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# Mapping maternity care: the configuration of maternity care in England

## Birthplace in England research programme. Final report part 3

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## Glossary of terms/abbreviations

AMU	Alongside Midwifery Unit
ANNP	Advanced Neonatal Nurse Practitioners
BMI	Body Mass Index
CQC	Care Quality Commission
FMU	Freestanding Midwifery Unit
GIS	Geographical Information System
HCC	Healthcare Commission
HDU	High Dependency Unit
ICU	Intensive Care Unit
LDRP	Labour, Delivery, Recovery and Postnatal rooms
MWS	Maternity Support Workers
MW	Midwife
OU	Obstetric Unit
SHA	Strategic Health Authority
SHO	Senior House Officer
WTE	Whole Time Equivalent



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### ***Mapping working group***

Membership of the working group was as follows: Alison Macfarlane, Neil Marlow, Chris McCourt, Mary Newburn, David Puddicombe, Maggie Redshaw, Rachel Rowe, Jane Sandall, Liz Schroeder, Louise Silverton and Julia Sonander.

### ***Contributions***

All the authors contributed to the design of the survey and provided critical comments on the draft report. Maggie Redshaw was responsible for the design and management of the 2010 survey, analysis of both data sets and drafting the report on which the authors commented.

Julia Sonander and Bill Alexander were responsible for the overall design and management of the 2007 survey on behalf of the Healthcare Commission (now Care Quality Commission). David Puddicombe used GIS for geographical mapping of the maternity units and Chris Hockley carried out initial data cleaning.

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# Executive Summary

## **Background**

Contemporary maternity services in England aim to provide high quality, individualised care for all women that is underpinned by effective organisation. A wide range of policy and resource issues can affect the way that services are planned, organised and delivered.

The Birthplace in England research programme has taken place in a context marked by a rising birth rate, changing demographics of the child-bearing population, shifting patterns of migration and organisational change. At the time the Birthplace programme was initiated, there was little reliable evidence about the nature, geographical location, distribution of midwifery units and their relationship to obstetric and home birth services. Detailed evidence was also lacking about staffing and capacity in all types of maternity unit.

## **Aims**

The primary research question for this component study was 'How is maternity care organised?' In other words how is maternity care configured, who provides the care and where is it provided? The descriptive data collected and used in answering this question aimed to provide a context for the Birthplace national prospective cohort study, to assist in site selection for that study and for the case studies component, to contribute to the economic analysis of the costs of maternity care and to describe changes in configuration over time.

## **Methods**

Two surveys of trusts and units providing maternity healthcare in England were conducted.

- Data on the organisation of maternity care in 2007 was collected as part of the maternity care review conducted by the Healthcare commission in 2007. This was a mandatory survey of all trusts providing maternity care in England covering all aspects of provision. Selected variables relating to aspects of intrapartum care services were used in the present study to describe the configuration and characteristics of intrapartum care services in 2007.
- Selected data capturing changes in configuration of maternity care in 2010 were collected in a follow-up survey carried out by the Birthplace study team in late 2010.

Completion of the 2010 survey by trusts and units was not mandatory.

## **Results**

Main findings were as follows.

### **Units and configuration**

- In 2007 data were returned from all 152 trusts providing maternity care in England (100%). Fewer trusts responded to the 2010 survey (63%) though these were representative in terms of configuration. Basic data were available for all trusts in 2010(100%) on numbers and types of unit and trust configuration.
- The configuration of maternity care within trusts changed over the course of the study: in 2007, two thirds of trusts (66%) contained only one or more obstetric units and by 2010 the proportion had decreased to half (49%); in 2007, less than a fifth of trusts contained at least one AMU and by 2010 the proportion had increased to 35%; in 2007, 18% of trusts contained an FMU and by 2010 the proportion was 24%.
- By 2010 the overall number of maternity units had increased by 11%, with twice as many AMUs as in 2007 (53 compared with 26).
- Based on 2007 data the geographical distribution of maternity units, particularly OUs and delivery beds reflects the centres of population.
- There were marked differences in the numbers of midwife-led units in different areas of England in 2007: FMUs were most common in the South West and AMUs were more likely in London and South Central SHA regions.

### **Workload**

- Intrapartum care in an OU was the most common form of provision, with staff in OUs caring for more than 95% of women giving birth in hospital in the year ending 31 March 2007 (1% in FMUs and 3% in AMUs).
- Each different type of unit provided intrapartum care for radically different numbers of women: a median of 192 in FMUs, 613 in AMUs and 3217 in OUs in 2007.
- All types of unit varied in the numbers of women giving birth: over a quarter of OUs (29%) reported having fewer than 2500 women giving birth and a similar proportion (26%) delivered more than 4000 women.

- Based on the 2007 trust data the median proportion of births that took place at home was 2.5%, including both planned and unplanned home births.

### **Capacity, occupancy and eligibility**

- Data were returned from 262 units in 2007 with 2193 delivery beds or bed spaces, 6.2% in FMUs, 6% in AMUs and most (88%) in OUs.
- There was considerable variation in capacity for care during labour and birth between and within the types of unit: the medium number of delivery beds ranged from 2 in FMUs, 5 in AMUs to 10 in OUs.
- There was substantial variability in 'occupancy' (women giving birth per delivery bed) within and across all unit types and between geographical regions.
- Eligibility criteria for admission to FMUs and to AMUs were not consistent for either type of unit.

### **Staffing**

- A total of 19,415 whole time equivalent (WTE) midwifery posts were reported in March 2007 and 5263 WTE maternity support worker posts.
- A total of 3864 WTE medical staff working in obstetrics were reported in March 2007, almost entirely in OUs: similar proportions were senior house officers (31%), registrars (30%) and consultants (30%) and 9% were staff grades or associate specialists.
- General practitioner (GP) involvement in intrapartum care was widely distributed, but at low density with only 12% of maternity units reporting GP engagement with maternity care (2 FMUs and 30 OUs).
- Paediatric or neonatal staff were on-call for the delivery suites or theatres associated with AMUs and OUs and in 44% of OUs ANNPs took on this role.
- Overall the largest components of the midwifery maternity workforce were midwives employed at Bands 6 (52%) and 7(21%), followed by maternity support workers at Band 2 (14%); less than 3% of the workforce were employed above this level.
- Midwifery staffing levels (midwives per 1000 births) varied between units of the same type and between the different types of unit: levels were higher in FMUs (median of 35 midwives per 1000 women giving birth compared with 31 per 1000 in AMUs and OUs); the number of maternity support staff per 1000 births was also higher in FMUs (23 per thousand women delivered vs. 7 and 8 per 1000 in AMUs and OUs respectively).

- Some units did not employ MSWs in 2007: 15% of FMUs, 35% of AMUs and 2% of OUs did not do so. Of those that did, OUs were most likely to use them in delivery suite (99%, compared with 79% of AMUs and 46% of FMUs).
- There was considerable variation between OUs in the ratio of obstetric medical staff per 1000 women delivered per year (median 6.8 per 1000), obstetric consultants (median 2 per 1000) and obstetric anaesthetist staff (2.5 per 1000).

### **Intrapartum related services**

- In 2007 almost all units provided a telephone triage system for early labour assessment and half reported providing early labour assessment by a midwife at home, a service most commonly provided by FMUs (65%) and AMUs (58%) compared with 47% of OUs.
- A large proportion of maternity units of all types had fixed birthing pools (79%).
- Specialist medical services on site that included a 24 hour epidural service, dedicated obstetric theatres, adult intensive care units and neonatal units and obstetric high dependency beds were more likely to be associated with OUs.
- Where adult intensive care and neonatal care were not available on-site, the distance to such a facility varied considerably (median distance 17 miles).

### **Gaps in provision**

- Gaps in provision occur as a consequence of staffing, capacity and other issues: 4% of midwifery posts and 11% of maternity support worker posts were reported to be vacant on March 31 2007.
- Midwifery vacancy rates varied with geographical area and were highest in London and lowest in the Yorkshire and Humberside region.
- A total of 39% of maternity units reported closing to admissions on one or more occasions in the year to 31 March 2007 (32% of FMUs, 35% of AMUs and 39% of OUs); while OUs were more likely to have closed at all, AMUs and FMUs were more likely to have closed more often or for longer.
- The overall turnover rate of midwifery staff due to resignations and retirements in the year to 31 March 2007 differed little across the different types of unit (7% FMUs, 8% AMUs and 7% OUs); individual unit turnover which varied from 0-40% was not related to size of OU

or FMU unit as reflected in the numbers of women delivered, though an association was indicated for AMUs.

- In 2007 the proportion of midwives aged 50 years or more was 21% (26% in FMUs, 22% in OUs and 19% in AMUs).

### **Recent and future changes in service provision**

- In comparison with 2007, by 2010 over three quarters of trusts had increased their midwifery establishments (77%), increased the numbers of consultant obstetricians (80%) and obstetric cover (77%).
- By 2010 a third or more of trusts had increased the overall number of delivery units (36%), delivery bed capacity (44%) and paediatric cover (32%).
- In 2010 substantial proportions of trusts were planning yet further increases in the number of delivery units (54%), delivery bed capacity (57%), the midwifery establishments set (66%), the numbers of consultant obstetricians (64%) and obstetric cover (58%).

### **Conclusions**

The current organisation of maternity care reflects a wide variety of influences and it appears that trusts have to some extent developed different solutions and strategies in providing maternity care. Population density and complexity of need may have driven some of the specialist services, especially those based in cities and centres of population. However, it is unlikely that the care needs of mothers and babies vary to the extent that services do, particularly those at low risk of complications. The variation in all the aspects of maternity care service delivery and organisation reported goes beyond such differences and appears to reflect inequalities in provision.

Despite the multiple influences at work, there are some discernible patterns in the shifting picture of provision. The changing nature of specialist medical training has affected the way that maternity care is organised as a whole, but particularly in OUs and AMUs. The rising birth rate and increased acuity is making demands on the skill base of the health professionals involved and on the capacity of all units as reflected in staffing levels, beds, rooms and specialist facilities that include theatre and high dependency care. Many trusts have responded to these pressures and they are continuing to try to find solutions in the way that care is organised and configured that address the needs of the populations they serve in the different areas of England.

While the evidence and findings presented create a national picture, perhaps more significantly, the variations described can be used as drivers for change and quality improvement both locally and nationally. Policy

makers, commissioners, managers and maternity staff in trusts and units have evidence with which to make comparisons and consider in reviewing their own services while planning future maternity care provision.

Further research could include modelling of provision using the data set employed for the mapping descriptive analyses and should include exploration of the effects of impact of the changing demographic structure, need and expectations of the child-bearing population.

Monitoring the changes that take place in services is critical in informing future planning and evaluating what is currently in place. Thus the collection of detailed information about outcomes for women and the way that trusts and units provide maternity care is essential, particularly in the context of the ways in which the Birthplace prospective component study research and related findings may affect configuration and practice more broadly.

Specifically in the changing environment of maternity care, further research is needed that is adequately evidence based on the development of validated tools for matching both medical and midwifery staffing to need on a shift by shift basis and overall.

---

# 1 Introduction

Modern maternity services aim to provide high quality, individualised care, underpinned by the way that care is organised nationally and locally.<sup>1, 2</sup> Policy implementation and resource issues of diverse kinds may affect the way that services are delivered for individual women and for different populations.<sup>3</sup> Resources, particularly staffing, are recognised as critical aspects of maternity care provision.<sup>4-7</sup>

The Birthplace in England research programme has taken place against a back drop that includes a rising birth rate, changing patterns of migration and organisational change in terms of commissioning and the development of maternity networks. Maternity care, like other areas of healthcare, has to deliver services to women and babies who are at low risk of complications and those about whom there may be long-lasting, developing or unexpected concerns. It has to be provided in large centres of population and rural environments and in areas with variable community and individual level resources.

## 1.1 The research question

The primary research question for this part of the programme was 'How is maternity care organised?' In other words, how is maternity care configured, who provides the care, and where is it provided? The descriptive data collected and used in answering this question aimed to provide a context for the Birthplace national prospective cohort study, to assist in site selection for that study and for the case studies component, to contribute to the economic analysis of the costs of maternity care and to describe changes in configuration over time.



---

## 2 Methods

As a contextual component, it was planned to collect data on the organisation of maternity care by surveying all trusts and units providing maternity care in England in 2007. At the same time the Healthcare Commission (HCC) (now Care Quality Commission) planned to undertake a review of maternity care of which a similar organisational survey of trusts was a key element.<sup>3</sup> In order to avoid duplication of effort and to minimise the burden of data collection on trusts it was decided to combine the Birthplace and HCC surveys and run these as one. The survey instrument was developed by a mapping working group involving Birthplace co-investigators, researchers and HCC staff members. The HCC set up and managed the 2007 survey. A follow-up postal survey was planned to take place at the end of the Birthplace programme to document changes in configuration and provision.

### 2.1 Data collection

#### 2.1.1 2007 survey

Trusts and units were given information about the review in advance of the 2007 survey. A paper copy of the form was available to assist with data collection prior to online entry and return with information about the joint NPEU and HCC working. Online explanations about data items were available and a helpline was provided to respond directly to queries from trust and unit staff.

From May 2007 trust and unit data could be entered and saved. Participation was mandatory for all trusts providing maternity care in England with a completion date in October 2007 for final data return.

The survey was divided into two sections: one for the trust and the other to be completed by each of the units in the trust. Leads within each trust were responsible for passing on requests for information and enabling unit leads to respond.

In the 2007 survey trust and unit statistics on most aspects of care were requested for the year to 31 March 2007. Other numerical data, such as those relating to staffing establishments, were requested as of 31 March 2007. The data items requested covered many aspects of organisation and policy. Those of relevance to Birthplace included midwifery and medical staffing, numbers of women delivered, numbers of births, planned and unplanned home births, eligibility criteria for births planned out of obstetric units, the rooms and beds available, and the location and provision of specialist services such as high dependency or intensive care for mothers and babies. Data were also collected on recent and planned changes to

capacity and staffing and the numbers of the different types of units within trusts. Staffing data were largely requested in Whole Time Equivalent (WTEs) for which budgets and funding were in place. Minimal data cleaning was carried out, with cross checks between trust and unit data on staffing numbers and women delivered. The annual numerical data presented below are based on the year to 31 March 2007 unless otherwise specified.

### **2.1.2 2010 follow-up survey**

A second survey was carried out in November-December 2010 by the Birthplace team at the end of the Birthplace in England research programme in order to document any changes in configuration and the organisation of maternity care since 2007.

Separate trust and unit postal questionnaires were sent to Heads of Midwifery. Unlike the initial survey, participation was optional rather than mandatory. The survey utilised a sub-set of the previous questions: it included an overview of changes in maternity care during the previous three years, further changes planned, staffing numbers and women delivered. Two email reminders were sent and responses were logged, checked and entered into a database at the NPEU.

Where questionnaires were not returned, data from the continuously updated Birthplace in England database were used to provide information on trust changes, numbers and type of unit.

## **2.2 Data analysis**

The focus for the analysis is largely on data relating to intrapartum maternity care and items relevant to intrapartum care as agreed by the Mapping working group. However, data on staffing reflect all areas of maternity care unless otherwise specified.

The data were collected and entered into an MS Access database and data checks and analyses were carried out using STATA 10.1 SE and SPSS 15.0. Frequencies and proportions were calculated. The location information was used for geographical mapping (MapInfo) with a geographical information system (GIS). Analysis was carried out by trust, configuration within trust, type of unit and region as reflected by Strategic Health Authority (SHA).

The three possible types of unit, as defined in the first component of Birthplace (OU, AMU and FMU, see final report part 2) were listed for information on the unit section of the survey.

Trusts were asked to provide information about all the units providing maternity care within the trust and for information to be returned separately for each unit where intrapartum care was provided. Not all trusts were able to provide data for all their units on some aspects of functioning and thus the denominator varies as shown. In six trusts it was unclear the extent to which AMUs were in operation because it was not possible to

disaggregate AMU data from those of the OU on the same site. In these trusts the data provided combined both OU and AMU women using the trust services. Some data on staffing were not provided by two FMUs and one AMU.

---

## 3 Results

In 2007, data were returned from all 152 trusts providing maternity care in England (150 acute trusts and 2 primary care trusts) and 262 maternity units (56 FMUs, 26 AMUs and 180 OUs). By the end of 2010, following trust mergers the number of trusts providing maternity care in England was 148; responses were received from 93 trusts (63%). The proportion returned from trusts within different Strategic Health Authorities (SHAs) was uneven, with markedly fewer responses from the North East and South East Coast and relatively greater numbers of responses from the South West and South Central regions. By supplementing these data with data from the continuously updated Birthplace in England database, information on numbers and type of unit and configuration was available for all 148 trusts in 2010.

### **3.1 How is intrapartum maternity care provided and where is care available?**

Options for care for many women are reflected in the types of maternity units available within a trust. Although some women move across trust boundaries for different aspects of their care, most receive antenatal and labour and birth care in one trust (83%) with little variation by region in this proportion.<sup>8</sup> In practical terms women's choices may be limited to the local services available unless they or their babies require more specialist care.

#### **3.1.1 Configuration within trusts**

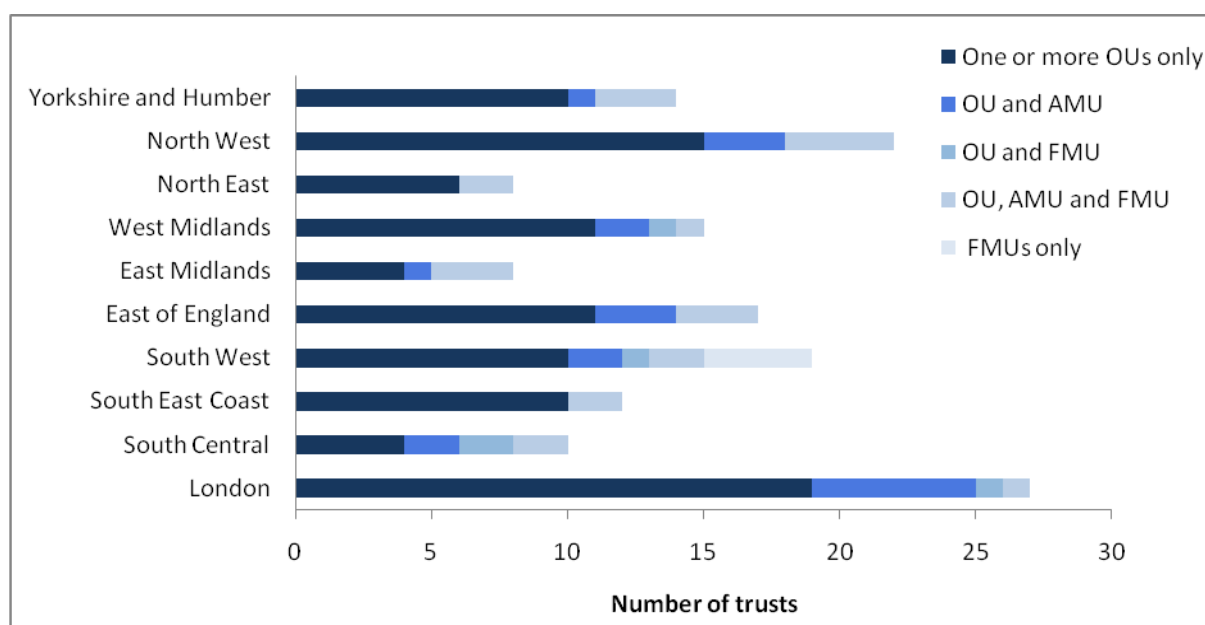
In 2007 the configuration of care within trusts was limited to obstetric units (OUs) in two thirds of trusts (66%) (Table 1). While many women will have received intrapartum care led by midwives in these units, the options for place of birth were either to receive maternity care in an obstetric unit or at home. However, as previously noted some women's actual choice may be broader than this where they can easily access care across boundaries, for example in big cities. Similar proportions of trusts had at least one FMU (18%) and at least one AMU (17%). At the time of the initial survey the number of FMUs in trusts ranged from one to six, but most trusts with an FMU had just one unit of this kind; few (3%) had all three types of unit.

The distribution of trusts with different types of configuration (Figure 1) indicates marked differences in the availability of midwife-led services (midwifery units) between trusts in different areas of England (SHAs) in 2007. Trusts with FMUs were more common in the South West and trusts with AMUs were more likely in London, the North West and the East of England.

**Table 1. Configuration of maternity care within trusts in England in 2007**

Trust configuration	Trusts	
	n	%
One or more Obstetric unit (OU) only	100	65.8
One or more OUs and one or more AMUs	20	13.2
One or more of all types of unit (OU, AMU and FMU)	5	3.3
One or more OUs and one or more FMUs	23	15.1
One or more FMUs only	4	2.6
Total	152	100

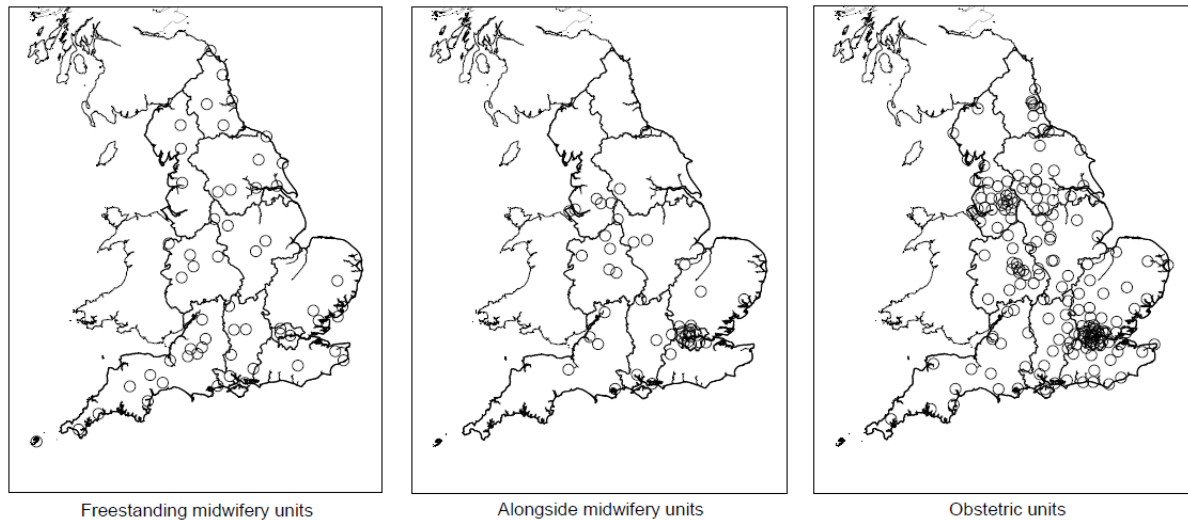
**Figure 1. Configuration of maternity units in 2007 within trusts by geographical area (SHA)**



### 3.1.2 The geographical location of maternity units

The geographical distribution of maternity units, particularly OUs, reflects the centres of population, (Figure 2). As with the different configurations of care, regional variation in the distribution of the different types of maternity unit is evident in the maps shown as well as in the proportions of the different configurations within each geographical area (Table 2).

**Figure 2. Distribution of FMUs, AMUs and OUs in England by geographical regions (SHA) in 2007**



While obstetric units predominate in all parts of England, there was variation in the extent to which AMUs and FMUs were part of the service: AMUs were most common in London and South Central; FMUs were most common in the South West and two regions apparently had no AMUs at this time.

**Table 2. Types of maternity unit by geographical area of England in 2007 (SHAs)**

Area (SHA)	Maternity Unit Type						Total n
	OU		AMU		FMU		
	n	%	n	%	n	%	
London	30	76.9	7	17.9	2	5.1	39
South Central	12	46.2	5	19.2	9	4.6	26
South East Coast	16	4.2	0	0.0	3	15.8	19
South West	16	45.7	3	8.6	16	45.7	35
East of England	18	69.2	3	11.5	5	19.2	26
East Midlands	11	73.3	1	6.7	3	20.0	15
West Midlands	18	69.2	3	11.5	5	19.2	26
North East	12	75.0	0	0.0	4	25.0	16
North West	28	80.0	3	8.6	4	11.4	35
Yorkshire and Humber	19	76.0	1	4.0	5	20.0	25
Total	180	68.7	26	9.9	56	21.4	262

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### 3.2 Births in maternity units

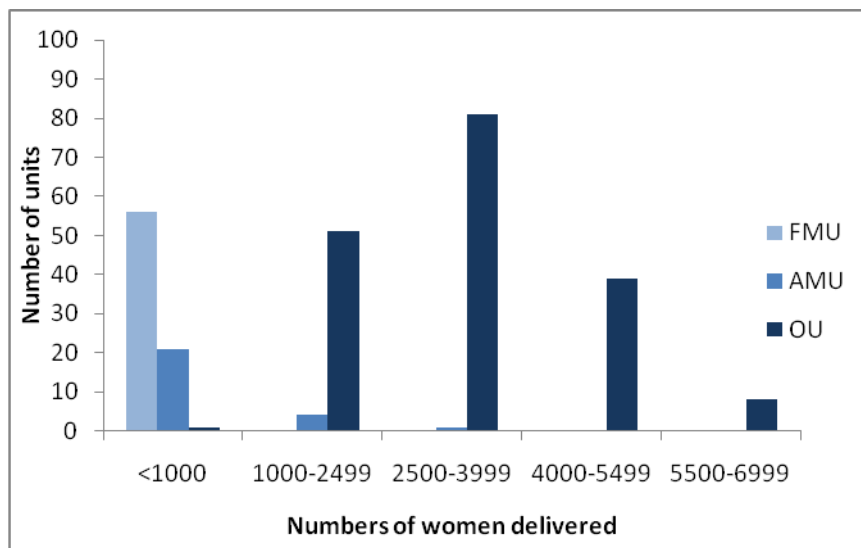
Units reported on a total of 621,312 women delivering in maternity units (excluding births at home). Intrapartum maternity care in an OU was by far the most common form of provision, with staff in OUs caring for more than 95% of the women giving birth in England in the year ending March 31 2007 (1.1% in FMUs and 3.1% in AMUs). However, it must be emphasised that many of the women giving birth in an OU will have received most of their care from midwives and more than half will have received midwife only care during labour and birth.<sup>8, 9</sup>.

All types of unit varied considerably in the numbers of women giving birth and the ranges in total numbers overlapped across the different types of unit (Table 3). The median number of women delivered in 2007 and inter-quartile range for each type reflects the kind of workload to be managed and the size of unit. The distribution of units by different levels of throughput (0) shows that over a quarter of OUs (29%) reported having fewer than 2,500 women giving birth while a similar proportion (26%) reported having more than 4,000 women giving birth. Midwifery units, both AMUs and FMUs, reported considerably fewer women giving birth compared with most OUs. While the marked increase in birth rate may not have been so evident in the reported numbers of women delivered in the year to 31 March 2007 as would be the case currently, the relative differences between the unit types in throughput are likely to have continued.

**Table 3. Numbers of women delivered in different types of maternity unit in year to 31 March 2007**

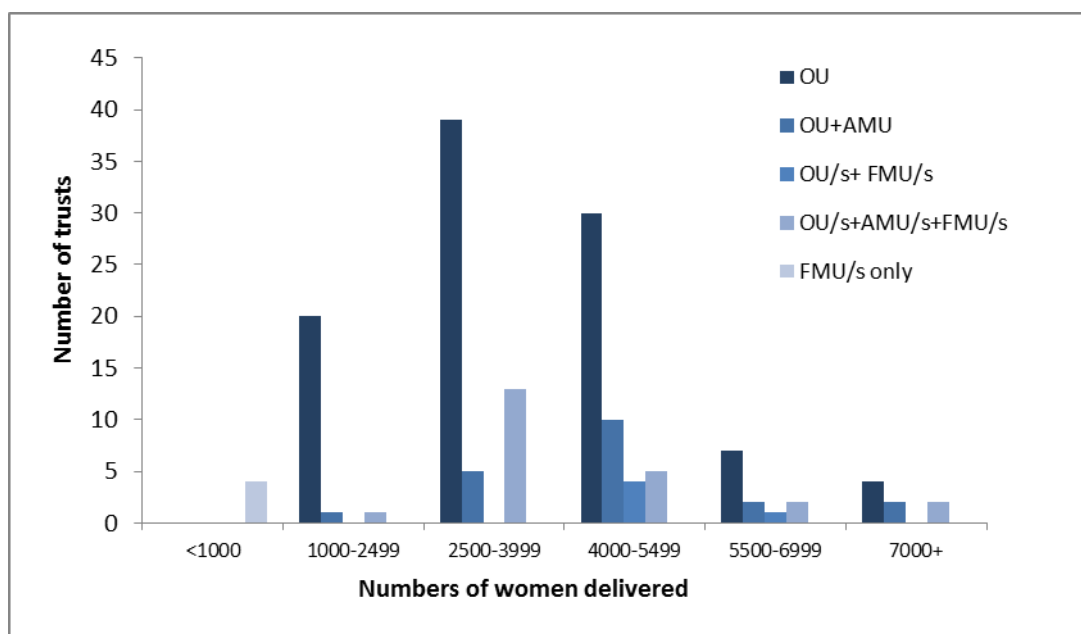
	<b>FMU n=56</b>	<b>AMU n=26</b>	<b>OU n=180</b>
Mean	201.1	738.2	3282.6
Median	192	613	3217
Interquartile range (IQR)	85-303	402-876	2433-4043
Range	8-548	93-2860	914-6781
Total births	11261	19192	590859

**Figure 3. Distribution of types of unit by women delivered**



The data at Trust level show wide variation in the numbers of women giving birth in trusts with the same type of configuration (Figure 4).

**Figure 4. Distribution of numbers of births in trusts by configuration in year to 31 March 2007**





### 3.3 Home births

Data were also collected on home births. The proportion of women reported to have given birth at home in England as a whole is relatively small: 2.8% in both 2007 and 2008.<sup>10, 11</sup> Based on the 2007 survey data returned, the proportion per trust varied between 0.45% and 22.2% (mean 3.5% and median 2.5%) of women delivered, including both planned and unplanned home births.

There were marked differences between individual trusts and some differences between those with different types of configuration in the proportions of women giving birth at home (Table 4). Trusts also differed in the proportions of women giving birth at home who gave birth with a health professional present (mean 81%, median 84%, range 14%-100%) and whether the birth at home was planned at the start of labour (mean 70%, median 74%, range 14%-100%).

**Table 4. Women giving birth at home in the year to 31 March 2007 in trusts with different configuration**

Trust configuration	% Home birth (n=152)	
	Median	Range
One or more Obstetric unit (OU) only (n=100)	2.5	0.5-11.3
One or more OUs and one or more AMUs (n=20)	1.9	0.8-4.4
One or more OUs and one or more FMUs (n=23)	2.7	0.9-4.4
One or more of all types of unit (OU, AMU and FMU) (n=5)	2.8	1.0-9.1
One or more FMUs only (n=4)	15.4	13.7-22.2
All configurations	2.5	0.1-22.2

### 3.4 Where are the beds?

Trusts were asked about a range of physical facilities including rooms and delivery beds in 2007.

#### 3.4.1 Capacity in units and regions

Data were returned from 262 units about 2,193 delivery beds or bed spaces, 6.2% of which were in FMUs and 6.3% in AMUs, with the large majority (87.5%) in obstetric units. A small number of rooms did not have delivery beds reported, most commonly FMUs, and one 'bed' was allocated to each of these. The number of delivery beds relates directly to the number of rooms: very few delivery areas were planned to be used by more than

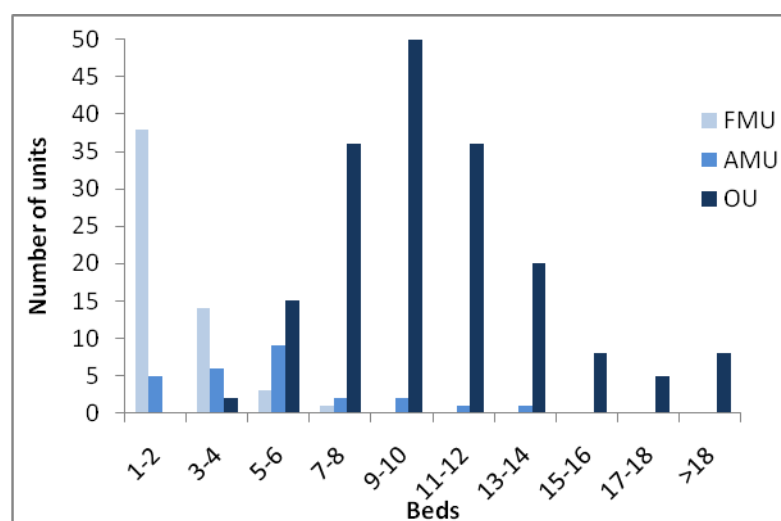
one woman at the same time. A total of 1.6% of delivery rooms had two beds.

Units of all types varied considerably in the numbers of delivery beds available (Table 5, Figure 5). Units with LDRP rooms (Labour, Delivery, Recovery and Postnatal) to which women are admitted and generally stay until discharge home, were asked to count these as delivery rooms. Thus the numbers of rooms available for labour and birth at any one time may be slightly fewer than those presented. The unit with the highest number of delivery beds (34) was running an LDRP system.

**Table 5. Delivery bed numbers by type of maternity unit in 2007**

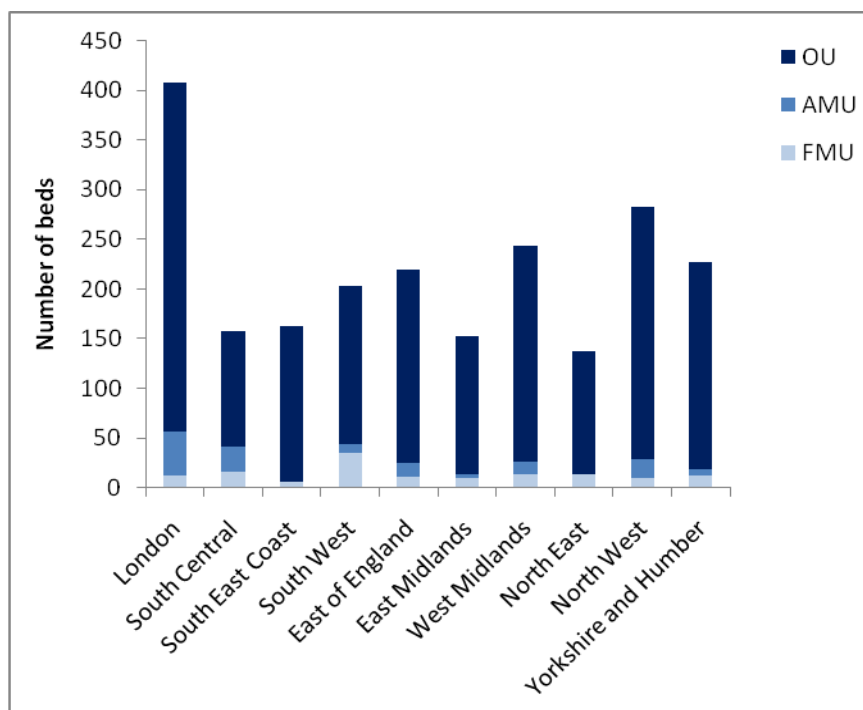
	<b>FMU n=56</b>	<b>AMU n=26</b>	<b>OU n=180</b>
mean	2.5	5.2	10.7
median	2	5	10
IQR*	2-3	3-6	8-12
range	1-7	1-13	3-34
Total beds	137	135	1921

**Figure 5. The distribution of delivery beds in different types of unit in 2007**



The numbers of beds in any geographical region generally reflected the centres of population, with London having approaching a fifth of all delivery beds in England (18.6%), followed by the North West (12.9%), West Midlands (11.1%) and Yorkshire and Humberside (10.4%) (Figure 6).

**Figure 6. The distribution of delivery beds by type of unit and geographical area (SHA)**



### 3.4.2 Beds and throughput

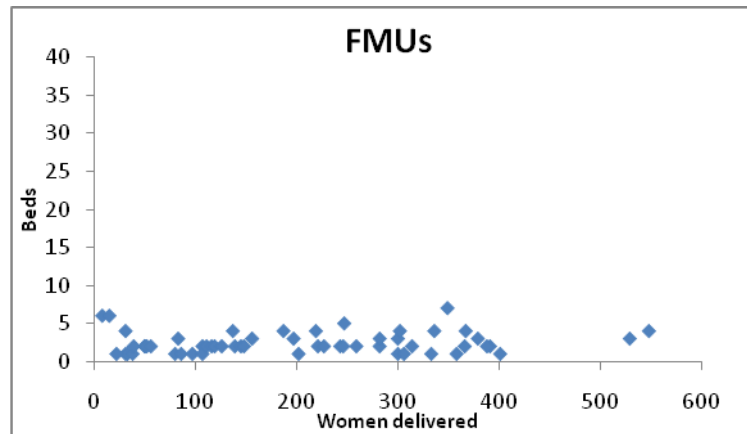
Delivery beds alone represent a limited measure of the capacity of units and trusts to provide intrapartum care. Overall there were 3.6 beds per 1000 women delivered in maternity units per year. While occupancy varied between units of the same type, the number of women delivering per bed/bed space also showed marked variation between the different types of unit (Table 6). This is illustrated in the relationships shown in Figure 7 where it appears that some outliers are functioning rather differently. There was much less variation in the number of delivery beds.

**Table 6. Women delivered per bed/per bed space by types of maternity unit in 2007**

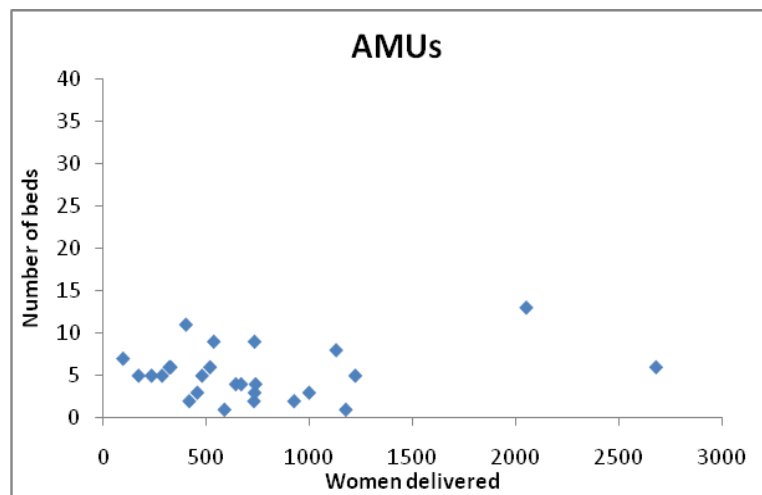
	<b>FMU n=56</b>	<b>AMU n=26</b>	<b>OU n=180</b>
Mean	89.1	146.2	318.0
Median	86.8	140.9	323.4
Interquartile range (IQR)	47.9-123.1	105.4-159.4	256.1-373.1
Range	3.8-379.0	46.3-318.0	102.3-507.3

**Figure 7. Delivery beds in relation to women delivered**

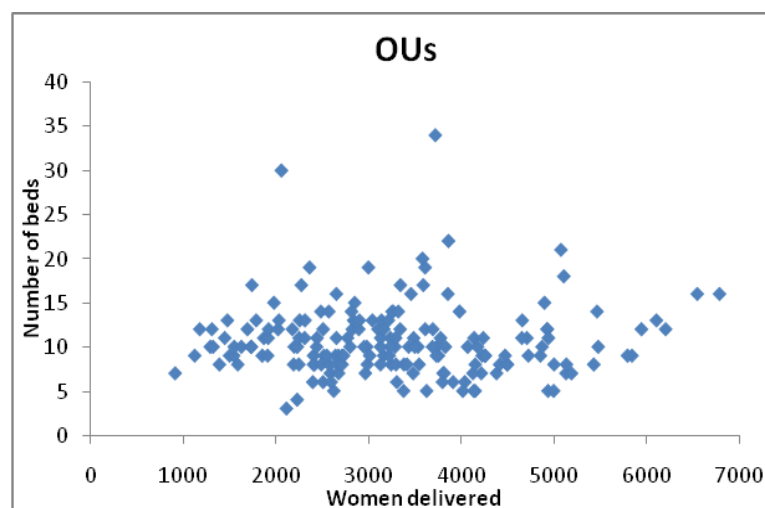
(a) FMU beds in relation to women delivered (n= 56 units).



(b) AMU delivery beds in relation to women delivered (n=26 units).

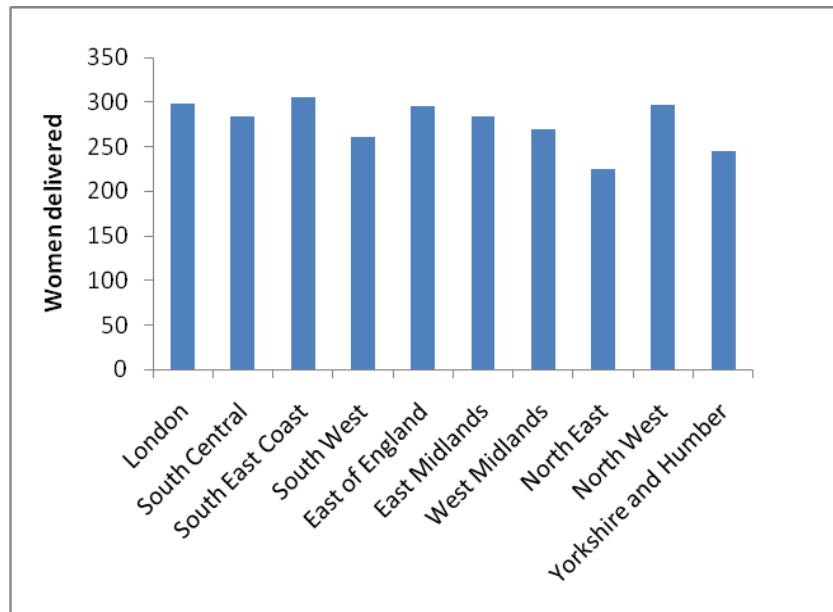


(c) OU delivery beds in relation to women delivered (n=180 units)



Examination of the data by geographical region (SHA) shows that occupancy as reflected in the number of women delivered per year per bed varied (ranging from 221 in the North East to 305 in South East Coast) (Figure 8). In terms of beds per 1000 women delivered per year, provision was greatest at 4.5 for the North East, compared with 3.4 for London and the North West and 3.3 for South East Coast areas.

**Figure 8. Women delivered per bed by geographical area (SHA) in year to 31 March 2007**



### **3.5 Eligibility for admission to FMUs and AMUs**

In the 2007 survey individual units were asked about the eligibility criteria for women planning to give birth in the unit and policy and decision-making in relation to planned FMU and AMU births. The factors listed were maternal age, preterm birth, parity, multiple birth, previous caesarean birth, BMI (Body Mass Index), the need and possibility of epidural anaesthesia and known term breech.

The respondents were asked to give details of the criteria and thresholds in operation and the way in which they were used. Thus the importance of the criteria listed in excluding women was described using the given categories as: 'critical on its own', 'relevant with other factors' or 'not generally relevant to decision-making'.

For FMUs the most common exclusion criteria considered 'critical' were gestational age (a pregnancy of less than 37 weeks), multiple birth, previous caesarean section, known breech position, a high BMI and that the use of epidural anaesthesia was planned (Table 7). Maternal age, either high or low and high multiparity were less likely to be seen as critical. Some variation in thresholds was evident, particularly in relation to BMI.

**Table 7. Criteria for eligibility for admission to FMUs and AMUs in 2007**

Factors	FMU n=48		AMU n=25	
	Details of criteria	Relevance of criteria	Details of criteria	Relevance of criteria
<b>Maternal age</b>				
Minimum (years)	Median 16 Range 14-16	<b>38% critical</b> 41% w/other factors 21% not relevant	Median 16 Range 14-16	<b>8% critical</b> 28% w/other factors 64% not relevant
Maximum (years)	Median 40 Range 35-39	<b>38% critical</b> 37% w/other factors 25% not relevant	Median 40 Range 35-40	<b>16% critical</b> 36% w/other factors 48% not relevant
<b>Gestation (weeks)</b>	Median 37 Range 36-37	<b>100% critical</b>	Median 37 Range 36-37	<b>84% critical</b> 12% w/other factors 4% not relevant
<b>Parity</b>	Primiparous	6% w/other factors 94% not relevant	Primiparous	<b>4% critical</b> 96% not relevant
Maximum parity	Median 5 Range 4-6	<b>50% critical</b> 40% w/other factors 10% not relevant	Median 5 Range 4-6	<b>44% critical</b> 36% w/other factors 20% not relevant
<b>Multiple births</b>	Twins	<b>100% critical</b>	Twins	<b>92% critical</b> 8% not relevant

<b>Previous caesarean section</b>	Previous CS but no indication in current pregnancy	<b>81% critical</b> 19% w/other factors	Previous CS but no indication in current pregnancy	<b>60% critical</b> 28% w/other factors 12% not relevant
<b>BMI</b>				
Minimum	Median 18 Range 15-23	<b>42% critical</b> 37% w/other factors 21% not relevant	Median 18 Range 16-20	<b>48% critical</b> 28% w/other factors 24% not relevant
Maximum	Median 35 Range 30-40	<b>79% critical</b> 21% w/other factors	Median 35 Range 30-40	<b>64% critical</b> 32% w/other factors 4% not relevant
<b>Epidural anaesthetic</b>	Planned	<b>98% critical</b> 2% not relevant	Planned	<b>88% critical</b> 12% not relevant
<b>Epidural anaesthesia</b>	Possible	<b>19% critical</b> 56% w/other factors 25% not relevant	Possible	<b>8% critical</b> 24% w/other factors 68% not relevant
<b>Breech position at term</b>	Known breech	<b>96% critical</b> 2% w/other factors 2% not relevant	Known breech	<b>92% critical</b> 8% not relevant

For AMUs the most common exclusion criteria were multiple birth, anticipated preterm birth, the planned use of epidural anaesthesia and known breech position. Similar variation in thresholds to those indicated as in use for FMUs was evident. However, the factors listed were less likely to be considered critical in the decision-making about place of birth, with a larger proportion of units reporting that a specific factor would be considered together with others or was not relevant.

The individual units were also asked how eligibility for giving birth in the units was documented. Eight FMUs and one AMU, in trusts, of different configurations did not provide any information about eligibility. Just under half of FMUs (44%) reported that there was a written protocol and the remainder (56%) had a written guideline. Less than a third of AMUs had a written protocol (28%) and the majority (72%) reported having a written guideline.

### **3.6 Staffing in maternity care**

Maternity care is provided by midwives, and medical staff working in obstetrics, supported by other staff groups that include anaesthetists, maternity support workers (MSWs), general practitioners (GPs), managers and administrators and data were requested from units on all these groups. The titles for maternity support workers employed in maternity care about whom trusts and units reported varied and could include 'health care support workers', 'health care assistants', 'midwifery assistants', 'auxiliaries', 'maternity assistants', and 'nursery nurses' working in postnatal care.<sup>12</sup>

#### **3.6.1 Midwifery and maternity support worker staff**

A total of 19,415 whole time equivalent (WTE) midwifery staff establishment posts and 18,670 WTE midwives in post were reported from all the maternity units in England as of 31 March 2007 (excluding one trust whose data were not returned following amalgamation after this date). Data from the NHS national staffing survey for 2007 indicated 19,298 full-time equivalent midwives working in the NHS<sup>13</sup> which compares well with the establishment posts reported in the HCC/NPEU 2007 survey. A small proportion of units (12%) employed staff above the establishment level, totalling 83 WTE posts in addition, a median of 1.8 posts in those doing so. This mapping report largely utilises data on WTEs working in all areas of maternity care unless otherwise stated. As many midwives and maternity support workers work part-time, many more individual staff from both groups are employed in maternity care and this aspect is not reflected in the data presented.

Over 90% of midwives and maternity support staff working in maternity services in England provided care based in OUs. Only small proportions of



midwives and MSWs worked in AMUs (3.3% and 2.8%) and FMUs (3.9% and 5.0%).

Midwifery establishments varied considerably across all three types of unit as did the numbers of WTE midwives in post. MSW establishments also varied within and between types of unit (Table 8).

Trusts were asked about their use of the Birthrate+ planning tool.<sup>14</sup> A total of 65% of units had used this to calculate midwifery staffing requirements (78% of OUs, 19% of AMUs and 41% of FMUs). While a total of 11% of OUs had more midwifery staff than were estimated as required, more than half the OUs (63%) were estimated to require 10 or more WTE staff in addition to those for which they were currently funded. Any mismatch was less marked for the other types of unit.

**Table 8. Midwifery and maternity support worker establishments and in post (WTEs) in 2007**

	<b>Midwives Establishment</b>	<b>Midwives in post</b>	<b>MSW Establishment</b>	<b>MSW in post</b>
<b>FMUs</b>	<b>(n=54)</b>		<b>(n=47)</b>	
Mean	14.4	13.6	4.8	4.4
Median	11.0	10.5	6.1	5.0
Interquartile range (IQR)	7.5-20.1	6.9-19.2	3.7-6.1	3.1-6.0
Range	1.0-38.1	1.0-6.1	0.0-12.8	0.0-13.0
<b>Total</b>	<b>778.9</b>	<b>733.2</b>	<b>256.7</b>	<b>239.0</b>
<b>AMUs</b>	<b>(n=25)</b>		<b>(n=20)</b>	
Mean	26.2	24.7	6.0	5.3
Median	18.6	17.0	5.0	3.6
Interquartile range (IQR)	9.0-33.6	9.0-33.5	1.0-7.0	1.0-6.9
Range	4.0-87.7	4.0-80.2	0.0-36.7	0.00-35.7
<b>Total</b>	<b>655.5</b>	<b>618.5</b>	<b>149.2</b>	<b>132.6</b>
<b>OUs</b>	<b>(n=180)</b>		<b>(n=178)</b>	
Mean	100.0	96.2	27.0	24.0
Median	92.7	88.2	24.7	21.2
Interquartile range (IQR)	75.0-120.8	71.8-117.0	8.3-34.0	16.0-30.7
Range	29.6-254.4	25.5-254.6	0.0-91.8	0.0-76.2
<b>Total</b>	<b>17,980.3</b>	<b>17,318.2</b>	<b>4,857.2</b>	<b>4,302.1</b>

### 3.6.2 Midwifery staffing and throughput

Midwives provide most of the direct care that women experience during labour and birth and this aspect of provision is central in enabling an effective service to function. The recommended level of midwifery staffing is 36 midwives per thousand births.<sup>5, 15</sup> Based on establishment data from 210 maternity units (53 FMUs, 24 AMUs and 133 OUs) the overall number of midwives per thousand women delivered was 32 in 2007. However, this varied by type of unit, with a median of 35 midwives per thousand in FMUs and 31 per thousand in AMUs and OUs. For MSWs, similarly calculated, overall the numbers reported give a ratio of 9 MSWs per thousand women delivered, and a median of 23 per thousand in FMUs, 7 per thousand in AMUs and 8 per thousand women delivered in OUs.

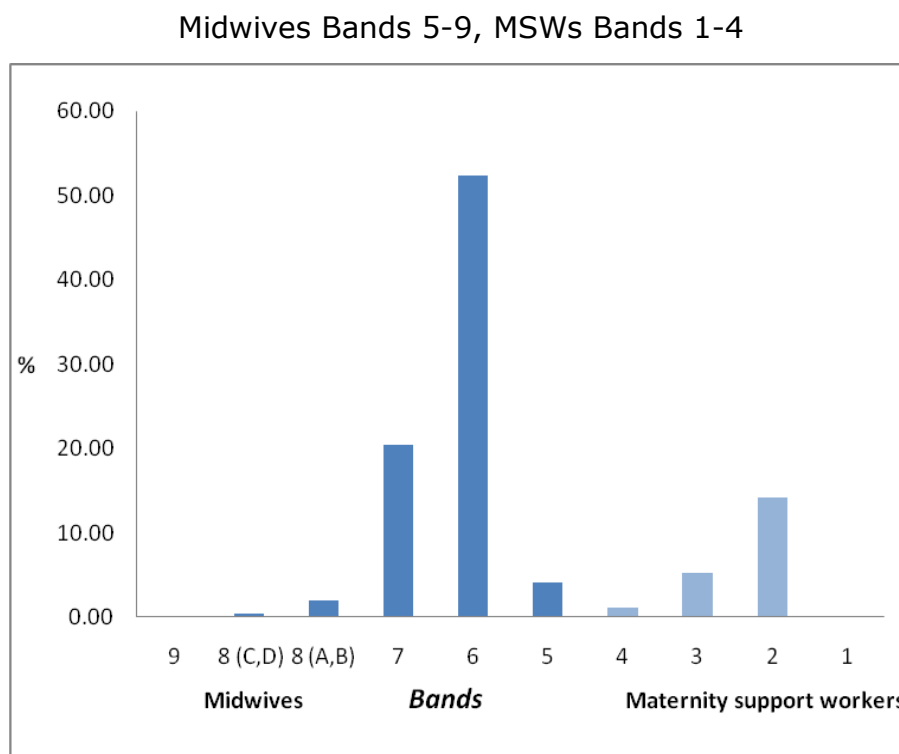
### 3.6.3 Skill mix in midwifery staffing

Direct care can be provided by staff with midwifery qualifications and other staff that are supervised, functioning as Maternity Support Workers (MSWs), though they may be given a range of different titles. The workforce in individual units varied with unit type: FMUs employed a median of 11 midwives and 6 MSWs, AMUs a median of 19 midwives and 5 MSWs and OUs a median of 93 midwives and 25 MSWs (Table 8). While it seems that the ratio of MWs to MSWs varies across the different types of unit, with relatively higher numbers of MSWs in FMUs, examination of individual unit data shows that a total of 13% of reporting units (31 out of 241) did not use MSWs at all (15% of FMUs, 25% of AMUs and 1% of OUs).

The skills, knowledge and experience required in running a maternity unit and providing appropriate care are diverse and midwives and MSWs are employed at a range of levels as reflected by the bands at which staff are employed. A total of 23,954.4 WTE combined midwifery and MSW posts and details of the bands at which they were employed were reported in the 2007 survey.

Overall the largest numbers of midwives are employed on Bands 6 and 7, with just over half of the maternity workforce employed on the lower Band 6 (Figure 9). The small proportions of Band 5 midwives are usually newly qualified staff during their probationary period. Most MSWs are employed on Bands 2 and 3.

**Figure 9. Maternity workforce: proportions of midwives and maternity support workers by band in 2007.**



Supervisory and management roles are key, however, similar functions may be provided by staff employed on different bands. Only three Band 9 staff were employed at this time at all and all three posts were associated with obstetric units. While the higher grades of Band 8 C/D occurred in all types of unit, not all units employed this grade (only 15% of FMUs, 21% of AMUs and 46% of OUs). A similar pattern was observed with the Band 8 A/B grades, though they were employed by more units (32% of FMUs, 42% of AMUs and 92% of OUs). Details of the use of different bands by unit type are shown in Table 9 and Table 10.

**Table 9. Skill mix among midwives in 2007, using establishment data by unit type**

	<b>Band 9</b>	<b>Band 8 (C/D)</b>	<b>Band 8 (A/B)</b>	<b>Band 7</b>	<b>Band 6</b>	<b>Band 5</b>
<b>FMUs</b>						
Mean	0.0	0.1	0.3	4.5	9.4	0.1
Median	0.0	0.0	0.0	3.0	7.8	0.0
Interquartile range (IQR)	0.0-0.0	0.0-0.0	0.0-0.5	1.0-7.4	4.0-15.1	0.0-0.0
Range	0.0-0.0	0.0-1.0	0.0-2.0	0.0-17.0	0.0-27.8	0.0-2.4
Total	0.0	2.8	14.0	244.3	509.5	6.3
<b>AMUs</b>						
Mean	0.0	0.2	0.6	7.3	18.5	0.6
Median	0.0	0.0	0.0	4.7	16.0	0.0
Interquartile range (IQR)	0.0-0.0	0.0-0.0	0.0-1.0	1.8-10.0	7.7-25.8	0.0-0.0
Range	0.0-0.0	0.0-2.0	0.0-5.0	0.0-30.6	1.6-65.6	0.0-6.4
Total	0.0	5.1	14.0	174.7	442.8	14.5
<b>OUs</b>						
Mean	0.0	0.5	2.6	27.23	64.4	5.3
Median	0.0	0.0	2.2	23.9	59.7	2.5
Interquartile range (IQR)	0.0-1.0	0.0-1.0	1.0-4.0	16.3-33.7	45.8-79.3	0.0-7.9
Range	0.0-2.0	0.0-4.0	0.0-9.6	2.5-105.8	9.6-158.9	0.0-47.7
Total	3.0	87.7	460.2	4901.8	11582.6	950.0

**Table 10. Skill mix among maternity support workers in 2007, using establishment data by unit type**

	<b>Band 4</b>	<b>Band 3</b>	<b>Band 2</b>	<b>Band 1</b>
<b>FMUs</b>				
Mean	0.0	2.1	2.6	0.0
Median	0.0	0.4	0.9	0.0
Interquartile range (IQR)	0.0-0.0	0.0-4.5	0.0-5.2	0.0
Range	0.0-0.8	0.0-6.9	0.0-12.8	0.0-0.0
Total	1.5	113.0	139.8	0.0
<b>AMUs</b>				
Mean	0.3	1.2	3.9	0.0
Median	0.0	0.0	3.0	0.0
Interquartile range (IQR)	0.0-0.0	0.0-2.0	0.0-5.0	0.0-0.0
Range	0.00-4.6	0.0-6.0	0.0-18.1	0.0-0.0
Total	6.7	30.8	97.7	0.0
<b>OUs</b>				
Mean	1.4	6.2	17.6	0.3
Median	0.0	3.0	17.1	0.0
Interquartile range (IQR)	0.00-1.1	0.0-8.5	11.9-22.8	0.0-0.0
Range	0.0-80.0	0.0-52.0	0.0-62.0	0.0-14.0
Total	251.2	1110.4	3164.6	44.3

Over two-thirds of maternity support workers were employed on Band 2 (69%) and a quarter (25%) at Band 3. Few were employed at Band 4 (5%) and very small numbers at Band 1 (1%), though at these bands the employment was almost entirely in OUs.

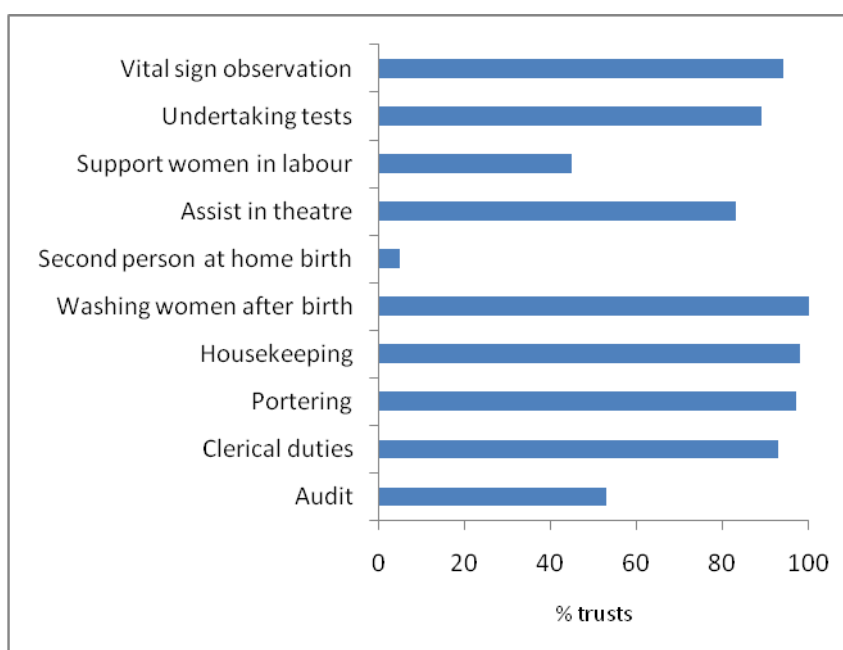
Trusts were asked about the role and about the activities of the maternity support workers employed. Many trusts reported that MSWs were involved in clerical and practical support and in some aspects of direct care, with some assisting in theatre, helping to support women in labour and providing personal care following birth (Figure 10).

Some data were specifically collected on the numbers of midwives and MSWs working on delivery suite. A total of 6707 (WTEs) midwives and 1709 (WTEs) MSWs were reported to be currently employed (in post) and working on delivery suite at the time of the data collection period in 2007 (Table 11). This was an overall ratio of one MSW to 3.9 midwives. However

some units were not using MSWs in this capacity (58% of FMUs, 35% of AMUs and 2% of OUs).

Trusts were also asked about the number of deliveries where midwives were in the lead role. Data were not available for all units, however, in all the FMUs for which data were available on this point (55 of 56) midwives were the lead healthcare professional for all women delivering (100%). In the 24 out of 26 AMUs with data, the proportion was 77% and in the 132 OUs returning data the proportion was 62%.

**Figure 10. Activities impacting on intrapartum care that MSWs undertake or for which they provide assistance as reported in 2007**



**Table 11. Midwives and maternity support workers (WTEs) in post on delivery suite/labour ward (including theatre) at 31 March 2007 by type of maternity unit**

	Midwives			MSWs		
	FMU n=42	AMU n=20	OUs n=178	FMU n=42	AMU n=20	OUs n=178
Mean	5.3	12.5	34.7	1.7	3.1	8.7
Median	5.3	11.5	33.0	0.0	2.8	7.5
Interquartile range (IQR)	2.9-7.8	6.8-17.3	23.4-43.0	0-4.4	0.8-4.7	5.7-10.4
Range	0-24.0	3.0-24.9	5.0-99.4	0-8.0	0-10.0	0-39.1
<b>Total</b>	275.5	250.5	6181.0	92.1	62.4	1554.1

### **3.6.4 Non-clinical staff**

Units were asked to report on non-clinical management and administrative or clerical support. All OUs reported administrative support and half of OUs (54%) reported, in addition, non-clinical management posts. Few FMUs and AMUs reported such posts, though approximately half (56% and 48% respectively) reported administrative and clerical support posts.

### **3.6.5 Medical staff associated with AMUs and FMUs**

Only one unit reported being an AMU and having a number of consultant and other medical staff working in maternity care. All the other AMUs (bar one which did not provide information) did not have medical staff employed or working in maternity care. All but three FMUs reported no medical staff working in maternity care. The three FMUs reporting the presence of medical staff appeared to be units with minimal cover at consultant and associate specialist grades and cover may have been provided by gynaecology medical staff. No anaesthetic consultants or registrars were reported as working in maternity care in either AMUs or FMUs.

### **3.6.6 Medical staff employed in OUs**

Because of the complex and cross-specialty way in which medical staffing is organised and the way in which trainees contribute, obstetric units were asked to return only limited data on medical staff working in maternity care. Specifically, they reported on the numbers (WTEs) in the different obstetric staff groups, apportioning when staff worked in both obstetrics and gynaecology and including locums (Table 12). It was not possible to make checks on data returned and effective apportioning for obstetrics, thus the WTE numbers of medical staff may have been over-estimated.<sup>5</sup> Data were returned on 3864 WTE obstetric medical staff. Establishment WTEs were not requested. At the time of data collection, of the medical staff directly involved in providing maternity care, including intrapartum care, just under a third were junior staff in training (31% SHOs) and a similar proportion (30%) registrars. Consultants provided just under a third of obstetric staffing (30%), supported by a smaller proportion (9%) of Staff Grades or Associate Specialists. Some minimal consultant cover was reported for a small number of sites with only midwifery provision.

The numbers of obstetric medical staff working in OUs per thousand women delivered per year ranged from 2.4 to 14.8 (median 6.8) and numbers of obstetric consultants ranged from 0.5 to 4.6 (median 2.0). Obstetric anaesthetics staff worked in maternity care (median of 2.5 per thousand women delivered per year) in addition.

**Table 12. Medical staff (WTEs) in post working in OUs in 2007**

	<b>Obstetricians</b>					
	<b>Consultant</b>	<b>Staff Grades/ Associate Specialist</b>	<b>Specialist Registrar</b>	<b>SHOs in Obstetrics</b>	<b>Consultant Obstetric Anaesthetist</b>	<b>Anaesthetist Obstetric Registrar</b>
Mean	6.41	1.92	6.51	6.63	3.85	4.62
Median	6	1	6	7	4	4.5
Interquartile range (IQR)	5.0-7.8	0.2-3.0	4.0-8.0	5.0-8.0	2.0-5.0	1.0-7.0
Range	0.5-12.8	0-14	0-17	0-15	0-11	0-18
<b>Total</b>	1153.2	346.1	1172.4	1192.7	650.7	758.0

Obstetric units were asked about consultant presence (not cover) on the labour ward or delivery suite during March 2007. Almost all OUs provided data (n=173) and three-quarters (77%) reported that consultant presence was 40 or more hours of per week at this time. A total of 13(8%) of OUs reported 60 or more hours of consultant presence, mainly the units delivering in the region of five thousand or more women per year, though not all units in this category reported this amount or more of consultant presence.

OUs and AMUs reported details of the paediatric or neonatal staff on the on-call rota for attending delivery suite or obstetric theatre and to provide a head count of staff with this responsibility. For the 165 units responding on this point on-call rotas of paediatric or neonatal staff consisted of a median of 6 consultants and of 13 medical staff at other grades. A total of 73 obstetric units (44%) had one or more advanced neonatal nurse practitioners (ANNPs) working in this way. Units in which ANNPs were able to provide this kind of care in theatre and on delivery suite had rotas with a median of 3 ANNPs, ranging from 1-10 in overall numbers. Two OUs had only ANNPs to provide this type of care, backed up by paediatric and neonatal staff from other hospitals.

### **3.6.7 General practitioner involvement**

Units were asked about general practitioners (GPs) working in maternity units. Relatively few units had GPs working in this way (12% overall): two FMUs and 30 OUs, some of which, though not all, were relatively small and located in rural areas. In one region (South East Coast) no units reported GP working and in the others GPs involvement in intrapartum care appeared to be widely distributed and at low density.



### **3.6.8 Models of midwifery care**

Women can be cared for differently, depending on the way that midwives work. In 2007 trusts were asked largely policy related questions about the models of care used within their maternity service. Almost all reported that it was policy to always assign a named midwife to each woman (85%). It was less likely that most women would always have the same midwife for antenatal and postnatal care, with a smaller proportion of trusts (63%) reporting this as policy. Each trust was also asked if midwives carried their own caseload covering antenatal, intrapartum and postnatal care for individual women. Most responded on this point (141 of 152) and of these two thirds (65%) did not have any midwives carrying their own caseload. A small proportion had more than ten midwives doing so (8%) and more had fewer midwives (27%) caring for women in this way. Where trusts reported some caseload working, approximately half (54%) indicated that the midwives involved shared the caseload with other team members.

Caseload midwifery care of some kind was more commonly reported to be available in trusts in some parts of the country, ranging from a small proportion in the South East Coast region (17%) to a quarter of trusts in London (26%), more than a third in the South West (37%) and Yorkshire and Humber (36%), and half of those in the East of England (53%).

No statistical data were collected on the numbers of women having access to or taking up the different models of care.

### **3.6.9 Availability of specialist and intrapartum related services**

Units were asked about the services available on or from their site (Table 13).

A telephone triage system was used for early labour assessment in all but 2 of the 262 units. Assessment of women in early labour by a midwife at home was a service reported to be available by approximately half of the maternity units, with midwifery units being more likely to offer this type of care. A large proportion of units had a fixed birthing pool (79%) available for use in labour, with little difference in the likelihood of this across the different types of unit. A small proportion had one or more mobile pools (19%). A total of 1629 women were reported to have given birth in a pool in the month of March 2007 (15% of whom did so in FMUs, 24% in AMUs and 62% in OUs).

**Table 13. Availability of intrapartum related services in different types of maternity unit in 2007**

Facility	Unit Type (%)			Total units n=262
	FMU n=56	AMU n=26	OU n=180	
Pregnancy day assessment unit	28.6	76.9	95.0	79.0
Early labour assessment by midwife at home	64.3	57.7	46.7	51.5
Birthing pool (fixed)	76.8	88.5	78.9	79.4
24 hour epidural service	0.0	23.1	93.9	66.8
1 or more Obstetric HDU beds	0.0	0.0	48.9	34.0
Adult Intensive Care Unit on site	10.7	76.9	92.8	73.7
1 or more dedicated obstetric theatres	0.0	0.0	98.9	67.9
Transfusion service on site	10.7	92.3	95.6	77.1
Neonatal unit on site	0.0	100.0	98.9	77.9

In general OUs were more likely to report specialist facilities available on site. These included dedicated obstetric theatres, adult intensive care units, transfusion and neonatal services. All high dependency obstetric beds were located in OUs, though only half of OUs had these and the number of beds varied in from 1-9 (median 2). Almost all OUs provided a 24 hour epidural service on the labour ward and some AMUs also provided this type of service.

During labour or shortly afterwards some women or babies may require transfer to other units for more specialist services. Units were asked about the proximity to an adult ICU. Most were on the same site, however, for units without an adult ICU on site, the nearest facility was a median distance of 17 miles (range 5-70miles). Several units in one trust were unable to identify the main unit to which women were likely to be transferred, indicating that it depended on the capacity available on the day.

As a key component of maternity service provision, units were also asked about neonatal services on site. For those maternity units without a neonatal unit on site (all FMUs and 2 OUs), details of the location and proximity to the nearest unit providing high dependency and intensive care were requested. For FMUs which did not have neonatal units accessible on site, the median distance to the nearest neonatal unit was 17 miles (range 5-54 miles). However, the distance to a neonatal unit that was able to provide the full range of neonatal intensive care may have been greater than this. Seven FMUs in two trusts in rural areas indicated that air transport was used for some transfers.

### 3.7 Where are the gaps?

Gaps in provision may take different forms: the types of unit and options available to women may vary; changes in the configuration of services may be taking place; staffing or capacity problems may arise and units may be temporarily closed to admissions.

#### 3.7.1 Closures

Units were asked about closures to admissions (in part or in full) and to provide data on all closures including those due to capacity and staffing problems in the year to the 31 March 2007. Most units reported not closing to admissions at all (61.2%), however, OUs were slightly more likely to have closed at all during the year (39%) compared with FMUs (32%) and AMUs (35%). However, of the units reporting closures, the OUs were more likely to have closed for shorter periods of time; over half of individual OUs closing (59%) had done so for less than a total of 7 days, compared with 28% of FMUs and 40% of AMUs which were more likely to have closed more often or for longer.

#### 3.7.2 Use of bank and agency midwifery and support staff

Units were asked about the extent to which additional midwifery staff had recently been employed in the month prior to the data collection period (Table 14). Half of both FMUs and AMUs, had employed bank midwives during this time (50% FMUs and 46% AMUs) and approximately a third had employed bank maternity support workers (FMUs 32% and 27% AMUs). Greater proportions of OUs had employed bank midwives (79%) and MSWs (59%). Units of all types reported either no or low levels of agency staff working at this time. No further details of bank or agency staff such as age or band were requested.

**Table 14. Units employing midwives and maternity support workers from bank and agency during March 2007.**

	FMU n=54		AMU n=22		OU n=180	
	n	(%)	n	(%)	n	(%)
Midwifery bank staff employed	28	(51.9)	12	(54.6)	142	(78.9)
Midwifery agency staff employed	0	(0)	2	(9.1)	17	(9.4)
MSW bank staff employed	18	(33.3)	7	(31.8)	106	(58.9)
MSW agency staff employed	0	(0)	0	(0)	4	(2.2)

### 3.7.3 Vacancies and turnover

Vacancy rates were calculated as of 31<sup>st</sup> March 2007 and based on establishment and WTE midwives or MSWs in post at that time, rather than the conventional calculation with posts that had been unfilled for a period of at least three months for which staff were actively being sought (Table 15).

**Table 15. Vacancies and turnover details among midwives and MSWs by unit type for 2007**

	Midwife vacancies		Midwife turnover	
	WTEs	%	Numbers resigning and retiring	% resigning and retiring
<b>FMU (n=25)</b>				
Mean	0.9	6.0	1.4	6.3
Median	0.2	1.7	1.0	3.9
Interquartile range (IQR)	0.0-1.2	0.0-10.0	0.0-2.0	0.0-10.0
Range	0.0-9.9	0.0-38.8	0.0-15.0	0.0-40.0
<b>AMU (n=54)</b>				
Mean	1.7	4.6	2.5	6.0
Median	0.8	3.1	1.0	4.1
Interquartile range (IQR)	0.0-2.3	0.0-8.7	0.0-3.0	0.0-10.7
Range	0.0-9.0	0.0-12.9	0.0-16.0	0.0-23.5
<b>OU (n=180)</b>				
Mean	4.1	4.1	8.1	6.4
Median	2.8	3.1	7.0	6.1
Interquartile range (IQR)	0.2-6.1	0.3-6.4	4.0-11.0	3.19-9.0
Range	0.0-23.6	0.0-16.0	0.0-55.0	0.0-22.5

The overall proportion of WTE midwifery posts vacant at this time across all types of unit providing data was 3.8%: the median proportion of vacant posts was 1.7% in FMUs, 3.1% in AMUs and 3.1% in OUs. MSW vacancies were higher than that of midwives at 11.8% overall, ranging from a median of 0% in FMUs to 10% in AMUs and OUs, though some units had MSW vacancy rates considerably higher than this (Table 16). For both groups it must be emphasised that the vacancies calculated are simply based on the agreed funded establishment which may not in fact reflect staffing requirements for maternity care. Some units reported employing more staff than were allowed for by their funded WTE establishment, an apparent oversupply (9% of FMUs, 8% of AMUs and 14% of OUs), mostly on a small scale, possibly associated with skill mix revisions. In presenting the vacancy rate for the different types of unit this has not been taken into account.

**Table 16. Vacancies among maternity support workers by unit type at 31 March 2007**

	<b>MSW vacancies</b>	
	<b>WTEs</b>	<b>%</b>
<b>FMU (n=47)</b>		
Mean	0.9	9.3
Median	0.2	0.0
Interquartile range (IQR)	0.0-0.8	0.0-16.4
Range	0.0- .2	0.0-57.6
<b>AMU (n=19)</b>		
Mean	1.1	15.1
Median	0.7	10.0
Interquartile range (IQR)	0.0-1.4	0.0-25.8
Range	0.0-4.0	0.0-47.2
<b>OU (n=178)</b>		
Mean	3.4	11.6
Median	2.4	9.7
Interquartile range (IQR)	0.5-4.7	2.4-16.9
Range	0.0-24.5	0.0-62.0

Unit staffing can be markedly affected by the numbers of staff resigning and retiring. Units were asked for a head count of current midwifery staff and about the numbers of staff leaving and resigning in the year to 31 March 2007 (Table 15). Using this as a measure of turnover it seems that overall there was little difference between turnover in the FMU, AMU and OU populations of midwives (7.3% FMU, 7.9% AMU and 7.0% OU). For individual units turnover varied considerably, ranging from 0-40% in FMUs, 0-24% in AMUs and 0-22% in OUs. The median turnover rate was approximately 4% for the two types of midwifery led unit and 6% for the OUs. With quite small numbers of staff some units could have an apparently substantial turnover, somewhat higher than this. However, nearly half of FMUs and AMUs reported no change at all in midwifery staffing during the year (46% and 45% respectively) for which data were reported. Overall midwifery staff turnover was not related to size of unit as reflected in the numbers of women giving birth, though when examined by unit type there was some indication that turnover among AMUs units delivering more women was likely to be higher. No such relationship was found with FMUs and OUs.

There has been concern about the aging population of midwives working in maternity care with regard to future planning and the provision of supervision and support for midwives at all levels, especially those coming into the profession. Units were simply asked about the midwifery staff aged fifty years or more (Table 17).

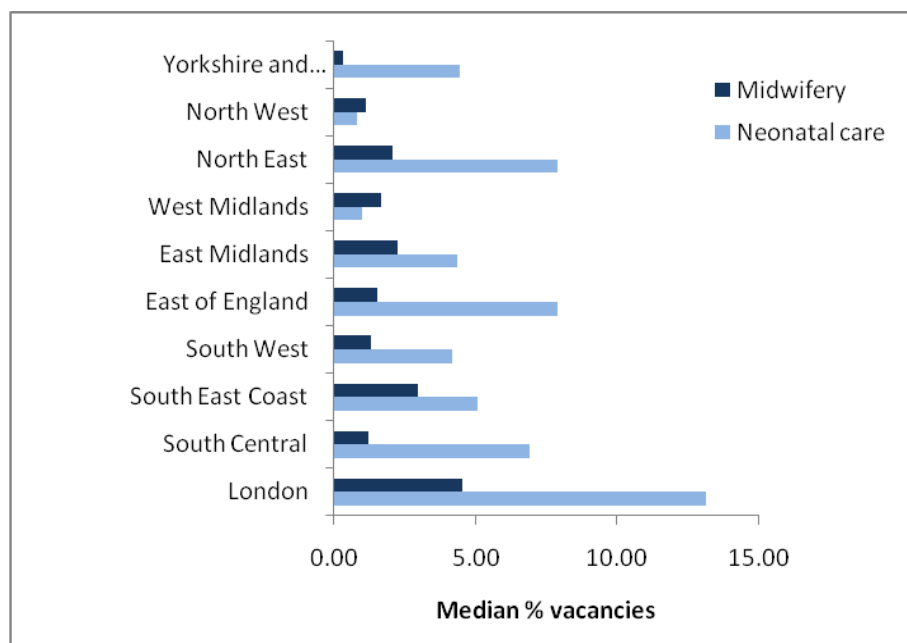
**Table 17. Number and proportion of midwives aged 50 years or over by unit type**

	Midwives aged 50 or more years	
	WTEs	%
<b>FMU (n=49)</b>		
Mean	4.6	38.6
Median	4.0	33.4
Interquartile range (IQR)	2.7-7.0	23.9-54.1
Range	0.0-12.0	0.0-94.3
<b>AMU (n=20)</b>		
Mean	5.3	16.5
Median	3.0	17.8
Interquartile range (IQR)	0.0-7.3	0.0-26.4
Range	0.0-30.0	0.0-56.6
<b>OU (n=168)</b>		
Mean	26.3	28.0
Median	23.7	27.9
Interquartile range (IQR)	17.7-32.0	21.7-33.9
Range	3.3-72.0	4.7-56.7

The changing demographics of the midwifery population were reflected in the overall proportion of WTE midwives employed aged 50 years or more, representing 21% of midwives in 2007. Over all 1 in 5 staff were aged fifty years or more. This was highest in the FMUs, where over a quarter (26%) of midwives were aged 50 years or over, followed by the OUs (22%) and then the AMUs (19%) The larger proportion of older staff in FMUs and to some extent OUs may reflect the greater experience required in working in that environment, both for clinical practice and in providing an effective learning environment and supervised experience for midwifery students.

Data were also collected on nurse staffing and vacancies in neonatal care as well as maternity units as part of the maternity review. Vacancy rates varied by region for units providing midwifery and neonatal care, with London having the greatest proportion of vacancies and the highest median rates for the units at the time that data were collected (Figure 11).

**Figure 11. Vacancy rates for maternity and neonatal units in different geographical areas (SHAs) as of 31 March 2007**



### 3.8 Changes in maternity services since 2007

In 2007 trusts were asked about past and future plans for maternity services and for details of changes in provision as part of the maternity review to which all trusts providing maternity care responded. The same questions were asked in the 2010 survey.

#### 3.8.1 Changes in numbers of units to 2010

A total of 289 maternity units were identified at the end of 2010, an increase of 11%. A small number of OUs had closed (n=5, one temporarily), a few FMUs had closed (n=4) and others (n=7) had opened. The proportion of AMUs had markedly increased (Table 18) by this time, with a further 27 units of this type being identified.

**Table 18. A comparison of the numbers of maternity units in England in 2007 and 2010**

	October 2007		December 2010	
	n	%	n	%
OU	180	68.7	177	61.25
AMU	26	9.9	53	18.34
FMU	56	21.4	59	20.42
<b>Total</b>	262	100.0	289	100.0

In 2010, as in 2007, there was regional variation: the North West had relatively more OUs; South Central and the South West had relatively fewer (Table 19). The numbers of midwifery units also varied.

**Table 19. Number of maternity units in 2007 and 2010 in different geographical regions of England**

	2007			2010		
	OU	AMU	FMU	OU	AMU	FMU
London	30	7	2	29	16	3
South Central	12	5	9	13	4	8
South East Coast	16	0	3	17	5	3
South West	16	3	16	16	6	15
East of England	18	3	5	19	5	4
East Midlands	11	1	3	10	3	3
West Midlands	18	3	5	17	5	6
North East	12	0	4	10	1	5
North West	28	3	4	28	7	4
Yorkshire and Humberside	19	1	5	18	1	8
<b>Total</b>	180	26	56	177	53	59

### 3.8.2 Plans for provision in 2007, changes up to 2010 and future plans

In 2007 trusts were asked about planned changes over the next three years. Most of these involved improvements in staffing, particularly increases in the funded midwifery establishment which more than half of trusts were planning, better obstetric cover and more obstetric consultant staffing (Table 20). Some trusts were also planning to increase the paediatric cover provided for delivery suite and theatre. Changes to the numbers of delivery units and bed capacity were planned by some trusts in association with changes in unit status and re-organisation.

The trusts making returns to the second mapping survey in 2010 reported marked changes in all the areas mentioned (0). In response to the rising birth rate and the changing requirements of medical training, more than three-quarters of trusts reported having increased their midwifery establishments, increased the numbers of consultant obstetricians and obstetric cover. A third had increased the paediatric cover for labour and delivery. Over half of units also reported increasing the numbers of beds available and the overall number of delivery units in the trust. It is emphasised that data were not collected on the magnitude of the changes



made and the lower return rate means that the data presented on these aspects of provision do not represent the whole population of trusts.

**Table 20. Future plans in 2007: numbers and proportions of trusts planning changes**

Trust changes in:	Next three years					
	Increase		Same		Decrease	
	n	%	n	%	n	%
Overall number of delivery units (n=152)	26	17%	114	76%	11	7%
Delivery bed capacity (n=152)	45	30%	92	62%	12	8%
Obstetric cover (n=148)	71	48%	76	51%	2	1%
Paediatric cover for delivery suite and theatre (n=148)	24	16%	122	82%	2	1%
Obstetric consultant staffing (n=150)	67	45%	79	53%	3	2%
Funded midwife establishment (n=152)	81	54%	60	40%	9	6%

As part of the second mapping survey in 2010 Trusts were also asked to look forward and indicate which aspects of maternity care provision were likely to change over the next three years. More planned increases in the numbers of maternity units, beds, medical and midwifery staffing in the near future were reported, though a small proportion of trusts are planning reductions in these (0).

**Table 21. Changes made in three years to December 2010: numbers and proportions of trusts making these changes in maternity care**

Trust changes in:	In <u>last</u> three years					
	Increase		Same		Decrease	
	n	%	n	%	n	%
Overall number of delivery units (n= 91)	33	36%	56	62%	2	2%
Delivery bed capacity (n=91)	40	44%	49	54%	2	2%
Obstetric cover (n=90)	69	77%	21	23%	0	0%
Paediatric cover for delivery suite and theatre (n=89)	28	32%	61	68%	0	0%
Obstetric consultant staffing (n=90)	72	80%	18	20%	0	0%
Funded midwife establishment (n=91)	70	77%	18	20%	3	3%

**Table 22. Future changes: numbers and proportions of planned changes in maternity care provision in the next three years from 2011 onwards**

Trust changes in:	In <u>next</u> three years					
	Increase		Same		Decrease	
	n	%	n	%	n	%
Overall number of delivery units (n= 91)	49	44%	38	42%	4	4%
Delivery bed capacity (n=91)	52	57%	32	35%	7	8%
Obstetric cover (n=90)	52	58%	34	38%	4	4%
Paediatric cover for delivery suite and theatre (n=90)	33	37%	54	60%	3	3%
Obstetric consultant staffing (n=90)	58	64%	30	33%	2	2%
Funded midwife establishment (n=91)	60	66%	25	28%	6	7%

Trusts were also asked about any closures and the opening of new units. Of the 63% of trusts (93) returning data recently, some indicated that a small number of FMUs (2) and OUs (4) were planned for closure in the next three years. Over the same period some new FMUs (11), AMUs (31) and OUs (10) are planned to be opened. Trusts also reported that mergers of some maternity units (12) would take place and some units would change in the type of maternity services provided (4). Only one neonatal unit was reported to be closing in the next three years.

### 3.8.3 Changes in configuration within trusts to 2010

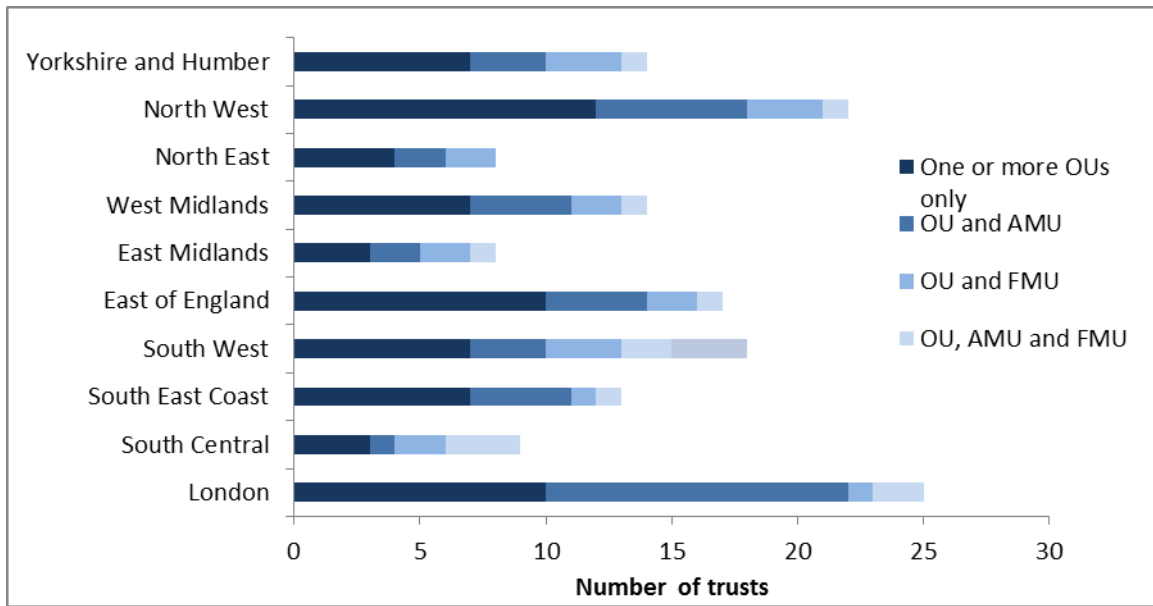
Checks were made using the second survey of trusts providing maternity care in 2010 and information from the Birthplace in England database on the current configuration of maternity care within trusts (Table 23).

**Table 23. Summary of configuration of maternity care in Trusts in England from 2007 and 2010 surveys**

Trust configuration	2007		2010	
	n	%	n	%
One or more Obstetric unit (OU) only	100	65.8	72	48.6
One or more OUs and one or more AMUs	20	13.2	38	25.7
One or more OUs and one or more FMUs	23	15.1	22	14.9
One or more of all types of unit (OU, AMU and FMU)	5	3.3	13	8.8
One or more FMUs only	4	2.6	3	2.0
Total	152	100.0	148	100.0

By the end of 2010 changes in configuration had occurred, much as planned in 2007, mostly within individual trusts. A small number of trusts had amalgamated. Most markedly the proportion of trusts with no midwifery-led units had declined from two-thirds (66%) to just under half of trusts (49%) and those with at least one AMU had doubled (from 17% to 35%). The proportion of Trusts with all types of maternity unit had increased slightly (from 3% to 9%). The numbers of the different configurations in different parts of England indicate that changes in maternity care provision have taken place across the country (Figure 12).

**Figure 12. Configuration of maternity units in 2010 within trusts by geographical area (SHA)**



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## 4 Discussion and conclusions

The current organisation of maternity care is likely to reflect the local population and historical developments and changes within the NHS, as well as proximity to other maternity units. It appears that trusts have to some extent developed different solutions and strategies in providing maternity care. Population density and complexity of need may drive the development and location of specialist services based in cities and centres of population. However, it is difficult to argue that the care needs of mothers and babies vary, particularly those at low risk of complications. The considerable variation in all the aspects of maternity care service delivery and organisation that we have examined seems to go beyond such differences. The variation described may simply reflect differences in investment in maternity care or it may to some degree provide evidence about the different solutions currently in place. Which ever interpretation is appropriate, the evidence on variation can be used as a driver for quality improvement both locally and nationally.

It is difficult to know what is acceptable variation in relation to, for example, staffing structure and organisation. Staffing levels and skill mix requirements may be addressed in different ways and while overall individual midwifery and medical establishments may appear satisfactory, the cover on a shift-by-shift basis may not be acceptable or appropriate for the numbers of women for whom care is required or for the complexity of their needs. Some standards have been put forward, but the evidence base for these is for the most part limited and they do not cover many of the aspects of organisation described in the report,<sup>5, 6</sup> nor is there adequate evidence in relation to outcomes for women and their babies associated with such factors.

It may be helpful to examine individual trusts and units which appear to be outliers, with a view to understanding specific issues and the ways in which the organisations providing intrapartum maternity care and commissioners have aimed to address these. The Case Studies component of the Birthplace in England research programme provides some examples of how intrapartum maternity care is organised on an individual trust basis.

Despite the variation, at the same time there are some discernible patterns in the shifting picture of provision. The changing nature of specialist medical training and input to maternity care following on from the European Working Time Directive has impacted and will continue to affect the way that maternity care is provided. At the same time the rising birthrate and increased acuity is making demands on the skill base of the health professionals and others involved<sup>4, 6</sup> and on the physical capacity of units to cope in terms of beds, rooms and specialist facilities that include theatre and high dependency care.

The report on the mapping component of the Birthplace in England research programme provides evidence about the configuration of maternity in England in 2007 and in 2010. Appreciating the variations in service provision, especially those associated with intrapartum care, differences in capacity and throughput is essential in planning future services and care. Information of this kind can enable trusts and units to place themselves in context and allows commissioners to ask key questions about the way that care is provided.

Detailed information is presented on the maternity workforce and midwifery and maternity support worker staffing, vacancies and turnover. Thus the mapping study findings, though essentially 'top down', may contribute to the debate on the need to measure staffing requirements in maternity care.<sup>14</sup> This is with a view to using similar parameters to those utilised in mapping to support more authentic modelling, prediction of staffing requirements and prediction of the need for future professional training and development in the area of maternity care.

A tool to allow maternity care providers to appropriately calculate staffing requirements overall and on a day-to-day basis would enable more effective planning and facilitate comparisons across trusts and units. The Birthrate+ tool has been used extensively (Ball et al, 2003a, 2003b), however, as has been pointed out (Sandall et al, 2011) validation is required in supporting its further development and use. Outcome data of the kind collected in the Birthplace prospective cohort study have the potential to contribute in this area.

The findings described relate well to the policies embodied in the choice agenda (Department of Health, 2007; Department of Health, 2010). Together with data directly collected from women on their experience of maternity care, the choices offered and those taken up<sup>3, 8, 16</sup> and the outcomes that have been measured in the prospective cohort study component of the Birthplace programme, the mapping study findings provide a comprehensive point of comparison for trusts and units to use. At the same time the data have allowed some measurement of change over time and can continue to provide a baseline for future comparisons.

Some of the aspects of organisation described relate to features of maternity services that are critical to safety,<sup>17</sup> ranging from staffing levels to availability and proximity to specialist services. The data collected reflect both policy, configuration of services and unit and trust statistics about the population served and the care provided. All are essential elements in creating a picture of how maternity services are currently organised and informing future developments, including the development of maternity networks.

## **4.1 Key messages**

- The needs of women and babies are likely to vary little in terms of maternity care, yet marked variation is evident in many aspects of provision at trust and unit level and between geographical regions. This includes variations in the types of unit available, beds, staffing and specialist and other services, even when taking into account the numbers of women for whom care is provided. Such differences which may reflect inequalities in provision require further examination.
- Options for place of birth in trusts have improved since 2007. However, the data on configuration of care suggest that some women are still unlikely to have a full range of choices available locally within each trust.
- Recent and planned changes include more AMUs, greater numbers of beds, more funded midwifery posts and more extensive consultant cover and staffing.
- The evidence on recent and planned future changes is significant in the broader national context of maternity care provision and reflects the efforts being made to address the policy agenda and population changes.
- Specialist services are of necessity more sparsely distributed and changes in these may function as drivers for some aspects of configuration.
- Some 'task-shifting' is evident in the midwifery staffing and skill mix data.
- The difficulties of calculating staffing and facility requirements and in defining appropriate standards were evident in the variation described among trusts and units.
- The description of maternity services in 2007 with details about recent changes in configuration to 2010, in conjunction with future plans, suggest that this area of healthcare is currently an active area for change.
- There is a continuing need to routinely document service configuration, organisational change and evolution, especially in the context of pressures for re-organisation, centralisation and diversification.

## **4.2 Recommendations for further research**

The mapping study provides an initial baseline on configuration of maternity care in 2007, and more recently in 2010, for comparison with future changes and developments. Monitoring of change over time will require

further systematic data collection and specific questions, for example in relation to medical staffing in maternity care.

Further research could usefully include modelling of provision using the data set employed for the mapping descriptive analyses. This should include exploring the impact of the changing demographics, locations of the child-bearing population and re-configuring maternity care provision in relation to place of birth.



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## **Addendum**

The Birthplace in England Research Programme combines the Evaluation of Maternity Units in England (EMU) study funded in 2006 by the National Institute for Health Research Service Delivery and Organisation (NIHR SDO) programme, and the Birth at Home study in England, funded in 2007 by the Department of Health Policy Research Programme (DH PRP). This document is part of a suite of reports representing the combined output from this jointly funded research. Should you have any queries please contact [Sdoedit@southampton.ac.uk](mailto:Sdoedit@southampton.ac.uk)