a midwife-led hospital birth (equivalent to an AMU in the UK) also had a significant preference for being in hospital [25]. Two of the studies [26, 27] additionally considered interactions with socioeconomic variables. These analyses showed, for example, that women with higher educational attainment had a stronger preference for involvement in decision making and for the availability of pain-relief treatments than those with lower educational attainment.
A descriptive survey in the same cohort of nulliparous women in the Netherlands [28] explored women’s motives for preferring each of the three settings available. Again, findings were broadly consistent with those summarised in this review. For example, the lack of ready availability of specialist help and concerns about transfer were important reasons for women preferring midwife-led and obstetric-led hospital births.

Findings from other countries are sparser. A study in New Zealand [29] which investigated what influenced women to choose an FMU versus a tertiary hospital unit found that women who chose an FMU were most strongly influenced by proximity and ease of access and by the atmosphere or ‘feel’ of the unit and were largely uninfluenced by the lack of specialist services. In contrast, the women who chose a hospital birth were mainly influenced by the availability of specialist services and by their confidence in hospital staff, and distance/ease of access played a smaller part. Again, these findings confirm that women differ with regards to their preference for availability of medical staff, with some preferring on site medical staff and others unconcerned about this as observed in the UK [22]. A further survey conducted in rural Tasmania where women had to travel between 45 minutes and two hours to the nearest major hospital also found that women traded off distance against perceived safety with the majority of women (59%) prepared to travel less than an hour to access ‘safe delivery’ [30]. These findings are also consistent with Pitchforth’s findings that women in remote and rural areas of the UK are potentially prepared to travel further to access hospital care but that women switch to less preferred options when the distance becomes too great [20].

Finally, a study in Canada [31] that investigated how pregnant women decided between home or hospital birth in Ontario province found that, overall, the top priorities for women when making a choice were feeling safer, feeling more comfortable and seeing birth as a natural process, but priorities differed depending on whether the woman had a preference for a home or hospital birth. The top priorities for women preferring a hospital birth were feeling safer, wanting access to pain
medication and feeling more comfortable; while the top priorities of those wanting a home birth were seeing birth as a natural process, wanting to avoid interventions, and feeling more comfortable. The vast majority of respondents in both groups also stated that they wanted to be involved in decision making. The study also included a small ‘undecided’ group. These women all wanted to avoid interventions but other preferences and priorities were mixed and more than half thought that hospital birth was safer for the baby than home birth.

Overall the consistency of findings appears to suggest that the birth place preferences described in this review may well be generalisable to other high-income countries with established midwifery-led birth options similar to those in the UK.

**Strengths and limitations of the review**

The main strengths of this review are that we have systematically identified and synthesised the quantitative evidence from reports published in scientific journals since 1992, providing evidence gathered from women in the UK about their birth place preferences.

A limitation is that, for pragmatic reasons, we took the decision to include only reports published in scientific journals and have not included grey literature or doctoral theses. As a check on possible gaps, we reviewed reports of recent national surveys of maternity care that have included questions relating to choice of place of birth [32-36] and other reports known to the authors that have addressed questions relating to choice [7, 37]. Only one of these [36] contained relevant data, although the survey methods (an online survey of members of the NCT, a national charity that provides support to parents) were such that the generalisability of the findings is uncertain. In this survey the vast majority (90%) of respondents were having a first baby so the findings largely reflect the preferences of this group and results suggest a possible bias towards women preferring non-OU settings. More than half of respondents wanted to give birth in an AMU (broadly consistent with Donaldson’s findings [19]), 10% at home (slightly higher than the proportions considering home birth reported by Lavender (7.6%) and Longworth (3%) [18, 22]), 25% in an OU and 6% in an FMU.
Interestingly, the overall proportion of respondents wanting an FMU birth was 7% or less for women having a first, second or third baby. However, in areas where an FMU was a possible choice, 21% of women reported that they wanted an FMU birth. Facilities (e.g. birth pools and partner accommodation) and safety were the most commonly mentioned reasons for choosing a particular location. Availability of medical staff and technology appeared to be particularly important to women choosing an OU, some of whom reported they didn’t feel comfortable going elsewhere whereas the unit being ‘friendly and supportive’, the availability of specific facilities, ‘less medical intervention’ and knowing that the location gave ‘great care’ were more frequently reported by women wanting an FMU birth. These findings appear to be broadly consistent with those of the studies included in this review.

We also carried out keyword searches of the NICE NHS Evidence database [38] and the British Library EThOS database of doctoral theses [39] but did not identify any further relevant quantitative studies. For these reasons we do not believe that extending our searches and inclusion criteria to other report types would have added important data to this quantitative review although we may have failed to include some relevant studies, particularly local surveys.

A further limitation is the generally poor methodological quality of the included studies. However, although many of the surveys were small and conducted in single units or small geographical areas, the consistency of some descriptive findings across studies suggests a degree of generalisability. Quality appraisal indicated that the experimental stated preference studies were of average quality by current standards partly reflecting the fact that the design, conduct and reporting of stated preference studies have advanced since the time these studies were conducted.

The relevance of the findings of this review to policy and practice is somewhat limited by the age of many of the included studies and the paucity of recent evidence. For example, only one of the included reports [24] is based on data collected since the publication of Maternity Matters in 2007 [2]. A further issue related to the age of the included studies is the extent to which women’s beliefs and preferences may have been influenced by the availability of new evidence indicating the safety
and benefits of midwifery-led birth settings for low risk women [40, 41] and by the recent expansion in the provision of midwifery units, particularly AMUs [7]. The extent to which women’s beliefs and preferences may be influenced by evidence and possibly by the increasing normalisation of midwifery-led settings is not well understood, but initiatives such as the Birth Place Choices Project [42, 43] have demonstrated that the acceptability and uptake of midwifery-led options is not fixed and can be influenced by measures such as providing training and support for midwives to ensure that the information and guidance given to women about the available choices is evidence-based. It is therefore possible that the data presented here may no longer fully reflect women’s current preferences. Indeed, much of the expansion in midwifery-led care has taken place in the period for which we have little evidence: in 2007 just over 3% of trusts had an OU, AMU and FMU [44], whereas BirthChoiceUK data for 2015 indicate that currently 17% of trusts in England provide all three options (Miranda Dodwell, personal communication).

A further limitation of the literature is that it provides very little evidence that directly illuminates women’s preferences for different types of maternity unit, e.g. AMU vs. FMU. Attributes such as availability of medical staff, availability of epidural pain relief and preferences for a setting where transfer will not be required if complications develop capture some but not necessarily all of the attributes that women may consider important when making a choice between an AMU and an FMU.

Six of the nine included studies were conducted in Scotland with several conducted in the same region in and around a relatively small city in eastern Scotland; and notably four of the five stated preference studies were conducted in Scotland. Findings, particularly those relating to distance and transfer, may therefore have been influenced by the fact that the Scottish study participants were drawn from less urbanised and more sparsely populated areas of the UK; and preferences relating to units with and without onsite medical staff may also have been influenced by the fact that FMUs (known as ‘community maternity units’ in Scotland) have been an established feature of Scottish maternity care for many years.
The review has identified some gaps in the quantitative evidence required by policy makers and service planners. For example, our findings suggest that there may be a mismatch between existing patterns of service provision and women’s preferences, with potentially more women having preferences that might be better met by birth in a midwifery unit than an OU, but we cannot reliably estimate from available data what proportion of low risk women have a preference for birth in a midwifery unit or conversely what proportion of low risk women currently have a preference for birth in an obstetric unit with the associated reassurance of immediate access to medical staff.

Findings from the UK and elsewhere also suggest that preferences for some attributes have not been adequately explored. For example, with the exception of the study by Donaldson which did not investigate individual attributes, none of the stated preference studies explored attributes such as unit intervention rates or other attributes that women seeking a ‘non-medicalised birth’ might prefer. Further research exploring women’s preferences for settings achieving low intervention rates might be merited.

**Conclusions**

The findings of this review suggest that there are some service attributes that are valued by the vast majority of women. These include local services, being attended by a known midwife throughout labour and, for most but not all women, a preference for a degree of control and involvement in decision-making. Women’s views and preferences differ markedly for other attributes, such as availability and degree of involvement of medical staff, the availability of epidural vs. other pain relief options and a ‘homely’ vs. clinical appearance of the delivery rooms. This suggests that policy makers, commissioners and service providers might usefully consider how to extend the availability of services that most women value while offering a choice of options that enable women to access services that best fit their needs and preferences. However, there is good evidence that preferences are influenced by expectations so it is important to recognise that women’s preferences and the birth place decisions that they take may be influenced by the fact that OU births are currently the norm.
Abbreviations

OU, Obstetric Unit; FMU, Freestanding Midwifery Unit; AMU, Alongside Midwifery Unit; SCBU, Special Care Baby Unit; ISPOR, International Society for Pharmacoeconomics and Outcomes Research.

Additional Files

Additional file 1.docx Search and study selection strategy. Details of: search strategy, screening and study selection procedures.

Additional file 2.docx Description of included studies. Description of included quantitative studies – expanded version of table 1.

Additional file 3.docx Critical appraisal of included surveys. Includes critical appraisal findings for the seven included surveys and an overview of the strengths and limitations of the included surveys.

Additional file 4.docx Quality appraisal of stated preference studies. Describes the findings of the critical appraisal of the five included stated preference studies using an ISPOR checklist.

Additional file .docx Narrative summary of findings from each of the included studies. The file provides a table summarising results from each study relating to (a) stated preferences and (b) factors that women report influenced their choice of unit or birth setting.

Acknowledgements

This review is one component of the Birthplace Choices project. The Birthplace Choices co-investigators are: Jennifer Hollowell (PI), Lisa Hinton, Kirstie Coxon, Rachel Rowe, Oliver Rivero-Arias and Miranda Dodwell.

We thank Joanne Forsey for assistance with screening, Nia Roberts for her advice on the search strategy, and Rachel Rowe and Miranda Dodwell for helpful comments on the manuscript.
Funding

This paper reports on an independent study which is part funded by the Policy Research Programme in the Department of Health.

The review incorporates parts of a study commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England.

The views and opinions expressed in this paper are those of the authors and do not necessarily reflect those of the Department of Health or NHS England.

Competing Interests

The authors declare that they have no competing interests.

Contribution to Authorship

JH conceived and developed the outline for the overall Birthplace Choices project; JH, KC and RM developed the protocol for the study; RM developed and ran the database searches; JH, RM and YL carried out screening; JH and YL extracted data; YL, RM, JB and JH critically appraised the included studies; JH drafted the manuscript with input from all authors. All authors were involved in interpretation of data, review and revision of the draft manuscript and approval of the final version.

Details of Ethics Approval

Not applicable

Consent for publication

Not applicable

Availability of data and materials

No additional data are available.
References

1. National Institute for Health and Clinical Excellence: Clinical Guideline 190: Intrapartum care for healthy women and babies. 2014.
2. Department of Health: Maternity Matters: Choice, access and continuity of care in a safe service. London: Department of Health; 2007.
3. Department of Health: Changing Childbirth, Part 1: Report of the Expert Maternity Group. 1993.
4. Department of Health Social Services and Public Safety (DHSSPS): A Strategy for Maternity Care in Northern Ireland 2012-2018. Belfast. www.dhsspsni.gov.uk/publications/strategy-maternity-care-northern-ireland-2012-2018; DHSSPS; 2012.
5. The Maternity Services Action Group: A Refreshed Framework for Maternity Care in Scotland. The Scottish Government. http://www.gov.scot/Publications/2011/02/11122123/2; 2011.
6. Welsh Government: A strategic vision for maternity services in Wales. WG12896. Welsh Government. http://gov.wales/topics/health/publications/health/strategies/maternity/; 2011.
7. National Audit Office: Maternity Services in England. Report by the Comptroller and Auditor General. London: The Stationery Office; 2013.
8. Care Quality Commission: 2015 survey of women’s experiences of maternity care. Statistical release. http://www.cqc.org.uk/content/maternity-services-survey-2015; 2015.
9. Office for National Statistics: Birth Characteristics in England and Wales, 2014. ONS Statistical Bulletin 2015.
10. Dodwell M: Trends in Freestanding Midwife-led Units in England and Wales 2001-2013. Royal College of Midwives; 2013.
11. Cooke A, Smith D, Booth A: Beyond PICO: the SPIDER tool for qualitative evidence synthesis. Qualitative health research 2012, 22(10):1435-1443.
12. Centre for Evidence-Based Management (CEBMa): Critical Appraisal of a Survey. Critical appraisal tool: http://www.cebm.org/wp-content/uploads/Critical-Appraisal-Questions-for-a-Survey.pdf Accessed 9 September 2015.
13. Bridges JF, Hauber AB, Marshall D, Lloyd A, Prosser LA, Regier DA, Johnson FR, Mauskopf J: Conjoint analysis applications in health—a checklist: a report of the ISPOR Good Research Practices for Conjoint Analysis Task Force. Value in Health 2011, 14(4):403-413.
14. Thomas J, Brunton J, Graziosi S: EPPI-Reviewer 4.0: software for research synthesis. 2010.
15. Hundley V, Ryan M: Are women's expectations and preferences for intrapartum care affected by the model of care on offer? BJOG: an international journal of obstetrics and gynaecology 2004, 111(6):550-560.
16. Hundley V, Ryan M, Graham W: Assessing women's preferences for intrapartum care. Birth 2001, 28(4):254-263.
17. Ratcliffe J, Longworth L: Investigating the structural reliability of a discrete choice experiment within health technology assessment. International journal of technology assessment in health care 2002, 18(1):139-144.
18. Longworth L, Ratcliffe J, Boulton M: Investigating women’s preferences for intrapartum care: home versus hospital births. Health & social care in the community 2001, 9(6):404-413.
19. Donaldson C, Hundley V, Mapp T: Willingness to pay: a method for measuring preferences for maternity care? Birth 1998, 25(1):32-39.
20. Pitchforth E, Watson V, Tucker J, Ryan M, van Teijlingen E, Farmer J, Ireland J, Thomson E, Kiger A, Bryers H: Models of intrapartum care and women's trade-offs in remote and rural Scotland: a mixed-methods study. BJOG: An International Journal of Obstetrics & Gynaecology 2008, 115(5):560-569.
21. Emslie MJ, Campbell MK, Walker KA, Robertson S, Campbell A: Developing consumer-led maternity services: a survey of women's views in a local healthcare setting. *Health Expectations* 1999, 2(3):195-207.

22. Lavender T, Chapple J: How women choose where to give birth. *Practising Midwife* 2005, 8(7):10-15.

23. Rennie A-M, Hundley V, Gurney E, Graham W: Women's priorities for care before and after delivery. *British Journal of Midwifery* 1998, 6(7):434-438.

24. Rogers C, Harman J, Selo-Ojeme D: Perceptions of birth in a stand-alone centre compared to other options. *British Journal of Midwifery* 2011, 19(4):237-244.

25. van Haaren-ten Haken T, Pavlova M, Hendrix M, Nieuwenhuijze M, de Vries R, Nijhuis J: Eliciting Preferences for Key Attributes of Intrapartum Care in The Netherlands. *Birth* 2014, 41(2):185-194.

26. Hendrix M, Pavlova M, Nieuwenhuijze MJ, Severens JL, Nijhuis JG: Differences in preferences for obstetric care between nulliparae and their partners in the Netherlands: a discrete-choice experiment. *Journal of Psychosomatic Obstetrics & Gynecology* 2010, 31(4):243-251.

27. Pavlova M, Hendrix M, Nouwens E, Nijhuis J, van Merode G: The choice of obstetric care by low-risk pregnant women in the Netherlands: Implications for policy and management. *Health Policy* 2009, 93(1):27-34.

28. van Haaren-ten Haken T, Hendrix M, Nieuwenhuijze M, Budé L, de Vries R, Nijhuis J: Preferred place of birth: Characteristics and motives of low-risk nulliparous women in the Netherlands. *Midwifery* 2012, 28(5):609-618.

29. Grigg C, Tracy SK, Daellenbach R, Kensington M, Schmied V: An exploration of influences on women’s birthplace decision-making in New Zealand: a mixed methods prospective cohort within the Evaluating Maternity Units study. *BMC Pregnancy and Childbirth* 2014, 14(1):1-14.

30. Hoang H, Le Q: Trade-off between local access and safety considerations in childbirth: rural Tasmanian women’s perspectives. *The Australian journal of rural health* 2012, 20(3):144-149.

31. Murray-Davis B, McDonald H, Rietsma A, Coubrough M, Hutton E: Deciding on home or hospital birth: Results of the Ontario choice of birthplace survey. *Midwifery* 2014, 30(7):869-876.

32. Healthcare Commission: Towards better births A review of maternity services in England. 2008.

33. Redshaw M, Heikkila K: Delivered with care: a national survey of women’s experience of maternity care 2010. Oxford: The National Perinatal Epidemiology Unit; 2010.

34. Redshaw M, Henderson J: Safely delivered: a national survey of women’s experience of maternity care 2014. 2015.

35. Redshaw M, Rowe R, Hockley C, Brocklehurst P: Recorded delivery: a national survey of women’s experience of maternity care 2006. Oxford: The National Perinatal Epidemiology Unit; 2010.

36. Bourke G: Support Overdue: women’s experiences of maternity services. NCT and The National Federation of Women’s Institutes (NFWI); 2013.

37. Dodwell M, Gibson R: An investigation into choice of place of birth, London: NCT; 2009.

38. Evidence search, Health and social care (online database) [www.evidence.nhs.uk] Accessed 23rd November 2015

39. EThOS: UK E-Theses Online Service (online database) [http://www.bl.uk/reshelp/findhelpprestype/theses/ethos/] Accessed 23 November 2105

40. Birthplace in England Collaborative Group, Brocklehurst P, Hardy P, Hollowell J, Linsell L, Macfarlane A, McCourt C, Marlow N, Miller A, Newburn M et al: Perinatal and maternal outcomes by planned place of birth for healthy women with low risk pregnancies: the Birthplace in England national prospective cohort study. *BMJ* 2011, 343:d7400.
41. Hollowell J, Puddicombe D, Rowe R, Linsell L, Hardy P, Stewart M, Newburn M, McCourt C, Sandall J, Macfarlane A et al: The Birthplace national prospective cohort study: perinatal and maternal outcomes by planned place of birth. Birthplace in England research programme. Final report part 4. London: NIHR Service Delivery and Organisation programme; 2011.

42. Barber T, Rogers J, Marsh S: The birth place choice project: phase one. British Journal of Midwifery 2006, 14(10):609-613.

43. Barber T, Rogers J, Marsh S: Increasing out-of-hospital births: what needs to change? British Journal of Midwifery 2007, 15(1):16-20.

44. Redshaw M, Rowe R, Schroeder L, Puddicombe D, Macfarlane A, Newburn M, McCourt C: Mapping maternity care. The configuration of maternity care in England. Birthplace in England research programme. Final report part 3. London: NIHR Service Delivery and Organisation programme; 2011.
Table 1: Description of included quantitative studies

| Study          | Study context/objective                                                                                                                                                                                                 | Methods, sample characteristics, response rate and sample size                                                                                                                                                                                                                                                                                                                                 | Study period | Choices compared |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------|
| Donaldson (1998) | This study was conducted in Aberdeen (Scotland), an area with an OU and an AMU in the same hospital, to assess the feasibility of the use of 'willingness to pay' as a measure of women's strengths of preference for intrapartum care (OU vs. AMU). | **Methods**: Willingness to pay study designed to evaluate 'low risk' women's preference for type of intrapartum care (OU vs. AMU) at around the time of the booking visit. Questionnaires were mailed to 'low risk' women before booking.  
**Sample characteristics**: Women at 'low obstetric risk'. No details reported.  
**Response rate**: 75%, n=113 (only 102 questionnaires (69%) were used for analysis for various reasons). | May 1994 | Hypothetical attributes of OU vs. AMU. |
| Emslie (1999) | This study was conducted to explore women's preferences and experiences following the opening of an FMU in the study area (Peterhead near Aberdeen in Scotland). Women in this area had four choices: home birth, FMU and both OU and AMU available approximately 35 miles away in Aberdeen. A DOMINO (Domiciliary in and out) delivery service was also available to women registered with the FMU. The FMU was based in the Peterhead Community Hospital. The largest general practice is located in Peterhead with two rural practices in the surrounding area. | **Methods**: Questionnaire survey mailed to women in the FMU's catchment area at around 14 weeks gestation, at 36 weeks gestation and 6 weeks postnatally. This survey was one component of a mixed methods study.  
**Sample characteristics**: Over half (59%) of respondents (n=254) were registered with the main GP practice in the FMU catchment area; 41% of women were nulliparous; 70% were aged under 29 years and 28% were under 24 years of age.  
**Response rate**: 77% for 14 week survey, n=254. Of these 83% responded to 36 week survey, n=210. | January to December 1995 | Study focuses on FMU vs. hospital (OU/AMU) choices made by women in the catchment area of a newly opened FMU. |
| Hundley (2001) | Pilot study to explore feasibility of using discrete choice experiment to assess women's preferences for | **Methods**: Discrete choice experiment. Data were collected by postal questionnaire from women recruited at booking. | January to November 1999 | Study evaluates preferences |
| Study  | Study context/objective                                                                                                                                                                                                 | Methods, sample characteristics, response rate and sample size                                                                                                                                                                                                 | Study period  | Choices compared                                                                 |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------|
| Hundley (2004) | The study was conducted to investigate the effect of service provision on consumer preferences, in particular, whether women who have access to systems of care which offer particular attributes value these attributes more highly than women for whom the attributes are not a realistic option. Three groups of 'low risk' women participated from areas with different services available (OU/AMU, FMU and OU/AMU without an epidural service). The areas also differed in the degree of continuity of carer offered. For primary report see Hundley (2001). | *Methods:* Discrete choice experiment. Data were collected by postal questionnaire from women recruited at booking.  
*Sample characteristics:* See Hundley (2001) for characteristics of the overall sample. 'Low risk' women in the three study groups were similar, but there were more nulliparous women in the Aberdeen (OU/AMU) group and women in the Elgin (OU/AMU without an epidural service) group were less deprived. The Peterhead and Elgin groups were relatively small (n=48 and n=60) compared to the Aberdeen group (n=193).  
*Response rate:* Estimated response rate overall was 40%. Response rate varied by area (33% - 44%), n=301 (193 from the Aberdeen group, 48 from the Peterhead Group and 60 from the Elgin group). | January to November 1999 | Preferences for particular service attributes in women with access to: OU/AMU vs. FMU ~30 miles from OU/AMU vs. OU/AMU without an epidural service. |
| Lavender (2005) | This project was commissioned by the Department of Health (UK) to inform the Children’s National Service Framework. The aim was to identify models of maternity care which provide a safe, equitable and sustainable service that meets the needs of the current and future generations. | *Methods:* Questionnaire survey of pregnant women in a purposive sample of 12 maternity units in England. Units were included that offered different birth settings (home, FMU, AMU and OU) and varied in size (50 births to 6000 births). This survey was one component of a mixed methods study.  
*Sample characteristics:* Half (51%) of the 2071 questionnaires returned were from district general hospitals (presumed to be OUs), | January to March 2002 | Preferences for a range of service attributes. |
| Study               | Study context/objective                                                                 | Methods, sample characteristics, response rate and sample size                                                                                       | Study period   | Choices compared                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------|
| Pitchforth (2008)  | A discrete choice experiment to evaluate preferences for key attributes of intrapartum care in women living in remote rural areas in Scotland served by FMUs and small consultant units without neonatal facilities. | Methods: Discrete choice experiment.<br><br>Sample characteristics: The mean age of respondents was 30 years, 43% women had delivered their first baby.<br><br>Response rate: 62%, n=877 (including 22 of whom returned blank questionnaires). | April 2004 to January 2005 | Preference for hypothetical attributes of midwifery-led vs. consultant care                                                                         |
| Rennie (1998)      | A pilot study to identify women's preferences for aspects of intrapartum care and to evaluate whether they differ in the postnatal period compared with late pregnancy. | Methods: A questionnaire survey of pregnant women at around 34 weeks gestation, with a follow-up questionnaire 10 days after the birth.<br><br>Sample characteristics: Despite stratified sampling there was a preponderance of nulliparous women (65%); 81% of participants were married and two thirds (66%) were owner occupiers. Most (70%) were planning to attend antenatal education. The mean age of respondents was 27.<br><br>Response rate: 96% for the 34 week survey (n=207); 86% of respondents also completed the postnatal questionnaire (n=185). | February to March 1996 | Study focuses on service attributes preferred antenatally vs. postnatally.                                                                           |
| Study          | Study context/objective                                                                                                                                                                                                 | Methods, sample characteristics, response rate and sample size                                                                                                                                                                                                 | Study period | Choices compared |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------|
| Rogers (2011) | This study was conducted to evaluate the viability of converting an AMU in outer London to an FMU following the planned closure of the OU in the hospital. The study focused on whether users of the existing AMU would choose the new FMU or would look for an alternative. | **Methods:** A questionnaire survey conducted amongst a cross-sectional sample of 'AMU users': women who were either booked, considering booking or who had given birth at the AMU situated in a hospital where a relocation of the OU was planned.  
**Sample characteristics:** The majority of study participants were pregnant (89%) and the remaining 11% had just had a baby. Sixty percent of participants were nulliparous.  
**Response rate:** 53%, n=121.                                                                                                               | October 2009 | AMU vs. FMU       |

Note that for some studies, the calculation of response rates varied between reports. In these instances we directly quote the response rate reported by the authors.
Table 2: Maternity service attributes used to assess preferences in the included studies

| Study & method | Preferences evaluated |
|---------------|-----------------------|
| **Donaldson (1998)** | Labour ward vs. midwives unit |
| *Willingness to pay* | Labour ward characterised as: |
| | - Doctors more likely to be involved in decision-making; midwives involved but women will not see the same midwife all the time; Electronic fetal monitoring; because of monitoring/other reasons 1 in 2 women have limitations on movement during labour; 1 in 12 women try alternative positions for delivery; 1 in 5 have an epidural; 1 in 3 have episiotomy |
| | Midwives unit characterised as: |
| | - Decisions made by women and midwives; most care from one midwife; traditional fetal monitoring, transfer to labour ward needed if continuous monitoring required; 1 in 4 women transferred to labour ward for electronic monitoring; because of monitoring/other reasons 1 in 3 have limitations on movement during labour; 1 in 8 try alternative positions for delivery; all types of pain relief available but transfer to labour ward required for epidural; 1 in 7 have an epidural; 1 in 4 have episiotomy |
| **Emslie (1999)** | Features of place of birth rated by women at 14 and 36 weeks (selected list – not all reported) |
| *Questionnaire survey - longitudinal follow-up* | - Quiet atmosphere |
| | - Baby with you at all times |
| | - Availability of specialist facilities |
| | - Convenience for visitors |
| | - Choices in pain relief |
| | - Choices in delivery |
| | Aspects of labour management rated by women (at 36 weeks): |
| | - Partner being there |
| | - Availability of specialist staff/equipment |
| | - Being kept informed |
| | - Being involved in decisions |
| | - Time alone with partner |
| | - Choice of pain relief |
| | - Freedom to choose different positions |
| | - Handed baby immediately |
| | - Cared for by known staff |
| | - Not being left alone |
| | - Homely atmosphere |
| | - Cared for by named midwife |
| | - Being introduced to people |
| | - Provision of music/TV |
| **Hundley (2004), Hundley (2001)** | Continuity (midwife): |
| | - Meet midwife antenatally, same midwife present throughout labour/birth vs. meet team of midwives antenatally, one present |
| Study & method | Preferences evaluated |
|----------------|-----------------------|
| **Discrete choice experiment** | throughout labour/birth vs. previously unknown midwife but present throughout labour/birth vs. midwives working shifts may change during labour/birth |
| Pain relief: | All methods except epidural vs. all methods available but epidural requires transfer vs. all methods available. |
| Fetal monitoring: | Continuous, movement may be restricted during labour vs. intermittent unless complications develop, then continuous if required |
| Appearance of room: | Homely vs. clinical appearance |
| Medical staff: | Involved in care vs. only involved if complications develop |
| Decision-making: | staff make decisions vs. staff make decisions but keep woman informed vs. staff discuss things with women before deciding vs. staff give woman assessment, woman in control of decisions |
| **Lavender (2005) Questionnaire survey** | Women were asked to state their level of agreement/disagreement with the following: |
| | - It is not important for me to have my baby in the same place as I receive antenatal care |
| | - It is important that my antenatal appointments are at a location close to where I live |
| | - I would be willing to travel if it meant I would receive higher quality care for my baby and me around the time of birth |
| | - It is important to me that a midwife helps me to give birth to my baby even if complications develop |
| | - I would feel unsafe if a specially trained doctor was not immediately available when I am in labour |
| | - It is not important to me that a midwife I know helps me to give birth to my baby |
| | - It is important to me that a special care baby unit is in the same place that I give birth |
| | - It is important to me to be able to have an epidural at any time of day or night |
| | - It is important to me that a pool is available for my labour/birth |
| | - I want to be looked after by midwives and not have doctors involved |
| | - I would not want to transfer to a hospital a few miles away if my baby or I develop a problem |
| **Longworth (2001) Conjoint analysis** | Continuity: |
| | - Have not met midwives prior to labour vs. have met midwives but don’t know them well vs. know midwives well |
| Location: | Labour ward vs. maternity unit with a home-like environment vs. home |
| Study & method | Preferences evaluated |
|----------------|------------------------|
| **Pain relief:** | - Gas & air/breathing only, no epidural, no birthing pool vs. gas & air and birthing pool, no epidural vs. all options including epidural |
| Decision-making during labour and delivery: | - Midwives and doctors will decide vs. decisions will be made jointly following discussion vs. woman will make own decisions |
| Probability of transfer to another hospital during labour | - No need for transfer if problems develop vs. low probability of transfer vs. high probability of transfer |
| **Pitchforth (2008)** | **Discrete choice experiment** |
| **Rennie (1998)** | **Questionnaire survey** |
| **Aspects of intrapartum care rated by study participants:** | - Birth companion |
| - Known midwife | - In control |
| - Few interventions | - Able to do what you want |
| - Same midwife in labour | - Not to lose control of behaviour |
| - Preferences and wishes followed | - Attendance of midwife: |
| - **Option for pain relief:** | o all the time vs. easy access vs. present only when I say |
| - **Information:** | o constant flow vs. staff to decide vs. only when asked for |
| - **Decision-making in labour:** | o pain-free with drugs vs. minimum drugs vs. drug free labour/other |
| - Staff decides vs. reach decision together vs. woman decides | **Rogers (2011)** |
| **Questionnaire survey** | Women who would use the local AMU when it becomes a stand-alone unit (FMU) were asked to select reasons for their choice: |
| - Easy to get to | - Physical environment |
| - Previous bad experience | - Previous good experience |
| - Can use water in labour and for birth | - Wants natural childbirth |
| - Homely/small | - Family can be involved |
| - Other | **Women who would not use the local AMU when it becomes a stand-** |
alone unit were asked to select reasons for their choice:
- Difficult to get to
- Want an epidural
- Feel safer
- Previous bad experience
- Previous good experience
- Physical environment
- Pressure from partner/family/friends
- Would prefer a midwife-led unit on the same site as the hospital labour ward
- Concern about transfer

¹ Note: In Pitchforth’s study, ‘pain relief’ was primarily included to ensure that respondents realised that an epidural was only available with consultant-led care. As such, the levels for this attribute varied in tandem with the levels of the ‘Staff involved’ attribute: the only options that respondents saw were either ‘Midwife-managed care’ and ‘No epidural available’ or ‘Consultant-led care’ and ‘All methods of pain relief’.
Table 3: Summary of main findings

| Attribute of care                        | Women’s birth place preferences                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Pain relief**                          | Women attach considerable importance to the availability of pain relief options. Some wish to have access to an epidural if needed, without necessarily intending to have one. Pain relief preferences appear to be influenced by women’s expectations of the options available to them.                                                                                                                                                  |
| **Medical staff involvement/availability**| A substantial proportion of women have a strong preference for care in a hospital setting where medical staff are not necessarily involved in their care, but are readily available. Ethnic minority women may be more likely to prefer a hospital birth and to have a range of medical facilities available on site.                                                                                                          |
| **‘Homely’ environment/atmosphere**      | Women tend to prefer more homely environments but preferences may to be weaker than for other attributes.                                                                                                                                                                                                                                                      |
| **Style of decision-making**             | Many women attach considerable importance to models of decision-making in which the woman is involved in decisions about her care.                                                                                                                                                                                                                                 |
| **Distance**                             | Proximity of services and/or travel time are important considerations for most women. Many women have a preference for a local unit and in some instances will trade off other preferences in order to attend a local unit, but women who have a strong preference for a consultant-led unit (or for specific services only available in a hospital with an OU) will travel further in order to access a unit where they feel safe. Women living in remote areas may accept long travel times whereas women living in urban areas where hospitals are typically closer may be less prepared to travel. Nulliparous women may be willing to travel further to a maternity unit that they perceive provides ‘higher quality care’. |
| **Transfer**                             | Women who prefer a hospital birth tend to express concern about transfer, whereas women who prefer a midwifery-led setting tend to be less concerned about transfer.                                                                                                                                                                                                 |
| **Other**                                | Having a birth companion present, information and being kept informed, a quiet atmosphere, and having a special care baby unit (SCBU) on site are amongst other attributes found to be important.                                                                                                                                                                                                 |

References identified through database searching (n = 3972) → Duplicated references removed (n=989)

References after duplicates removed (n=2983) → References excluded based on title & abstract screening (n=2911)

Title & abstracts screened (n=2983) → Full-text articles assessed for eligibility (n=72)

Full-text articles assessed for eligibility (n=72) → Full-text articles excluded with reasons (n=63):
- Off topic (27)
- Study design ineligible (29)
- Study sample ineligible (1)
- Not full primary research report (2)
- Incidental data/focus not on preferences (4)

Articles from hand searching reference lists (n=1) → Eligible articles from full-text screening (n=9)

Eligible articles included in synthesis (n=10 articles, n=9 studies)
### Additional file 2: Additional details of included study methods

| Study ID   | Study methods                                                                                                                                                                                                 |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Donaldson (1998)** | Willingness to pay study designed to evaluate 'low risk' women's preference for type of intrapartum care (OU vs. AMU) at around the time of the booking visit. Respondents were provided with a description of the key features of the two types of unit (including style of decision-making, one-to-one care from a midwife, electronic vs. 'traditional' fetal monitoring) and quantitative information about, for example, the chances of transfer, the proportions of women able to move around freely, having an epidural, transferred for an epidural. ‘Low risk’ women were mailed the questionnaire before booking with two subsequent reminders sent three and six weeks later, possibly after the booking visit. |
| **Emslie (1999)** | For the survey component of the study, questionnaires were mailed to women in the FMU’s catchment area at around 14 weeks gestation with one reminder letter sent after three weeks. Further questionnaires were sent at 36 weeks gestation and 6 weeks postnatally. This survey was one component of a mixed methods study. |
| **Hundley (2001)** | A discrete choice experiment in which ‘low risk’ pregnant participants were asked to choose between pairs of hypothetical scenarios. These scenarios were based on attributes identified in the literature as potentially important to women and which could vary between units. The attributes covered: continuity of carer (four levels varying in the extent to which the woman would know the midwife providing labour care); pain relief (three levels: all methods, all methods but transfer required for epidural, all methods other than epidural); type of fetal heart rate monitoring (continuous vs. intermittent), appearance of room (homely vs. clinical), involvement of medical staff (yes, vs. only if required), and involvement in decision-making (four levels ranging from no involvement to women deciding). ‘Low risk’ women were recruited at booking in three areas in Grampian (Scotland). Data were collected by postal questionnaire. A reminder system was not possible for data protection reasons. |
| **Hundley (2004)** | A discrete choice experiment in which ‘low risk’ pregnant participants were asked to choose between pairs of hypothetical scenarios. These scenarios were based on attributes identified in the literature as potentially important to women and which could vary between units. See Hundley (2001) for details. Three groups of women were recruited at booking: (a) women booking at Aberdeen Maternity Hospital who were eligible for AMU care; (b) women booked at the FMU in Peterhead Community Hospital; and (c) ‘comparable’ women booked at Dr Gray's Hospital, Elgin, a hospital providing ‘shared care’ (obstetricians and midwives at the hospital and GP/midwives in the community) with medical interventions available but without an epidural service. Data were collected by postal questionnaire. A reminder system was not possible for data protection reasons. |
| **Lavender (2005)** | A survey of pregnant women in a purposive sample of 12 maternity units in England. Units were sampled to ensure the inclusion of units serving women from various socio-economic/ethnic backgrounds and from urban and rural areas. |
| Study ID     | Study methods                                                                                                                                                                                                 |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | Units were included that offered different birth settings (home, FMU, AMU and OU) and varied in size (50 births to 6000 births). The study sample appears to have been a cross-sectional sample of women receiving antenatal care. The survey questionnaire included both open and closed questions and a series of statements that women were asked to either agree or disagree with. This survey was one component of a mixed methods study. |
| Longworth (2001) | The study used conjoint analysis to assess preferences for different aspects of intrapartum care comparing women actively choosing home birth to women who had booked for a hospital delivery. Literature and focus groups were used to identify attributes that were important to women. Scenarios based on these attributes were developed covering: continuity of contact with the same midwifery staff (unknown midwife, have previously met midwives, midwife well known to woman), location (labour ward, midwifery unit, home), pain relief (gas and air only, gas and air+ birthing pool, all types of pain relief including epidural), decision-making (by medical staff, shared, by woman), transfer (none, low probability, high probability). Two samples of women were selected from each of the two maternity units: (a) women who had booked for a home delivery; (b) 'low risk' women who had booked for a hospital delivery. The women appear to have been surveyed by postal questionnaire postnatally with one reminder sent to non-respondents after 4 weeks. |
| Pitchforth (2008) | The study involved a discrete choice experiment in which women were asked to choose between hypothetical scenarios. Three attributes were varied in eight different scenarios: type of unit (midwife-led (MU) vs. consultant-led (OU)), pain relief (all methods vs. no epidural) and travel time to unit (home (0 mins) vs. 30 mins from home vs. 60 mins vs. 90 mins vs. 120 mins). Eight small maternity units (<300 births per annum) were purposively selected to provide a spread of staffing/service models. The sample included four community FMUs and one FMU adjacent to a non-obstetric hospital, one GP-run community maternity unit, and two consultant-led units (OUs) both without neonatal facilities. Women resident in the catchment areas of these units who gave birth in the study period were sent a postal questionnaire six weeks after the birth with one reminder two weeks later. Women who had delivered in three non-study obstetric units in the region were included. These non-study OUs included two with neonatal facilities and one without. Data were also collected from medical notes on participants' risk status during pregnancy and at the time of the birth. |
| Rennie (1998) | A questionnaire survey in which a stratified sample of women expecting a first or second baby, living within Aberdeen city and booked for delivery in Aberdeen Maternity Hospital (OU or AMU) were recruited in antenatal care at 34 weeks. A follow-up questionnaire was given to women to complete at home 10 days after the birth. Follow-up of non-responders included an initial telephone call and a second postal reminder if required and was the same antenatally and postnatally. Additional data were extracted from medical notes. |
| Study ID | Study methods |
|----------|---------------|
| Rogers (2011) | A questionnaire survey was conducted amongst a cross-sectional sample of 'AMU users': women who were either booked, considering booking or who had given birth at the AMU situated in a hospital where a relocation of the OU was planned. |
Additional file 1: Search and study selection strategy

The quantitative systematic review of birth place preferences was one component of a broader systematic review which also encompasses the qualitative evidence relating to factors that may affect women’s choice of place of birth, including beliefs, preferences, knowledge and experience. Some aspects of the methods reflect the fact that searches were common to both the quantitative and the qualitative reviews.

The search strategy was designed to identify research studies within the scope of the broader review irrespective study design and screening was conducted by sequentially applying the criteria applicable to each component of the broader review as described below. Researchers who were part of the broader research team Kirstie Coxon (KC), the lead author of the qualitative review, Alison Chisholm (AC), a qualitative researcher, and Joanne Forsey (JF), a midwife and MRes student at City University were involved in screening in addition to the authors of the present study.

1. Search strategy

We used the a search strategy based on the SPIDER tool [1]

| SPIDER Tool        | Search Terms relating to:                                                                 |
|--------------------|------------------------------------------------------------------------------------------|
| Sample             | Pregnant women                                                                          |
|                    | Matern* or pregnan* OR women                                                            |
|                    | Pregnant women/                                                                          |
|                    | Mothers/                                                                                 |
| Phenomenon of      | Maternity unit/midwifery unit/birth centre/home birth/intrapartum care/place of birth    |
| interest           | Maternity adj2 (care or unit* or setting? Or center? Or centre? Or hospital? Or service*)|
|                    | obstetric adj2 (unit? or center? Or centre?)                                              |
|                    | midwi* adj2 (unit? or center? Or centre?)                                                 |
|                    | Home birth* or home childbirth or home delivery                                           |
|                    | birth adj2 (unit? or center? Or centre? Or place)                                         |
|                    | intrapartum care                                                                         |
|                    | Place of birth                                                                           |
|                    | Birthing Centers/                                                                        |
|                    | Delivery Rooms/                                                                          |
|                    | Home Childbirth                                                                         |
| Design             | NA                                                                                       |
| Evaluation         | Preferences/choice/experiences/decisions/views/influences/experiences/attitudes/expectations |
|                    | Prefer* or choice* or choos* or option? Or decision* or decid* or view* or experience* or need* or suggest* or influenc* or attitude* or satisf* or value* or expectation* or inform* or advice*or consum* or “Consumer – led” |
| Research setting   | United Kingdom/Great Britain/England/Scotland/Northern Ireland/United Kingdom/British/NHS |
|                    | United kingdom or uk or britain or gb or england or wales or scotland or northern ireland or british or nhs or national health service or Great Britain |
Databases searched

- Applied Social Science Index and Abstracts (ASSIA)[Proquest]
- Cumulative Index to Nursing and Allied Health (CINAHL) plus [EBSCOHost]
- EMBASE [OvidSP]
- Medline [OvidSP]
- PsycINFO [OvidSP]
- Science Citation Index [Web of Science Core Collection]
- Social Sciences Citation Index [Web of Science Core Collection]

Databases were searched in mid-March 2015.

2. Screening and study selection

Two reviewers independently screened titles and abstracts and full text as required. As noted above, because this review was conducted as one component of a broader systematic review the screening was conducted by sequentially applying the criteria applicable to each component of the review, with reviewers working in pairs. Screening was conducted as follows:

Stage 1: Jennifer Hollowell (JH) and JF screened all titles and abstracts applying only the exclusion criteria relating to country, broad topic of research, type of report and study population. Only references independently excluded by both reviewers were excluded. Remaining references were re-screened in stage 2.

Stage 2: Remaining titles/abstracts (n= 487) were re-screened by KC and JH who applied the screening criteria for the broader review, but did not exclude studies solely on the basis of design (i.e. qualitative, mixed-methods and quantitative studies were included). Discrepancies were resolved by discussion. Full-text articles (n=72) were retrieved for the remaining studies.

Stage 3 (qualitative review): JH and KC read and independently screened the full-text articles to identify eligible qualitative and mixed-methods studies. Discrepancies were resolved by discussion, with a third reviewer (AC) involved as required. During this screening process, JH and KC flagged all potentially eligible quantitative and mixed-methods studies.

Stage 4 (quantitative review): JH and Reem Malouf (RM) independently screened the full-text articles flagged at stage 3 to identify eligible quantitative studies. Discrepancies were resolved by discussion, with a third reviewer Yangmei Li (YL) involved as required.

References

1. Cooke A, Smith D, Booth A: Beyond PICO: the SPIDER tool for qualitative evidence synthesis. Qualitative health research 2012, 22(10):1435-1443.
Additional file 3. Critical appraisal of included studies

Based on a modified version of the Centre for Evidence Based Management ‘Critical Appraisal of a survey’ tool. Modified wording of appraisal questions is shown in italics.

Table 1. Critical appraisal of included surveys

| Appraisal question                                                                 | Donaldson (1998) | Emslie (1999) | Lavender (2005) | Hundley (2001) | Hundley (2004) | Rennie (1998) | Rogers (2011) |
|-----------------------------------------------------------------------------------|-------------------|----------------|-----------------|----------------|----------------|----------------|----------------|
| 1. Did the study address a clearly focused question relating to birth place preferences? | Y                 | Y              | Y               | Y              | Y              | (Y)            | Y              |
| 2. Is the research method (study design) appropriate for answering the research question? | Y                 | Y              | Y               | Y              | Y              | Y              | Y              |
| 3. Is the method of selection of the participants (employees, teams, divisions, organizations) clearly described? | Y                 | Y              | (Y)             | Y              | Y              | Y              | Y              |
| 4. Could the way the sample was obtained be free from (selection) bias?            | (Y)              | (Y)            | (Y)             | (Y)            | (Y)            | N              | N              |
| 5. Was the sample of participants representative with regard to the population to which the findings will be referred? | (Y)              | (Y)            | (Y)             | (Y)            | (Y)            | N              | (Y)            |
| 6. Was the sample size based on pre-study considerations of statistical power?     | ?                | ?              | ?               | Y              | Y              | ?              | ?              |
| 7. Was a satisfactory response rate achieved?                                     | Y                 | Y              | Y               | N              | N              | Y              | N              |
| 8. Are the measurements (questionnaires) likely to be valid and reliable?          | ?                | ?              | Y               | Y              | Y              | Y              | (Y)            |
| 9. Was the statistical significance assessed?                                     | (Y)              | (Y)            | (Y)             | N              | Y              | Y              | Y              |
| 10. Are confidence intervals given for the main descriptive survey results?       | N                | N              | N               | N              | N              | N              | N              |
| 11. Was the sample size adequate?                                                 | N                | N              | Y               | (Y)            | (Y)            | N              | N              |
| 12. Can the results be generalized to UK low risk women in general or to other specific groups of women? | N                | N              | (Y)             | N              | N              | N              | N              |
Studies conducted by Longworth et al. (2001) and Pitchforth et al. (2008) were not included in this appraisal because no descriptive survey data on preferences were reported. See supplementary file 4 for critical appraisal of stated preference studies.

Table 2. Summary description of strengths and limitation of the included surveys

| Study         | Description                                                                 |
|---------------|-----------------------------------------------------------------------------|
| Donaldson     | Single centre, relatively small sample size, good response rate. No confidence intervals reported for descriptive statistics. |
| Emslie        | Single area, relatively small sample size, good response rate in early pregnancy survey, lower response rate in follow-up survey at 36 weeks. |
| Lavender      | Survey based on nationally representative sample of units with apparently adequate response rate, but uncertainty about possible selection bias. Limited statistical analysis and no confidence intervals presented for descriptive statistics. |
| Hundley 2001  | Single region with three centres. Poor response rate, relatively small sample, no confidence intervals. |
| Hundley 2004  | See Hundley 2001.                                                            |
| Rennie        | Relatively small, single centre study with good response rate. Questionnaire not well described making some results difficult to interpret. |
| Rogers        | Small single centre study with relatively low response rate.                 |

---

1 [http://www.cebma.org/wp-content/uploads/Critical-Appraisal-Questions-for-a-Survey.pdf](http://www.cebma.org/wp-content/uploads/Critical-Appraisal-Questions-for-a-Survey.pdf)
**Additional file 4: Quality appraisal of stated preference studies**

**Methods**

Five papers reporting stated preference studies were identified by the systematic review – four discrete choice experiments (DCEs) and one willingness-to-pay (WTP) study [1-5]. The quality of the methods used in each of these studies was evaluated using the guidelines for conjoint analysis developed by the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Preference-based Methods Special Interest Group’s Conjoint Analysis Working Group [6]. The authors of these guidelines note that although the term ‘conjoint analysis’ is used, the guidelines are equally applicable to DCE studies.

These guidelines present a checklist which contains 30 items, spread over 10 broad research questions (Table 1). For each item on the checklist, studies were assigned a score of one if it was fully addressed, 0.5 if it was partially addressed, zero if it was not addressed, or no score if the item was not applicable (N/A). All items were weighted equally and studies were classified as low quality (fulfilled <50% of applicable quality criteria), average quality (fulfilled between 50% and 80% of applicable criteria), or high quality (fulfilled >80% of applicable criteria) [7].

Each of the papers evaluated in the quality appraisal presented specific challenges. These are discussed below.

**Hundley et al. (2001) and Hundley and Ryan (2004) [2, 3]**

These papers use the same dataset to address two different research questions. As a result, both papers were scored separately in this review. However, credit was given to the later paper if readers were referred to the earlier paper for specific pieces of information that addressed the quality criteria.

**Donaldson et al. (1998) [1]**

This paper does not report the results of a DCE or conjoint analysis, rather respondents are asked just one WTP question. As a quality checklist specifically for WTP studies was not identified in the literature, the Bridges et al. checklist was adapted in order to evaluate this paper. Only those quality criteria which were not DCE specific were considered (18 of the original 30 criteria), with the quality score expressed as a percentage of these criteria only. Some criteria were DCE specific but could be adapted to consider WTP studies instead (e.g. item 1.3). This paper was therefore assessed against an adapted version of these items.

**Longworth et al. (2001) [4]**

This paper reports the main results of a DCE study. It was supplemented in 2002 by a paper by Ratcliffe and Longworth which considered a specific issue concerning DCE experiment design [8]. This second paper was not included in the quality appraisal due to its methodological focus, but it was reviewed in order to assess whether any additional information was provided which might change the quality score given to the Longworth et al. (2001) paper. However, no additional information was identified.

**Pitchforth et al. (2008) [5]**
This paper reports the main results of a DCE study. It was supplemented in 2009 by a paper, again by Pitchforth and colleagues, which reported the results of qualitative work undertaken alongside the DCE [9]. This second paper was not included in the quality appraisal as it did not report stated preferences, but it was reviewed in order to assess whether any additional information was provided which might change the quality score given to the Pitchforth et al. (2008) paper. However, no additional information was identified.

Analysis

The scores for each paper were calculated individually and then combined in order to calculate an unweighted average quality score across all five studies. As this average score will be biased by the inclusion of two studies using the same dataset [2, 3], an adjusted average was also calculated by combining the quality scores for these two papers (taking the highest score for each item across the two papers) and then calculating an overall score. The percentage of studies meeting each of the thirty criteria in the Bridges et al. checklist was also calculated. Finally, the results were analysed at the broader research question level in order to identify any general patterns across all the studies.

Results

Tables 2 and 3 present the quality scores for all studies, broken down by item and by research question. The appendix contains the detailed checklists completed for each paper. The mean quality score was 55% (range: 44-61%), indicating an evidence base of average quality. When the two Hundley studies were considered as one study, the score for this combined study was 68%, which raised the average quality score across all papers to 56%.

A number of quality criteria were met by most if not all studies. No studies included an opt-out (item 3.3) but this decision was justified in all cases. Almost all studies appropriately justified the sampling strategy that was used (item 7.1), and study limitations, generalisability and implications were generally adequately discussed (items 9.3 and 10.3). However, several quality criteria were met by very few studies. No studies justified the number of attributes or profiles in each choice task (items 3.1 and 3.2), only one study partially described the study data collection instrument and methods (item 10.2) and only one study partially evaluated the properties of the experimental design (item 4.2). Other general weaknesses included a lack of justification for attribute selection (item 2.2), experimental design (item 4.1) or mode of administration (item 7.2), and little consideration of the quality of responses (item 8.2). Specific comments regarding the quality of each paper are provided in the following section.

Hundley et al. (2001) and Hundley and Ryan (2004) [2, 3]

Hundley et al. (2001) is a paper of average quality, with a score of 61%. This paper scored highly on criteria related to the data collection plan: the sampling strategy was broadly justified, all key limitations were noted, and the mode of administration was probably appropriate. Other strengths included the use of additional qualifying questions, the overall level of burden of the data-collection instrument and the inclusion of a comprehensive discussion section which covered study limitations, generalisability and implications. This paper scored poorly on criteria related to the construction of choice tasks, with no justification provided for the number of attributes and profiles selected. Other limitations included a poorly described data-collection instrument and a limited discussion of issues surrounding the experimental design.

Hundley and Ryan (2004) is also a paper of average quality, with a score of 61%, and shares similar strengths and weaknesses with Hundley et al. (2001). The key differences are that in this later study
the research question and study importance are more precisely defined, but less information is provided on the experimental design and the quality of the responses received. The combined quality score across both Hundley papers is 68%, which indicates that taken as a whole, this study is of average quality.

Donaldson et al. (1998) [1]

This is a low quality paper, with a score of 44%, although it should be noted that this was a WTP study, so only 18 of the 30 DCE quality criteria were relevant. Only three criteria were fully met: the study rationale was described in detail, the WTP questions were explained well, and the study limitations and generalisability were adequately discussed. Numerous criteria were only partially met (or not met at all), and the data collection plan was particularly poorly described (items 7.1, 7.2 and 7.3).

Longworth et al. (2001) [4]

This is a paper of average quality, with a score of 57%. This paper scored highly on criteria related to the definition of the research question and the level of justification provided for the use of a DCE. Other strengths included the justification of the sampling strategy and the use of additional qualifying questions to place the DCE results in context. This paper scored poorly on criteria related to the study presentation, the construction of the choice tasks and the experimental design process. In addition, little information was provided on study limitations and generalisability.

Pitchforth et al. (2008) [5]

This is a low quality paper, with a score of 48%. This paper scored highly on criteria related to the validity of the results and conclusions and the overall presentation of the study. Respondent characteristics were also considered in detail in the analysis. However, this paper scored poorly on criteria related to the selection of attributes and levels, the construction of the choice tasks and appropriate elicitation of preferences.

Summary

These results indicate that the stated preference evidence base in this context is of average quality. However, a number of caveats should be noted. First, a checklist published in 2011 was used to evaluate the quality of each paper. This checklist reflects the latest consensus regarding good practice in this field but all of the papers included in this quality appraisal were published before the checklist was devised, hence it is not unreasonable that these papers do not meet all of the quality criteria. Second, when papers have not met one of the items on the checklist this may not necessarily indicate poor quality, rather it may reflect practical issues. For example, it is now common practice for papers reporting the results of DCE studies to publish data collection instruments as electronic supplementary materials. However, this was not necessarily possible for older DCE studies. Finally, some of the DCE studies reported relatively simple experimental designs and did not estimate complex regression models. However, methods for selecting experimental designs have evolved considerably in the past decade, and new approaches for estimating choice models have also been developed (e.g. latent class analysis). Again, it is not necessarily unreasonable that these papers have not met these quality criteria when judged by the very latest standards.
Table 1: Checklist items

| Research question | Item |
|-------------------|------|
| 1. Was a well-defined research question stated and is conjoint analysis an appropriate method for answering it? | 1.1 Were a well-defined research question and a testable hypothesis articulated? |
|                   | 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? |
|                   | 1.3 What is the rationale for using conjoint analysis to answer the research question? |
| 2. Was the choice of attributes and levels supported by evidence? | 2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? |
|                   | 2.2 Was attribute selection justified and consistent with theory? |
|                   | 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? |
| 3. Was the construction of tasks appropriate? | 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? |
|                   | 3.2 Was the number of profiles in each conjoint task justified? |
|                   | 3.3 Was (should) an opt-out or a status-quo alternative (be) included? |
| 4. Was the choice of experimental design justified and evaluated? | 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? |
|                   | 4.2 Were the properties of the experimental design evaluated? |
|                   | 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? |
| 5. Were preferences elicited appropriately, given the research question? | 5.1 Was there sufficient motivation and explanation of conjoint tasks? |
|                   | 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? |
|                   | 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? |
| 6. Was the data collection instrument designed appropriately? | 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? |
|                   | 6.2 Were the attributes and levels defined, and was any contextual information provided? |
|                   | 6.3 Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? |
| 7. Was the data-collection plan appropriate? | 7.1 Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? |
|                   | 7.2 Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? |
|                   | 7.3 Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? |
| 8. Were statistical analyses and model estimations appropriate? | 8.1 Were respondent characteristics examined and tested? |
|                   | 8.2 Was the quality of the responses examined (for example, rationality, validity, reliability)? |
|                   | 8.3 Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately? |
| 9. Were the results and conclusions valid? | 9.1 Did study results reflect testable hypotheses and account for statistical uncertainty? |
|                   | 9.2 Were study conclusions supported by the evidence and compared with existing findings in the literature? |
|                   | 9.3 Were study limitations and generalisability adequately discussed? |
| 10. Was the study presentation clear, concise, and complete? | 10.1 Was study importance and research context adequately motivated? |
|                   | 10.2 Were the study data-collection instrument and methods described? |
|                   | 10.3 Were the study implications clearly stated and understandable to a wide audience? |
Table 2: Summary of quality scores for all studies, by item

| First author | Year | Score for each item | Total score | Max score | %* |
|--------------|------|---------------------|-------------|-----------|----|
|              |      | 1.1 | 1.2 | 1.3 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 | 4.3 | 5.1 | 5.2 | 5.3 | 6.1 | 6.2 | 6.3 | 7.1 | 7.2 | 7.3 | 8.1 | 8.2 | 8.3 | 9.1 | 9.2 | 9.3 | 10.1 | 10.2 | 10.3 |
| Hundley      | 2001 | ½  | ½  | ½  | ½  | 0   | 1   | 0   | 0   | 1   | ½  | ½  | 1   | ½  | 1   | ½  | 1   | ½  | 1   | ½  | 1   | 0   | 1   | 17  | 28  | 61%  |
| Hundley      | 2004 | 1   | 1   | ½  | ½  | 0   | 1   | 0   | 0   | 1   | ½  | ½  | 1   | ½  | ½  | 0   | ½  | 1   | ½  | 0   | 1   | 0   | 17  | 28  | 61%  |
| Donaldson    | 1998 | ½  | 1   | 0   | 0   | 1   | 0   | 0   | 0   | 1   | ½  | ½  | 1   | ½  | 1   | ½  | 1   | ½  | 1   | ½  | 0   | 1   | 1   | 1   | 17  | 28  | 61%  |
| Longworth    | 2001 | 1   | 1   | ½  | ½  | 0   | 1   | ½  | 0   | ½  | 1   | ½  | ½  | 1   | ½  | ½  | 0   | ½  | 1   | ½  | ½  | 0   | 1   | 1   | 17  | 28  | 61%  |
| Pitchforth   | 2008 | 0.5 | ½  | 0   | 0   | ½  | 0   | 0   | 0   | ½  | ½  | ½  | 0   | ½  | ½  | 0   | ½  | 1   | ½  | ½  | 0   | 1   | 0   | 1   | 17  | 28  | 61%  |

*Studies classified as low quality (fulfilled <50% of applicable quality criteria), average quality (fulfilled between 50% and 80% of applicable criteria) or high quality (fulfilled >80% of applicable criteria)

Table 3: Summary of quality scores for all studies, by research question

| First author | Year | % of criteria which were fully met |
|--------------|------|-----------------------------------|
|              |      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Hundley      | 2001 | 50% | 50% | 33% | 67% | 75% | 75% | 63% | 67% | 67% | 50% |
| Hundley      | 2004 | 83% | 50% | 33% | 33% | 75% | 75% | 63% | 33% | 83% | 67% |
| Donaldson    | 1998 | 50% | -  | -  | -  | -  | 50% | 50% | 17% | 50% | 50% |
| Longworth    | 2001 | 100% | 67% | 33% | 33% | 75% | 50% | 67% | 67% | 67% | 17% |
| Pitchforth   | 2008 | 50% | 33% | 33% | 17% | 25% | 100% | 50% | 50% | 83% | 67% |
| Overall      |      | 67% | 50% | 33% | 38% | 60% | 69% | 60% | 54% | 70% | 50% |
References

1. Donaldson C, Hundley V, Mapp T. Willingness to pay: a method for measuring preferences for maternity care? Birth. 1998;25(1):32-9.
2. Hundley V, Ryan M. Are women's expectations and preferences for intrapartum care affected by the model of care on offer? BJOG : an international journal of obstetrics and gynaecology. 2004;111(6):550-60. doi:10.1111/j.1471-0528.2004.00152.x.
3. Hundley V, Ryan M, Graham W. Assessing women's preferences for intrapartum care. Birth. 2001;28(4):254-63.
4. Longworth L, Ratcliffe J, Boulton M. Investigating women's preferences for intrapartum care: home versus hospital births. Health & social care in the community. 2001;9(6):404-13.
5. Pitchforth E, Watson V, Tucker J, Ryan M, van Teijlingen E, Farmer J et al. Models of intrapartum care and women's trade-offs in remote and rural Scotland: a mixed-methods study. BJOG : an international journal of obstetrics and gynaecology. 2008;115(5):560-9. doi:10.1111/j.1471-0528.2007.01516.x.
6. Bridges JF, Hauber AB, Marshall D, Lloyd A, Prosser LA, Regier DA et al. Conjoint analysis applications in health—a checklist: a report of the ISPOR Good Research Practices for Conjoint Analysis Task Force. Value in health : the journal of the International Society for Pharmacoeconomics and Outcomes Research. 2011;14(4):403-13. doi:10.1016/j.jval.2010.11.013.
7. Abdul Pari AA, Simon J, Wolstenholme J, Geddes JR, Goodwin GM. Economic evaluations in bipolar disorder: a systematic review and critical appraisal. Bipolar Disorders. 2014;16(6):557-82. doi:10.1111/bdi.12213.
8. Ratcliffe J, Longworth L. Investigating the structural reliability of a discrete choice experiment within health technology assessment. International journal of technology assessment in health care. 2002;18(1):139-44.
9. Pitchforth E, van Teijlingen E, Watson V, Tucker J, Kiger A, Ireland J et al. "Choice" and place of delivery: a qualitative study of women in remote and rural Scotland. Quality & safety in health care. 2009;18(1):42-8. doi:10.1136/qshc.2007.023572.
Appendix: Completed checklist for individual studies

1. Hundley 2001

| Item                                                                 | Score | Comments                                                                                                                                                                                                 |
|----------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 Were a well-defined research question and a testable hypothesis articulated? | 0.5   | Clear aim stated in Introduction. No testable hypotheses articulated                                                                                                                                      |
| 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? | 0.5   | The study perspective (decision-making by pregnant women) was described to some degree, and some information about the decision-making context was provided, although this was predominantly covered in the Discussion |
| 1.3 What is the rationale for using conjoint analysis to answer the research question? | 0.5   | The rationale for using conjoint analysis (a DCE) was partially provided in the Introduction and further comments regarding the rationale were made in the Discussion (e.g. advantages over a simple rating exercise) |
| 2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? | 0.5   | Attribute identification undertaken by reviewing studies of midwife-managed units and policies, and professional recommendations, so was evidence-based but formal strategies were not used |
| 2.2 Was attribute selection justified and consistent with theory?     | 0     | Limited justification provided, and attribute selection was not placed in a theoretical context                                                                                                          |
| 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? | 1     | Yes                                                                                                                                                                                                   |
| 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? | 0     | No                                                                                                                                                                                                   |
| 3.2 Was the number of profiles in each conjoint task justified?       | 0     | No                                                                                                                                                                                                   |
| 3.3 Was (should) an opt-out or a status-quo alternative (be) included? | 1     | An opt-out was not included, but as this is not a decision that women could opt out of making, this design decision was justified                                                                 |
| 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? | 0.5   | Choice of experimental design was justified. Alternative experimental designs were not considered                                                                                                      |
| 4.2 Were the properties of the experimental design evaluated?         | 0.5   | The experimental design was evaluated for orthogonality and level balance. Other aspects (e.g. choice probabilities) were not considered                                                                 |
| 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? | 1     | The number of choice tasks was justified by the authors and was likely to be appropriate                                                                                                               |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks? | N/A   | Cannot be determined as the survey instrument was not made available                                                                                                                                  |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | 0.5   | An appropriate elicitation format was used. Indifference was not strictly permitted, but the authors noted instances where indifference led to a choice not being made |


| Item                                                                 | Score | Comments                                                                                     |
|---------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------|
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? | 1     | Yes. Respondents were also asked about their preferred level for each attribute, and asked to identify their most preferred attribute |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 0.5   | Appropriate demographic information was collected. However, it was not clear that sufficient attitudinal data were collected |
| 6.2 Were the attributes and levels defined, and was any contextual information provided? | N/A   | Cannot be determined as the survey instrument was not made available |
| 6.3 Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? | 1     | Based on the information provided on response rates, response times and completion rates, for both the pilot and the main survey, the level of burden of the data-collection instrument was likely appropriate |
| 7.1 Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? | 1     | The sampling strategy was broadly justified, and all key limitations were noted in the Discussion section |
| 7.2 Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? | 0.5   | The mode of administration was likely appropriate, but was not justified |
| 7.3 Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? | 1     | Ethical approval was obtained for the survey |
| 8.1 Were respondent characteristics examined and tested? | 0.5   | Information on respondent characteristics was presented and discussed, but this information was not incorporated into the regressions that were conducted (e.g. in the form of latent class analysis) |
| 8.2 Was the quality of the responses examined (for example, rationality, validity, reliability)? | 1     | Yes |
| 8.3 Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately? | 0.5   | It is likely that an appropriate model was estimated, but limited information was provided on the modelling process |
| 9.1 Did study results reflect testable hypotheses and account for statistical uncertainty? | 0.5   | The study results did not reflect testable hypotheses, but uncertainty was considered in the form of the significance of model coefficients |
| 9.2 Were study conclusions supported by the evidence and compared with existing findings in the literature? | 0.5   | The study conclusions were supported by the evidence but were not fully compared with existing findings in the literature |
| 9.3 Were study limitations and generalisability adequately discussed? | 1     | Yes |
| 10.1 Was study importance and research context adequately motivated? | 0.5   | This objective was only partially met (which links back to item 1.2) |
| 10.2 Were the study data-collection instrument and methods described? | 0     | Limited information was provided on the description of attributes and levels and the survey instrument was not made available |
| 10.3 Were the study implications clearly stated and understandable to a wide audience? | 1     | Yes |
| Item | Score * | Comments |
|------|---------|----------|
| Total score (% of max possible) | 17/28 (61%) | |

*1=fully addressed, 0.5=partially addressed, 0=not addressed
2. Hundley 2004

| Item                                                                 | Score | Comments                                                                                                                                 |
|----------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1 Were attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? | 0.5   | Readers were referred to Hundley 2001 regarding attribute identification, hence the same score is given                                    |
| 2.2 Was attribute selection justified and consistent with theory?     | 0     | Readers were referred to Hundley 2001 regarding the justification of attribute selection, hence the same score is given                    |
| 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? | 1     | Readers were referred to Hundley 2001 regarding level selection, hence the same score is given                                          |
| 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)?                   | 0     | No                                                                                                                                 |
| 3.2 Was the number of profiles in each conjoint task justified?      | 0     | No                                                                                                                                 |
| 3.3 Was (should) an opt-out or a status-quo alternative (be) included?                                               | 1     | An opt-out was not included, but as this is not a decision that women could opt out of making, this design decision was justified         |
| 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered?                  | 0     | Very limited information is given on the experimental design, and readers are not referred to Hundley 2001, hence a lower score is given |
| 4.2 Were the properties of the experimental design evaluated?        | 0     | No                                                                                                                                 |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks?                                                | N/A   | Cannot be determined as the survey instrument was not made available                                                                       |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | 0.5   | An appropriate elicitation format was used. Indifference was not permitted. This decision was not justified                                |
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? | 1     | Yes. Respondents were also asked about their preferred level for each attribute, and asked to identify their most preferred attribute     |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 0.5   | Appropriate demographic information was collected. However, it was not clear that sufficient attitudinal data were collected |

| Item                                                                 | Score | Comments                                                                                                                                 |
|----------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 Were a well-defined research question and a testable hypothesis articulated? | 1     | Research question (aim) clearly defined. Hypothesis implicit in the research question                                                 |
| 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? | 1     | The study perspective (decision-making by pregnant women) was described well, and the study was placed in a particular decision-making context |
| 1.3 What is the rationale for using conjoint analysis to answer the research question? | 0.5   | The rationale for using conjoint analysis (a DCE) was partially provided in the Introduction and Methods sections                         |
| 3.1 Was the number of conjoint tasks included in the data-collection instrument appropriate?                          | 1     | The number of choice tasks was justified by the authors and was likely to be appropriate                                              |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks?                                                | N/A   | Cannot be determined as the survey instrument was not made available                                                                       |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | 0.5   | An appropriate elicitation format was used. Indifference was not permitted. This decision was not justified                                |
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? | 1     | Yes. Respondents were also asked about their preferred level for each attribute, and asked to identify their most preferred attribute     |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 0.5   | Appropriate demographic information was collected. However, it was not clear that sufficient attitudinal data were collected |

10
| Item | Score * | Comments |
|------|---------|----------|
| 6.2  | N/A     | Cannot be determined as the survey instrument was not made available |
| 6.3  | 1       | Based on the information provided on response rates and completion rates, for both the pilot and the main survey, the level of burden of the data-collection instrument was likely appropriate |
| 7.1  | 1       | The sampling strategy was fully described, and all key limitations were noted in the Discussion section |
| 7.2  | 0.5     | The mode of administration was likely appropriate, but was not justified |
| 7.3  | 1       | Ethical approval was obtained for the survey |
| 8.1  | 0.5     | Information on respondent characteristics was presented and discussed, but this information was not incorporated into the regressions that were conducted (e.g. in the form of latent class analysis) |
| 8.2  | 0       | No |
| 8.3  | 0.5     | No information was presented which would enable a judgment to be reached regarding the appropriateness of the model that was estimated, and readers were not referred to Hundley 2001 for this information |
| 9.1  | 1       | Yes |
| 9.2  | 0.5     | The study conclusions were supported by the evidence but were not fully compared with existing findings in the literature |
| 9.3  | 1       | Yes |
| 10.1 | 1       | Yes |
| 10.2 | 0       | Limited information was provided on the description of attributes and levels and the survey instrument was not made available |
| 10.3 | 1       | Yes |

**Total score (% of max possible)**  
17/28 (61%)

* 1=fully addressed, 0.5=partially addressed, 0=not addressed
| Item                                                                 | Score | Comments                                                                 |
|----------------------------------------------------------------------|-------|--------------------------------------------------------------------------|
| 1.1 Were a well-defined research question and a testable hypothesis articulated? | 0.5   | The research question was well-defined but no testable hypothesis was articulated |
| 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? | 0     | Very limited information was provided on the study setting, and the decision-making context was not described |
| 1.3 What is the rationale for using conjoint analysis to answer the research question? b | 1     | This was described in detail in the introductory section of the paper |
| 2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? | N/A   | Not applicable – not a DCE study |
| 2.2 Was attribute selection justified and consistent with theory? | N/A   | Not applicable – not a DCE study |
| 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? | N/A   | Not applicable – not a DCE study |
| 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? | N/A   | Not applicable – not a DCE study |
| 3.2 Was the number of profiles in each conjoint task justified? | N/A   | Not applicable – not a DCE study |
| 3.3 Was (should) an opt-out or a status-quo alternative (be) included? | N/A   | Not applicable – not a DCE study |
| 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? | N/A   | Not applicable – not a DCE study |
| 4.2 Were the properties of the experimental design evaluated? | N/A   | Not applicable – not a DCE study |
| 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? | N/A   | Not applicable – not a DCE study |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks? a | 1     | Yes |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | N/A   | Not applicable – not a DCE study |
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? b | 0     | No additional qualifying questions were asked alongside the WTP question |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 0.5   | Some sociodemographic information was collected but this was not presented in any detail, and was not accompanied by information on attitudes, health history or treatment experience |
| 6.2 Were the attributes and levels defined, and was any contextual information provided? | N/A   | Not applicable – not a DCE study |
| Item                                                                 | Score | Comments                                                                                                                                                                                                 |
|----------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? | 0.5   | The level of burden was likely appropriate (although some elements of the data collection instrument were not presented (e.g. demographic questions). Respondents were somewhat encouraged to respond carefully to the WTP questions |
| Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? | 0.5   | Limited justification was provided                                                                                                               |
| Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? | 0     | This was not described or justified                                                                                                            |
| Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? | 0     | No                                                                                                                                            |
| Were respondent characteristics examined and tested?                  | 0.5   | Respondent characteristics were only examined in a limited manner                                                                            |
| Was the quality of the responses examined (for example, rationality, validity, reliability)? | 0.5   | Response quality was only examined in a limited manner                                                                                         |
| Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately? | N/A   | Not applicable – not a DCE study                                                                                                               |
| Did study results reflect testable hypotheses and account for statistical uncertainty? | 0     | No                                                                                                                                            |
| Were study conclusions supported by the evidence and compared with existing findings in the literature? | 0.5   | Study conclusions were supported by the evidence but were only compared with existing evidence in a limited manner                              |
| Were study limitations and generalisability adequately discussed?      | 1     | Yes                                                                                                                                           |
| Was study importance and research context adequately motivated?        | 0.5   | In a limited manner                                                                                                                           |
| Were the study data-collection instrument and methods described?       | 0.5   | Only the elements of the data collection instrument related to the WTP questions were described in detail                                    |
| Were the study implications clearly stated and understandable to a wide audience? | 0.5   | The study implications were only considered in a limited manner                                                                                |

**Total score (% of max possible)** | **8/18 (44%)**

* = fully addressed, 0.5 = partially addressed, 0 = not addressed; * These criteria refer specifically to DCE or conjoint analysis studies but are equally applicable to WTP studies (e.g. 1.3: What is the rationale for using a WTP study to answer the research question?). As such, this study is assessed against adapted versions of these items.*
### 4. Longworth 2001

| Item                                                                 | Score | Comments                                                                 |
|---------------------------------------------------------------------|-------|--------------------------------------------------------------------------|
| 1.1 Were a well-defined research question and a testable hypothesis articulated? | 1     | Yes, in the introduction and methods sections                            |
| 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? | 1     | Yes, in the introduction                                                  |
| 1.3 What is the rationale for using conjoint analysis to answer the research question? | 1     | The rationale is provided at the beginning of the paper                  |
| 2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? | 1     | Attribute identification was supported by both literature reviews and focus groups |
| 2.2 Was attribute selection justified and consistent with theory?    | 0.5   | Attribute selection was not fully justified                               |
| 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? | 0.5   | Levels were likely consistent with the study perspective and hypothesis but were not fully justified |
| 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? | 0     | No                                                                       |
| 3.2 Was the number of profiles in each conjoint task justified?      | 0     | No                                                                       |
| 3.3 Was (should) an opt-out or a status quo alternative (be) included? | 1     | An opt-out was not included, but as this is not a decision that women could opt out of making, this design decision was justified |
| 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? | 0.5   | This was only partially justified and alternative designs were not considered |
| 4.2 Were the properties of the experimental design evaluated?         | 0     | No                                                                       |
| 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? | 0.5   | The number of choice tasks was not justified by the authors but was likely to be appropriate |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks? | N/A   | Cannot be determined as the survey instrument was not made available    |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | 0.5   | An appropriate elicitation format was used. Indifference was not permitted. This decision was not justified |
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? | 1     | Yes                                                                      |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 0.5   | Limited respondent information was collected. This was not described fully in the paper |
| 6.2 Were the attributes and levels defined, and was any contextual information provided? | N/A   | Cannot be determined as the survey instrument was not made available    |
| 6.3 Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? | N/A   | Cannot be determined as the survey instrument was not made available and no information is presented which would permit the |
| Item                                                                 | Score | Comments                                                                                                                                 |
|---------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| 7.1 Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? | 1     | level of burden to be inferred                                                                                                          |
| 7.2 Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? | 0.5   | The mode of administration was likely appropriate but was not justified                                                                  |
| 7.3 Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? | 0.5   | Ethical approval was granted for the survey but ethical considerations were not addressed in the paper                                      |
| 8.1 Were respondent characteristics examined and tested?              | 0.5   | Respondent characteristics were partially examined                                                                                    |
| 8.2 Was the quality of the responses examined (for example, rationality, validity, reliability)? | 0.5   | Quality was examined in a limited way by considering dominance                                                                         |
| 8.3 Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately? | 1     | Model estimation was likely appropriate, and models were also estimated for likely relevant subgroups                                   |
| 9.1 Did study results reflect testable hypotheses and account for statistical uncertainty? | 1     | Yes                                                                                                                                    |
| 9.2 Were study conclusions supported by the evidence and compared with existing findings in the literature? | 1     | Yes                                                                                                                                    |
| 9.3 Were study limitations and generalisability adequately discussed? | 0     | No                                                                                                                                     |
| 10.1 Was study importance and research context adequately motivated?  | 0     | No                                                                                                                                     |
| 10.2 Were the study data-collection instrument and methods described? | 0     | Limited information was provided on the description of attributes and levels and the survey instrument was not made available         |
| 10.3 Were the study implications clearly stated and understandable to a wide audience? | 0.5   | These were not fully stated                                                                                                           |

Total score (% of max possible) | 15.5/27 (57%) |

*1=fully addressed, 0.5=partially addressed, 0=not addressed*
5. Pitchforth 2008

| Item                                                                 | Score | Comments                                                                 |
|----------------------------------------------------------------------|-------|--------------------------------------------------------------------------|
| 1.1 Were a well-defined research question and a testable hypothesis articulated? | 0.5   | Only partial detail was provided about the research question but testable hypotheses were fully articulated |
| 1.2 Was the study perspective described, and was the study placed in a particular decision-making or policy context? | 1     | Yes                                                                      |
| 1.3 What is the rationale for using conjoint analysis to answer the research question? | 0     | The rationale for using a DCE was not provided                           |
| 2.1 Was attribute identification supported by evidence (literature reviews, focus groups, or other scientific methods)? | 0     | No                                                                       |
| 2.2 Was attribute selection justified and consistent with theory? | 0.5   | Attribute selection was only partially justified but was likely consistent with theory |
| 2.3 Was level selection for each attribute justified by the evidence and consistent with the study perspective and hypothesis? | 0.5   | Level selection was not justified but was likely consistent with the study perspective and hypothesis |
| 3.1 Was the number of attributes in each conjoint task justified (that is, full or partial profile)? | 0     | No                                                                       |
| 3.2 Was the number of profiles in each conjoint task justified? | 0     | No                                                                       |
| 3.3 Was (should) an opt-out or a status-quo alternative (be) included? | 1     | An opt-out was not included, but as this is not a decision that women could opt out of making, this design decision was justified |
| 4.1 Was the choice of experimental design justified? Were alternative experimental designs considered? | 0     | No                                                                       |
| 4.2 Were the properties of the experimental design evaluated? | 0     | No                                                                       |
| 4.3 Was the number of conjoint tasks included in the data-collection instrument appropriate? | 0.5   | The number of tasks was likely appropriate but no justification was provided for this decision |
| 5.1 Was there sufficient motivation and explanation of conjoint tasks? | N/A   | Cannot be determined as the survey instrument was not made available    |
| 5.2 Was an appropriate elicitation format (that is, rating, ranking, or choice) used? Did (should) the elicitation format allow for indifference? | 0.5   | An appropriate elicitation format was used. Indifference was not permitted. This decision was not justified |
| 5.3 In addition to preference elicitation, did the conjoint tasks include other qualifying questions (for example, strength of preference, confidence in response, and other methods)? | 0     | No additional qualifying questions were reported                         |
| 6.1 Was appropriate respondent information collected (such as sociodemographic, attitudinal, health history or status, and treatment experience)? | 1     | Yes                                                                     |
| 6.2 Were the attributes and levels defined, and was any contextual | N/A   | Cannot be determined as the survey instrument was not made available    |
| Item                                                                 | Score | Comments                                                                                                                                 |
|----------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------|
| information provided?                                                |       |                                                                                                                                          |
| 6.3 Was the level of burden of the data-collection instrument appropriate? Were respondents encouraged and motivated? | N/A   | Cannot be determined as the survey instrument was not made available and no information is presented which would permit the level of burden to be inferred |
| 7.1 Was the sampling strategy justified (for example, sample size, stratification, and recruitment)? | 0.5   | The strategy was described fully but only partially justified                                                                              |
| 7.2 Was the mode of administration justified and appropriate (for example, face-to-face, pen-and-paper, web-based)? | 0.5   | Mode of administration was likely appropriate but was not justified                                                                         |
| 7.3 Were ethical considerations addressed (for example, recruitment, information and/or consent, compensation)? | 0.5   | Ethical approval was not required for the survey but ethical considerations were not addressed in any detail in the paper                    |
| 8.1 Were respondent characteristics examined and tested?              | 1     | Yes                                                                                                                                      |
| 8.2 Was the quality of the responses examined (for example, rationality, validity, reliability)? | 0     | No                                                                                                                                      |
| 8.3 Was model estimation conducted appropriately? Were issues of clustering and subgroups handled appropriately? | 0.5   | Estimation was handled somewhat appropriately. Although subgroup analyses were presented, these used simple methods and more complex regression approaches (which may have been appropriate) were not considered |
| 9.1 Did study results reflect testable hypotheses and account for statistical uncertainty? | 1     | Yes                                                                                                                                      |
| 9.2 Were study conclusions supported by the evidence and compared with existing findings in the literature? | 0.5   | Study conclusions were supported by the evidence, but were only compared with existing findings in a limited manner                         |
| 9.3 Were study limitations and generalisability adequately discussed? | 1     | Yes                                                                                                                                      |
| 10.1 Was study importance and research context adequately motivated? | 1     | Yes                                                                                                                                      |
| 10.2 Were the study data-collection instrument and methods described? | 0     | Limited information was provided on the description of attributes and levels and the survey instrument was not made available              |
| 10.3 Were the study implications clearly stated and understandable to a wide audience? | 1     | Yes                                                                                                                                      |

**Total score (% of max possible)**

13/27 (48%)
Additional file 5: Narrative summary of findings from each of the included studies

| Report               | Stated preferences                                                                                                                                                                                                 | Factors that women report influenced their choice of unit or birth setting                                                                                     |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Donaldson (1998)     | When asked to express a preference between the two options (OU vs AMU), 33% of women did not express a preference, 55% expressed a preference for the AMU and 11% for the OU (labour ward). |
| Stated preference    | There appeared to be a possible trend towards women in households falling in lower social class groups being more likely to prefer an OU (25% in women in social class IV or V or unemployed, 12.5% in women in social class III and 6.4% in women in household in social classes I and II). The study also analysed 'willingness to pay' (a method that can be used to assess strength of preference for different options). However, because of a small sample and high level of missing data the findings are difficult to interpret. | Amongst the women (n=57) who expressed a preference for the AMU, 28% commented about it being ‘more homely and relaxed’, 14% ‘more personal’, 12% commented on women being more involved in the unit and 12% commented on continuity of care. Around 10% stated that their preference was not strong. Among the women who preferred the OU (n=11), three mentioned equipment, one mentioned interventions and two made general comments. |
| Report       | Stated preferences                                                                                                                                                                                                                                                                                                                                 | Factors that women report influenced their choice of unit or birth setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emslie (1999)| Women's opinions on the features that they considered important changed between 14 and 36 weeks. The top five at 14 weeks were 'quiet atmosphere' (89%), 'baby with you at all times' (87%), 'availability of specialist facilities' (85%), 'convenience for visitors' (82%) and choices in pain relief (81%). At 36 weeks 'quiet atmosphere' remained at the top of the list (99%) followed by 'choices in pain relief' (95%), 'availability of specialist facilities' (94%), 'baby with you at all times' (93%) and 'choices in delivery' (91%). Survey data relating to antenatal care preferences indicated that women rated the importance of seeing the same staff at each antenatal visit highly. The top five factors that women mentioned at 36 weeks as being important to them with regard to labour were: 'partner being there' (89%), 'availability of specialist staff/equipment' (65%), 'being kept informed' (58%), 'being involved in decisions' (53%) and 'time alone with partner' (42%). Other factors mentioned less frequently included: 'choice of pain relief' (40%), 'freedom to choose different positions' (30%), 'handed baby immediately' (30%), 'cared for by known staff' (28%), 'not being left alone' (21%), 'homely atmosphere' (18%), 'care for [sic] by named midwife' (18%). | Factors which women reported influenced their birthplace choice varied according to parity. For nulliparous women the top five reasons at 14 weeks were: ‘distance from home’ (59%), ‘convenience for family’ (51%), ‘reputation of unit/hospital’ (40%), ‘atmosphere of unit/ward’ (35%) and ‘experience of friends’ (30%). ‘Advice of midwife’ was mentioned by 29%, ‘specialist back up’ by 25% and ‘proximity to partners work’ by 24%. For multiparous women the top five reasons were: ‘previous experience’ (75%), ‘distance from home’ (44%), ‘convenience for family’ (44%), ‘specialist back up’ (33%) and ‘reputation of unit/hospital’ (32%). Factors that were significantly more influential for nulliparous women compared with multiparous women were ‘experience of friends’ and ‘advice of midwife’. |
| Report | Stated preferences | Factors that women report influenced their choice of unit or birth setting |
|--------|--------------------|---------------------------------------------------------------------|
| Hundley (2001) | Of the attributes presented to participants in ‘hypothetical scenarios’ (known midwife, pain relief options, monitoring, appearance of room, medical staff involvement, decision-making style), style of decision-making was reported to be the most important by 40% of women, followed by pain relief (23%), 'known midwife' (17%), involvement of medical staff (13%), type of monitoring (7%) and homely vs clinical appearance of the room (<2%). In the discrete choice experiment (DCE) all attributes significantly influenced women's choices. Regression analyses showed that women tended to prefer scenarios with more continuity of midwife, more pain relief options, continuous monitoring rather than intermittent; and tended to prefer scenarios where medical staff were routinely involved and where women had greater levels of involvement in decision-making. In the DCE using hypothetical scenarios the findings relating to fetal monitoring and involvement of medical staff were in the opposite direction to women’s stated preferences when asked to simply report their preferences by selecting from a list. The authors report that ‘the results of the regression model suggest that respondents preferred maternity units that offered greater continuity of caregiver from the midwife, more methods of pain relief, continuous fetal heart rate monitoring, a homely appearance, routine involvement of medical staff and greater involvement for the woman in the decision-making process.’ (Hundley (2001), p258) |
| Report                  | Stated preferences                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Factors that women report influenced their choice of unit or birth setting |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Hundley (2004) Discrete choice experiment | Women in all three geographical study areas stated that they preferred to have labour care from a midwife that they had met during pregnancy, and to have all methods of pain relief available, intermittent fetal monitoring, a homely environment, involvement of medical staff only if required and greater control/involvement in decision making. In the study area with least continuity available, women were significantly less likely to prefer the option of labour care from a midwife that they had met during pregnancy (52% vs 72-75% in other areas). In the DCE regression analysis, all six attributes (continuity of midwife, pain relief, monitoring, room appearance, medical staff involvement and decision making style) were important to women in the Aberdeen (OU/AMU) area but pain relief was not a significant attribute in the other two (FMU and OU/AMU without epidural) areas. The authors comment that their findings are consistent with an 'endowment effect', that is expectations influence preferences. |                                                                                                                                 |
Lavender (2005) Survey

The statements that elicited the strongest agreement related to the presence of a special care baby unit, proximity of antenatal care to home, the importance of being assisted by a midwife at the birth, being willing to travel for higher quality care and feelings of lack of safety if a specially trained doctor was not immediately available:

- ‘It is important to me that a special care baby unit is in the same place that I give birth’: 35% strongly agreed and overall 73% agreed or strongly agreed.
- ‘It is important that my antenatal appointments are at a location close to where I live’: 72% agreed or strongly agreed.
- ‘It is important to me that a midwife helps me to give birth to my baby even if complications develop’: 69% agreed or strongly agreed.
- ‘I would be willing to travel if it meant I would receive higher quality care for my baby and me around the time of birth’: 68% agreed or strongly agreed.
- ‘I would feel unsafe if a specially trained doctor was not immediately available when I am in labour’: 62% agreed or strongly agreed.

Although many women felt it important to be helped by a midwife even if complications developed only 20% agreed or strongly agreed that they wanted to ‘be looked after by midwives and not have doctors involved’ and (as noted above) 62% considered that they would feel unsafe if they did not have a ‘specially trained doctor’ immediately available in labour. A statement regarding the importance of care by a "midwife I know" for the baby's birth did not elicit strong responses: few strongly agreed or strongly disagreed with most respondents fairly equally divided between agreeing, disagreeing and neither agreeing nor disagreeing. Half of the participants considered that it was important to be able to have an epidural any time of the day and night. A quarter of participants agreed that the availability of a pool
for labour/birth was important to them; while 46% neither agreed nor disagreed that this was important.

Women's views did not differ by age or level of area deprivation. Nulliparous women were significantly more likely than multiparous women to say that they were willing to travel for antenatal care (72% vs. 65%) and were more likely to say that the availability of a pool was important to them (32% vs. 19%). (p52) Compared with white European women, ethnic minority women (n=303) were more likely to say that it was important to have antenatal care close to where they lived (81% vs. 71%); were significantly more likely to feel unsafe if a doctor was not available (78% vs. 60%); and were more likely to consider it important to have a special care baby unit available where they gave birth (84% vs. 73%).

| Report | Stated preferences | Factors that women report influenced their choice of unit or birth setting |
|--------|--------------------|----------------------------------------------------------------------------|
|        |                    |                                                                             |


### Stated preferences

The conjoint analysis identified three distinct groups: those with a 'dominant preference for home births', those with a 'dominant preference for hospital births' and 'traders' that is women who changed their preferences based on the attributes of the service. Amongst women with a dominant preference for hospital birth, conjoint analysis indicated that women had a significant preference for higher levels of continuity of carer and more autonomy in decision-making. They also had a significant preference for a hospital location, access to all forms of pain relief and somewhere without the need for transfer in the event of complications. In contrast, only three attributes appeared to be important to women with a dominant preference for home birth: continuity, location and level of autonomy in decision-making. Amongst 'traders' continuity of carer was the only attribute that significantly influenced preferences with higher levels of continuity being preferred. Amongst other attributes, it appeared that a homely environment was more important than access to an epidural, which in turn was more important than decision-making style and the risk of needing to be transferred. The authors note that the package of care ranked first by 'traders' would be 'a situation in which there is high continuity of carer, the location of delivery is a maternity unit with a home-like environment, there is access to a birthing pool and gas and air for pain relief, the woman has autonomy in decision-making and there is no need to transfer to another location during labour if a problem develops.' It is notable that 'continuity' (of midwife) was a significant preference across all groups.

### Factors that women report influenced their choice of unit or birth setting

| Report | Factors that women report influenced their choice of unit or birth setting |
|--------|--------------------------------------------------------------------------|
| Longworth (2001) Conjoint analysis | The conjoint analysis identified three distinct groups: those with a ‘dominant preference for home births', those with a 'dominant preference for hospital births’ and 'traders’ that is women who changed their preferences based on the attributes of the service. Amongst women with a dominant preference for hospital birth, conjoint analysis indicated that women had a significant preference for higher levels of continuity of carer and more autonomy in decision-making. They also had a significant preference for a hospital location, access to all forms of pain relief and somewhere without the need for transfer in the event of complications. In contrast, only three attributes appeared to be important to women with a dominant preference for home birth: continuity, location and level of autonomy in decision-making. Amongst 'traders' continuity of carer was the only attribute that significantly influenced preferences with higher levels of continuity being preferred. Amongst other attributes, it appeared that a homely environment was more important than access to an epidural, which in turn was more important than decision-making style and the risk of needing to be transferred. The authors note that the package of care ranked first by 'traders' would be ‘a situation in which there is high continuity of carer, the location of delivery is a maternity unit with a home-like environment, there is access to a birthing pool and gas and air for pain relief, the woman has autonomy in decision-making and there is no need to transfer to another location during labour if a problem develops.’ It is notable that 'continuity' (of midwife) was a significant preference across all groups. |
| Report            | Stated preferences                                                                                                                                                                                                 | Factors that women report influenced their choice of unit or birth setting |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Pitchforth (2008) | In this discrete choice experiment, regression analysis showed that women living in remote and rural areas preferred shorter travel time to access intrapartum care, preferred to deliver in a maternity unit rather than at home and that an OU was the preferred option. The analysis revealed that women were prepared to travel up to 133 minutes from home to receive consultant (OU) care and that they would travel 16 minutes further to receive consultant-led care vs alternatives. Women living in particularly remote areas were willing to travel further. Women's risk status, type of care at the last birth, and remoteness/rurality of area of residence all influenced women's willingness to travel. Women were more likely to prefer the birth setting that they had recently given birth in (home, FMU, OU). In summary the authors state that women overwhelmingly preferred an institutional delivery to a home birth and that women on average preferred consultant-led care, but drew a travel time threshold at around 2 hours. |


| Report | Stated preferences                                                                                                                                                                                                                                                                                                                                                   | Factors that women report influenced their choice of unit or birth setting |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Rennie (1998) Survey | Antenatally the presence of a birth companion was the most highly rated factor (78% of women considered this 'very important'). The proportions of women rating other factors as 'very important' were: having 'preferences and wishes followed' (46%), 'in control' (42%), 'able to do what you want' (37%), 'same midwife in labour' (27%), 'few interventions' (25%), 'not to lose control of behaviour' (24%) and 'known midwife' (21%). Postnatally significantly more women rated having a birth partner as very important (90% vs 78% antenatally); while the proportion of women rating 'known midwife', 'not to lose control of behaviour' and 'preferences and wishes followed' as 'very important' declined postnatally. Antenatally a quarter or more of women rated having a 'known midwife' or the 'same midwife in labour' and 'few interventions' as neither important nor unimportant ('don't mind'). With regard to access to a midwife 'easy access' rather than 'all the time' or 'only when I say' appeared to be the preferred option antenatally. Being given a 'constant flow' of information in labour appeared to be the preference antenatally; postnatally 76% of women rated 'information in labour' as 'very important'. With regard to pain relief, 'minimum drugs' appeared to be considered more important than either being pain free or having a drug-free labour; while effective pain relief was rated as very important by 64% of women postnatally. Results suggested a preference for shared decision making antenatally; postnatally 46% of women considered it 'very important' 'to have control of decision making'. |                                                                                                                                                                                                                          |
### Report: Stated preferences

| Survey | Factors that women report influenced their choice of unit or birth setting |
|--------|------------------------------------------------------------------------|
| Rogers (2011) | Overall 63% of women in this sample of 'AMU users' said that they would give birth in the unit if it became an FMU; 17% said that they would not choose the FMU and 19% were unsure. Multiparous women were more likely to say that they would use the FMU than nulliparous women (71% vs. 57%) but the difference was not statistically significant (p=0.1). Amongst the women who said that they would choose the FMU (n=76), the main reasons were ‘the provision of a homely environment, opportunities for a natural birth, use of water in labour and accessibility’. (Rogers (2011), p238) A previous good experience was more likely to be given as a reason in multiparous women, and the availability of water was significantly more likely to be cited by nulliparous women. Amongst the 21 women who said that they would not choose the birth centre when it became an FMU, the main reasons related to preferring a birth centre on the same site as an OU (81%), 'feel[ing] safer' elsewhere (67%) and concerns about transfer (38%). The women who stated that they would choose the FMU tended to agree with a series of statements about the possible benefits of birth in an FMU: ‘provides women-centred care’, ‘provides a safe alternative to a hospital birth’, ‘provides a more natural alternative to a hospital birth’, ‘has considerable advantages to a hospital birth’, ‘provides a safe alternative to home birth’, ‘has considerable advantages to a home birth’, ‘has a more homely/relaxed atmosphere compared to a hospital birth’ (Rogers (2011), p239-240). Around two thirds of the 'AMU users' who would not choose an FMU also agreed with many of the statements about some of the perceived positive attributes of an FMU but were less certain about safety: only 29% agreed that an FMU ‘provides a safe alternative to a hospital birth’ (cf 87% of those who would choose an FMU) and only 67% (cf 90%) agreed that an FMU "provides a safe alternative to home birth". |