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Citation for published version (APA):

Sandall, J., Homer, C., Sadler, E., Rudisill, C., Bourgeault, I. L., Bewley, S., Nelson, P., Cowie, L., Cooper, C., & Curry, N. (2011). *Staffing in maternity units. Getting the right people in the right place at the right time*. The King's Fund.

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STAFFING IN MATERNITY UNITS

Getting the right people in the right place
at the right time

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The King's Fund seeks to understand how the health system in England can be improved. Using that insight, we help to shape policy, transform services and bring about behaviour change. Our work includes research, analysis, leadership development and service improvement. We also offer a wide range of resources to help everyone working in health to share knowledge, learning and ideas.

Published by
The King's Fund
11-13 Cavendish Square
London W1G 0AN
Tel: 020 7307 2591
Fax: 020 7307 2801
www.kingsfund.org.uk

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Charity registration number: 1126980

First published 2011 by The King's Fund

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ISBN: 978 1 85717 609 4

A catalogue record for this publication is available from the British Library

Available from:

The King's Fund
11-13 Cavendish Square
London W1G 0AN
Tel: 020 7307 2591
Fax: 020 7307 2801
Email: publications@kingsfund.org.uk
www.kingsfund.org.uk/publications

Edited by Isabel Walker

Typeset by Grasshopper Design Company

Printed in the UK by The King's Fund

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Acknowledgements

We wish to thank all our respondents who provided us with detailed information about workforce innovation and practice.

Summary

This report was commissioned by The King's Fund to answer a fundamental question: Can the safety of maternity services be improved by more effectively deploying existing staffing resources?

There is much debate at present about staffing levels in maternity. The independent inquiry into the safety of maternity services commissioned by The King's Fund suggested that, while staffing levels are important, employing more staff may not necessarily improve safety. The inquiry found that the effective deployment of the *right* staff doing the *right* thing at the *right* time in the *right* place is the key to improvement (The King's Fund 2008, p 48).

Current financial pressures mean that it is unrealistic to expect significant increases in numbers of staff. As such, maternity services – and the National Health Service (NHS) as a whole – will need to focus on developing new ways of working in order to maintain, and increase, levels of safety and quality within the resources available.

This report considers the available evidence about the relationship between staffing levels and deployment practices and safety of care for mothers and babies. It focuses specifically on the intrapartum period, which refers to labour and birth. In so doing, the report considers different staffing models and approaches. In recognition that current practice is likely to be more advanced than the published literature, a small number of case studies have been used to offer examples of innovative activities.

The key findings for each section of this report are outlined below.

Policy and workforce challenges for maternity services

The main challenge currently facing maternity services is to improve the safety and quality of care while contributing towards the £15–20 billion of efficiency savings required of the NHS as a whole by the end of 2013/14. The difficulties involved in meeting this challenge are exacerbated by:

- demographic changes, including a rising birth rate and an increase in case complexity and morbidity, which place additional demands on care provision
- the European Working Time Directive, which makes it difficult to provide specialty-specific 24-hour cover
- a restructured postgraduate medical training programme, which is deemed to produce less experienced specialists, working for shorter hours, than the previous arrangements.

Key observations are as follows.

- Detailed information is available about the midwifery workforce, but much less is known about the significant and growing numbers of support workers, who play a valuable role within the maternity care team and could take on additional tasks. This makes it difficult to model requirements for the future workforce.

- National recommended midwifery staffing ratios are based largely on the Birthrate Plus planning tool, which analyses workforce requirements in terms of what women need, and does not take into account the contribution of other staff apart from midwives. Despite the tool's popularity and widespread implementation, there is an absence of evidence about whether its use contributes to improved safety.
- New standards for obstetricians call for an increased consultant presence on delivery suites in response to the growing complexity of case mix, increased intervention rates and reduced availability and experience of trainees. There is an absence of evidence about whether an increase in consultant presence contributes to improved safety. Significant expansion of consultant numbers does not look achievable at present unless funding is diverted from other parts of the service.

Workforce issues and safety: literature review

This section reviews recent studies on the relationship between workforce issues and safety in maternity care under three main headings:

- the maternity workforce, including staffing levels and any evidence of links between levels and outcomes
- skill mix, including use of support workers, task-shifting and the development of new and extended roles
- different models of staff deployment, including midwife-led care, caseload midwifery and continuity of care.

Key findings are as follows.

- There is limited evidence about the link between staffing levels and maternity outcomes, although stronger evidence from non-maternity services shows a positive relationship between increased staffing levels and improved outcomes.
- More important than total numbers of staff is the skill mix, experience and deployment of available staff. Such staffing issues are particularly critical out of hours, when more babies are born.
- There is a need for further research into the Birthrate Plus tool in order to assess whether it could be developed to allow effective planning across the different professions.
- There is potential for task-shifting. Evidence shows that midwives can effectively perform some tasks that are usually performed by medical staff (such as routine examination of newborns) without compromising safety or quality of care. However, if midwives are to take on extended roles, consideration needs to be given to how their workload should be reorganised to create time for the additional responsibility.
- International evidence suggests that nurses could play a greater role in maternity services.
- Maternity support workers are widely used, and anecdotal evidence suggests they have potential to play a valuable role in maternity services. Further research is required to firmly establish the implications of the use of support workers on safety and quality, paying particular attention to the level of training and supervision they require.

- Midwife-led care can offer a range of better outcomes for women who are low or medium risk when compared with medically led care and models where different professionals share responsibility for care.
- Continuity of care, both obstetric or midwife-led, has been shown to deliver favourable outcomes. In particular, caseload midwifery is positively associated with quality and safety.
- Non-UK evidence shows that continuous intrapartum support has also been associated with better outcomes and more positive birth experiences, particularly when the support is provided by a lay person.

Resource use in maternity care

This section considers evidence about the costs of delivering maternity care in terms of:

- midwife-led versus medically led care
- the potential for task-shifting
- other drivers of the costs of birth, including the setting and mode of birth and length of stay.

Key findings are as follows.

- Evidence of the financial implications of different staffing models is limited. Isolating the staffing component of maternity costs is complex. Much of the available data originates in different countries, making comparisons particularly difficult.
- Midwife-led models of care appear to offer potential for cost-saving.
- There is limited evidence around the cost-effectiveness of task-shifting, although some models, such as use of nurses in maternity services, appear to offer cost savings.
- Mode and place of birth, as well as length of stay, have implications for staffing requirements. However, few studies have isolated and costed the staffing component.

Stakeholder reports of innovative practice

Examples of current innovative practice are included throughout the paper and seek to highlight new and emerging approaches to maternity care. These examples include:

- the use of maternity support workers
- task-shifting between midwives and obstetricians in maternity care
- the use of lay 'doulas' to support women through labour
- the use of the Productive Ward programme.

Although there has been little in the way of formal evaluation of these schemes, impact assessments and anecdotal evidence point to a range of potential cost-effective benefits for women, staff and organisations.

Key observations from current initiatives are as follows.

- Use of maternity support workers can produce positive results, including freeing up midwives to spend more time with women and improve women's experience of care. Cost-effectiveness has not been established and implementation needs to be carefully assessed.

- Nurses and neonatal nurses can play a useful role in releasing midwife time and there are indications of improvements in quality of care.
- A range of simple organisational changes can significantly increase the time midwives are able to spend on direct care. For example, implementation of principles of the Productive Ward programme has increased the time midwives spend on direct care giving with no increased cost.

Overall conclusions

In common with the rest of the NHS, maternity services face some significant challenges over the next few years. Changing demographics and rising birth rates come at a time of increasing financial constraint and continuing rising maternal morbidity rates. In order to maintain high levels of safety in the service, it is clear that significant changes need to be made to the way services are delivered. There are already pressures on midwives due to the rising birthrate and high levels of retirement from the profession and many have called for increased staffing levels. There is clearly a need for minimum levels of staffing in maternity services, but there is evidence to suggest that it is not just about absolute numbers of staff but also about *effective deployment* of existing staff.

Although much of the evidence is mixed, and some needs to be treated with caution, there are examples that demonstrate the potential to bring about productivity gains while maintaining – and in some cases improving – safety and women’s experience of birth. Midwife-led models of care, in particular, appear to offer positive outcomes and experience and a potential for cost-saving. There is potential for further task-shifting – eg, to nurses and support workers – within maternity services and some of these models of staff deployment warrant further exploration.

A number of specific recommendations have been identified below.

Recommendations

- Midwife-led models of care should be deployed across the service for low- and medium-risk women, with a view to providing a more cost-effective model of service delivery that releases obstetricians to focus on women with more complex needs.
- Nurses could be used more widely to free up the time of midwives and doctors.
- The role of maternity support workers should be explored. Clarity and consensus is required nationally over what the role should involve in order to ensure that robust oversight and accountability processes are established.
- The deployment of both midwives and doctors should be reviewed in out-of-hours services to ensure the availability of sufficiently experienced and senior staff.
- Continuity of care should be encouraged. The use of continuous lay support during labour, in addition to clinical care, shows potential to improve women’s experience and should be further explored by services in the UK.
- There is a need for high-quality research into the effectiveness of new and emerging models of care where there is potential for cost savings while maintaining levels of safety. Particular areas of potential include the use of maternity support workers and doulas and the shifting of tasks between nurses, midwives and doctors.
- Further research into the Birthrate Plus tool would be of value in assessing whether it could be developed to allow effective planning across the different professions.

Introduction

Why a new report?

The challenges facing England's maternity services were set out in 2008 by two key publications: *Safe Births: Everybody's business*, the report of an independent inquiry commissioned by The King's Fund (The King's Fund 2008) and *Towards Better Births*, the Healthcare Commission's review of maternity services (Commission for Healthcare Audit and Inspection 2008). These and other recent reports identified similar areas in need of improvement, including staffing, training and communication.

There is much debate at present about staffing levels in maternity. Much of this debate focuses on the numbers of midwives and the Royal College of Midwives has raised concerns about shortages. Indeed, the main focus of reports and government policy on safe maternity services has been the need to increase staffing numbers, particularly midwives and consultants. Many of the guidelines and standards produced by professional bodies have also focused on staff inputs, such as a 60-hour obstetric consultant presence on labour wards and one-to-one midwife care in labour. There is recognition that midwives, particularly, are under pressure due to the rising birth rate, the increasing complexity of many births and high levels of retirement from the profession. However, staff feedback obtained from the Safer Births events organised by The King's Fund in 2009 and from an earlier report on health professionals' views (Smith and Dixon 2007) suggested that, while staffing levels are important, changes in staff deployment could address at least some of the challenges to delivering safe care. *Safe Births: Everybody's business* (The King's Fund 2008) suggested that, while numbers of staff are important, it is the effective deployment of the *right* staff doing the *right* thing at the *right* time in the *right* place that is the key to improvement.

In response, The King's Fund has commissioned this report, which considers the available evidence on workforce deployment and skill mix in maternity services in terms of their impact on safety during labour and birth (the intrapartum period). The report is designed to answer this fundamental question:

Can the safety of maternity services be improved by more effectively deploying existing staffing resources?

The report examines the relevant literature and identifies evidence for the cost-effectiveness of different staffing models. It is intended that its findings will inform the thinking of policy-makers, professional bodies and regulators in England and further afield as well as offering support to those striving to improve maternity services locally.

The need for greater productivity

Despite recent initiatives to make use of maternity support workers (MSWs), dedicated operating theatre assistants, nurses, models of team/caseload midwifery and changes to obstetric rostering, there remains a widespread perception that having more qualified

staff is the key to improving safety in maternity services. Although gaps in staffing levels do exist, the current economic outlook for the National Health Service (NHS) suggests that significant staff increases are unrealistic and that the NHS as a whole, including maternity services, will need to focus on enhanced productivity as a route to improved safety. Of course, focusing on staffing is not the only route to improved productivity and it should be acknowledged that productivity gains could be looked for in other areas, for example, risk and litigation and inappropriate or unnecessary use of caesarean section. This report focuses specifically on the staffing element.

Safe Births: Everybody's business (The King's Fund 2008) defined productivity as 'the right person, doing the right thing, at the right time, at the right place'. It concluded: 'Applying the same approach to maternity should free up staff time, with a positive knock-on effect on safety as well as on the experience of professionals' (p 47).

- The *right person* includes having obstetric consultants on labour wards at times of greatest risk and pressure, and easily accessible to junior staff at other times. It might also mean having the appropriate skill mix to support midwives on maternity units and in the community.
- Doing the *right thing* might include actively aiming to reduce unnecessary interventions, releasing staff time spent in operating theatres and on extended postnatal care.
- Doing the right thing at the *right time* might involve early detection of problems and their referral to the right people. For example, the Royal College of Physicians' evidence to The King's Fund's Safe Births inquiry emphasised the importance of early involvement of medical consultants in the care of women with pre-existing medical conditions.
- Delivering care in the *right place* might involve using triage midwives to keep elective cases and women who are not in labour away from labour wards and theatres, while ensuring the availability of home births and community-based care for suitable women.

The report concluded that, although staffing levels are important, the more crucial issue is how available staff are *deployed*. More effective deployment, it suggested, could go some way to addressing the safety issues facing maternity services. A more recent report, published as part of The King's Fund's inquiry into the quality of general practice in England, has explored the possibility of general practitioners (GPs) taking on an enhanced role in maternity services (Smith *et al* 2010). This is not covered in this report, which focuses only on the intrapartum period.

The safety challenge

The challenge in the current time of financial constraint is to increase productivity with minimal or no additional resources while also improving quality and safety.

Safe Births: Everybody's business focused specifically on the safety of maternity services rather than their quality or efficiency, although quality and efficiency are both closely linked to safety. In this report, we have used the same definition of patient safety, drawn in turn from the United States Institute of Medicine and set out in the box opposite.

The intention of any safety intervention is to improve outcomes for patients by reducing harm. These outcomes may be clinical (eg, morbidity and mortality) or patient-derived (eg, quality of life and patient experience). Clinical error can be measured in several different ways, none of which can be considered the 'gold standard' (Brown *et al* 2008).

Characteristics of patient safety

Patient safety is concerned primarily with the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from health care itself. It should address events that span the continuum from ‘errors’ and ‘deviations’ to accidents. Safety emerges from the interaction of the components of the system. It is more than the absence of adverse outcomes and it is more than avoidance of identifiable ‘preventable’ errors or occurrences. Safety does not reside in a person, device or department. Improving safety depends on learning how safety emerges from the interaction of components.

Patient safety is related to ‘quality of care’, but the two concepts are not synonymous. Safety is rather an important subset of quality.

Source: Vincent 2006

Our focus

The dimensions of quality of care have been defined in *Crossing the Quality Chasm* (Institute of Medicine 2001) as ‘safe, effective, patient-centred, timely, efficient, and equitable care’. The first three dimensions were addressed in the Next Stage Review (Department of Health 2008) and all six have been recommended by the Midwifery 2020 Programme (2010).

In this report, our primary focus has been the *safety* of care for mothers and babies during the intrapartum period, that is, during labour and birth. While women’s experience is also an important outcome, it has not been the main focus of this research. However, much of the research has demonstrated that safety and a positive experience are not mutually exclusive. We have been particularly interested in research exploring the impact of staffing levels, staff deployment and skill mix on a range of outcomes for mothers and babies and the cost-effectiveness of different approaches.

Aim and method

Our aim has been to consider the evidence on workforce deployment and skill mix in maternity services, particularly in terms of their impact on safety. We have done this in two ways:

- through a scoping review of the published and unpublished literature from 1993 to the end of 2009 on the relationship between the maternity workforce, staffing, skill mix and deployment practices and the safety of maternity care in middle- and high-income countries
- by gathering information from key stakeholders about innovative responses to some of the workforce challenges identified in the review.

Scoping reviews usually offer detailed descriptions of research findings, which are then summarised for dissemination to policy-makers, practitioners and consumers. We used Arksey and O’Malley’s methodological framework (Arksey and O’Malley 2005), which suggests a five-stage process:

- identification of the research question to be addressed
- identification of studies relevant to the research question

- selection of studies to include in the review
- charting of information and data within the included studies
- collating, summarising and reporting results of the review.

An optional sixth stage involves consultation with stakeholders to ensure comprehensive inclusion of all relevant material.

Our method is described in detail in Appendix B, p 35.

1 Policy and workforce challenges for maternity services

Introduction

The key challenges currently facing maternity services are to improve productivity along with safety and quality of care at a time of increased pressure from a combination of budgetary constraints, demographic changes, working hours legislation and reforms to the postgraduate medical training programme. These factors have implications for midwifery and obstetric workforce planning. This section sets out the main challenges currently facing maternity services and focuses on current staffing levels and the challenges associated with identifying 'optimum' staffing levels.

Influences on current and future service provision

UK policy is consistent in its commitment to deliver a choice of safe, accessible, high-quality maternity care that is woman-focused and family-centred (Department of Health 2004; Department of Health Partnerships for Children, Families and Maternity 2007). Key underpinning principles are that pregnancy and birth are normal life events and that all women, regardless of risk profile, should be offered the most positive birth experience possible.

The performance of maternity services has been seen as a touchstone of the ability of the health service to deliver safe, effective care with a good patient experience (Department of Health 2009b). The key challenges currently facing the maternity workforce are to improve productivity along with safety and quality of care. According to the quality, innovation, productivity and prevention challenge (QIPP), 'the NHS needs to identify £15–£20 billion of efficiency savings by the end of 2013/14', with a focus on quality, prevention, productivity and innovation (Department of Health 2010).

As such, in maternity there will be significant pressure to improve productivity by developing new ways of working, creating new assistant and advanced practice roles and increasing the flexibility and adaptability of the maternity workforce. Such changes will involve fundamental and innovative changes to the way services are delivered in order to improve productivity and quality outcomes. This, in turn, will require action to reduce inappropriate variations, such as in rates and timing of induction, caesarean sections (Bragg 2010) and other interventions (NHS Institute for Innovation 2010).

At the same time, the profile of women accessing maternity services has changed dramatically, while demographic and lifestyle challenges are placing additional demands on the provision of care. The United Kingdom has seen a rising birth rate along with age, obesity and multiple pregnancy, and an increase in patients with existing co-morbidity. Additionally, women from disadvantaged backgrounds and those with complex social needs continue to experience poorer pregnancy outcomes (Lewis 2007).

Structural changes in the organisation and delivery of health services in general are also having an impact on the shape and location of maternity services and the

associated workforce. For example, in England the Transforming Community Services programme has been used with particular success to promote community maternity services (Department of Health 2009a). More recent proposals for NHS reform will see GP consortia commissioning maternity services from 2013, which may have further implications for the way services are structured.

Changes in care delivery to date have been accompanied by changes in contractual arrangements and training requirements. Specific workforce challenges include meeting the European Working Time Directive and maternity staffing standards set by the Clinical Negligence Scheme for Trusts (CNST), changes in obstetric workforce training and deployment and the need to improve health and well-being. Junior doctors have seen their working practices changed by the introduction of full shifts. Postgraduate medical training has already been significantly reformed by the Modernising Medical Careers initiative and will change further in the light of Sir John Tooke's report *Aspiring to Excellence* (Tooke 2008).

Workforce planning and development calls for a strategic, integrated and cross-professional approach (House of Commons Health Committee 2007). The Workforce Review Team has recommended that workforce planning should flow explicitly from agreed service strategy and that the future workforce should be characterised by 'the right people, with the right skills, in the right places, at the right time' (Workforce Review Team 2009). Thus policy changes relating to the content of care and how it is delivered have implications for the maternity workforce.

One of the major challenges facing acute specialties is the limitation on working hours imposed by the European Working Time Directive legislation. For some clinical specialties the impact of the Directive may be mitigated by cross-cover initiatives like Hospital at Night, now used in many hospital trusts. Those responsible for providing paediatric and maternity services now face particular difficulties because of the need to have specialty-specific clinical skills immediately available 24 hours a day as these specialties have heavy night-time loads and cannot be cross-covered.

The midwifery workforce

The number of midwifery staff in post in the United Kingdom on 30 September 2008 was 25,664, or 19,639 whole-time equivalents (WTE), representing an increase of 571 (341 WTE) since 2007. The majority of the workforce is female and most work part time (Information Centre NHS 2010). There are particular concerns around midwife numbers at present as a large number are nearing retirement age (RCM 2008) and the rising birth rate is putting pressure on services.

Much less is known about the significant and growing numbers of maternity support workers. What we *do* know is that their evolution and development is variable across the United Kingdom, along with the job titles used and the training provided. Key reports have suggested that more use could be made of support workers (NHS National Workforce Projects 2009) and the Royal College of Midwives (RCM) has published useful guidance on the valuable role they play within the maternity care team (Royal College of Midwives 2010a).

Staffing levels and ratios

While midwives are present at all births and are the main providers of antenatal and postnatal care, it has been difficult in the past to prescribe appropriate staffing levels because patterns of care vary between maternity services. Staffing needs in both hospital

and community settings depend on service design, buildings and facilities, local geography and demographic factors, as well as models of care and the capacity and skills of individual midwives. Other significant variables with an impact on staffing levels include women's choice and risk status.

As maternity services develop different models of service delivery, such as home birth, caseload midwifery practices and stand-alone midwife-led units, their staffing requirements may alter, particularly in the service development phase.

Over the past decade, the RCM states, the birthrate has increased by 19 per cent, while midwife numbers have increased by 12 per cent. On this basis the RCM estimate that there are 3,500 fewer midwives than the number needed to deliver a safe, high-quality service (Royal College of Midwives 2010b). In addition, many midwives are nearing retirement; 17.5 per cent of London's midwives are eligible to retire now and more than half (around 53 per cent) could retire in the next 15 years (RCM 2008). In recognition of the complexities of this issue, the RCM and the Royal College of Obstetricians and Gynaecologists (RCOG) have carried out reviews of midwifery service provision and workforce planning tools. The ratios of midwives to births recommended by the RCM (RCM 2009) are designed to deliver a safe, high-quality maternity service, as described in *Maternity Matters* (Department of Health 2007). The RCOG review *Safer Childbirth* recommends staffing levels in recovery, theatre and high dependency units (RCOG 2007).

The NHS Litigation Authority (NHS Litigation Authority 2010) has published risk management standards for NHS organisations providing labour ward services (www.nhs.uk/NHSLA/RiskManagement/). The standards require staffing levels for all obstetric midwifery, nursing and support staff for each care setting, which should be calculated using the figures identified in *Safer Childbirth* (RCOG 2007).

The ratio recommended by *Safer Childbirth*, based on the expected national birth rate, is 28 births to one WTE midwife for hospital births and 35:1 for home births. Further specific recommendations are as follows.

- **Birth centres/midwifery-led units** The normal recommended ratio is 35:1 to reflect the generally low dependency of women accessing these services. However, separate assessment is needed when providing intrapartum care for women requiring transfer to hospital care, or providing ante- or postnatal care on an inpatient basis. These issues are beyond the scope of this paper.
- **Caseload midwifery practice** Where midwives are giving total antenatal, intrapartum and postnatal care to low-risk women, a ratio of 35:1 is recommended, although this should be reviewed in cases of high social and support need.
- **Labour wards** The number of midwives allocated to each shift must enable a minimum of 1.0–1.4 midwives for each woman in established labour, depending on case mix.

The Birthrate Plus planning tool

The national ratio of midwives to patients is based on data from a large number of hospital and community settings in England and hinges on a planning tool known as Birthrate Plus (BR+). This tool was first proposed as a means for determining midwifery staffing levels in 1992 (Ball 1992), with further guidance published in 1996 (Ball and Washbrook 1996).

BR+ has been endorsed by the RCM and others as the recommended midwifery workforce planning tool for the United Kingdom (RCM 2009) and has been used in

many maternity services to model midwifery staffing requirements. The tool is now also used in other countries; for example, a project to test its usefulness in Australia has been in progress in New South Wales for the past three years (www.health.nsw.gov.au/nursing/midwifery.asp). Although the link between BR+ and improved outcomes is limited, no better or more usable tool has been developed for the midwifery workforce in the past decade, while experience of the tool, both at home and abroad, has highlighted its value and importance.

BR+ involves calculating the case mix of women using maternity services and retrospectively allocating them to one of five categories based on complexity during labour and birth. The variables used to classify women include interventions or other factors that signify increased complexity, posing additional demands on midwifery care. These are:

- active labour lasting more than eight hours
- intravenous infusion
- induction of labour
- epidural anaesthesia
- high level of support in labour
- perineal tears
- forceps or caesarean delivery birth
- multiple birth and/or neonatal complications.

The presumption is that ‘the population of women being served, together with the clinical policies pursued within intrapartum care, and the availability of services, such as epidural analgesia and neonatal services, will affect the case-mix and the midwife time needed’ (Ball *et al* 2003b, p537). The complete staffing recommendations take account of time needed for management, variability of workload, holiday, sickness, and study leave (Ball *et al* 2003a). They also account for activities that midwives perform but could arguably be delegated to others.

Implementing and using BR+

In 2001/2, the Department of Health funded a project designed to help a number of maternity units in England and Wales to implement BR+. The project aimed to support individual services in their workforce planning but was not designed as a comparative study of the demands on midwifery services and the staffing required to meet them, and did not involve validation of the tool in terms of the link between staffing levels and safety. In subsequent work, a total of 101 maternity services spanning 117 sites undertook workforce studies. By the time of publication, 64 units had completed their studies and most were found to have 75–80 per cent of their recommended trained staffing establishment (Ball *et al* 2003a).

The 2001/2 project also examined staffing ratios (Ball *et al* 2003b, 2003a) and the report suggested that ‘an initial ratio of 28 hospital births per WTE midwife per annum might be appropriate’ (Ball *et al* 2003a, p 266). In terms of home/caseload deliveries, the authors suggested a ratio of 35 per WTE midwife per annum. This allowed for travel in rural and urban settings but not for variations in demographic complexity.

Many subsequent reports have used these same ratios, sometimes more prescriptively than the original authors suggested. These include the Safer Childbirth standards (Royal

College of Obstetricians and Gynaecologists *et al* 2007) and *Standards for Maternity Care* (RCOG 2008). The RCM's guidance on staffing standards sets out 28 births per WTE midwife as the national ratio, with caveats about national variation (RCM 2009). The guidance recommends calculating separate ratios for hospital and community services based on the further work of BR+ (RCM 2009; Birthrate Plus 2010). It is also acknowledged that the tool may not be applicable in remote and rural areas.

Value and limitations of BR+

The advantage of BR+ is that it analyses workforce requirements in terms of what women need rather than what midwives do. The process involved in classifying a hospital's case mix is intuitive and simple to grasp, while the factors used to categorise individual women are easy to collect and measure, which makes the tool highly appealing to hospital managers and commissioners of services. In addition, the calculations are based on the standards of one-to-one care in labour that have been cited as policy in every government document since 1980.

The Department of Health has endorsed BR+ as the definitive midwifery workforce planning tool (Royal College of Obstetricians and Gynaecologists *et al* 2007). But despite these recommendations and its widespread implementation, there is limited objective evidence of the tool's effectiveness or how it relates to patient safety. The only published literature on BR+ are the three papers from 2003 that describe how it was used in the 2001/2 project in England but provide limited information on its contribution to improved patient safety. Two more papers are in progress, based on data from 2006–2008. Further research is needed to explicitly link patient safety outcomes with staffing ratios based on BR+ analyses.

Other tools in use or development

Further research is in progress by the BR+ researchers to develop a Birthrate Acuity Score (Jean Ball, personal communication, November 2009). The Acuity Score is based on the original BR+ retrospective intrapartum score system, which classifies women into categories 1–5 according to complexity and provides classification for other women cared for in labour wards who are not in active labour. Using the same clinical indicators, the new tool is used *prospectively* to allocate the level of midwifery care needed. A paper is in progress to explain its predictive value.

Another new tool, recently launched by the National Patient Safety Agency (NPSA) is the Intrapartum Scorecard (NPSA 2010). This is designed to be used by the labour ward co-ordinator every four hours to collect contemporaneous information about staffing and activity. There is limited published evidence on its implementation or impact.

The obstetric workforce

Obstetric staffing requirements need to be set within the broader context of the European Working Time Directive and Modernising Medical Careers (NHS 2007). They also need to take account of growing pressures on the system from rising birth rates and an increase in medical complexity associated with factors like older mothers, social exclusion, obesity, multiple pregnancies arising from assisted reproduction, rising prematurity, and rising rates of caesarean sections and other interventions.

Modernising Medical Careers (MMC) has restructured the postgraduate years, with basic training of two foundation years (FY1–2) rather than one, followed by two years

of specialty training (ST) (ST1–ST2). Training continues through ST3–ST7, with core training completed by ST5, then either Advanced Training Skills Modules (ATSMs) or a sub-specialty training programme, leading to the Certificate of Completion of Training (CCT). It has been assumed, not unreasonably, that this abbreviated seven-year training programme with fewer contracted hours per week within it produces less-experienced specialists than the previous regime.

The RCOG has established standards for the obstetric consultant role, consultant numbers and the need for increased consultant presence on delivery suites in several recent publications (RCOG 2009, 2007, 2005). The first of these reports, *The Future Role of the Consultant* (RCOG 2005) argues for moving towards 24-hour consultant cover on labour wards. It cites the growing complexity of case mix, increases in operative birthrates, a reduction in trainee numbers, hours and experience and emerging evidence that an increased consultant presence would lead to a fall in rates of caesarean section and complications from operative deliveries (Patel and Murphy 2004). An appendix in the RCOG report includes data from the National Patient Safety Agency (NPSA) and other sources suggesting that severe fetal distress is most common after midnight, as analysis of Scottish data confirms (Pasupathy *et al* 2010).

The report recommends that larger units (defined as delivering more than 6,000 babies per year) and those with a high proportion of complex women should have a consultant presence for the full 168-hour week. However, this recommendation is based on the perceived need for 24-hour obstetric cover and concerns relating to the experience and expertise of obstetric trainees, rather than direct evidence about the relationship between consultant presence and childbirth outcomes.

The most recent RCOG report, *The Future Workforce in Obstetrics and Gynaecology* (RCOG 2009), outlines future staffing requirements, as set out in Table 1 below. It should be borne in mind that obstetricians undergo dual training as obstetricians and gynaecologists but do not necessarily practice as both. This adds an extra layer of complexity to workforce planning in this area.

Based on data from the latest RCOG census, the report suggests that 26 units would need to provide 168-hour consultant presence, with a minimum equivalent of nine dedicated WTE obstetricians for the labour ward for each unit. This would require a significant increase in consultants, which is not achievable in the time frame suggested by the RCOG and currently adopted by the NHS Litigation Authority for completion by 2010/11. The economic and organisational implications for NHS trusts of providing the recommended level of consultant cover are currently unknown.

Table 1 Proposed standards of delivery suite consultant presence

Category*	Units		Consultant presence (year of implementation)		
	(n)	Deliveries (n)	60 hours	98 hours	168 hours
A	62	< 2,500	Local	–	–
B	86	2,500–4,000	2009	–	–
C1	26	4,000–5,000	2008	2009	–
C2	18	5,000–6,000	2008	2008	2010
C3	8	> 6,000	2008	2008	2008

* Hospital/unit categories defined in *Safer Childbirth*

Source: RCOG (2009)

Conclusion

In common with the rest of the NHS, maternity services face some significant challenges over the next few years. Changing demographics and rising birth rates come at a time of increasing financial constraint and continuing rising maternal morbidity rates. In order to maintain high levels of safety in the service, it is clear that significant changes need to be made to the way services are delivered.

One of the key challenges is establishing the required level of maternity staffing. There is a paucity of evidence that clearly links staffing levels of midwives and obstetricians directly to patient safety, although there is evidence of a relationship between staffing levels and patient outcomes in other areas of medicine/nursing (*see p 14*). Currently, the ratio of midwives to births is planned using the BR+ tool. As stated earlier, although widely used, there is a lack of evidence about whether use of the tool is associated with higher levels of patient safety. There is also little consideration of the growing numbers of maternity support workers and the role that they play. There is a need for further research into the BR+ tool in order to assess whether it could be developed into a multi-professional tool to allow effective planning across the different professions.

Similarly, there is a perceived need for full obstetric consultant cover in larger units but little evidence about the link between consultant numbers and maternity outcomes. Changes to the obstetric training programme, the introduction of the European Working Time Directive and the recommendation for full consultant cover in larger units have added to the pressures already stemming from the rising birth rate and increasing complexity of women giving birth.

What is clear is that the recommended consultant cover and midwife-to-birth ratios are not readily achievable with the resources available and within the timescale intended. The next section examines the available evidence about the link between staffing levels and safety and draws on examples where different approaches to maternity care delivery have been used.

2 Workforce issues and safety: literature review

In this section we examine the available evidence around the link between outcomes and different models of staff deployment and care delivery. The findings from our scoping review are organised into three main areas:

- **the maternity workforce** with a focus on links between staffing levels and related outcomes
- **task-shifting, skill mix and the use of extended midwife and nurse roles** This section also looks at the role of maternity support workers.
- **models of care delivery** including the use of pathways and protocols; midwife-led care; and caseload models.

The feedback we obtained from key stakeholders is presented as case studies throughout to provide examples of innovation in current practice.

In this section, we focus for the most part on care during labour and birth provided by midwives and medical and support staff as the key area of concern regarding safety. We also include evidence from a number of important studies relating to non-maternity workers, including registered nurses in medical/surgical wards, advanced practice nurses and staff working in intensive care units where there is transferable learning for maternity services.

The maternity workforce

The key staffing issue is how midwifery and medical staffing levels, expertise and skill impact on safety in childbirth and outcomes for mothers and babies. The two main challenges are to determine

- the optimum 24-hour staffing of delivery suites by midwives and consultant obstetricians
- the most appropriate division of tasks between obstetricians, midwives and support workers.

Determining the optimum maternity staffing levels is complex and there is limited evidence about the association between staffing levels and outcomes. However, ongoing research at the National Nursing Research Unit is using NHS maternity statistics to develop a model that will incorporate clinical outcome measures, staffing and workforce, patient and trust characteristics (www.kcl.ac.uk/schools/nursing/nnru/).

Midwifery staffing and outcomes

Few studies have examined the relationship between midwifery staffing levels and patient outcomes. The review identified two relevant studies that sought to establish any association.

A prospective workload study carried out in 23 consultant-led labour wards in Scotland, using case note review of 1,561 consecutive births, assessed the association between midwife staffing, process and neonatal outcome indicators. The process measures used were: continuous electronic fetal monitoring (CEFM), appropriate use of CEFM, and time to medical response for a serious fetal heart trace abnormality. Neonatal outcome indicators were low Apgar scores (below seven at five minutes), admission to neonatal unit (NNU) for more than 48 hours, and neonatal resuscitation. Complete information was available for 99 per cent of workload time points and CEFM processes. The findings of this study showed no associations between occupancy or midwife staffing ratios and adjusted CEFM process, low Apgar scores and admission to NNU for more than 48 hours. However, there *was* an association between increased midwife staffing ratios and a reduced risk of neonatal resuscitation. Thus there is some evidence that midwifery staffing is associated with neonatal outcomes, although the size of this effect may be small (Tucker *et al* 2003).

A second prospective study, using an observation tool in seven labour wards in the north-west of England over one year, found some adverse events and unreported 'near misses' attributable to midwifery shortages in all units. In all the units studied, most midwives performed clerical duties that took them away from clinical work. In three units, poorly organised team midwifery systems had resulted in midwives rarely providing intrapartum care and were reported to have eroded their labour ward skills and confidence (Ashcroft *et al* 2003). This qualitative study suggests that, although absolute staffing levels are important, good outcomes are not just dependent on numbers of midwives but can actually be affected by a complex mix of factors – in this case, the relative experience of available midwives and how the available staff are deployed.

Obstetric staffing and outcomes

Only one study has investigated the links between obstetric, paediatric and parental factors and neonatal outcomes. This drew on cross-sectional data from all 65 maternity units in the Thames region between 1994 and 1996, covering a total of 540,834 live births and stillbirths. It found that birth weight accounted for most of the variability in stillbirth rates and neonatal mortality. After adjustment for birth weight, perinatal units with a more 'interventionist' approach (defined by higher rates of caesarean sections, epidurals and instrumental births) and higher levels of consultant obstetric staff were found to be associated with lower stillbirth rates; and this effect persisted after adjustment for other possible predictive and confounding factors. This study's relevance may be limited by its age (Joyce *et al* 2004).

Out-of-hours staffing and outcomes

Just as important as staffing levels is the range of expertise available within the maternity workforce, particularly out of regular working hours. An observational study carried out in a tertiary-level university teaching hospital in Southern Ireland found that 67 per cent of infants were born out of office hours. A total of 83 per cent of operative births undertaken because of poor progress in the second stage of labour took place out of hours, as did 77 per cent of emergency caesareans performed for fetal distress. Most perinatal deaths, births of infants with low Apgar scores and complicated births also occurred out of hours (O'Donoghue *et al* 2008).

These findings were replicated in a Scottish population-based retrospective study investigating the effect of time and day of birth on the risk of neonatal death in a sample of more than a million term live births (Pasupathy *et al* 2010). The proportion of births

that occurred during the day on weekdays, weekday nights (1700–0900) and weekends were 27.7 per cent, 47.2 per cent and 25.1 per cent, respectively. The researchers found that the risk of neonatal death ascribed to anoxia was increased among women delivering outside the hours of the normal working week.

The researchers noted that the association between delivery out of hours and neonatal death ascribed to intrapartum anoxia could be a result of many different variables. Observational studies have limited capacity to identify the causal pathways. For example, it could be explained by variation in staffing at different times of day, the immediate availability of senior clinicians, or access to obstetric operating theatres. The association was not explained by maternal, infant or obstetric characteristics, or hospital throughput, onset of labour or mode of delivery. Fatigue among clinical staff is often suggested as a cause of increased risk of adverse outcomes observed at night. This is unlikely to explain the findings, as there was no excess risk of death among women delivering during the night compared with the daytime. Thus the nature of the problem still needs to be clarified – whether the difference in outcomes is related to the numbers of staff available or their level of experience.

Increased risks associated with out-of-hours care were also identified by a study examining the causes of 37 cases of birth asphyxia in term infants that were severe enough to warrant admission to neonatal care in the north-west of England between 2001 and 2002 (Ashcroft 2008). The main problems included failure to respond appropriately to signs of fetal hypoxia, undiagnosed obstructed labour, delayed resuscitation, and excessive and inappropriate use of oxytocin. All cases involved human error and the deployment of unsupported and inexperienced personnel in positions for which they lacked the necessary skill and experience. This latter problem was exacerbated by the use of unsupervised junior medical staff as first on-call for complications, and failure to sustain safe midwifery staffing levels.

Non-maternity staffing and outcomes

There are a few studies from the non-maternity literature that consider the impact of staffing levels on outcomes. One, from the United Kingdom, reviewed studies published between 1998 and 2008 that had examined the impact of staffing levels and skill mix on patient, nurse and organisational outcomes, mainly in acute care settings (Flynn and McKeown 2009). The researchers found that higher nurse staffing levels were associated with better patient outcomes, including safety, and better nurse outcomes, such as job satisfaction.

Other UK and US studies have found registered nurse (RN) staffing levels and hours of direct patient contact to be associated with improved outcomes (Kane *et al* 2007; Lankshear *et al* 2005; Currie *et al* 2005). In their systematic review, Kane and colleagues from the United States examined 28 studies for a link between nurse staffing levels and patient outcomes in acute hospital settings (Kane *et al* 2007). They found higher staffing levels to be associated with reduced mortality and adverse clinical events together with improved safety in intensive care and surgery patients. Increased hours of direct patient care were also linked with better outcomes, including a lower risk of hospital-related death and reduced length of stay in hospital.

A UK review of studies examining the impact of nurse staffing levels in hospital also found a positive relationship between increased staffing levels and improved outcomes, including a reduced rate of adverse events and fewer deaths among surgical and medical patients (Currie *et al* 2005).

Skill mix, task-shifting and extended roles in the maternity workforce

Limited evidence is available about the optimum skill mix for a maternity unit. This is partly because of the lack of uniform definition of skill mix. It has been defined by the World Health Organization (WHO) as ‘the mix of posts, grades or occupations in an organisation’ (Buchan and Dal Poz 2002, p 575), while other authors have referred to task-shifting, delegation and substitution (Laurant *et al* 2005). Findings are obscured by this lack of consensus as well as by the poor design of most studies – largely descriptive accounts of single sites using small sample sizes (eg, Dubois and Singh 2009). However, there is some evidence about the impact of substitution or task-shifting – eg, midwives taking on tasks traditionally performed by doctors, and support workers taking on tasks normally performed by midwives – as well as extension of the midwifery role to include specific tasks such as neonatal examination.

The number of studies examining the impact of changes in roles and shifting of tasks performed in health care on outcomes has steadily increased since 2000. Most of these are systematic reviews of the effects of one of the following:

- nurses and (to a lesser extent) other health professionals taking on tasks of doctors
- support workers/nursing assistants taking on nursing tasks.

Some maternity units have implemented the ‘Productive Ward’ initiative with a view to improve ward processes and environments in order to free up time for staff to spend on direct patient care. This programme has not yet been formally evaluated but a current case study is included in this section.

Extended roles for nurses and midwives in maternity care

Typically, task-shifting studies examine the impact of situations where a nurse or midwife is responsible for providing similar tasks as a doctor. Two high-quality studies showed improved outcomes and cost savings after midwives took on tasks previously performed by neonatal staff (Townsend *et al* 2004; Aubrey and Yoxall 2001).

A UK study looked at the implications, including cost-effectiveness, of extending the midwifery role to include the task of routine examination of healthy newborns, which is usually carried out by junior neonatal doctors (Townsend *et al* 2004). A group of 826 mother–baby pairs were allocated at random to either senior house officer (SHO) or midwife care for the routine examination performed about 24 hours after birth. Quality assessment was based on video recordings, scored against agreed criteria. Other factors considered included maternal satisfaction with, and professional opinion about, the examination.

Analysis of the results revealed no significant differences between SHO and midwife examinations in relation to referral rates to hospital or primary care services. Midwives scored higher than SHOs on the videotaped assessments, and maternal satisfaction, as measured by questionnaire, was higher after midwife examinations. A modelling exercise showed that having all babies on postnatal wards examined by midwives rather than doctors would save about £4.30 per baby born, or £2.5 million nationally. The authors concluded that this development in the midwife role would probably lead to improved quality of care and higher maternal satisfaction. However, midwives’ workload would need to be re-organised to create time for the additional responsibility.

Changes in the numbers and work patterns of medical staff in training grades pose a significant challenge to the provision of an effective clinical neonatal service. Advanced neonatal nurse practitioners (ANNP) could play a role in this changing neonatal service, although their effectiveness, established in North America, has not been properly evaluated in the United Kingdom. A UK study set out to evaluate the effectiveness of ANNPs in resuscitating preterm babies at birth against the standard set by junior medical staff (Aubrey and Yoxall 2001). Retrospective analysis of resuscitation details and clinical outcomes of 245 preterm (< 33 weeks' gestation) babies born in Liverpool Women's Hospital between 1998 and 1999 showed the following impact on outcomes:

- resuscitation teams led by ANNPs provided the same interventions as medically led teams
- although babies resuscitated by ANNP-led teams were no more likely to be intubated, they were intubated more quickly and received surfactant sooner than those resuscitated by medically led teams
- babies attended by ANNP-led teams were less likely to be hypothermic on admission to the neonatal unit.

The retrospective design of this study means its findings should be viewed with caution, with further prospective research needed to make a broader assessment of the comparative effectiveness of ANNPs in a UK context.

Examples of current use of nurses in maternity care

Bedford Hospital has been using nurses to provide pre- and peri-operative care for women having caesarean sections in order to release more midwife time for antenatal screening and surveillance and one-to-one care in labour. This followed a rise in the rate of caesareans to 23 per cent of deliveries, accompanied by complaints about the quality of care, such as late medication and soiled beds. While this scheme has not been formally evaluated, there are some indications of improved quality of care, with caesarean rate reductions to 20.8 per cent and medications being given on time. Mothers' views are sampled every quarter, and in March 2010 84 per cent said they had received one-to-one care in labour, compared with 46–64 per cent during 2008. The prevalence of one-to-one care in labour was also seen to have risen in an evaluation carried out as part of a local pilot of the National Patient Safety Agency (NPSA) intrapartum score.

The use of advanced neonatal nurse practitioners (ANNPs) in Ashington, Northumberland was evaluated at a small maternity unit that took over responsibility for all of the duties of a departing paediatric senior house officer (SHO). Perinatal deaths, which ran at the rate of 4.32 per 1,000 births during the period 1990–1995, were reported to have dropped to 3.17 per 1,000 during 1996–2000, after the ANNPs took over neonatal care, suggesting that a nurse-led unit can provide at least as high a standard of care. Since the entire region reported a fall in neonatal deaths, it is not clear whether the drop in Ashington can be attributed to the use of nurses.

Shifting tasks from midwives to maternity support workers

Strategic approaches to the development of maternity support workers are under way at a national level in Scotland, Wales and Northern Ireland and at more local levels (albeit as part of a national initiative) in England (NHS Employers and Care Services Improvement Partnership 2006). Support workers are expected to play a key role in the maternity workforce of the future; but, although the role has been established for some time, there is limited understanding of who these people are, what they do and what competencies they possess.

A study commissioned by the Department of Health provided a systematic overview of the numbers, scope and range of practice, training levels, skill mix and service model arrangements of support workers in maternity services in England. Managers were enthusiastic about the contribution these workers made to the work of the maternity team, and some innovations were identified (Stout 2007). The study noted substantial variations in the titles used, the range of activities performed, the entry level of training required, grades assigned and pay rates for similar work. Some of the tasks performed by support workers required considerable training and competence, yet governance oversight of delegated responsibility and accountability was variable, giving rise to concerns about quality and safety of care. Areas identified as needing further research included

- the impact of the support worker role on outcomes for mothers and babies
- cost-effectiveness of the role at different levels of training and scope of practice
- the views and experience of women receiving care from support workers (Sandall *et al* 2007).

There is good evidence from Cochrane reviews for some interventions performed by support workers (eg, providing support in labour), which can both reduce intervention rates and improve maternal and neonatal outcomes (Hodnett *et al* 2007).

Lay health workers in general offer real benefits by comparison with usual care in promoting immunisation uptake and breastfeeding, improving TB treatment outcomes, and reducing child morbidity and mortality. The evidence of other health benefits is too limited to draw conclusions (Lewin *et al* 2010) and we do not know whether maternity support workers would have the same impact.

There is little evidence to support the provision of a postnatal home visiting service by support workers, based on a Dutch model of maternity aides. Although women valued the service, there was no evidence of any health benefit at six-week or six-month follow-up and no difference in use of National Health Service (NHS) services, while the additional cost of providing the service was around £180 per woman (Morrell *et al* 2000).

Examples of current use of maternity support workers

Through our contact with stakeholders, we identified three regions that were engaged in developing the role of maternity support workers (MSWs) to support qualified practitioners and create more flexibility in the workforce.

NVQ programme in the West Midlands

West Midlands Strategic Health Authority (SHA) was developing the scope of the MSW role in several settings, with a view to making the role sustainable, raising its profile and developing a National Vocational Qualification (NVQ) programme for it. Several trusts had transferred their support workers to this job description and were working towards an apprenticeship model based on the national Skills for Health competency frameworks. Future development will focus on establishing an NVQ based on the generic health support worker role, but progress had been stalled by changes to the NVQ system. The hope is that the eventual NVQ will be set at a high enough level to enable qualifying students to apply for midwifery training. Although there had been no formal evaluation of this project, it was clear that it had taken considerable effort to encourage cross-organisational working and that seamless funding would have helped with this process.

West Midlands SHA had also rolled out across the region a new operating theatre maternity support worker (OTMSW) role specifically to provide scrub duty support for caesareans. The training is comprehensive, although less wide-ranging than that provided for operating theatre nurses. This role was being piloted in three sites and, although no formal evaluation was planned, local trusts were expected to be able to produce some information on impacts from general audit.

Impact evaluation in the East Midlands

East Midlands SHA was using semi-structured interviews with heads of midwifery, midwives, MSWs and service users to document the role of MSWs across the region, evaluate its impact on care quality and move towards a consistent service model. Key findings were as follows:

- more than 90 per cent of midwives felt they had more time to spend with high-risk women and on their essential role
- half of the midwives felt well supported by MSWs
- mothers were often not able to tell the difference between MSWs and midwives and, in general, felt better supported with more holistic care.

Although there was strong anecdotal evidence that MSWs have a positive impact on care delivery and achievement of targets, it was not yet possible to quantify this impact and make recommendations for future staffing ratios.

A new commissioning model in South Central

NHS South Central is involved in creating a sustainable maternity workforce to service the region's rising birth rate without creating more midwife posts. An outcomes-based commissioning model has been designed to harness the key staff skills and competencies needed to deliver a safe and effective service by developing

continued opposite

Examples of current use of maternity support workers *continued*

existing roles and identifying new ones. The model is based on a role ratio of 25 per cent midwife time to 75 per cent MSW time, with midwives involved in co-ordinating and overseeing MSW care. It has now been tested in two trusts serving areas of high social deprivation, with MSWs working to an established competency framework. Future work will focus on more creative deployment of obstetricians/gynaecologists and on developing an associate practitioner role in ultrasonography.

Interim evaluation of the new MSW model, based on a local 'quality matrix', was carried out after six months. Findings suggest that it has been a challenge to change the hearts and minds of midwives, with some seeing the new model as a threat to their role rather than an enhancement. Recruitment and retention of midwives in some areas has also been challenging, although recruitment and retention to MSW posts has been strong. A key lesson learned is the need to help maternity teams understand that the model is not a cheap alternative to standard care but a potential means to better-quality care.

South Central has now been asked to support the evaluation of the new model for high-needs women in Southampton. The evaluation will use standards set by the National Institute for Health and Clinical Excellence (NICE) to audit the postnatal pathway, focusing particularly on re-admission rates, 28-day feeding and maternal satisfaction.

Shifting tasks from nurses to support workers and other health professionals in non-maternity services

Studies that have investigated the impact on patient and quality outcomes of the shifting of tasks from nurses and other health care professionals to support workers are limited. We have included these here as they are relevant when considering the shifting of tasks in maternity care.

The overall evidence about the impact of nurse task-shifting to support workers on quality of care and cost effectiveness is inconclusive (Buchan and Dal Poz 2002; Sibbald *et al* 2004; Dubois and Singh 2009). Several surveys have addressed the same issue. One of these analysed data from 30 hospitals, focusing on the activities and workload patterns of nurses from a range of grades (Jenkins-Clarke and Carr-Hill 2003). The researchers found little 'flexibility in the deployment of nursing staff in response to variations in demand' (p 13) in intensive care units and general hospital wards such as surgery, medicine and orthopaedics. Some evidence was found that using 'housekeepers' or non-nursing staff for administrative tasks on wards improved the amount of time qualified nurses were able to spend with patients.

A UK study used case study design methods (a combination of surveys, interviews, observations, focus groups and review of documents) to examine the work of health care assistants in one hospital (Spilsbury and Meyer 2004). The study focused on the work and the views of a number of assistants, including health care, therapy and maternity assistants, with a range of experience in various clinical areas. Findings focused on the problems associated with the health care assistant role rather than its impact on patient outcomes. These included a limited role in patient handover and, in some cases, involvement in patient monitoring (eg, blood glucose testing) without proper training in response to low nurse staffing levels and high clinical workloads.

Shifting tasks from doctors to advanced practice nurses and other health professionals in non-maternity services

There is limited and inconclusive evidence that shifting tasks to nurses from doctors in acute and primary care settings outside maternity care is associated with improved patient outcomes or reduced costs. Such evidence as we have is also compromised by an over-reliance on descriptive single-site studies (Buchan and Dal Poz 2002) and use of short-term outcome measures (Laurant *et al* 2005).

Buchan and Dal Poz (2002) carried out two systematic literature reviews (between 1986 and 1996 and 1996 and 2000) for the WHO to gather evidence for the impact of extended nurse roles on outcomes. They found limited evidence that extended nurse roles, especially those of nurse practitioner and nurse-midwife, improved outcomes in terms of patient satisfaction and health care costs (although most of the studies were from the US and so need to be considered within the context of that system). They did, however, cite evidence from three randomised controlled trials (RCTs) showing that nurses were associated with better patient satisfaction outcomes than general practitioners (Shum *et al* 2000; Kinnorsley *et al* 2000; Venning *et al* 2000).

More recent reviews paint a similar picture. A Canadian systematic review of papers on skill mix published between 1995 and 2008 found limited evidence about the impact of extended nurse roles on patient outcomes (Dubois and Singh 2009). Only a few studies showed that extended nurse roles improved patient safety and effectiveness, and these findings may be compromised by the difficulties in distinguishing benefits relating to specific interventions from those relating to nurses' roles.

A UK review also found limited evidence of the impact of extended nursing roles on outcomes in intensive care units (Srivastava *et al* 2008), echoing the findings of two previous UK systematic reviews which focused on different settings (Sibbald *et al* 2004; Laurant *et al* 2005). Sibbald and colleagues synthesised evidence for the impact of health care workforce skill mix changes on patient and quality outcomes from 24 studies covering a range of clinical areas, including general surgery, oncology, acute and secondary care. They found limited evidence of improvements associated with extended health care practitioner roles – mostly nurses working in community rehabilitation and health promotion/education roles. The Cochrane review by Laurant and colleagues (2005) assessed evidence for the impact of shifting tasks to nurses from doctors in primary care from 16 studies and found no differences in health outcomes or costs.

Models of care delivery in maternity services

Innovative ways of working within maternity services include care pathways, protocols, home visiting and outreach programmes that offer continuity of care and continuous lay support in labour.

Care pathways and protocols

NHS policy has focused on the need for high-quality services informed by evidence of best practice, and care pathways are emerging as an effective tool for improving clinical and organisational performance. Pathways and protocols to standardise care and support implementation of evidence into practice have now been introduced across the service, with limited evidence of impact.

In Italy, researchers used a pre- and post-implementation analysis model to evaluate the effect of introducing a care pathway for childbirth in a study of 380 women (Marchisio

et al 2006). Key outcome indicators and costs were reviewed to compare traditional care processes with those set out in the pathway. They found a significant reduction in episiotomy rates and an increase in satisfaction in women cared for with a pathway approach, but no differences in caesarean section and perineal wound rates. The average costs per pathway patient were slightly higher at €1,278.42 (£873.64) than those for traditional care, at €1,146.87 (£783.74).

UK researchers carried out a multi-site case study evaluation to assess the impact of care pathways and protocols on clinicians, service users and service delivery (Bick *et al* 2009). One of the five sites was a midwifery-led birth centre, which had implemented an adapted version of the All Wales Clinical Pathway for Normal Birth. The researchers found the pathway had led to a number of benefits, including increased confidence by midwives in their skills to support normal birth, and promotion of team working. Some unintended consequences included poor documentation of care in labour and a negative impact on working relationships with other midwives and doctors.

Examples of Productive Ward implementation

The NHS Institute for Innovation and Improvement provides leaders' guides and support modules for organisations seeking to make improvements in accordance with the Productive Ward (PW) 'releasing time to care' initiative. This aims to improve ward processes and environments in such a way that staff have more time to spend on patient care, so improving safety and efficiency. A case study report of implementation in antenatal maternity services can be seen at www.institute.nhs.uk/quality_and_value/productivity_series/productive_ward.html.

PW initiatives were reported by two trusts with the aim of enabling midwives to spend more time on direct care of women and, ultimately, increasing women's satisfaction.

Surrey and Sussex NHS Trust

Surrey and Sussex NHS Trust, which chose the maternity unit as a pilot ward, found a number of simple ways to release midwives' time, including:

- implementing 24-hour administrative support
- arranging voicemail for community midwives so that women didn't have to call the ward
- encouraging appropriate referral to general practitioners (GPs) rather than the ward for such routine tasks as BP checks, wound care and antibiotic prescriptions
- establishing a prominent 'ward vision' setting out bullet-point expectations of each staff role
- focusing midwife care on women who were unwell, with care of well women delegated to health care assistants (HCAs)
- appointing one leader per shift to take an overview of all activity
- allowing three visitors per bed (including partner/carer) instead of two
- cutting down on discharge time by operating a group discharge system.

continued overleaf

Examples of Productive Ward implementation *continued*

Ongoing audit of these activities has shown the following benefits:

- the percentage of midwife time spent on direct care has increased from 32 per cent to 50 per cent over seven months
- complaints from women about visitor restrictions have been reduced from 11 to 0 over three months
- staff team members feel more supported
- no additional costs have been incurred.

One key learning point is that small changes can have a big impact. Another is that staff are often the best judges of what would make them more efficient. In this trust, HCAs were made responsible for planning how mealtime schedules could be better organised and they designed an effective system to make sure every woman was offered something to eat. It is important to build staff feedback about how the changes are working into the system, with a view to making continuous improvements.

Eleven o'clock stop

Brighton and Sussex University Hospitals Trust implemented an 'eleven o'clock stop' scheme as part of the PW initiative. This aimed to reduce the rate of re-admission to the postnatal ward and reduce midwife time spent on discharge. Babies and mothers were being routinely re-admitted for problems like feeding difficulties and dehydration because of a presumed shortage of community midwives. Under the scheme, mothers and their partners are given training on a range of issues, including breastfeeding technique and postnatal problems, by a midwife and a nursery nurse at 11am on the day of their discharge. No additional costs are attached to these sessions, for which attendance rates are currently running at 100 per cent. A linked research project by an advanced neonatal practitioner has shown a threefold reduction in numbers of babies re-admitted to the postnatal ward, coupled with speedier re-admissions where necessary.

The 'eleven o'clock stop' scheme is being further developed as a 'call us back service', whereby mothers or babies with problems are identified before discharge and given a card with a number to call in case of any difficulties.

Midwife-led versus medically led care

A Cochrane review compared midwife-led care with other models of care (medically led and shared) in 11 trials involving 12,276 women at low and medium risk (Hatem *et al* 2008). Midwife-led care is defined as where 'the midwife is the lead professional in the planning, organisation and delivery of care throughout pregnancy, birth and the postpartum period'; medically led care refers to a model of care where an obstetrician or physician provides the majority of care; and 'shared care' refers to a model of care where the lead professional changes (usually between the obstetrician/physician and midwife) depending on whether the woman is pregnant, in labour or has given birth and according to place of birth. It should be acknowledged that risk is dynamic and it can be difficult to sort women into risk categories. Of course, women can be transferred should risk escalate.

This review found that midwife-led care was associated with several significant benefits for mothers and babies, and no adverse effects. Women receiving midwife-led care were less likely to experience antenatal hospitalisation, regional analgesia, episiotomy and instrumental birth and they were more likely to experience spontaneous vaginal birth, feel in control during childbirth, be attended at birth by a known midwife and initiate breastfeeding. Women whose care was led by midwives were also less likely to experience fetal loss before 24 weeks' gestation, while their babies tended to be discharged sooner. There were no significant differences between the groups in rates of later fetal loss or neonatal death, or in overall fetal/neonatal death rates.

Continuity of care

There is limited evidence that examines continuity of care specifically, although it is often an implicit element of midwife-led care (see section above).

A study comparing care by regular and on-call obstetricians found that women attended by the latter had higher rates of caesarean section and third- or fourth-degree tears, but lower episiotomy rates, with no differences in the rate of instrumental births (Abenheim *et al* 2007). The increased caesarean rate in the on-call group happened mainly in the first stage of labour because of concerns over fetal heart traces. The effects were not modified by time of day. These results suggest that continuity of care might have an impact on outcomes.

The results of a sub-group analysis of a Cochrane review comparing midwife-led care with shared or medically led care, as defined above, suggested that continuity of care provided through a caseload midwifery model had an impact on outcomes (Hatem *et al* 2008). The study found that women considered at high risk cared for under a caseload midwifery model were significantly less likely to lose a baby at 24 weeks or later or have babies with five-minute Apgar score of less than seven. Sub-group analyses must always be interpreted with caution because of the risk of bias.

Other reviews suggest that continuity of care can contribute to better outcomes. For example, a comparison of the outcomes of caseload midwifery, provided as primary health midwifery care (PHMC) and standard hospital care in low-risk women in Sydney, Australia, found reduced rates of interventions for multiparous women receiving PHMC (Johnson *et al* 2005). A higher proportion of primiparous and multiparous women receiving PHMC had pethidine during labour. The primiparous women receiving PHMC underwent fewer episiotomies and, although there was an increase in perineal tears, the combined perineal trauma rates were similar for both care models. Similar (very small) numbers of infants in both parity groups and both care models had Apgar scores of less than seven at five minutes and were admitted for intensive or special care. Within the limitations of its design (with no factors controlled for), this study supports the safety and effectiveness of the primary health care midwifery model.

Continuous support in labour

Historically, women have been attended and supported by other women during labour, and concerns about the dehumanisation of birth experiences in some parts of the world have led to calls for continuous support by women for women during labour. A Cochrane review assessed the effects of continuous support on mothers and their babies (Hodnett *et al* 2007). The researchers also wanted to know whether these effects were influenced by any of the following factors:

- routine practices in the birth environment that might affect women's autonomy, freedom of movement and ability to cope with labour
- the status of the care-giver – ie, staff or otherwise
- whether the support began early or late in labour.

The researchers found that women who had continuous intrapartum support were more likely to have slightly shorter labours and spontaneous vaginal births than those without continuous support. They were also less likely to have caesarean sections or intrapartum analgesia or to report dissatisfaction with their childbirth experiences.

In about half the trials included in the review, the support-givers were not hospital staff members but women who may or may not have had special training; in general, continuous intrapartum support was associated with greater benefits when the provider was not on staff. Greater benefits were also seen when support began early in labour and in settings where epidural analgesia was not routinely available. However, it is important to note that in the above review women still received clinical care from a midwife or obstetric nurse, and that continuous support was in addition to, and not a replacement for, qualified staff. It is also important to note that none of the studies was UK-based and some were based in countries that do not use midwives.

Example of continuous lay support through a volunteer doula project

This project to recruit and train local women as volunteer doulas was initiated in NHS Hull by the Goodwin Development Trust in partnership with Sure Start and the local university. The women were offered 70 hours of training on issues including child protection, domestic violence, active birth and breastfeeding. The training package is now being rolled out in other areas, with local organisation and Department of Health funding.

The original aim of the project was to support vulnerable and/or isolated women (eg, teenage mothers, asylum seekers and migrant workers) from about 28 weeks of pregnancy to up to six weeks postnatal. So far 350 women in Hull have used the service and the plan is to support 100 women every year, eventually spreading the benefits to less-targeted groups. Women referred to the project are visited by team members and then matched with volunteers, who help them to make their birth plans as well as offering general support during pregnancy. The doulas then support the women through delivery and the immediate postnatal period. A formal evaluation is in progress, and so far 25 volunteers have gone on to train as midwives.

Conclusion

There is limited evidence about the association between staffing levels and outcomes. A small number of studies have suggested that higher levels of staffing may lead to better outcomes in maternity services. Evidence about the proportion of births occurring out of office hours and the associated risks suggests that particular attention needs to be paid to ensuring appropriate availability of experienced staff during these periods. The more prominent finding, however, is that ensuring quality and safety is not simply about absolute numbers but is also about the skill mix and deployment of those staff present. No studies have established the optimum skill mix required but there is some important learning about the need for sufficiently experienced staff and the need to deploy staff appropriately.

Evidence suggests that there is potential for task-shifting and extending roles while maintaining, and in some cases improving, outcomes. Evidence is strongest for midwives taking on extended roles and performing some of the tasks generally performed by junior doctors. However, if midwives are to take on extended roles, consideration needs to be given to how their workload should be reorganised to create time for the additional responsibility. There is also evidence from the US that neonatal nurses have potential to take on extended roles; this needs to be further explored in a UK context.

The maternity support worker role is becoming increasingly widespread and anecdotal evidence suggests it has potential to play an important part in maternity services with positive results, including greater flexibility for midwives, increased patient satisfaction and more effective use of resources. Evidence of the use of support workers in non-maternity services is equivocal and their impact on patient safety and outcomes is unclear. Evidence as to the effectiveness of support workers in maternity services is limited largely because of the plethora of titles used to describe them and the variability of tasks they perform. Some concerns have been raised about variable responsibility and accountability structures and the consequent risks around safety. The use of maternity support workers is an area that could benefit from targeted evaluation to ensure that they receive appropriate training and supervision and are deployed to the greatest effect.

In terms of different models of care delivery, midwife-led care has been shown to offer a range of better outcomes when compared with medically led and shared care for low- and medium-risk women. Continuity of care, delivered by either an obstetrician or a midwife, has also been shown to deliver favourable outcomes. One model that shows particular potential is that of caseload midwifery. The available literature suggests that this model has positive associations with safety.

Continuous support during labour has also been shown to deliver benefits in non-UK studies. The use of lay people to offer continuous support to women in labour, in addition to clinical care from a midwife or obstetrician, has been shown to offer a more positive birth experience. Further research would help to firmly establish the cost and safety implications of such lay support in the UK. The example of the doula project in Hull, although not formally evaluated, appears to be delivering positive results.

Although there is some evidence to suggest that the use of care pathways and standard protocols in maternity can yield a number of benefits, the number of studies is small and point to the potential to increase costs and to have some unintended consequences.

The implementation of the Productive Ward programme in the UK has offered maternity units the opportunity to test the impact of more streamlined processes and environments on the safety and efficiency of care. Although not yet evaluated formally, ongoing audit of one case study site suggests positive results in terms of midwives spending more time on direct care at no additional cost.

3 Resource use in maternity care

This section reviews evidence about the economics of different models of maternity staffing models, including midwife-led care and task-shifting. It recognises that, although the workforce is an important driver of cost in maternity services, it is difficult to disentangle it from other drivers, such as mode of delivery, birth setting and length of stay.

Midwife-led versus medically led care

Several studies have sought to compare the costs of midwife-led care with consultant/medically led care. The studies use a variety of methods in their costing calculations and some include elements of antenatal and postnatal care in addition to the intrapartum period. This makes it difficult to draw conclusions.

A comparative analysis of normal hospital birth in nine European countries confirmed the importance of labour costs and skill mix as determinants of total delivery costs (Bellanger and Or 2008). While medical tests and drugs accounted for only 1–10 per cent of these costs for all countries, staffing accounted for as much as 74 per cent of total costs in Germany and 63 per cent in Spain, although the equivalent figure was only 25 per cent in Italy, 28 per cent in Denmark, 34 per cent in France and 42 per cent in England. Denmark, France and England are identified as examples of countries that primarily use midwives to provide support before, during and after birth, while Germany and Spain almost always have an obstetrician present during birth, which accounts for their additional staff costs. The researchers conclude that higher nurse-to-physician ratios reduce costs because midwives and nurses are able to take on many medical tasks that would otherwise be performed by doctors.

Similar results emerged from a randomised controlled trial (RCT) carried out in Aberdeen, Scotland, where the costs of care in a midwife-led unit were compared with those incurred on a consultant-led unit in a study population of 2,844 low-risk women (Hundley *et al* 1995). The researchers identified four main cost centres: staff costs, consumables, capital costs and overheads. They calculated additional costs for setting up the midwife-led unit of £40.71 per woman – a difference mostly accounted for by the cost of providing more midwives. The researchers conclude that, while midwife-led care offers a safe and effective alternative to consultant-led care, with lower rates of intervention and equally good outcomes for babies, there are costs resulting from having a separate midwife-led unit because of the need for more midwives.

A smaller trial carried out in Quebec, Canada, compared midwife-led and physician-led care and costs for the prenatal, intrapartum and postpartum periods (Reinharz *et al* 2000). Although no significant differences were detected in terms of costs or clinical outcomes, women offered midwife-led care felt they had received a better quality of prenatal care and felt more in control of the birth.

Another trial compared the costs of a new model of midwife-led maternity care in community centres with standard care in a public hospital in Australia (Homer *et al* 2001). The overall mean cost of providing midwife-led care was \$2,579 per woman compared with \$3,483 per woman for standard care. In a sensitivity analysis, the cost savings associated with midwife-led care were maintained even when the caesarean rate exceeded that of standard care and even after excluding the costs of admission to a special care nursery. The overall savings were most likely due to more efficient antenatal care provision; but the researchers advise that moves to save costs by increasing throughput should be weighed against the implications for quality of care, since visits could become briefer and waiting times longer.

Five studies in a Cochrane review that compared midwife-led with shared or medically-led care (*see* p 22 for definitions) in 11 trials involving 12,276 women at low and medium risk (Hatem *et al* 2008) included cost data, using different economic evaluation methods. All found savings associated with midwife-led intrapartum care. In terms of postnatal care, one study suggested a higher cost for midwife-led care and another showed no difference. Although the studies were inconsistent in their approach to estimating maternity care costs, it seems there is potential for cost-saving with midwife-led care.

The impact of task-shifting

Section two of this paper identified the potential of task-shifting in maternity services. Several studies have considered the impact on costs. One review of the effects of shifting tasks to advanced practice nurses (APNs) from doctors found that cost savings are often associated with improved outcomes (Brooten *et al* 2004). The researchers cite evidence that maternity nurses are 98 per cent as productive as physicians in providing maternity care, with a lower underlying cost structure; they also order fewer tests and prescribe less medication than physicians, while offering improved satisfaction and better outcomes.

One US study included in this review compared the costs and outcomes of physician-only antenatal care with that of care shared between physicians and APNs for women at high risk because of diabetes, hypertension or preterm labour (Brooten *et al* 2001). Women cared for in a shared-care model with doctors and APNs had fewer fetal/infant deaths, fewer preterm births, fewer prenatal hospitalisations, fewer infant re-admissions and more twin pregnancies carried to term than those cared for exclusively by physicians. Although there were more postpartum admissions for women cared for in a shared model with APNs, they spent fewer days in hospital than those receiving physician-only care. In all, this model of care led to cost savings of more than 750 hospital days and almost US\$2.5 million for the 173 women in the study followed through one year after delivery. While it is difficult to draw general conclusions from this study because of its narrow inclusion criteria, and impossible to translate to the UK where care is regularly shared between midwife and doctor, it offers some evidence of the impact of task-shifting in prenatal and postnatal care.

As already stated in the previous chapter, the Cochrane review by Laurant and colleagues (2005) assessed evidence for the impact of shifting tasks to nurses from doctors in primary care from 16 studies and found no differences in health outcomes or costs.

No cost data is available for the use of lay support during labour. However, given that these individuals attend births in addition to the clinical staff, it is unclear whether they ultimately add to overall costs or yield savings. In addition, there is no strong evidence about the relative cost-effectiveness of maternity support workers.

Other cost drivers

Staffing is not the only driver of costs in maternity services. Other factors, such as equipment use, also play a part. In addition, factors such as the mode and place of birth have implications not just for costs but also for staffing requirements.

Birth setting

The delivery setting has clear implications for staffing levels and skill mix, although few studies have successfully isolated the workforce costs from other factors (such as 'hotel' costs and equipment).

One study did reflect that, while resource use for birth centres was usually lower than in hospital settings, the cost implications varied according to other factors, such as grades of staff involved (Anderson and Anderson 1999). The chief drivers for lower resource use outside hospital were lower rates of interventions and/or shorter lengths of stay. Data from a US study showed the mean cost per labour and birth to be \$3,385 in birth centres, compared with \$4,763 in hospitals (Stone and Walker 1995).

Other reviews have concluded that home birth can be a cost-effective option for low-risk pregnancies when compared to both birth centres and hospital-based care (eg, Anderson and Anderson 1999; Henderson and Petrou 2008). The cost-effectiveness stems largely from the absence of hotel costs, rather than staffing.

Mode of birth

The mode of birth is an important driver of costs and has implications for staffing. One study that looked at the economic implications of caesarean section found a lack of high-quality economic data to support the theory that caesarean section is more expensive than other modes of birth (Petrou *et al* 2001). The paper argues that staff costs incurred during labour and birth are dependent on the level and mix of staff involved, the duration of their involvement and the relevant unit costs which, in turn, depend on local practices and the wider organisation of health care services. The studies included in Petrou and colleagues' review revealed that caesarean sections are attended by larger numbers of all categories of staff than instrumental births, which are, in turn, attended by larger numbers than spontaneous vaginal births. However, it is often not clear whether this staff presence is continuous through labour and birth or intermittent. The authors call for further studies to more accurately measure staff inputs and requirements during labour and birth.

A similar review looked at a wide range of studies from various countries on the comparative economics of different birth methods (Henderson *et al* 2001). The 11 studies providing specific data on staffing costs associated with delivery found that the cost of a vaginal delivery ranged from £604 to £1,414, while that of a caesarean section ranged from £1,051 to £2,004. However, the fact that the American studies (seven of these) cited fees charged rather than actual staffing costs casts doubt on the accuracy of these figures.

Length of postnatal stay

The mode of birth has important implications for length of postnatal stay, another key driver of costs. Although the 'hotel' costs of a long length of stay are important, the staffing implications of early discharge also need consideration. Some studies have

looked at interventions that have sought to reduce length of stay and re-admission in the postnatal period.

An economic evaluation of an RCT by Petrou and colleagues compared the cost-effectiveness of early postnatal discharge and home midwife support with that of a traditional postnatal hospital stay in Geneva, Switzerland (Petrou *et al* 2004). The authors conclude that the former model offers significant cost savings without compromise to the health and well-being of mothers and babies. Women allocated to home-based care were scheduled for discharge 24–48 hours after vaginal birth, or 72–96 hours after caesarean section. They were then visited by midwives within 10 days of birth, with the number and frequency of visits determined by the needs of the family. Women allocated to hospital care were scheduled for discharge 4–5 days after vaginal birth and 6–7 days after section, with no subsequent midwife support unless clinically indicated. However, the relevance to a UK setting is limited as early discharge with needs-based care is already implemented.

The home-based care regime reduced the mean duration of hospital stay by 41 hours, while increasing the mean number of midwifery visits by 2.9. There were no significant differences between the groups in relation to re-admissions for mothers or babies, use of hospital outpatient services, community care or other non-medical resources, and time off work by partners. Home-based care reduced postnatal care costs by an average of 1,554 Swiss francs (£975 at 2010 exchange rates) by comparison with hospital-based care, mostly because of the reduction in hospital stay. A similar US programme provided home visits by nurses in the first 10 days of life. The programme was shown to improve outcomes (measured in re-admission rates of babies) while also reducing costs (Paul *et al* 2004). Although such models have potential to reduce the costs associated with a longer hospital stay or re-admission, any savings would need to be balanced against the increased midwifery or nurse requirement.

Another study looked at the impact of a hospital-based managed care intervention (CareMap) after caesarean section that involved the use of a nurse case manager to co-ordinate multidisciplinary care activities (Blegen *et al* 1995). By comparison with those offered standard care, the women in the managed care group spent 13.5 per cent less time in hospital, leading to a similar level of cost reduction. The researchers point out, though, that it is difficult to disentangle the constituent parts of such complex interventions and work out which had most impact. Again, the extra staffing implications need to be balanced against any cost savings.

Conclusion

The staffing costs of intrapartum care delivery are difficult to identify because of the complexity of disentangling not just the intrapartum element from ante- and postnatal care, but also the staffing component from associated costs, such as birth setting, mode of delivery and length of stay. A further difficulty in interpreting the evidence is that the available data comes from different national systems of maternity care, which makes direct cost comparison difficult. As such, the evidence of the financial implications of different staffing models is limited.

The available evidence, however, suggests that midwife-led models of care could provide a safe and, in many cases, cost-effective alternative to medically led intrapartum care. Task-shifting offers another possible route to cost savings. Midwives and nurses are able to take on some tasks traditionally performed by doctors, which could potentially release savings, although there is a paucity of clear evidence. There is no robust evidence about

the cost-effectiveness of maternity support workers or the use of continuous lay support in labour. The cost-effectiveness of caseload midwifery models is also unclear. Models of care that deploy staff in the community to provide postnatal care appear to be cost-effective. Such models have been shown to release savings through bringing about shorter lengths of stay. It is not clear how those savings balance against the need for greater community-based staffing capacity. It is also not clear what the implications of such a change would be for labour ward staffing levels.

4 Conclusions and recommendations

The key challenge currently facing maternity services is to improve the safety and quality of care while increasing productivity. The quality, innovation, productivity and prevention challenge (QIPP) has pointed to the need for the National Health Service (NHS) as a whole to identify £15–£20 billion of efficiency savings by the end of 2013/14, with a focus on quality, prevention, productivity and innovation.

At the same time, the health service faces workforce challenges, including the European Working Time Directive, changes in obstetric training and deployment and new maternity staffing standards set by the Clinical Negligence Scheme for Trusts (CNST). In addition, the profile of midwives means that significant numbers will retire in the near future.

Meeting these challenges will require fundamental changes in service delivery along with innovation to improve productivity and quality outcomes. There will be significant pressure to improve productivity by developing new ways of working, creating new assistant and advanced practice roles and enhancing the flexibility and adaptability of the maternity workforce.

Our scoping review of the relevant research addressed a number of workforce issues, including staffing numbers, skill mix, task-shifting and delegation, models of care and cost-effectiveness. We included studies from a range of countries, which increased the diversity of models considered, although not all of these are directly applicable to UK settings. Case studies of current innovative practice revealed that various different initiatives are being implemented but that formal evaluation is still lacking.

It should be acknowledged that this paper focuses specifically on workforce models within a range of scenarios and settings and does not consider issues of transition between units or the workforce implications thereof. In addition, it does not explore other areas in which productivity gains may be made. Staffing is only one component of productivity and gains could be looked for in other areas, for example, risk management and litigation and inappropriate or unnecessary use of caesarean sections.

Key lessons learned

Although some research from outside maternity services points to an association between higher staffing levels and better outcomes, the current financial pressures on the NHS mean that the recommended ratios of midwives to women and level of consultant cover is unlikely to be achieved in the near future. This poses challenges for maternity services in delivering a safe service to an increasingly complex population, particularly out of hours. Therefore, it is essential that maternity services examine the way in which services are delivered and the way in which different staff are deployed.

Staffing levels

The evidence linking outcomes with absolute staffing levels in maternity is mixed. More crucial than absolute numbers is the skill mix of available staff and the way they are deployed. Not using clinical staff to perform administrative or clerical work, for example, is one example where staff could be redeployed to greater effect. Providers and commissioners need to ensure that staff with sufficient experience are available when required. This is particularly important out of hours when a high proportion of births take place.

Task-shifting and extended roles

Task-shifting to midwives and nurses from doctors is one approach that holds potential. Evidence shows that midwives can take on extended roles that could involve undertaking some of the tasks traditionally performed by doctors. In addition to freeing up doctors to focus on the most complex patients, extending the roles of midwives and nurses holds potential for cost savings. The use of nurses, such as advanced practice nurses, should also be further explored in the UK, as international evidence suggests that they could play a greater role in maternity services, eg, providing neonatal cover, with potential for cost-saving.

Midwife-led care

Midwife-led care has been shown to offer benefits in terms of both outcomes and experience, with some potential for cost-saving, for low- and medium-risk women. Greater use of midwife-led care could potentially free up consultants to focus on high-risk women. It is important for midwives to work to their full scope of practice, particularly by providing care that emphasises normality and reduces unnecessary interventions.

Continuity is an important aspect of maternity care, although its association with cost-effectiveness is difficult to establish. Continuity of midwifery and obstetric care carry benefits in terms of both outcomes and costs. Some evidence suggests that continuity of midwife support delivered via a caseload model of care can offer benefits in terms of outcomes. Rearranging services around women, rather than areas of a hospital, has the potential to enhance continuity of care, with benefits for women, midwives and doctors.

Use of support workers and lay support

There is fairly widespread use, in the UK, of maternity support workers who have been deployed with a view to freeing up midwives and doctors to enable them to focus on more complex tasks. There is positive anecdotal evidence for the effectiveness of such roles but little data is available as to their numbers and deployment and formal evaluation is required to fully assess their impact. Some concerns have been raised around the variability of their responsibilities and accountability structures, and further guidance is needed to establish appropriate levels of training and supervision.

Emerging evidence also points to the use of lay people offering effective and continuous support to women throughout pregnancy, birth and the postnatal period. Such doula schemes need to be formally evaluated in order to assess their impact on outcomes and cost-effectiveness.

Gaps in the knowledge base

This review has highlighted significant gaps in the knowledge base and the need for further research and evaluation in this area. Although there is some useful evidence around certain models of care, skill mix and deployment, there is relatively weak evidence around the cost-effectiveness of the different elements. In addition, no studies have looked at how shift patterns impact on patient or staff outcomes and the costs of care. Most studies do not separate staffing levels from skill mix in terms of impacts, so it is difficult to weigh up the risks and benefits of changing either skill mix or staffing levels.

Research on the impact of shifting tasks to support workers from other health professionals is very limited. Additionally, the role of support workers in maternity care is not well understood, which leads to confusion and a lack of clarity about roles and scope of practice.

Determining adequate midwife and obstetric staffing numbers remains a significant challenge for maternity services. The Birthrate Plus (BR+) planning tool is widely used across the United Kingdom to calculate midwife staffing requirements, but more research is needed on its relationship to outcomes. Further research into the BR+ tool would be of value in exploring whether it could be developed and used for multi-professional planning.

Finally, we found a paucity of methodologically robust economic analysis. The Birthplace in England study, in particular the cost-effectiveness systematic review and modelling component, should provide much-needed evidence about the costs and outcomes associated with different birth settings, especially related to long-term costs and outcomes (www.npeu.ox.ac.uk/birthplace/component-studies/ces). Further research is needed to identify the specific staffing implications of different models, settings and modes of delivery.

Overall conclusions

In common with the rest of the NHS, maternity services face some significant challenges over the next few years. Changing demographics and rising birth rates come at a time of increasing financial constraint and continuing rising maternal morbidity rates. In order to maintain high levels of safety in the service, it is clear that significant changes need to be made to the way services are delivered. There are already pressures on midwives due to the rising birth rate and high levels of retirement from the profession and many have called for increased staffing levels. There is clearly a need for minimum levels of staffing in maternity services, but there is evidence to suggest that it is not just about absolute numbers of staff but also about *effective deployment* of existing staff.

Although much of the evidence is mixed, and some needs to be treated with caution, there are examples that demonstrate the potential to bring about productivity gains while maintaining – and in some cases improving – safety and women's experience of birth.

Our recommendations

In the light of what we have learned from this review, we make a number of key recommendations.

- Midwife-led models of care should be deployed across the service for low- and medium-risk women, with a view to providing a more cost-effective model of service delivery that releases obstetricians to focus on women with more complex needs.
- Nurses could be used more widely to free up the time of midwives and doctors.
- The role of maternity support workers should be explored. Clarity and consensus is required nationally over what the role should involve in order to ensure that robust oversight and accountability processes are established.
- The deployment of both midwives and doctors should be reviewed in out-of-hours services to ensure the availability of sufficiently experienced and senior staff.
- Continuity of care should be encouraged. The use of continuous lay support during labour, in addition to clinical care, shows potential to improve women's experience and should be further researched.
- There is a need for high-quality research into the effectiveness of new and emerging models of care where there is potential for cost savings while maintaining levels of safety. Particular areas of potential include the use of maternity support workers and doulas, and the shifting of tasks between nurses, midwives and doctors.
- Further research into the BR+ tool would be of value in assessing whether it could be developed as a multi-professional tool to allow effective planning across the different professions.

Appendix A: Definition of terms used

Adverse event: an incident that results in harm to a patient.

Adverse reaction: unexpected harm resulting from a justified action where the correct process was followed for the context in which the event occurred.

Error: failure to carry out a planned action as intended or application of an incorrect plan.

Harm: impairment of structure or function of the body and/or any deleterious effect arising there from.

Hazard: a circumstance, agent or action that can lead to or increase risk.

Health: a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Health care: services received by individuals or communities to promote, maintain, monitor or restore health.

Health care associated harm: harm arising from or associated with plans or actions taken during the provision of health care rather than an underlying disease or injury.

Injury: damage to tissues caused by an agent or circumstance.

Near miss: an incident that did not cause harm.

Patient: a person who is a recipient of health care.

Patient safety: the reduction of risk of unnecessary harm associated with health care to an acceptable minimum. An acceptable minimum refers to the collective notions of given current knowledge, resources available and the context in which care was delivered weighed against the risk of non-treatment or other treatment.

A patient safety incident: an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient.

Safety: the reduction of risk of unnecessary harm to an acceptable minimum. An acceptable minimum refers to the collective notions of given current knowledge, resources available and the context in which care was delivered weighed against the risk of non-treatment or other treatment.

Source: *The Conceptual Framework for the International Classification for Patient Safety* (WHO 2009)

Appendix B: Review method

Search strategy

The search was conducted by the Centre for Evidence and Policy at King's College, London. A defined search syntax of MeSH and free-text terms relating to workforce, skill mix, patient care and safety was applied across: Medline, Medline in Process, British Nursing Index, Health Management Information Consortium, Maternity and Infant Care, Cochrane Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), EPOC specialised register of trials, DARE, Cochrane Economic Evaluations, CINHAL, Social Policy and Practice (SPP), Social Science Citation Index, and ASSIA (see below for an example of a search strategy). This search syntax was then re-applied with an additional cluster to cover costs, and cost benefit and cost-effectiveness terms. The goal was to conduct a sensitive rather than specific search of the literature; thus search terms were of necessity kept very broad, resulting in many irrelevant studies being eliminated at the study selection phase (see below). All literature database searches were limited to the English language, and published between 1993 and January 2010. *Changing Childbirth* (Department of Health 1993) was published in 1993 and we made an assumption that this would pre-date and be a stimulus to research in this area.

Once the relevant studies were selected from the literature database search, we carried out a selective search of relevant websites. Through consultation with our stakeholders, and members of the research team and colleagues, we compiled a list of relevant websites to search. Searches were conducted of Pubmed, Google Scholar and specific websites. In an attempt to be as comprehensive as possible in our search, we also collected literature from reference lists of relevant articles, specific journal issues with related material, and suggestions from colleagues. All search hits were then uploaded into End-Note X2.01, a bibliographic reference tool.

Study selection

Because we were interested in papers that specifically examined the relationship between skill mix, deployment and safety, we excluded papers on pre-and post-qualification education and training, and staff management and human resource issues such as recruitment and retention and job satisfaction – although we acknowledge that these areas also need to be taken into consideration. We generated a list of more than 4,089 abstracts. For inclusion in the scoping review, the abstracts had to indicate that the articles contained: original research (including systematic reviews) on the relationship between staffing, skill mix and staff deployment and safety and health outcomes. Excluded from the review were commentaries, editorials and research conducted in low-income countries. Three authors screened abstracts (LC, JS, ES) independently with double checking of a random sample.

Example of a search strategy

Database	Medline 1950 to February Week 3 2010
Host	OVID
Strategy	<ol style="list-style-type: none"> 1. child birth.mp. or \$Infant, Newborn/ 2. exp Parturition/ 3. exp Delivery, Obstetric/ or delivery/ or (child or infant and (delivery)).mp. 4. postnatal care.mp. or Postnatal Care/ 5. prenatal care.mp. or Prenatal Care/ 6. (Cesarean\$ or Cesarian\$).mp. 7. Cesarean Section/ 8. or/1-7 9. midwif\$.mp. or Midwifery/ 10. nurse midwife.mp. or Nurse Midwives/ or midwife\$.mp. 11. exp Maternal Health Services/ or maternity service.mp. 12. named midwif\$.mp. 13. labour ward or labor ward.mp. or “Obstetrics and Gynecology Department, Hospital”/ 14. Maternity Support Worker\$.mp. 15. Triage midwif\$.mp. 16. physician assistant.mp. or Physician Assistants/ 17. nursery nurse.mp. 18. operating theatre staff\$.mp. 19. obstetrician\$.mp. or ob adj gyn.mp. 20. Obstetrics/ or (Obstetrics or Private obstetrics).mp. 21. Gynaecologist.mp. 22. \$Community Health Services/ or community care services.mp. 23. trained volunteer\$.mp. 24. doula\$.mp. 25. (relative or partner or husband or father or family\$ or grandparent\$ and (delivery\$ or assist\$)).mp. 26. or/9-25 27. (human resources\$ or HR department).mp or \$Personnel Administration, Hospital/ 28. (workforce\$ or work force\$ or work load\$ or workload\$).mp. 29. skill\$ or skill mix.mp. 30. Training.mp. 31. Education, Professional, Retraining/ or retraining or reskilling.mp. 32. deployment.mp. or workforce deployment.mp. 33. “Personnel Staffing and Scheduling”/ 34. (roster or shift\$ or rota\$).mp. 35. (on call or off duty and (rota)).mp. 36. teamwork\$ or team work\$.mp. 37. (staff ratio or staff adj patient ratio or staff-patient ratio\$).mp. 38. Substitution.mp. 39. (labor ward or labour ward and (consultant cover or doctor cover)).mp. 40. or/27-39 41. (care and (caseload\$ or case load\$ or case management or postnatal or post natal or one adj one or post partum)).mp. 42. role/ or professional role/ or midwif\$ adj role.mp. 43. or/41-42 44. exp Safety/ or Safe\$.mp. 45. patient safety.mp. 46. healthcare quality.mp. or “Quality of Health Care”/ 47. Patient Satisfaction/ or Patient Satisfaction.mp. or patient experience.mp. 48. experinece.mp. 49. or/42-48 50. (impact\$ or effect\$ or outcome\$ or evaluat\$ or efficiency\$ or productiv\$ or skill mix).mp. 51. 8 and 26 and (40 or 43 or 49) and 50 52. Limit 51 yr= “1993 – Current” 53. Limit 52 to (English language and humans)
Results	2221

Search results

Following screening, we sourced the full papers on 241 abstracts as some papers report different aspects from the same study. With the general health care literature, we included only reviews and studies published since 2008. We initially obtained all the papers relating to maternity care. To be eligible for inclusion in the review, study designs were assessed using EPHPP assessment criteria for quantitative studies (www.nccmt.ca/uploads/registry/QATool.pdf) and CASP criteria for other study designs and reviews (www.phru.nhs.uk/pages/phd/resources.htm). We included systematic reviews from the Cochrane Library but did not seek or review the individual studies used in the systematic review as this was reported already. This left us with 111 papers, which were then classified into thematic areas: general workforce and skill mix; maternity models of care; maternity skill mix; maternity staffing and economics.

Table B1 Identified papers by thematic focus

Thematic area	Number of papers excluded	Number of papers following quality assessment
General workforce staffing and skill mix	23	58
Maternity	102	35
Economics	5	18
Total	130	111

Innovative practice: approach to data gathering

Because innovation in practice is often one step ahead of the published literature, part of the review involved gathering case examples of different approaches to the challenges facing maternity services. Below is a brief description of the approach taken to identifying the examples used in this paper.

It was important to make contact with stakeholders at the beginning of the review process, and their early involvement allowed us to seek guidance about the research question and areas of focus, thus optimising the relevance of the results.

Two advisers from the Royal College of Obstetricians and Gynaecologists (RCOG) and Royal College of Midwives (RCM) helped to define the initial question and scope of the review. They also commented on the search strategy and sample of stakeholders and acted as critical readers of the final report.

The following 39 stakeholders were contacted in order to elicit information about innovation in relation to staff deployment, skill mix and safety strategies:

- strategic health authority maternity leads (10)
- local supervising authority midwifery officers (10 regions)
- The King's Fund Safer Birth Initiative leads (7)
- RCOG regional college advisers with a remit for quality and safety (12).

Many of these either failed to reply or had no relevant information to offer; but the initial contacts generated a further 58 leads. The individuals concerned were invited to share their learning about innovative ways of working that optimised workforce

deployment. In the end we received a total of 42 responses, of which 14 referred to relevant changes whose impact had been, or was being, assessed. More detail was gathered from these contacts through semi-structured telephone interviews, of which summaries are given in the text of this paper.

Innovations at regional level included:

- development of support worker roles in a range of settings
- a volunteer doula project
- use of nurses in pre- and post-operative care for caesareans.
- introduction of the Productive Ward programme in maternity.

Assessment of most of these projects was ongoing.

Appendix C: List of organisations included in the targeted website searching

Europe

European Centre for Health Policy

World Health Organization

United Kingdom

The King's Fund

National Institute for Health and Clinical Excellence

Health Foundation

Department of Health

Skills for Health Healthcare Workforce Portal

Royal College of Obstetricians and Gynaecologists

Royal College of Midwives

United States

US Agency for Healthcare Research and Quality

Appendix D: NHSLA Clinical Negligence Scheme for Trusts (CNST) Standards

NHS organisations that provide labour ward services are subject to assessment against both the NHSLA Acute (or PCT) Standards and CNST Maternity Standards. All the NHSLA Standards are divided into three 'levels': one, two and three. NHS organisations that achieve success at level one in the relevant standards receive a 10 per cent discount on their CNST and risk-pooling schemes for trust contributions, with discounts of 20 per cent and 30 per cent available to those passing the higher levels. The CNST Maternity Standards are also divided into three levels and organisations successful at assessment receive a discount of 10 per cent, 20 per cent or 30 per cent from the maternity portion of their CNST contribution. Standards relating to staffing are reproduced here.

Standard 1 – Criterion 3: Staffing Levels (Midwifery & Nursing Staff)

The maternity service has approved safe staffing levels for all midwifery, nursing and support staff, which are in line with *Safer Childbirth* (RCOG 2007) recommendations and are implemented and monitored.

Level 1 Minimum Requirements

- 1.1.3 The maternity service has approved documentation governing safe staffing levels for all midwifery, nursing and support staff, which as a minimum must include a description of the:
- midwifery, nursing and support staff groups utilised by the maternity service in all care settings
 - availability of an experienced midwife coordinator for each shift on the labour ward
 - required staffing levels for all midwifery, nursing and support staff for each care setting (which should be calculated using the figures identified in Table 6 of *Safer Childbirth* (RCOG 2007))

In addition, the maternity service is required to provide:

- an annual audit of midwifery, nursing and support staff staffing levels in the maternity service to establish whether they are in line with the recommendations in *Safer Childbirth* (RCOG 2007)**
- business plan(s) which reflects the result of the annual audit to address staffing shortfalls, if any***
- contingency plan(s) to address ongoing staffing shortfalls, if any***
- contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness**

The maternity services' approved documentation governing safe staffing levels for all midwifery, nursing and support staff, must also include a description of the:

- process for monitoring compliance with all of the above requirements, review of results and subsequent monitoring of action plans.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

Standard 1 – Criterion 3: Staffing Levels (Midwifery & Nursing Staff) *continued*

Level 2 Minimum Requirements

2.1.3 The maternity service can demonstrate implementation of the approved documentation governing safe staffing levels for all midwifery, nursing and support staff, in relation to the:

- annual audit of midwifery, nursing and support staff staffing levels in the maternity service to establish whether they are in line with the recommendations in *Safer Childbirth* (RCOG 2007)
- business plan(s) which reflect the results of the annual audit to address staffing shortfalls, if any*
- contingency plan(s) to address ongoing staffing shortfalls, if any*
- contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

Level 3 Minimum Requirements

3.1.3 The maternity service can demonstrate that it is monitoring compliance with the approved documentation governing safe staffing levels for all midwifery, nursing and support staff, in relation to the:

- annual audit of midwifery, nursing and support staff staffing levels in the maternity service to establish whether they are in line with the recommendations in *Safer Childbirth* (RCOG 2007)
- business plan(s) which reflect the results of the annual audit to address staffing shortfalls, if any*
- contingency plan(s) to address ongoing staffing shortfalls, if any*
- contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

Where the monitoring has identified deficiencies, there must be evidence that recommendations and action plans have been developed and changes implemented.

Rationale: Assessments of current and future workforce requirements should be made locally to identify the number and experience of staff required to provide appropriate and safe cover in all care settings. Appropriate staffing levels and skill mix across all midwifery, nursing and support staff are essential for providing a safe maternity service.

References:

Department of Health (2007). *Maternity Matters: Choice, access and continuity of care in a safe service*. London: COI. Available at: www.dh.gov.uk

Royal College of Anaesthetists, Royal College of Midwives, Royal College of Obstetricians and Gynaecologists, Royal College of Paediatrics and Child Health (2007). *Safer Childbirth: Minimum standards for the organisation and delivery of care in labour*. London: RCOG Press. Available at: www.rcog.org.uk

Royal College of Midwives (2009). *Guidance Paper on Staffing Standards in Maternity Services*. London: RCM Press. Available at: www.rcm.org.uk

Royal College of Obstetricians and Gynaecologists, Royal College of Anaesthetists, Royal College of Midwives, Royal College of Paediatrics and Child Health. (2008). *Standards for Maternity Care: Report of a Working Party*. London: RCOG Press. Available at: www.rcog.org.uk

Standard 1 – Criterion 4: Staffing Levels (Obstetricians)

The maternity service has approved safe staffing levels for prospective consultant obstetrician presence on the labour ward, which are in line with *Safer Childbirth* (RCOG 2007) recommendations and are implemented and monitored.

Level 1 Minimum Requirements

1.1.4 The maternity service has approved documentation, governing prospective consultant obstetrician presence on the labour ward, which as a minimum must include a description of the:

- a. consultant obstetricians utilised on each labour ward
- b. established prospective consultant obstetrician presence on each labour ward (which should be calculated using the figures identified in Table 8 of *Safer Childbirth* (RCOG 2007))
- Pilot** c. **requirement for a consultant obstetrician’s attendance in person in the following clinical situations:**
 - a. eclampsia
 - b. maternal collapse (such as massive abruption, septic shock)
 - c. caesarean section for major placenta praevia
 - d. postpartum haemorrhage of more than 1.5 litres where the haemorrhage is continuing and a massive obstetric haemorrhage protocol has been instigated
 - e. return to theatre – laparotomy
 - f. when requested

In addition, the maternity service is required to provide:

- d. an annual audit to establish whether prospective consultant obstetrician presence on each labour ward is in line with *Safer Childbirth* (RCOG 2007)
- e. business plan(s) which reflect the results of the annual audit to address staffing shortfalls, if any*
- f. contingency plan(s) to address ongoing staffing shortfalls, if any*
- g. contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness

The maternity services’ approved documentation governing prospective consultant obstetrician presence on the labour ward, must also include a description of the:

- h. process for monitoring compliance with all of the above requirements, review of results and subsequent monitoring of action plans.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

Standard 1 – Criterion 4: Staffing Levels (Obstetricians) *continued***Level 2 Minimum Requirements**

- 2.1.4 The maternity service can demonstrate implementation of the approved documentation governing prospective consultant obstetrician presence on the labour ward, in relation to the:
- requirement for a consultant obstetrician's attendance in person in the following clinical situations:
 - a. eclampsia
 - b. maternal collapse (such as massive abruption, septic shock)
 - c. caesarean section for major placenta praevia
 - d. postpartum haemorrhage of more than 1.5 litres where the haemorrhage is continuing and a massive obstetric haemorrhage protocol has been instigated
 - e. return to theatre – laparotomy
 - f. when requested
 - annual audit to establish whether prospective consultant obstetrician presence on each labour ward is in line with *Safer Childbirth* (RCOG 2007)
 - business plan(s) which reflect the results of the annual audit to address staffing shortfalls, if any*
 - contingency plan(s) to address ongoing staffing shortfalls, if any*
 - contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

The assessor will select two clinical situations from the above list at random to assess the maternity service's compliance with the first minimum requirement.

Level 3 Minimum Requirements

- 3.1.4 The maternity service can demonstrate that it is monitoring compliance with the approved documentation governing prospective consultant obstetrician presence on the labour ward, in relation to the:
- requirement for a consultant obstetrician's attendance in person in the following clinical situations:
 - i. eclampsia
 - ii. maternal collapse (such as massive abruption, septic shock)
 - iii. caesarean section for major placenta praevia
 - iv. postpartum haemorrhage of more than 1.5 litres where the haemorrhage is continuing and a massive obstetric haemorrhage protocol has been instigated
 - v. return to theatre – laparotomy
 - vi. when requested

continued opposite

Standard 1 – Criterion 4: Staffing Levels (Obstetricians) *continued***Level 3 Minimum Requirements**

- 3.1.4 *cont.*
- annual audit to establish whether prospective consultant obstetrician presence on each labour ward is in line with *Safer Childbirth* (RCOG 2007)
 - business plan(s) which reflect the results of the annual audit to address staffing shortfalls, if any*
 - contingency plan(s) to address ongoing staffing shortfalls, if any*
 - contingency plan(s) to address short term staffing shortfalls, e.g. due to increased workload or sickness.

* Those maternity services with staffing levels in line with the recommendations from the annual audit will not be required to produce a business plan or contingency plan to address ongoing staffing shortfalls.

The assessor will select two clinical situations from the above list at random to assess the maternity service's compliance with the first minimum requirement.

Where the monitoring has identified deficiencies, there must be evidence that recommendations and action plans have been developed and changes implemented.

Rationale: Assessments of current and future workforce requirements should be made locally to identify the number and experience of staff required to provide appropriate and safe cover on labour wards. Appropriate consultant obstetrician staffing levels are essential for providing a safe service.

References:

Department of Health (2007). *Maternity Matters: Choice, access and continuity of care in a safe service*. London: COI. Available at: www.dh.gov.uk

Royal College of Obstetricians and Gynaecologists (2009). *Responsibility of Consultant On-call*. Good Practice No. 8. London: RCOG Press. Available at: www.rcog.org.uk

Royal College of Obstetricians and Gynaecologists (2009). *The Future Workforce in Obstetrics and Gynaecology*. London: RCOG Press. Available at: www.rcog.org.uk

Royal College of Obstetricians and Gynaecologists, Royal College of Paediatrics and Child Health (2008). *Children's and Maternity Services in 2009: Working Time Solutions*. London: RCOG Press. Available at: www.rcog.org.uk

Royal College of Obstetricians and Gynaecologists (2010). *Labour Ward Solutions*. Good Practice No. 10. London: RCOG Press. Available at: www.rcog.org.uk

Royal College of Anaesthetists, Royal College of Midwives, Royal College of Obstetricians and Gynaecologists, Royal College of Paediatrics and Child Health (2007). *Safer Childbirth: Minimum Standards for the Organisation and Delivery of Care in Labour*. London: RCOG Press. Available at: www.rcog.org.uk

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Source: NHS Litigation Authority, 2010 #9734, 2010/2011 Version 1 March 2010

Appendix E: Further resources

A range of organisations are supporting workforce change in maternity services and have identified a number of innovations on their websites. Although very few of these have been subject to formal evaluation, we report below on those assessed for impact.

The Child Health and Maternity Partnership

The Child Health and Maternity Partnership (CHaMP) is a national service improvement resource, with particular expertise in integrated working across health and social care (www.chimat.org.uk/champ/). It provides support for service delivery, joint commissioning, knowledge-sharing and partnership working. Its range of resources for workforce planning, including maternity e-learning and a series of maternity workforce development workshops, act as an educational tool, a practical guide to sustainable and evidence-based workforce planning, and an evaluation method. Guidance for those developing services to meet the Working Time Directive (WTD) in maternity services is also available. Findings from early Maternity Matters adopter sites are also on the website, with reported outcomes from the introduction of support workers in a range of settings including saved midwife time, reduction in the need for overtime by midwives, and better recruitment and retention in maternity services. These outcomes have also been documented elsewhere (Stout 2007).

The Children's and Maternity Services in 2009: Working Time Solutions

The NHS National Workforce Projects website also provides details of workforce change projects (www.healthcareworkforce.nhs.uk). Its broad aims were to evaluate the impact of implementing the WTD on maternity and children's services and to discover examples of good practice in order to provide guidance. One specific aim was to evaluate the effectiveness of staffing models in a range of services that aim to be compliant with the WTD in five key areas: compliance, patient safety, training, work/life balance for doctors, and finance and sustainability. Findings reported on this website suggest an association between more consultants and improved patient safety, but with cost implications. Key learning points are that solutions for individual units depend on local context and characteristics and that monitoring of WTD compliance by trainee doctors must be carried out on a regular basis.

Maternity Matters Early Adopter Sites

The national Child and Maternal Health Observatory website (www.chimat.org.uk/) provides details of local innovation, including the two examples below.

Improving intrapartum team working

Poor transfer communication between midwives and obstetricians has been linked with maternal deaths, and this project was designed to explore the inter-professional culture in the two maternity units within the East Lancashire NHS Hospitals Trust. By identifying factors that worked for and against collaboration, the idea was to produce guidelines with special emphasis on booking criteria and transfer procedures that could serve as the basis for a national standard. Although anecdotal evidence suggests that the process led to improved communication between disciplines, these conclusions are rather vague and there is no objective evidence of improved transfer or collaboration.

Maternity support workers in a stand-alone birth centre

In 2005 a new integrated model of care was introduced in Stockport NHS Foundation Trust following a full review of maternity service provision involving service users and other key stakeholders. The Corbar Birth Centre is now staffed overnight by two maternity support workers (MSWs), supported by two on-call midwives. This development of the MSW role has led to more effective use of resources and enabled midwives to work in more flexible ways. Other outcomes include positive feedback from patients and their families, job satisfaction for the support workers themselves and reduced lengths of stay in the birth centre.

References

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