

Models of intrapartum care and women's trade-offs in remote and rural Scotland: a mixed-methods study

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Objective To explore women's preferences for, and trade-offs between, key attributes of intrapartum care models.

Design Mixed-methods study using discrete choice experiments (DCEs) and focus groups.

Setting The North of Scotland.

Population Women from the catchment areas of eight rural maternity units in the North of Scotland.

Methods Based on current policy, 'model of care' and 'time travelled' were selected as key attributes of intrapartum care in remote and rural settings. A DCE questionnaire explored women's preferences for and trade-offs between these attributes. Focus groups validated the DCE attributes and provided valuable information about the drivers of women's preferences for place of delivery.

Main outcome measures Preferences for attributes of intrapartum care.

Results Eight focus groups were conducted, and 877 eligible women completed the questionnaire. Overall, the DCE results found women preferred delivery in a unit to home birth and

consultant-led care (CLC) to midwife-managed care (MMC). Women preferring CLC associated it with covering every eventuality and increased safety. Although women preferred shorter travel times, trade-offs indicated a willingness to travel for approximately 2 hours to get one's preferred choice. Focus group findings and subgroup DCE analysis showed heterogeneity of preferences related to experience, risk status, geographic location, perception of care and family circumstances.

Conclusions In contrast to service redesign offering local midwife-managed intrapartum care, most rural women in our study expressed a preference to give birth in hospital and have CLC because they felt safer. Women were willing to travel for this but within limits. Qualitative results showed that women's preferences were influenced by their home and family context, beliefs and previous pregnancy experiences. Challenges for service redesign are to provide comprehensive obstetric services within acceptable travel time, while responding to the heterogeneity of women's preferences.

Keywords Discrete choice experiments, intrapartum, mixed-methods, preferences, remote and rural.

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Introduction

Pressures to increase centralisation of acute obstetric and neonatal services have particular implications for rural populations, which account for around one-fifth of the UK population and one-third of Scotland's population.¹ NHS-wide medical workforce issues mean that sustaining acute

medical service provision in small district general hospitals is difficult. New limited working hours for junior doctors and consultants and recommendations for 24-hour coverage in labour wards, all contribute to rising workforce costs.² Other challenges for remote and rural settings include recruitment and retention of medical staff, increasing requirements to train to subspecialty level, recommendations on staffing and

skills required to deal with obstetric emergencies and the professional requirements to demonstrate competency by completing a set number of procedures annually.^{3,4}

Despite pressure towards larger and further centralised acute services, policy recommendations generally support local community-based services that may be more clinically appropriate for low-risk women.⁵ However, research on issues of safety, clinical appropriateness, costs and client preferences is lacking, and considerable uncertainty remains about the sustainability of local services for women in rural and remote settings. This paper reports a study of rural women's preferences for different attributes of intrapartum care.

Methods

This study was part of an evaluation study of maternity services in the North of Scotland, funded by Remote and Rural Areas Resource Initiative (RARARI), NHS Scotland.⁶ The Multicentre Research Ethics Committee Scotland judged our study to be service evaluation and, as such, not in need of ethical approval. Information about the continuing study was displayed in all participating units and labour wards.

'Mixed methods' is a generic term referring to the integrated use of qualitative and quantitative methods in one study. The purpose of using mixed methods in our study was to inform and improve the development of methodology and to gain a more comprehensive understanding of women's preferences.⁷

Setting

Low annual delivery numbers (<300) were used as a proxy to identify units in remote and rural settings. From 12 eligible units, a stratified sample of 8 units were purposively selected by the staffing/service model of care according to the Expert Group on Acute Maternity Services (EGAMS) classifications in Scotland (Table 1). The units represent the range of existing unit types from stand-alone midwife-led community maternity units (EGAMS level 1b) to consultant-led units with no neonatal facility (EGAMS level 2a). These eight rural units differed in remoteness from small urban to very remote rural (Table 1).⁸ Of the four excluded units, two stand-alone midwifery units were closing, another had fewer than 20 births per annum, and the unit alongside a nonobstetric hospital had fewer than 40 births.

Discrete choice experiment questionnaire

Discrete choice experiments (DCEs) are based upon the premise that all goods and services can be described by their characteristics (or attributes).⁹ In this study, a DCE assessed the strength of women's preferences for two attributes of intrapartum care and how women make trade-offs between these attributes.⁹⁻¹¹ Driven by policy and models of current service provision, the attributes selected were 'model of care' and 'travel time from home'. These attributes reflected characteristics of staffing and associated equipment, skills and competencies discussed in local maternity service reviews, which remained controversial. Namely, changing small

Table 1. Description of rural study sites by birth rate, level of care and rurality

Unit no.	Annual birth rate	Staffing model	Level of care (EGAMS) ⁵	Remote/rural classification*
1	240	Consultant-led obstetric maternity unit, no neonatal facility	Level 2a	Very remote small town
2	198	Consultant-led obstetric maternity unit, no neonatal facility	Level 2a	Very remote small town
3	143	Community maternity unit adjacent to nonobstetric hospital	Level 1c	Very remote small town
4	93	GP-run community maternity unit	Level 1c	Very remote small town
5**	56	Stand-alone midwifery-led community unit	Level 1b	Remote small town
6**	110	Stand-alone midwifery-led community unit	Level 1b	Other urban
7**	78	Stand-alone midwifery-led community unit	Level 1b	Other urban
8	20	Stand-alone midwifery-led community unit	Level 1b	Very remote rural

*Very remote small town (population between 3000 and 10 000, over 60 minutes drive to settlement with population over 10 000), remote small town (population between 3000 and 10 000 within 30 and 60 minutes drive from settlement with population over 10 000), other urban (population between 10 000 and 125 000) and very remote rural (population less than 3000 over 60 minutes drive time from settlement with population over 10 000).

**All part of one LHCC (Local Health Care Cooperative).

obstetric-led district general hospitals to community midwife-led units and further centralisation of obstetric services, which increases travel time. When presented to respondents the 'model of care' attribute was subdivided into 'staff involved' and 'pain relief available' to ensure that respondents realised that epidural analgesia was only available with consultant-led care (CLC). Increasingly, DCEs offer an opt-out option,¹² but this was not possible for childbirth. Instead, home birth (defined as midwife-managed care [MMC], with no epidural available and zero travel time from home to delivery unit) was included as a third option in all scenarios. Table 2 presents the levels of each attribute and the definitions provided in the questionnaire. The combination of attributes and levels resulted in eight different scenarios, which were all included in the questionnaire. A fold-over design was used, thus, respondents were presented with eight choices between the two unit-based options and home birth. The questionnaire was piloted ($n = 30$) using women from the catchment area of Units 5, 6 and 7 before the start of the main study. Women were asked to state their maximum acceptable travel time, which then informed selection of levels for the travel time attribute. The DCE was a main-effects-only design, so no interaction was considered.

Subjects

Women, identified prospectively from the geographical catchment areas of the eight study units, and who delivered between April 2004 and January 2005, were sent a questionnaire. This included women referred to, and delivered in, any of the three referral hospitals in the North of Scotland; one specialist tertiary unit (EGAMS level 3), one consultant-led unit with neonatal facility (EGAMS level 2b) and one consultant-led unit without neonatal facility (EGAMS level 2a).

Eligible consecutive deliveries were identified from units' birth registers using maternal postcodes for the geographical catchment of the study units. Local midwives, trained by the authors, checked the pregnancy outcome before posting the questionnaires. Women who experienced a stillbirth, early neonatal loss or who had an infant(s) in neonatal intensive care were excluded. The questionnaire with a prepaid return envelope was sent 6 weeks after delivery with one reminder 2 weeks later. Nonparticipants were invited to return a blank questionnaire to avoid receiving a reminder. Questionnaires were anonymous to the investigators, showing only a unique identifier for unit and serial number.

Focus groups

Qualitative methods have been advocated as a means of validating DCE attributes and interpreting quantitative results.¹³ Our focus groups explored what factors were important to women, and why, when deciding where to deliver and through this whether the selection of attributes was appropriate and to identify drivers of preference heterogeneity around these attributes. Findings were also used to inform subgroup analysis of the DCE responses. Participants were presented with one sample DCE question (Figure 1) to stimulate discussion. Participants were asked to answer the question, then, within the group, each attribute was discussed. Following this, participants were asked what other attributes or factors were important to them.

Focus groups participants were recruited from parent and toddler groups in the locality serving each of the eight units. All groups were audio recorded (with consent) and transcribed verbatim. Data collection and analysis was an iterative process.¹⁴

Table 2. Attributes and levels selected for DCE questionnaire

Attribute	Levels	Definition of attributes given to respondents
Model of care		
Staff involved	Midwife-managed	If your care is <i>midwife-managed</i> , doctors are only involved in the event of a complication
	Consultant-led	If your care is <i>consultant-led</i> , midwives will be involved, but your overall care is under the direction of hospital doctors
Pain relief available	All methods of pain relief	Except for epidurals, the methods of pain relief available in different maternity units are the same. These methods include Entonox (gas and air) and Pethidine or morphine.
	No epidural available*	From some units, you would have to be transferred to a larger unit if you wanted an epidural
Time travelled to delivery unit**	30 minutes from home; 60 minutes from home; 90 minutes from home; 120 minutes from home	The average time taken to travel from your home to the maternity unit

*Pain relief available was always 'no epidural available' for MMC.

**Range of travel times was informed by pilot study ($n = 30$) where respondents were asked to state the maximum time they would be willing to travel.

CHOICE 1

In which place would you prefer to give birth (*Please tick one box*)?

A	B	C
<ul style="list-style-type: none"> ▪ Consultant-led care ▪ All methods of pain relief ▪ 90 minutes from home <div style="text-align: center;"><input type="checkbox"/></div>	<ul style="list-style-type: none"> ▪ Midwife-managed care ▪ No epidural available ▪ 60 minutes from home <div style="text-align: center;"><input type="checkbox"/></div>	<ul style="list-style-type: none"> ▪ Midwife-managed care ▪ No epidural available ▪ Home birth — zero travel time <div style="text-align: center;"><input type="checkbox"/></div>

Figure 1. Example choice question.

Analysis*DCE analysis*

Data from the questionnaires were coded and entered into SPSS version 12.0.¹⁵ Responses were analysed using conditional logit regression in STATA version 9.1.¹⁶ The independent variables were model of care and travel time. Details of the regression models and analysis are available from E.P. Initially, the data were analysed and trade-offs calculated for the whole sample. Previous research and the focus groups indicated that preferences may be influenced by personal circumstances and/or experiences of maternity services,¹⁷ thus hypotheses were drawn up for subgroup analysis (Table 3). We analysed by rural catchment hospital and hospital of delivery ([i] 'Delivery Unit EGAMS level', [ii] 'Catchment Unit EGAMS level'). Respondents' risk status ([i] across whole pregnancy, [ii] at the outset of pregnancy and [iii] during labour) and geographical location (mainland/island and rurality of catchment unit) were also used as subgroup categories (Table 3). To ascertain risk status, the case notes for each woman who delivered in the study period were reviewed and linked to questionnaire responses through a unique identifier. Data abstraction forms were developed using national and regional guidelines for indications that would require referral to acute obstetric units. Full details of how risk status was ascertained and tracked are described elsewhere.⁶ For each subgroup, the restriction that preferences are homogeneous was tested using the likelihood ratio test. (In this case, the likelihood ratio test is distributed chi-squared with three degrees of freedom, with a critical value of 7.845 at the 95% significance level.)

Focus group analysis

The qualitative analysis involved reading and rereading of the transcripts by the focus group facilitators (E.P., J.I., E.M.) and other members of the research team (E.V.T., J.F., V.W.). Based on the constant comparative method, an iterative method of analysis was employed.¹⁸ 'Open-codes' were initially applied to represent the significance of sections of text. These were then grouped into organising themes and categories, which were

Table 3. Hypotheses tested in subgroup analyses

Subgroups	Number in subgroup	Hypothesis
Delivery Unit EGAMS level		
1a	8	Prefer a home birth
1b	136	Prefer unit-based MMC
1c	159	Prefer unit-based MMC
2	190	Prefer unit-based CLC
3	348	Prefer unit-based CLC
Type of care during last delivery		
MMC	318	Prefer unit-based MMC
CLC	559	Prefer unit-based CLC
Catchment Unit EGAMS level		
1b	413	Prefer unit-based MMC
1c	211	Prefer unit-based MMC
2	218	Prefer unit-based CLC
Risk status at outset of pregnancy*		
Low risk at outset of pregnancy	560	Prefer unit-based care
High risk at outset of pregnancy	280	Prefer unit-based CLC
Risk status throughout pregnancy**		
Low risk throughout pregnancy	608	Prefer unit-based care
High-risk episode(s) during pregnancy	234	Prefer unit-based CLC
Risk status in labour***		
Low risk during labour	304	Prefer unit-based care
High risk during labour	488	Prefer unit-based CLC
Geographic location		
Mainland	605	Prefer unit-based CLC
Island	272	Prefer unit-based MMC
Very remote small town	448	Prefer unit-based care
Very remote rural	56	Prefer unit-based care
Remote small town	89	Prefer unit-based care
Other urban	281	Prefer unit-based CLC

Risk assessment based on national and regional guidelines.

*Assessment based on one or more indicator of risk relating to specified previous obstetric problems, medical problems or current pregnancy problems.

**Assessment based one or more indicator of risk relating to specified infections, bloods and hypertension, maternal problems or fetal/other problems arising.

***Assessment based on presence of one or more indicators of risk relating to specified fetal problems, maternal problems or process of intrapartum arising.

modified and checked as part of an iterative process. The emphasis was on identifying themes emerging from the data rather than using preconceived categories.¹⁹ Quotations are used to illustrate the main themes and to maintain anonymity; focus groups are identified by unit number (Table 1).

Results

The results are presented to best represent our use of mixed methods. The DCE results for the whole sample are presented

first, followed by the focus groups and then the DCE subgroup analysis.

Response rates and respondent characteristics

Of 1414 births during the study period, 1404 eligible women were sent the DCE questionnaire. The response rate was 62% ($n = 877$). Twenty-two blank questionnaires were returned. The mean age of respondents was 30 years (range 15–47 years). This was the first delivery for 42.8% ($n = 373$) of the sample. Women with previous experience had 1–8 other children (median = 1).

Six or seven women were recruited for each of the eight focus groups; however, actual groups comprised 4–7 mothers of age 24–45 years, who represented a range of experience in terms of length of time since most recent delivery and parity (Table 4).

DCE results (full sample)

Of the 877 respondents who returned the questionnaire, 824 completed all 8 choices, 8 completed 7 choices, 9 completed 6 choices, 4 completed 5 choices, 7 completed 4 choices, 1 completed 3 choices, 6 completed 2 choices and 18 completed 1 choice. (This results in 20 349 observations, given one choice equals three observations; one chosen scenario and two unchosen scenarios.)

Table 5A presents the multivariate conditional logit results from the full sample. The negative and significant coefficient for travel time indicates respondents' preference for a care model with shorter travel time from home. The positive and significant coefficients for both CLC and MMC indicated that respondents prefer to deliver in a maternity unit rather than at home. A Wald test confirmed that the coefficients on CLC and MMC are significantly different ($\chi^2(1) = 11.10$, $P = 0.000$), and CLC is most preferred (indicated by larger coefficient). The ratio of coefficients indicates that respondents are willing to travel up to 133 (2.789/0.021) minutes from

home to receive maternity care in a consultant-led unit and 117 (2.467/0.021) minutes to receive maternity care in a midwife-managed unit rather than give birth at home. Consequently, respondents were willing to travel 16 minutes further for CLC.

Focus group findings

The example choice question proved a good catalyst for discussion in the groups. Recurring themes were grouped into broad categories; CLC versus MMC, attitude to home birth, pain relief, travel time (all service related) and family circumstances (nonservice related).

CLC versus MMC

When presented initially with the example DCE question, often women stated that they would choose B (MMC, no epidural available and 60 minutes from home) over A (CLC, all methods of pain relief available and 90 minutes from home) because they favoured MMC and shorter travel time. As discussions developed, it became clear that for the actual delivery, women did not always prefer MMC. Participants associated CLC with covering every eventuality, 'having everything there' or, as one woman described, being the 'ultimate safety net'. This was an important consideration for women when comparing place of delivery.

So you kinda want to go where there is everything and get back to (name of local unit) as soon as possible (Unit 5).

I still can't make my mind up. The midwives are trying to say, you know, you can deliver here and there's just always that in the back of your mind where you know everything is there in (name of referral unit). There's not everything here (Unit 5).

While referral units and CLC were associated with greater safety, the term 'conveyor belt' was used when referring to experienced lack of personal attention in larger hospitals.

In (name of referral unit) you have to buzz for them to notice, whereas here they have the time to notice before you would have to say. They pop in and out the whole time basically (Unit 3).

Women stated that relationships built with midwives during pregnancy were a benefit of MMC in the local units during delivery. Women felt that local midwives could empathise with their experiences, while consultants had a more distant relationship with them:

I just think that midwives tend to be sympathetic and have more of an open ear. Consultants tend to think more on outcomes than on the experience (Unit 8).

But nobody particularly wants consultant-led care. You want a midwife ... somebody who has been with you and is familiar with your history (Unit 5).

MMC was closely associated with supportive and comfortable care in smaller units. In several groups, women likened

Table 4. Characteristics of focus group participants

Location (Unit no.)	No. participants	Characteristics of women		
		Age range (years)	Parity range	Most recent intrapartum experience
1	4	30–45	1–3	3 to 6 years
2	5	27–40	1–3	7 months to 4 years
3	6	28–37	1–3	14 weeks to 7 months
4	6	25–41	1–4	11 months to 3 years
5	7	27–40	1–2	16 months to 5.5 years
6	6	25–36	1–3	9 months to 3 years
7	7	24–41	1–7	4 weeks to 7 months
8	6	32–45	1–5	14 months to 7 years

the local maternity unit to a hotel in comparison with delivery in the referral unit, for example:

It is just like a hotel and they help you with the baby and if you have a bad night they will take the baby for you and in (name of referral unit) you would have to fight for that.

Yeah

You're terrified to ask, you know, 'Can you take the baby?' They are like, 'I have got other babies' (Unit 4).

Attitude to home birth

Overall, being in a maternity unit, whether consultant-led or midwife-managed was associated with having help available in the event of complications. For this reason, many focused immediately on unit-based options rather than home birth when given the example choice question. Again, safety was often mentioned as a factor in the choice of unit-based care.

If you're in a hospital I think you feel safe (Unit 6).

Participants in several focus groups reflected that a home birth might be unsuitable for them because of their remote and rural locations and distance to their local maternity unit.

I think if you lived somewhere like (name referral city) or a city or whatever, you might choose a home birth, knowing that the hospital is there because if you choose a home birth here it's a different kettle of fish altogether. Because, you imagine people staying in a big city might choose a home birth thinking, I'm five minutes up the road from the hospital anyway so, I can be there (Unit 5).

Women also commented that a home birth was not an option offered to them.

Pain relief

When participants were discussing preferences for methods of pain relief, in particular the availability of epidural, there were differences in opinion and strength of opinion. Some felt it was important to have all types of pain relief available, particularly for first-time mothers and knowing it was there provided general reassurance.

I think if you haven't had a child its important to know its there, isn't it? (Unit 4).

It's like a safety net. The knowledge of it being there, even if you don't want it. Its there and that's like a, takes away fears (Unit 2).

This said, many stated that the availability of an epidural was not a factor in the choice of where to deliver.

So I never thought, oh, I want an epidural, I will have to go to (name of referral unit), when I got pregnant again so, no, it never really came into my line of thought at all (Unit 1).

Referring directly to the trade-offs presented in the DCE, women did not think that they would choose to travel further only to have access to an epidural. For example, while one

group listed the lack of epidural as a disadvantage of their local unit, when asked, they stated that they would not travel to the referral unit solely for this.

But was that important for you? (facilitator)

No.

Well, no.

You wouldn't take (name of referral unit) just so you could get an epidural! (Unit 4).

Travel time

Women generally accepted some travel time to the delivery unit as being part of living in a remote and rural area. Travel time was interpreted differently depending on location. For example, although the question stated 120 minutes, island residents instinctively interpreted this as meaning travel to the referral unit on the mainland and explained how this differed from travelling for 2 hours on the mainland because of the need for air or sea transport. This was also entangled with the travel time implications for visitors to the hospital.

- *120 minutes by ambulance is no bother at all*
- *If it is 120 minutes and you go by road*
- *It's the water here that makes the difference and the fact that, you know, if you do end up going, you know folk can't come and see. I mean its 3 hours and then an hour. 120 minutes by road would probably be ok. Most folk have to do that anyway. I mean, not many of us are 30 minutes from a place (Unit 4).*

I mean there is a difference of 2 hours driving, for instance, or flight for 2 hours...especially from here, like they are having to get a plane up from (name of city) and the same thing, or having to get people up in the middle of the night. But if it is a car journey then it is instant. Okay you have got traffic, but it is basically, you know you are on your way...much quicker (Unit 3).

Family circumstances

Women in several groups explained that family circumstances often affected decisions about where to give birth, and, for some, travelling to a more distant unit was undesirable because they would be far from family support in the referral unit, as it was too far from home for family members to travel to.

This was a particular concern as women considered the possibility of having to stay away from home for a potentially lengthy and uncertain time period, as would be the case if moved to a referral unit before reaching full term.

I would say one of the ones that bothered me was the length of time you would potentially be in (name of referral unit) and that was one of the things that if I tried to have the baby turned that they would do it at 36 weeks so I would go down for 36 weeks and they would probably want me to stay and then if the baby had turned then you could wait for, you know, till about 42 weeks

before, you know, before your baby might decide to come. So I mean, so it is potentially being in (name of referral unit) for 6 weeks, plus your recovery time after the birth (Unit 3).

Time away from home had implications for the whole of the family and was a particular concern if women already had other children.

... if your husband is a joiner and you have got other children say. Who is going to take the time off work to look after the children while you were in (referral unit)? It, you know, especially if you are there for two weeks beforehand (Unit 8).

The issues raised in the focus groups, particularly around the importance of geographic location in terms of level of remoteness and island/mainland differences, were used to inform the subgroup analysis.

DCE results—preferences by subgroups

The subgroup analysis supported all, but one of the hypotheses is shown in Table 3. In all cases, a likelihood ratio test indicated that preferences were significantly different across subgroups, and the restriction of pooling the categories was not valid (Table 5A, Table 5B). Women who experienced episode(s) of high risk during the course of pregnancy or labour preferred unit-based CLC over MMC or home birth. Respondents expressed a preference for models of care similar to what they experienced during their most recent delivery.

Preferences were affected by geographic location; island residents preferred MMC, while mainland residents preferred CLC. Geographic location also affected the importance of travel time to respondents, with those living on the mainland being prepared to travel further for their most preferred care. When respondents were grouped according to remote and rural categories (defined by catchment unit), those classed as very remote were prepared to travel further for either maternity care package.

Discussion

Current UK policy stresses that women have the right to choose where and how to give birth.^{20,21} Our DCE showed that, looking at the whole sample, these women had an overwhelming preference for unit-based care as opposed to home birth and indicated a threshold willingness to travel for approximately 2 hours for care in a unit. This sample also had a stronger preference for CLC compared with MMC, and these women were willing to travel 16 minutes further for CLC. Willingness to travel was greater among women living in very remote rural areas compared with those living in less remote areas, which indicates the validity of the model. By definition, women living in remote areas have to travel further to access a range of services, and this was reflected in the preferences expressed.

Further subgroup analysis showed that preferences varied according to type of unit at delivery, EGAMS level of local

catchment unit, geographic location and respondents' risk status. These findings largely support previous work showing that women prefer systems of care that they are familiar with (i.e. have access to and experience of), the so-called status quo bias.¹⁷ The one exception was that, on average, women living in the catchment of stand-alone midwifery units did not prefer MMC over CLC. The focus groups showed that women in the catchment areas of the stand-alone midwifery units highly valued their local units, because of greater familiarity and one-to-one support from midwives,²² but suggested that for actual delivery, women may prefer CLC, which they associated with safety and having 'everything there'. This is consistent with previous studies suggesting that the provision of adequate 'safety net' services that can deal with emergencies and acute care needs are highly valued in rural populations.²³ It is also important to note that three out of the four stand-alone midwifery units were not as remote as the other units involved in the study, and their nearest referral unit was accessible in 45–60 minutes. The finding that MMC and CLC were, on average, equally preferred among women in the catchment of stand-alone midwifery units may reflect that both models of care were perceived as realistic delivery options.

Our findings present challenges for service redesign. With specific reference to intrapartum care, the current policy focus on provision of locally based midwife-led care may not accurately reflect women's preferences. Furthermore, additional centralisation of acute obstetric services may be unacceptable to women in terms of increasing travel time from home. The difficulties in interpreting women's views and preferences and potential limitations of DCEs in informing service redesign, given the *status quo bias* have been highlighted.^{24–26} An important consideration is that the findings could suggest that no change is preferable to the developing models of care. What is clear, through the combination of methods, is that women were able to discern between the different models of care presented and weigh up advantages and disadvantages associated with each. Women formed these views through experience and framed them realistically within known parameters of current service provision and their particular remote and rural context. The heterogeneity in preferences shown is evidence of the influence of factors beyond experience and can usefully inform service provision. For example, island residents, with the unusual model of midwife-care alongside nonobstetric hospital, showed stronger preference for MMC and had distinct concerns regarding travel.

The DCE achieved a reasonably high response rate of 62%,^{27–29} but a number of potential limitations should be considered. First, the trade-offs explored in the DCE between model of care and time travelled likely do not reflect all the trade-offs women face in reality. Indeed, the focus groups showed that women had many and varied considerations in their decisions about where to deliver. Some of these, most notably the social and financial implications of being away

from home, were nonservice related.³⁰ Further limitations of our selection of attributes may have been that the study focused specifically upon intrapartum care, so it did not include attributes of antenatal or postnatal care, although these were important in women's evaluations of different models of care. Similarly, availability of specialist neonatal care was not included. Finally, we have highlighted that interconnections between experience, expectations and preferences are complex and that these may be better explored in future studies using a prospective study design to capture preferences before and after birth.³¹

The potential advantages of using qualitative methods alongside DCEs in selection and validation of attributes and interpretation of quantitative results have been highlighted but underused and rarely reported in detail.^{11,13} Our combined use of focus groups and DCEs proved a strength as focus groups helped validate attributes and gave a valuable insight into the decision-making process, essential in interpreting the DCE results and designing the subgroup analysis. Women participating in the focus groups were self-selected, and their views may differ from other women in the catchment areas. Given that similar themes arose in all of the focus groups, this may not be a problem. Together, the findings of the study represent respondents' views and preferences from the selected remote and rural settings in one region of Scotland, a region that well exemplifies both rurality and remoteness in the UK and specific models of care. Generalisability of findings to other service networks in less rural settings remains unknown, but the use of travel time rather than distance may have relevance for urban populations.

Conclusion

The key messages from the study are shown in Box 1. Women in our study preferred to deliver in a maternity unit rather than having a home birth and indicated a threshold willingness to travel for approximately 2 hours for care in their preferred location. Overall, women preferred CLC to midwife-led care, but their preferences for different models of care was

Box 1. Key messages.

- Women overwhelmingly preferred an institutional delivery to a home birth.
- Women on average preferred CLC, but drew a travel time threshold at around 2 hours. This has implications for further centralisation of intrapartum care.
- MMC was associated with greater social support, but women weighed this against the perceived increased safety with CLC.
- Combining focus groups with DCE gave a valuable insight into women's decision making and aided the interpretation of the DCE results.

associated with the care model they had experienced and their risk status during pregnancy and labour. In the context of women-centred care and, more broadly, a patient-centred NHS, our findings present challenges for policy making and service redesign. The current emphasis on local midwife-managed intrapartum care and the likely further centralisation of obstetric services may both be contrary to women's preferences.

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Supplementary material

The following supplementary material is available for this article:

Appendix S1. Maternity services: women's preferences questionnaire.

These materials are available as part of the online article from: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1471-0528.2007.01516.x>.

(This link will take you to the article abstract).

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