



**SCOTTISH EXECUTIVE**

---

**EXPERT GROUP ON ACUTE MATERNITY SERVICES**

**REFERENCE REPORT**

**DECEMBER 2002**

**EXPERT GROUP ON ACUTE MATERNITY SERVICES - REFERENCE REPORT**

<b><u>SECTION I: BACKGROUND TO EXPERT GROUP ON ACUTE MATERNITY SERVICES</u></b>	<b>1</b>
<b><u>SECTION II: POPULATION STATISTICS AND PROVISION OF MATERNITY CARE</u></b>	<b>11</b>
<b><u>SECTION III: INTERNATIONAL COMPARISONS OF MATERNITY CARE PROVISION</u></b>	<b>35</b>
<b><u>SECTION IV: EVIDENCE RELATED TO COMMUNITY MATERNITY UNITS</u></b>	<b>40</b>
<b><u>SECTION V: RISK ASSESSMENT AND MANAGEMENT WITHIN MATERNITY SERVICES</u></b>	<b>49</b>
<b><u>SECTION VI: EDUCATION AND CLINICAL COMPETENCIES</u></b>	<b>57</b>
<b><u>SECTION VII: WORKFORCE ISSUES</u></b>	<b>69</b>
<b><u>SECTIONS IX:KEY PRINCIPLES</u></b>	<b>76</b>
<b><u>REFERENCES</u></b>	<b>84</b>
<b><u>ANNEX A: REMIT AND MEMBERSHIP OF EXPERT GROUP ON ACUTE MATERNITY SERVICES</u></b>	<b>91</b>
<b><u>ANNEX B: TABLES AND STATISTICS ON MATERNITY SERVICES IN THE YEAR 1999-2000 FOR SCOTLAND</u></b>	<b>97</b>
TABLE A.1: MATERNITY LOCATIONS IN SCOTLAND AT MARCH 2000 .....	97
TABLE A.2: NUMBER OF DELIVERIES BY NHS BOARD AND HOSPITAL .....	99
TABLE A.3: NUMBER OF DELIVERIES BY HOSPITAL AND DEPRIVATION QUINTILE.....	102
TABLE A.3A: PERCENTAGE DELIVERIES BY HOSPITAL AND DEPRIVATION QUINTILES.....	104
TABLE A.4: NUMBER OF SINGLETON DELIVERIES BY HOSPITAL AND MOTHER'S AGE ON ADMISSION.....	106
TABLE A.5: PERCENTAGE OF SINGLETON DELIVERIES BY HOSPITAL AND PARITY .....	108
TABLE A.6: PERCENTAGE OF SINGLETON DELIVERIES BY INDUCTION OF LABOUR .....	111
TABLE A.7A: PERCENTAGE OF BIRTHS BY HOSPITAL AND MODE OF DELIVERY .....	113
TABLE A.7B: PERCENTAGE OF BIRTHS BY HOSPITAL AND MODE OF DELIVERY .....	116
TABLE A.8: NUMBER OF DELIVERIES BY HOSPITAL AND GESTATION .....	118
TABLE A.9: NUMBER OF DELIVERIES BY HOSPITAL AND BIRTHWEIGHT .....	121
TABLE A.10: NUMBER OF ANTENATAL EPISODES BY LENGTH OF STAY .....	124
TABLE A.11: DELIVERIES TRANSFERRED FROM ANOTHER HOSPITAL BY TYPE OF ADMISSION, FINANCIAL YEAR 99/00 .....	127
TABLE A.12: NUMBER OF POSTNATAL EPISODES BY LENGTH OF STAY .....	128
ANNEX C: INTERNATIONAL MODELS OF MATERNITY CARE	130
ANNEX D: ADVANTAGES OF BIRTH CENTRES	135
ANNEX E: EXIT AND ENTRY EXAMPLES TO LEVELS OF MATERNITY CARE	136
ANNEX F: SUMMARY OF REPORT ON NEONATAL TRANSPORT .	145
ANNEX G: OMPETENCIES AND COURSES	148

## **SECTION I: BACKGROUND TO EXPERT GROUP ON ACUTE MATERNITY SERVICES**

### **INTRODUCTION**

1. Deputy Minister for Health and Community Care, Mary Mulligan, set up a Short Life Expert Working Group on Acute Maternity Services (EGAMS) with representation from stakeholders in maternity services to consider the implications of implementing *A Framework for Maternity Services in Scotland 2001* (the 'Framework') specifically in relation to intrapartum care. Account is required to be taken of changes within the NHS, workforce and changing maternity needs against the backdrop of deprivation and the mixture of urban and dispersed rural populations. The Group were asked to consider the method by which appropriately trained and skilled staff would provide intrapartum care in appropriate locations throughout Scotland in a safe and sustainable fashion.
2. This report is a comprehensive, evidence based, reference document, which will be available to all clinicians and other stakeholders on SHOW (Scottish Health On the Web). This reference report describes the background to the evolution of current maternity services and present service provision, identifies the appropriate criteria for care within the different care locations, identifies the skills and competencies that are required by the maternity workforce, and provides the evidence to enable the provision of a comprehensive acute maternity service in Scotland. An overview report from the Group will be published in hard copy and on SHOW.

### **Background**

3. Improvements were made within maternity care in Scotland following the 1993 Policy Review *Provision of Maternity Service in Scotland*, but progress was limited as reported in the comprehensive audit of maternity services entitled *Maternity Care Matters* in 1999.
4. There have been changes in the maternity needs of women and the provision of maternity care which have fundamental effects on future provision:
  - falling birthrate, which is projected to continue
  - mothers are having babies at a later age with a reduced family size

- medical technological advances mean that women with more complex medical problems are able to become pregnant and bear children
  - the technological capability of antenatal care has resulted in a more complex maternal-fetal caseload
  - intervention in maternity care has increased. Neonatal technical advances have resulted in sicker, smaller and more premature babies surviving
  - changing expectations of care (access, involvement in decision making, analgesia)
  - length of hospital stay has decreased with earlier discharge into the community.
5. A number of important changes within the workforce arena have implications for maternity services. The *Review of Specialist Registrar Training* by Professor Calman in 1993, the New Deal for Junior Doctors in 1991, the European Working Time Directive and the difficulties encountered in recruitment and retention of staff, and the decline of general practitioners' involvement in intrapartum care, are amongst a range of developments resulting in workforce pressures. The Scottish Integrated Workforce Planning Group Report suggested that planning for the workforce must take account of models of care provision, and *Working for Health – the Workforce Development Action Plan* (August 2002) confirmed the need to plan services and workforce together. *Future Practice: A Review of Scottish Medical Workforce* concluded that increasing specialisation and restrictions on working time make traditional patterns of medical staffing untenable. Professor Temple concluded that “all current acute service configurations need to be reviewed to test the validity and viability to sustain a high quality 24 hour service .....” He suggests that more doctors, a change in professional practices and, critically, a redesign of the NHS is required.

## **Policy Context**

6. *Our National Health: a plan for action, a plan for change* was published in December 2000. The Scottish Executive set out the plan for innovation and reform of the National Health Service in Scotland to achieve a stepwise change in the health of the Scottish people and in the quality, access and responsiveness of the healthcare system in Scotland. The then Minister of Health, Ms Susan Deacon, asked the Chief Nursing Officer to develop *A Framework for Maternity Services in Scotland* based on a comprehensive consultation with the public and professionals throughout Scotland.

7. The Scottish Executive Health Department aims to work in partnership with individuals, communities, and service planners and providers to ensure that children across Scotland receive the best possible start in life – even before birth. Maternity services, therefore, have a fundamental role to play in providing women, their partners and their babies with the care and support they need at this important time. There is the need to ensure that women receive high quality maternity care before, during and after pregnancy. The *Framework* sets out the philosophy and principles within a template to develop priorities in maternity care, challenging the National Health Service to meet the needs of women and their partners and empower professionals and public alike to rise to that challenge.

### **Remit of the Expert Group on Maternity Services (EGAMS)**

8. The Group was asked to consider national, regional and local planning of maternity services, and promote innovative approaches to intrapartum care, consistent with the principles set out in the *Framework*. This is expected to assist NHS Boards to plan and configure their acute maternity services.
9. The Group was also asked to review and summarise international approaches to intrapartum care and describe the present configuration of acute maternity services in Scotland. It was required to apply appropriate models of acute maternity care and delivery, consistent with the *Framework*, to Scottish geography and demography to ensure a patient centred, safe service, available to patients as close to their home as possible. The Group was required to describe how to maximise patient choice whilst ensuring proper assessment and safe management of risk. In addition, the Group was asked to consider the development of a regional approach to the management of high risk obstetric care, based on the hub and spoke model set out in the Acute Services Review.

The model for acute maternity services was expected to include:

- a description of the range of maternity care providers, and criteria for care in the defined levels and locations of care described in the *Framework*
- the range of professional skills required by the Scottish maternity workforce within the different levels of care, and practical proposals to achieve this
- workforce issues

- a description of midwives' role and responsibilities in midwife led services
  - recommendations to enhance the skills and responsibilities of maternity care professionals
  - identification of innovative approaches to training and education for maternity professionals
  - a description of the support services required for the development of modern maternity services in Scotland and, in particular, arrangements for transfer between services, transfer and retrieval,
10. Two subgroups were established related to risk assessment and clinical competencies. From the onset both groups worked in collaboration, sharing the same philosophy and principles and receiving feedback and notes of respective meetings. Following the initial subgroup meetings, the groups combined to work more effectively and considered the types of maternity units according to the levels of intrapartum care and neonatal care identified in tables 20 and 21 of the *Framework* (pages 7 and 11).
11. The full remit and membership of EGAMS and its subgroups is contained in **Annex A (page 91)**

### **A Framework for Maternity Services in Scotland**

12. This set out a vision and philosophy for maternity services that would provide women with a family centred, locally accessible, essentially midwife managed, comprehensive and clinically effective model of safe care, before, during and after childbirth, which reflects a multi-disciplinary integrated approach to care. Different levels of maternal and neonatal care were identified to be appropriate for care to meet the needs of Scotland's urban and rural communities. It also reiterated that pregnancies and childbirth were a normal physiological process, that women should be involved and consulted in the decision making process, that care should be safe and evidence based and risks discussed and agreed by all and be provided within the community setting when appropriate. *The attainment of a safe outcome for mother and baby was paramount.*

## LEVELS OF INTRAPARTUM CARE BY LOCATION AND CHILDBIRTH

**Table 1.1: Levels of intrapartum care by location and childbirth**

Level of care	Location of delivery	Lead carer	Clinical situation	Care need and delivery	Suggested No. of del
Ia	Home (planned)	Midwife (GP)	Normal pregnancy and labour	Suitable home facility with back-up from the Scottish Ambulance Service (paramedics) and supporting advice from a linked maternity unit	
Ib	Stand-alone community maternity unit	Midwife (GP)	Normal pregnancy and labour	Appropriately equipped midwifery unit for normal care and agreed transfer guidelines to a linked maternity unit	
Ic	Community maternity unit adjacent to non-obstetric hospital	Midwife (GP)	Normal pregnancy and labour	As Ib above. Medical staff (surgeon/GP) appropriately trained to perform emergency caesarean section	
Id	Community maternity unit adjacent to maternity unit	Midwife (GP)	Normal pregnancy and labour	As Ib above	
Iia	Consultant-led maternity unit with no neonatal facility	Consultant Obstetrician(plus midwife)	Low risk pregnancy and labour	Maternity unit care with monitoring facilities and anaesthetic cover with no access to paediatric facilities on site	<1,000
Iib	Consultant-led maternity unit with on-site neonatal facility	Consultant Obstetrician (plus Midwife)	Low to medium risk pregnancy and labour	Maternity unit care with monitoring facilities, access to anaesthetic and paediatric cover, but transferring out as required to special care baby unit or neonatal intensive care in a larger maternity unit	<1,000
Iic	Consultant-led maternity unit	Consultant Obstetrician(plus Midwife)	Low and most high risk pregnancies and labour	Full maternity unit and support services with easy access to special care baby unit/neonatal intensive care and access to adult high dependency care and adult intensive care	1,000-3,000 or more
III	Consultant-led specialist maternity unit	Consultant Specialist in Maternal Fetal Medicine(Midwives /others)	Complex and high risk pregnancies and labour	As for level Iic, but with on-site neonatal intensive care and access to neonatal surgery and adult intensive care	>3,000

A summary of the main principles and key points outlined in the *Framework for Maternity Services* is set out below.

### Information and communication (Principles 23-27)

13. There must be an appropriate and comprehensive Maternity Services Database to inform current practice and future development, both locally and nationally. This should be underpinned by a comprehensive standardised national multi-professional woman-held maternity record, covering all aspects of maternity care. Public and professional consultation should be fundamental to service design and provision. Women of reproductive age should have easy access to evidence-based information as well as to all



services relating to any aspect of reproductive healthcare. A system of advocacy should be developed. The use of telemedicine technology should be developed, especially in remote and rural and isolated communities, both for communication, service provision and continuing and further education. All professionals must be adequately trained to ensure high quality verbal and written communication between women, their families and all carers involved in all aspects of maternity care to ensure team working and a sensitive approach when complex issues arise.

### **Service organisation and provision (Principles 18-21)**

14. Maternity care should be organised to provide a comprehensive, clinically effective and safe, flexible, integrated, multidisciplinary, seamless and accessible service tailored to meet the needs of women and their families, within a safe and secure environment. Women with special needs require specific and targeted provision. Health Boards must develop Maternity Services Strategies and Local Implementation Schemes within a local and regional context, in the light of national guidance. They must ensure professional and public consultation and involvement, while developing a managerial framework covering all levels and locations of provision. Care should be based on local guidelines. Regard should be given to alternative models of care and continuity of care and carer, which also considers the needs of the workforce in terms of leadership, skills, competencies, training, education, clinical standards, accountability and audit. The specific issues of recruitment and retention and remoteness and rurality need to be considered. The Clinical Standards Board for Scotland will develop a range of maternity standards. Arrangements for the transfer of in-utero or postnatal mother and babies to a linked secondary or tertiary unit should be developed ensuring that the decision-making process is appropriately made by experienced professionals supported by agreed local guidelines.

### **Risk assessment and management (Principle 22)**

15. All health professionals must have a clear understanding of risk assessment and management to improve the quality of care, and this should be carried out in partnership with women, especially to inform their Birth Plan. NHS Trusts should develop Risk Assessment and Management Programmes for both clinical and non-clinical risk,

including review and audit, and they should develop guidelines for the management of complications arising in pregnancy.

### **Pre-conception and early pregnancy (Principles 1-3)**

16. To ensure that all women have maximal health status before, during and after pregnancy service providers must provide a comprehensive health promotion and health education programme, and ensure informed access to appropriate care is available. A service should be developed specifically for both pre-conception and early pregnancy problems.

### **Pregnancy in the antenatal period (Principles 4-8)**

17. Maternity services should provide a women and family centred, locally accessible, comprehensive, safe and clinically effective care with communication and integration between different levels and locations of care. The majority of antenatal care is low risk and should be midwife managed, with where relevant GP involvement and the appropriate incremental care being provided by secondary and tertiary care providers. This should be developed considering the RCOG Three Level Tiered Model based on risk assessment and locally developed guidelines. Women's needs should be holistically assessed with appropriate and easy access to all care providers. There should be a comprehensive antenatal diagnostic and screening service. The parent education and health promotion programme should be comprehensive and partners should be encouraged to take an active role throughout pregnancy.

### **Childbirth (Principles 9-11)**

18. Women have the right to be involved in the decision-making process when choosing how and where to give birth. This should be supported by comprehensive, high quality information and evidence-based clinical advice regarding all aspects of obstetric, neonatal and anaesthetic care, including risk and geographical factors. Maternity services, including all aspects of obstetric, neonatal, anaesthetic and other specialist services, should provide a fully integrated service, responsive to the needs of the mother and baby. When planning the locations for childbirth, the Royal College of Obstetricians and Gynaecologists (RCOG) Three Level Tiered Model approach to incremental care should be considered as previously identified (see Table 1.1, page 7).

19. All locations of delivery should be developed within a local and regional geographic network of care with guidelines for escalating levels of intrapartum care and transfer. There should be agreed entry and exit criteria for intrapartum care within all locations. One to one midwifery care should be given to all women in labour and childbirth to ensure individual attention and support, preferably with continuity of carer. The full range of midwifery and obstetric care should be available in all secondary and tertiary centres. Planned home births should have a comprehensive and agreed Individual Action Plan. Maternity services staff should be given appropriate support, training and education to maintain the appropriate skills and competencies to ensure that appropriate care may be given within the different levels and locations of intrapartum care. Leadership is essential in labour wards, which should have identified midwifery, obstetric, paediatric and anaesthetic leads and there should be arrangements for direct consultant involvement in the intrapartum care of high risk cases. A multidisciplinary Labour Ward Forum should be in place, which will include ongoing service monitoring review and auditing as well as multidisciplinary training.

### **Postnatal and parenthood (Principles 12-17)**

20. Maternity services should provide comprehensive, integrated, multi-professional and flexible postnatal care and support the family to facilitate successful transition to motherhood and parenthood, having regard to parental informed choice and continuity of care. The prevention and detection of ill health are crucial, especially mental health, and appropriate management of any morbidity should be provided. Acute and primary care providers should develop a Four Level Tiered Model approach to neonatal care, developed by the British Association of Paediatric Medicine (BAPM) and adapted in Table 21 of the *Framework* (see Table 1.2, page 11), ensuring that appropriate need is met, based on locally developed guidelines and transition between levels of care. Multi-professional support must be planned and provided on discharge. Services must inform and then support mothers in their choice of infant feeding, while promoting, supporting and sustaining breastfeeding as the preferred method. A debriefing of their experiences within this pregnancy should be offered.

## Levels of neonatal care by location

**Table 1.2: Levels of neonatal care by location**

Level of care	BAPM category	Location	Lead carer	Support carer	Care
I	Normal Care	Home, GP/Midwife Unit, Maternity Unit I-III	Mother + wider family	Midwife, Neonatal Nurse, Paediatrician	Advice and supervision, birth examination, vitamin K administration, discharge examination, screening programme, parental support and education
II	Special Care	Maternity Unit I-III, Postnatal Ward, Transitional Ward, Special Care Baby Unit	Midwife, Specialist neonatal nurse, Mother	Paediatrician, Midwife, Specialist Neonatal Nurse	Care and treatment exceeding normal care includes Level I care
III	Level 2 High Dependency Intensive Care	Maternity Unit II-III, Special Care Baby Unit, Neonatal Intensive Care	Paediatrician/ Neonatologist	Specialist Neonatal Nurse	Continuous skilled supervision but not as intensive as Level IV, parenteral nutrition, respiratory support, intra arterial monitoring, includes Level I care
IV	Level 1 Maximal Intensive Care	Maternity Unit II-III, Neonatal Intensive Care	Neonatologist	Specialist Neonatal Nurse, Other consultant specialities	Continuous highly skilled supervision, assisted ventilation, circulatory support, peritoneal dialysis, post-op care, intensive parental support, Includes Level 1 Care

## SUMMARY AND WAY FORWARD

*There is a consensus of opinion amongst the planners and providers of maternity care throughout Scotland that, given the constraints raised in the previous sections, the present configuration and levels of intrapartum and neonatal care are no longer sustainable in the short, medium and long term.*

21. This has arisen due to changes in the population and demographic features. Scotland has a centralised population density with some rural dispersion together with a reducing population, a falling birth rate, a reduction in family size and women having children later, thus changing the volume and complexity of intrapartum care. Maternity needs have changed as there are more complex maternal morbidities, complex and operative delivery procedures are increasing and advanced neonatal care means that ill, premature and low birthweight babies are being looked after more successfully. All maternity care professions are experiencing difficulty in recruitment and retention. Increasing demands of clinical governance and quality of care mean that it is difficult to provide an appropriately trained and competent professional workforce to provide quality of care in all the present intrapartum locations. In terms of the medical workforce, there are difficulties in future compliance with 48 hours European Working Directive. The constraints on junior doctors' working hours and implementation of the Calman recommendations on medical training, coupled with difficulties experienced in recruitment and retention and increasing demands of clinical governance and quality of care, make it increasingly difficult to provide an appropriately trained workforce to provide quality care in all the present intrapartum locations.
  
22. Progress to fully implement the *Framework for Maternity Services* in the light of recent events has not resolved the difficulties of providing safe, comprehensive and effective intrapartum care throughout Scotland. It is timely, that professionals and consumers within maternity services in Scotland have been given the opportunity to review the available evidence and advise on a way forward for intrapartum care, which will take account of the drivers for change and ensure delivery of an enhanced quality service. The findings of the Group will be addressed in the following sections of this report.

## **SECTION II: POPULATION STATISTICS AND PROVISION OF MATERNITY CARE IN SCOTLAND**

### **Introduction**

1. The analysis presented mainly covers the period of 1999-2000 as the latest complete birth cohort, as the 2000-01 provisional data have significant deficiencies. It must be noted that for much of the data described for small units, especially <400 deliveries, they are too small to be regarded as statistically significant, especially with changes over time, and much of the data refers to singleton deliveries only due to the method of collection and ease of analysis. The average Scotland-wide twinning rate for 1999-2000 was 1.36% with a range of 0.44% (CGH) to 1.82% (AMH).

### **Population**

2. In Appendix 4 of the *Framework* document, an attempt was made to estimate the future number of births in Scotland and by NHS Board. The total birth rate has been declining from 67,000 births in 1995 to 55,147 in 1999 to 53,061 in 2000, with an Information Services Division (ISD) provisional 2001 figure of 51,642. The Registrar General for Scotland reported that actually 52,527 births were recorded in Scotland in 2001, the lowest number ever recorded and a 22% fall within the last 10 years (Registrar General for Scotland, Scotland's Population 2001). Birth rates in Scotland are lower than any other country in the United Kingdom and this projection is set to continue: the rates are similar to other European countries, some of which have lower birth rates than Scotland (Spain, Italy, Germany, Austria and Greece).
3. This trend is affected by the number of women of reproductive age (15-44 years), which is expected to fall from 109,000 in 1998 to 93,000 in 2016, and also on the age-specific fertility rates. These rates have been declining in Scotland since the baby boom peak in the 1960s, is consistent with that of most European countries and is expected to continue. It has declined in all age groups with the peak of child bearing age becoming older: the peak age of fertility in the 1960s was approximately 24 years of age compared to 30 years of age now. The mean age of first pregnancy is now later (26 years in provisional 2001 data) and the completed family size has fallen from 2.63 in 1934 to 1.95 in 1955 and an

estimated 1.75 in 1999. Most women have completed their child bearing by 45 years of age and the period between first and last pregnancies has reduced.

4. There is a debate about the present plateauing of fertility rates in 20 year old women with some statisticians predicting reversion to a more normal curve (A Framework for Maternity Services in Scotland, 2001). It is impossible to predict future fertility rates with certainty. The Government Actuaries assume that completed family size will continue to fall off until the 1975 birth cohort, and then eventually level out. They also developed projections of birth numbers utilising the present period fertility rate assuming 1.75, in addition calculated rates for 1.6 and 1.4 family size. These projections have then been applied to the projected population of reproductive age women. Using the assumptions listed, the estimated number of births in Scotland per year until 2010 are shown in Table 2.1.

**Table 2.1: Estimated Total Number of Births in Scotland Utilising Different Fertility Rate Assumptions 2000-2010 in Scotland in Thousands**

Fertility Assumption	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Published GRO Projection	57	57	56	56	55	55	55	55	55	55	55
Revised GRO Projection		55	52	52	52	51	51	51	50	50	50
Age Specific Fertility Rates 1999	54	53	52	51	50	50	49	49	48	48	48
Completed Family Size 1.6	55	55	54	53	53	52	52	51	51	51	51
Completed Family Size 1.4	52	51	49	48	47	40	45	45	45	44	44

Source: ISD 2002

5. The *Framework* also projected births by individual NHS Boards on the above assumptions, and this is shown in Tables 9, 10 and 11 of Appendix 4 of the *Framework*. Although it is at an early stage, the best-fit projection appears to be the 1999 Age Specific Fertility Rates predicting 48,000 births in Scotland by 2010.

### **Birth Mapping**

6. An extensive birth mapping exercise was undertaken by ISD and GRO. This mapped the postcode of residence of women when they gave birth and related this to the actual unit of delivery. Surprisingly, this showed that in general terms, women delivered in the maternity facility within their local NHS Board area or closest specialist centre (Level IIc or III). Obviously exceptions were noted in terms of maternal choice or referral relating to reasons of specific and complex fetal and maternal morbidities.

## Live and Still Birth Deliveries by Maternity Units in Scotland

7. The different maternity units in Scotland at March 2002 by NHS Board Area, Levels of Intrapartum Care and Geographic Location are shown in Table A.1 (Annex B, page 97). A more extensive analysis of the number of deliveries by hospital and NHS Board is shown in Table A.2 identifying population estimates, recent maternity numbers, home deliveries and the levels of intrapartum and neonatal care as identified by the *Framework*. The decline in birth rate is generally reflected in all NHS Board areas, the exception being Borders and Lanarkshire.
  
8. Throughout Scotland there currently exists an informal network of different levels of provision of maternity care reflecting an evolved, tiered and geographical approach encompassing morbidity, case mix and rurality. Allocation of the units to the different levels of care is at March 2000 (Table A.2, page 99 ) but subsequently *some changes in configuration and birth numbers have already occurred throughout Scotland.*

### Level III

9. In 2002 there were **4 regional centres of Level III** consultant-led specialist maternal-fetal units, which delivered 35.3% of all deliveries and these consist of:

<b>North</b>	Aberdeen Maternity Hospital, Aberdeen
<b>South East</b>	Simpson Memorial Maternity Pavilion, Edinburgh, now Simpson Centre for Reproductive Health
<b>West</b>	Princess Royal Maternity Hospital and Queen Mother's Hospital in Glasgow



## Level II

10. There are **13 Level IIc** consultant-led maternity units, which delivered 50.3% of all births in Scotland, and these units deliver approximately 1-3,000 babies per year, although there are some large units delivering approximately 5,000 babies, but these are not specialist maternal fetal tertiary centres. There is a real variation in birth numbers and provision in the different units and *some of these have changed in recent rationalisation*:

<b>North</b>	Raigmore Hospital, Highland
<b>South East</b>	Ninewells Hospital and Perth Royal Infirmary, Tayside Forth Park Maternity Hospital, Fife St John's Hospital, Lothian
<b>West</b>	Southern General Hospital, Greater Glasgow Royal Alexandra Hospital and Inverclyde Royal Hospital, Argyll and Clyde Stirling Royal Infirmary, Falkirk Maternity Hospital, Forth Valley Wishaw General Hospital, Lanarkshire Ayrshire Central Hospital, Ayrshire and Arran Cresswell Maternity Hospital, Dumfries and Galloway

11. There are **4 Level IIb** consultant-led maternity units with onsite neonatal facilities with less than 1,000 deliveries and they delivered 5.4% of all births. These are:

<b>North</b>	Western Isles Hospital, Western Isles Dr Gray's Hospital, Grampian
<b>South East</b>	Borders General Hospital, Borders
<b>West</b>	Vale of Leven Hospital, Argyll and Clyde

12. There is only **one Level IIa** consultant-led maternity unit without onsite neonatal facilities with less than 1,000 deliveries, this being Caithness General Hospital in Highland in the north region.

13. The location of the Level III and IIc maternity units reflects the urban centralisation of Scotland's population, while the relatively large numbers of IIa, Ic and Ib facilities

highlights the dispersed remote and rural population of Scotland responding to local needs. While the 4 Level III centres apparently appropriately deliver the majority of the complex maternal-fetal case mix, it should be noted that all specialist facilities deliver a variety of care options for low risk women, which can depend on maternal choice and geographical factors. The 16 units designated as Levels III and IIc delivered 86.2% of all births, while 51.2% of all births took place in the 6 Scottish maternity units delivering more than 3,000 deliveries per year.

## Level I

14. There are **5 Level Ic** community maternity units adjacent to a non-obstetric District General Hospital (DGH) and these are:

<b>North</b>	Gilbert Bain, Shetland Balfour Hospital, Shetland Belford Hospital, Highland
<b>West</b>	Dunoon & District GH and Lorne & Islands DGH, Argyll and Clyde

15. There are now **18 Level Ib** standalone midwifery units and these are as follows:

<b>North</b>	Daliburgh Hospital, Western Isles Insch & District War Memorial Hospital, Jubilee Hospital, Kincardine O'Neil War Memorial Hospital, Chalmers Hospital, Fraserburgh Hospital and Peterhead Hospitals, Grampian Portree Hospital, MacKinnon Memorial Hospital, Highland
<b>South East</b>	Arbroath Infirmary, Montrose Royal Infirmary, Tayside
<b>West</b>	Campbeltown Hospital, Victoria Hospital, Mid Argyll Hospital, Islay Hospital, all Argyll and Clyde Isle of Arran War Memorial Hospital, Davidson Cottage Hospital, Ayrshire and Arran Dalrymple Hospital, Dumfries and Galloway

16. **Level Ia** refers to delivery in the home setting which presently accounts for <1% of all deliveries in Scotland and there is enormous regional variation.

## Deprivation

17. The number and percentage of singleton deliveries, by hospital and deprivation quintile, are shown in Table A.3 (page 102). These are derived from the 1991 census on postcode sectors and the quintiles are based on total populations. This shows a close relationship of approximately 20% for the delivery population attributable to each quintile. While there is no real variation in deprivation quintile by maternity Scotland-wide, there is a huge variation by hospital unit, closely reflecting the east-west divide and this highlights obstetric and neonatal case mix, morbidity and co-morbidities and is evident in obstetric and perinatal outcome (Confidential Enquiries into Maternal Deaths, CEMD 2001).

## Maternal Age

18. Maternal age by admission to hospital is shown in Table A.4. (page 106). This reveals that teenage pregnancies accounted for 8.9% of all pregnancies with the highest rates in IRH (12.8%) and ACMH (11.5%) and the lowest in PRI (7.1%), QMH (7.1%) and AMH (6.7%); the vast majority of teenage pregnancies were delivered in consultant-led units.

19. The age group of 20-34 year old mothers accounted for 76.3% of all deliveries with a surprisingly consistent spread throughout all maternity units. Women aged 40 years or above accounted for 2.1% of all pregnancies, with high rates noted in QMH and SMMP. Almost all elderly primigravidae were delivered in larger consultant-led units reflecting the associated morbidity.

20. The mean age of mothers at first births continues to rise and the 2001 provisional data shows the average as 26 years of age. The percentage of mothers giving birth aged >35 years above has doubled to 16.2% in the last decade, whereas the percentage of mothers < 19 years has fallen to 7.1%. Less deprived areas are associated with an older age at birth whereas the reverse is seen in highly deprived areas, once again reflecting higher morbidities and poor maternal-fetal outcome in deprived areas.

## **Parity**

21. The range of parities is similar in CMUs and consultant-led units (Table A.5, page 108). In Scotland 46.1% of deliveries were primigravidae, 47.5% were para 1-3 and 6.3% were greater than para 3. There is evidence to suggest that multi-parity (>3) or grand multi-parity is declining and that grand multiparous births are delivered in consultant-led units, again reflecting the higher associated risk.

## **Induction**

22. There is a real difficulty and variation in the coding and recording of induction, with an apparent inconsistency in the identification and differentiation of induction, repeat induction and augmentation of labour. Therefore any interpretation must be made with caution (Table A.6, page 111). The overall Scottish average induction rate is 27.6%: consultant-led unit average induction rate is 29.2% with wide variation of 42.4% (SRI), 46.0% (GRMH) and 37.8% (WIH) compared to SMMP (23.6%), FMH and BMH showing approximate rates of 23.5%. The overall CMU induction rate is 2.9% with significant variation of 33.7% (FH) and 14.5% (GBH) to most units with no inductions noted. There is generally no induction in CMUs, and the data highlights an absence of a consistent approach to induction and augmentation of labour throughout the consultant-led service in Scotland.

## **Mode of Delivery**

23. The mode of delivery by hospital is identified in Tables A.7a and b (page 113) and should be interpreted with caution, since some of the units have small numbers. The statistics do not identify either the severity of case mix and morbidity or the transfer rates of women, who were booked for low risk care, and subsequently transferred to other maternity units.

24. In Scotland, spontaneous vertex deliveries (SVD) account for 66.3% of all deliveries. With the exception of Balfour (BH) and Gilbert Bain (GBMH), which are CMUs with facilities for operative delivery, the CMU SVD rate was approaching 100%, with a few assisted deliveries recorded. The variation between consultant units is difficult to explain solely on differential case mix.

25. The overall rate of intervention in births is 33.7% (ie non SVDs) with a wide range of 42.6% (RAH), 43.4% (AMH) to 25.4% (LH) and 26.3% (CMH). The rate of vaginal breech delivery (VBD) shows a steadily decreasing rate to currently only 0.6% of all deliveries, as many units now opt for elective caesarean section following a world-wide evidence based trend, possibly associated with the ineffectiveness and low use of external cephalic version.
26. The rates of assisted vaginal delivery (forceps and ventouse combined) has stabilised to an overall average of 12.4%, with significant variation between units in the ratio between forceps and Ventouse delivery reflecting clinical preference. The range of assisted vaginal delivery varies from approximately 17% (BGH, QMH, NHs and AMH) to 6.7% (LH) and 5% (CMH).
27. The rise of caesarean section rates in Scotland reflects that observed in westernised maternity care (Expert Advisory Group on Caesarean Section in Scotland 2001), with the total Scottish caesarean section rate being 20.7% in 1999-2000 and the provisional 2001 rate being reported as 21.9% (ISD, Scottish Hospital Statistics 2002). There is a marked variation by unit, which cannot be explained wholly by case mix or morbidity from 14.9% (IRH) and 15.4% (FMH) to 24.4% (AMH), 25.6% (RAH) and 26.3% (QMH). The emergency to elective caesarean range is 13.6% to 7.4% overall, with again wide variations between units. Projection of the number of caesarean sections, using the 1999 Age Specific Fertility Rates applied to the GRO reproductive age population, while utilising the present indications for caesarean section, suggests that this trend will indeed continue to rise (Table 2.2, page 18):

**Table 2.2: Predicted Total Caesarean Section Rate in % by Years**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
20.2	20.7	21.2	21.7	22.1	22.5	22.9	23.3	23.7	24.0	24.4

Source: *ISD 2002*

28. It is noted that the main reasons for caesarean section include failure to progress, fetal distress, repeat caesarean section, breech presentation and increasingly maternal choice in the absence of any clinical indications. In mothers having a first baby > 35 years of age, caesarean sections occur in 39.8% of all cases. The overall average caesarean section rate for twin pregnancies is currently between 50% and 53%. The Expert Advisory Group on

Caesarean Section recommended evidence based practice for undertaking caesarean section, which should all be prospectively audited.

### **Episiotomy and tears**

29. There is huge variation in the incidence, coding and recording in relation to episiotomy and tears in vaginal deliveries and interpretation requires extreme caution. Of the 42,302 deliveries for which data on episiotomy status has been recorded (60% of total deliveries), 52% of these had no episiotomy, while 17.5% of vaginal births had an episiotomy, thus highlighting the data deficiencies. The consultant-led units had an average rate of 25.2% (range 8.5% to 38.8%), while the overall CMU episiotomy rate was 5.2% (range 0-19%). Of the 16,959 vaginal deliveries recorded for tears 16.5% were first degree tears or lacerations, 10.9% second degree tears and only 0.4% third and fourth degree tears combined. No third or fourth degree tears were recorded in CMUs within these returns and no transfers were required for specialist repair by a specialist centre.

### **Gestation and birth weight**

30. The details on the number of deliveries and percentages by hospital gestation and birth weight are identified in Tables A.8 and A.9 (page 118). Most deliveries in Scotland are at term with 93% being recorded as over 37 weeks' gestation in the period of 1999-2000. The overall prematurity rate has stabilised at approximately 6.9% over the last 5 years: 5.7% were 32-36 weeks, 0.8% were 28-31 weeks and only 0.4% were under 28 weeks. Similarly 90.7% of births were in the birthweight category of 2500-4499gms while 1.2% were under 1500gms, 6.2% between 1500-2499, and 1.9% were above 4500gms. It would appear that most low birthweight/very low birthweight and premature/extremely premature babies are generally being delivered in the appropriate consultant-led Level IIc and III centres, with adequate maternal and neonatal facilities nearby.

### **Admissions and length of stay**

31. The number and percentage of length of stay for ante-natal admissions are recorded in Table A.10 (page 124) - this does not include "delivery admissions", identify multiple admissions for the same pregnancy or state the reason for admission during the ante-natal period. 96.4% of all admissions are less than 4 days and there is very little variation

between units. The pattern of ante-natal admissions and discharges between maternity units is generally consistent with the regional incremental level of ante-natal care approach reflecting morbidity.

32. Table A.11 (page 127 ) illustrates deliveries transferred from another hospital around the time of labour, which generally illustrates the tiered level approach: 2.4% (1,275 deliveries) were admitted to a different maternity unit in the same provider Trust, while only 1.1% (570) were admitted from a different Trust provider unit to a more specialist unit.

33. Postnatal length of stay (Table A.12, page 128 ) has fallen over the last 10 years. In the 1999-2000 returns, 75.7% of deliveries were discharged under 4 days, 19.7% within 4-6 days and only 4.6% last over 7 days: the provisional postnatal average length of stay for 2000-01 is reported to be 3.2 days, but covers all case mix. There is a wide variation between both CMUs and consultant-led units reflecting increased postnatal stay due to rurality and case mix: increased postnatal stay is correlated with caesarean section, operative vaginal delivery, maternal co-morbidities and neonatal complications. The trend of early postnatal discharge (< 24 hours), is significantly increasing with uncomplicated deliveries and even operative or more complex births are either being discharged earlier into the community or being transferred to a lower level of maternity care facility

### **Maternal co-morbidities**

34. Adverse pregnancy outcome for mother and fetus is strongly linked to social deprivation and complications such as preterm labour, intrauterine growth restriction, low levels of breast feeding and high levels of neonatal morbidity. Women who experience such pregnancy complications are at substantially higher risk of developing cardiovascular disease in later life. In addition babies born to mothers with pre eclampsia are also at increased risk of premature delivery and being born very small. Babies which survive are maybe at increased risk of high blood pressure and diabetes in adult life. In order to minimise this cardiovascular risk much current research is focusing on the potential of maternal and fetal therapy to effectively manipulate growth of the fetus and placenta.

35. The most recent edition of “*Why Mothers Die*” (Confidential Enquiry into Maternal Deaths, 2001) highlights the relationship between social exclusion and the likelihood of maternal death. Socio-economic deprivation is associated with less effective health service use and poor health status (Williams, 1990; Townsend & Davidson 1982) and other factors which adversely influence pregnancy outcomes, such as drug abuse, also correlate with social deprivation (Hepburn & Elliott, 1997). Underlying factors which impact on maternal and child health are high levels of smoking, obesity reflecting poor diet and sedentary lifestyle. The adverse pregnancy outcome associated with socio-economic deprivation is compounded by the high psychological cost to women of living in poverty, this impacts on the health and wellbeing of the whole family.
36. Strong evidence indicates that the course of events experienced by pregnant women and their infants and young children influences development, well-being and health throughout later life. Healthy development is influenced by a variety of familial, socioeconomic and environmental factors, and by nutritional status, chronic disease and disability. All populations have critical periods of increased vulnerability during the development process that are predictive of long term health; and additionally certain populations (for example, the offspring of parents with mental illness) are at high risk throughout development. It is during these developmental periods and at times of transition that an unhealthy developmental pathway or disorder can be magnified and result in lifelong adverse consequences.
37. Disorders occurring during the early stages of the lifecycle have the potential for severe impact on individuals and families across lifetimes and generations. Examples include infertility and difficulties in early pregnancy that lead to pre-eclampsia (in 5-7% of all pregnancies) or preterm birth (6-10% of pregnancies, accounting for more than 75% of neonatal mortality and morbidity, and considerable later disability and neurological handicap). Child and youth physical and mental health problems carry a heavy burden for the affected individuals and their families. For example, at least 20% of children or adolescents have clinically important emotional or behavioural problems or chronic medical illness.



## Neonatal provision

38. Optimal neonatal care is provided by an appropriately trained team, including midwives, neonatal nurses and medical paediatricians. The neonatal workload in all maternity units includes the routine care of healthy newborn infants by appropriately trained staff within an appropriate environment, including the establishment of breast or artificial feeding. A 24 hour service for neonatal resuscitation is required for all confinements, while acute care is focused on emergency and anticipated resuscitation, attendance at high risk deliveries and the management of babies requiring special or intensive care. Both the initial acquisition of competencies and the subsequent updating and retention of skills requires to be addressed. Each unit should clearly state the level of neonatal care offered to allow mothers informed choice of the type of facility and level of care, that they wish for their babies.
39. In CMUs, complications arising in labour will require on-site resuscitation and management by midwives, or GPs where appropriate, and on occasions transfer by a midwife and paramedic to an appropriate consultant-led facility. CMUs can no longer rely on emergency back-up of neonatal and obstetric flying squads. Therefore all units providing any care to neonates must be capable of providing resuscitation and short-term support for the sick infant, whilst activating the neonatal transport system. With the increasing trend of early discharge of mothers and infants from maternity units, it is impossible to identify all neonatal morbidity within the unit setting, as conditions may only emerge once the transitional period of neonatal adjustment has been completed.
40. Optimal neonatal care, outwith the home or CMU, is best provided within an hospital setting with integration of maternity and neonatal services, supported by medical paediatrics, specialist services and a comprehensive range of support services. The configuration of present neonatal provision in Scottish consultant-led obstetric units is shown in Table 2.3 (page 26). In these consultant-led obstetric units approximately 20%-25% of deliveries are attended by a member of the neonatal team and subsequently 10%-15% are admitted to a special or intensive care cot.
41. The staffing requirements will vary depending on the unit case mix and the level of neonatal care provided. In Scotland neonatal care is experiencing a deficiency of

appropriately trained neonatal nurses and midwives due to difficulties with recruitment and retention. The reduction in junior doctors' numbers and hours has had a significant effect in maintaining neonatal and paediatric rotas.

42. Consultant-led obstetric units, isolated or at a distance from a District General Hospital with a paediatric service, present difficulties in paediatric staffing and paediatric support. In smaller units with paediatric in-patient beds, resident staff may be responsible for both neonatal and general paediatric care: these units may require the support of neonatal nurse practitioners in order to provide appropriate support to labour wards and Special Care Baby Units. The paediatric staff will vary according to the unit: in consultant-led services with a Special Care Baby Unit, the care of infants must be supervised by an appropriately trained consultant with 24 hour resident experienced junior staff.
43. With the increasing recognition of antenatal morbidity and congenital malformations by detailed fetal scanning, antenatal discussions between perinatal specialists and neonatologists will facilitate the management and delivery of these high risk infants. The immediate postnatal management of some high risk infants will only be available in a few specialist sites in Scotland: planned pre-natal intrauterine transfer remains the safest form of transfer in most cases, augmented by a neonatal transport system.
44. Regional planning of maternity services will lead to a comprehensive review of all levels of neonatal provision, both locally and regionally and should address the rationalisation of special and intensive care sites in Scotland.

**Table 2.3: Neonatal provision in consultant-led obstetric units:Scotland September 2002**

Regions by Hospital	City/Town	Approx number of deliveries	General Paeds on site	Level of neonatal care	Neonatal Surgery	Out of hours cover (trainee)
<b>I</b>						
<b>NORTH</b>						
Aberdeen Mat	Aberdeen	4,500	Y	NICU	Yes	Dedicated
Raigmore	Inverness	1,800	Y	NICU	No	Shared duties
Western Isles Hospital	Stornoway	180	Y	Normal Care	No	Con Community Paediatrician
Caithness General	Wick	150	N	Normal Care	No	GP
Dr Grays	Elgin	800	Y	SCBU	No	Shared duties SHO1
<b>SOUTH EAST</b>						
Simpson	Edinburgh	6,250	N	NICU	No	Dedicated
Borders General	Melrose	1,000	Y	SCBU	No	Shared duties
St John's	Livingston	2,500	Y	SCBU	No	Shared duties
Forth Park	Kirkcaldy	3,000	N	NICU	No	Shared (split site) duties
Ninewells	Dundee	3,000	Y	NICU	No	Dedicated
Perth Royal	Perth	1,200	Y	Normal Care	No	Shared duties
<b>WEST</b>						
Princess Royal Mat	Glasgow	4,500	N	NICU	No - close	Dedicated
Queen Mothers	Glasgow	3,500	Y	NICU	Yes	Dedicated
Southern General	Glasgow	3,000	N	NICU	No - close	Dedicated No paed inpatients on site
Royal Alexandra	Paisley	2,000	Y	NICU	No	Shared duties
Inverclyde	Greenock	1,000	Y	SCBU	No	Shared duties
Vale of Leven	Alexandria	900	N	SCBU	No	Dedicated No paed inpatients on site
Ayrshire Central	Irvine	3,500	N	NICU	No	Dedicated and or Shared
Cresswell now attached to D&GH	Dumfries	1,200	Y	SCBU	No	Shared duties
Wishaw	Wishaw	4,500	Y	NICU	No	Dedicated
Stirling Royal } Falkirk Royal }	Stirling Falkirk	1,500 1,400	Y N	NICU SCBU	No No	Shared duties Dedicated No paed inpatients on site

## TRANSPORT IN ACUTE MATERNITY SERVICES

### Existing services

45. Ambulance transport is accessed in three main ways: the 999 system, direct telephone numbers used by GPs and hospital based clinicians, and by pre-book forms sent by mail or fax to the appropriate control centre. The 999 system will result in an emergency response: direct telephone contact by a GP or hospital clinician will have a varied

response, emergency or urgent, dependent on the clinical condition of the patient. The pre-book form is used to arrange routine type journeys, most of which are conducted by the Non Emergency Service.

46. At the time of arranging ambulance transport, the control centre nearest the location of the patient is the point of contact for all of the above methods of access. Any ordering authority can contact the Air Desk, but the public do not have direct contact with this facility. The Air Desk is currently located in Aberdeen and co-ordinates all air ambulance activity across Scotland. The air fleet operates six aircraft, two rotary and four fixed wing. The two helicopters work from Inverness and Glasgow. The fixed wing planes work from Aberdeen, Kirkwall, Lerwick and Glasgow.

47. The provision of ambulance transport is currently facilitated from eight Operational Control centres serving the relevant NHS Board Areas. The following table shows the ambulance control centres and the NHS Board areas they serve.

**Table 2.4 : Ambulance Control Centres**

<b>Ambulance Control Centre</b>	<b>NHS Board Areas</b>
Edinburgh	Lothian & Borders.
Glasgow	Greater Glasgow.
Paisley	Argyle & Clyde.
Ayr	Ayrshire & Arran and Dumfries & Galloway.
Aberdeen	Grampian, Orkney & Shetland.
Inverness	Highlands & Western Isles.
Motherwell	Lanarkshire.
Dundee	Tayside, Forth Valley & Fife.

48. Land based vehicles operate from 152 locations across Scotland and are staffed by a mixture of paramedics and technicians. The ability to have a paramedic in every frontline ambulance will vary across the country depending on the staff mix within the Division. The target is to have a paramedic in every frontline ambulance in 2005.

## **Issues associated with the current configuration**

**999 Access:** Patients who use the 999 system receive an emergency response and are taken to the appropriate receiving unit. This may be the mother's chosen maternity unit or, depending on how imminent the birth is and/or the condition of the mother and the family. The crew might request back up at the scene from a midwife or flying squad, or the patient may be taken to the nearest acute receiving unit, i.e local Accident & Emergency Department, which might not have a maternity unit attached. This may have implications for the A&E Department of the nearest hospital in terms of lack of back-up obstetric, midwifery and paediatric support.

**GP or Hospital:** On deciding the need for the transfer either to hospital from home or inter-hospital, the lead clinician normally contacts the service to request transport. At this point the main factors to include in the decision making process are:

- whether the transfer is emergency or urgent
- the nature and type of journey
- the location of the patient and proposed receiving unit
- the condition of the mother and fetus/baby
- who will be accompanying the woman.

49. This process has the following difficulties:

- identifying the best mode of transport - land or air
- establishing contact with the service at an appropriate level to advise or facilitate the above
- the nature of staff mix who will be on the responding vehicle
- the type of equipment available in the vehicle
- the time that it takes to make these arrangement

50. Many ambulance staff are concerned that they may not have the necessary skills and competencies to deal with home deliveries or obstetric emergencies. The existing basic training does not fully equip them with the range of competencies they may require in the event of an unplanned birth or an obstetric emergency. Consequently, many ambulance staff request back up or they move the woman to the nearest A&E Department, which may not have any on-site maternity support. The ability to maintain relevant skills is

reduced as exposure to obstetric emergencies is low in comparison to other patient categories. This leads to a loss of skill and confidence in front line ambulance staff. Inter-hospital transfers account for a high proportion of maternity related ambulance work. Organisationally, inter-hospital transfers present concerns related to managing the resource to the location, maintaining ongoing business whilst a resource is being utilised for a protracted period of time, and the overall service time that transfers can take. Factored into this must be the time it takes for the ambulance team to return to base following the transfer.

### Existing maternity workload

51. The provision of detailed statistical information related to maternity patients is not currently available, but it is possible to obtain data related to activity and journeys by way of location, type and number.

52. In the year 2001 to 2002, a total of 6339 calls were handled under the very broad heading of 'Maternity' and although Accident & Emergency resources managed all of these, a number of the journeys would have been planned. Table 2.5 highlights the number and nature of emergency calls, with the majority originating at home

**Table 2.5: Emergency calls to SAS**

<b>Presenting Condition</b>	<b>Outside</b>	<b>Home</b>	<b>Business Premises</b>	<b>Inter-Hospital</b>	<b>Other</b>	<b>Total</b>
Gynae/Miscarriage	13	398	49	11	2	473
Pregnancy/Childbirth	68	2099	156	160	9	2493
Total						2966

**Table 2.6: Urgent calls to SAS**

<b>Presenting Condition</b>	<b>Outside</b>	<b>Home</b>	<b>Business Premises</b>	<b>Inter-Hospital</b>	<b>Other</b>	<b>Total</b>
Gynae/Miscarriage	1	359	34	148	5	547
Pregnancy/Childbirth	14	1624	90	1035	63	2826
Total						3373

53. This data may not be all-inclusive, as it only identifies cases which are 'called in' as pregnancy specific.

## **Neonatal Transport**

54. Following the Acute Services Review, Sir David Carter, the then Chief Medical Officer, commissioned Dr Phil Booth (consultant neonatologist, Aberdeen) to chair a Working Group to consider the Transport of Critically Ill and Injured Children in Scotland. The paediatric section of this report was submitted in 2000, which resulted in a centrally funded nationally co-ordinated dedicated paediatric transport and retrieval service: the Managed Clinical Network was commissioned by NSD and consists of two dedicated retrieval teams based in Edinburgh and Glasgow.
55. Due to the diversity and complexity of the provision of neonatal services in Scotland, the different needs of critically ill neonates and the significantly different manpower providers of the service compared to paediatric intensive care, a separate report on Neonatal Transport was commissioned.
56. This report was submitted to the Scottish Executive Health Department in March 2002, and the findings and recommendations were accepted. Interim funding was secured to maintain the service until April 2003. The Chairs of the 3 Regional Planning Groups have been asked to implement the recommendations of the report through the regional planning structure, to ensure that a comprehensive and integrated neonatal transport system is developed throughout Scotland, based on the recommendation of 3 Regional Transport Groupings. National Services Division are currently facilitating the development of interim arrangements on behalf of the regional planning groups. A comprehensive summary of the report is set out in Annex G (page 148 ).

## **Future plans and configuration**

57. In keeping with changing demographics and service requirements, the nature of Scottish Ambulance Service (SAS) provision has been reviewed. The review considered the role, function and location of all Operational Control centres. There is a planned restructuring of this element of the service and over the coming two years the number of centres will reduce from eight to three in the following configuration.

**Table 2.7: Future centres for operational control**

<b>Ambulance Control Centre</b>	<b>Health Board Areas</b>
Edinburgh	Lothian & Borders Tayside, Forth Valley & Fife
Paisley	Greater Glasgow Argyll & Clyde, Ayrshire & Arran Dumfries & Galloway, Lanarkshire
Inverness	Highlands & Western Isles, Grampian, Orkney and Shetland

58. These three centres will co-ordinate, manage and resource all accident and emergency activity throughout Scotland. These centres are to be referred as Emergency Medical Dispatch Centres (EMDC) and will operate a priority based dispatch system which will categorise all 999 calls dependant on individual patient needs. The non-emergency service will be delivered from 30 hospital sites, supported and co-ordinated centrally from a national planning processor in Dundee.

59. The Air Desk is also being moved to Dundee and will be called the Transport Co-ordination Centre. The Dundee EMDC will also provide a business recovery centre should any of the three main centres fail. There should be the facility for clinicians to make one call to arrange transport and this could be organised through the Transportation Co-ordination Centre (Air Desk). This would ensure that the most appropriate method of transport is identified and advice is given as to which mode best suits the journey type in relation to the condition of the patient, at which time issues relating to equipment, skills mix of crew and potential police escorts are discussed.

60. The introduction of Priority Based Despatch will help manage the emergency workload and has the potential to improve the availability of ambulances. However, this will vary by area, by time of day and by day of week.

61. It is important to ensure that the type of vehicle used best suits the transfer function. The vehicle fleet should be reviewed, but it would not be realistic to base fleet requirements only on obstetric or neonatal transfer. The Scottish Ambulance Service advises that it would be more practical to have a limited number of specialised vehicles to facilitate inter-hospital journeys.



62. The level of resource required to support any change in configuration of intrapartum care should consider the following points:

- The impact of direct access from the 999 system without midwife intervention.
- The additional service time created by longer transfer times to the appropriately identified secondary or tertiary unit.
- The impact on the Ambulance Service of a change in risk status during a pregnancy and this may be particularly relevant following trauma or acute illness.
- Additional training time may be required and this must not compromise the maintenance of operational cover.

63. Where it is likely that the ambulance staff will be part of the care team in an identified high risk birth then mothers should be given the opportunity to meet with ambulance staff and become familiar with a typical A&E vehicle. In rural areas, where transfer by ambulance may be more common, SAS propose that consideration should be given to the possibility of a named crew, similar to the named midwife standard that exists in maternity care currently.

## **Conclusion**

64. Any change to the organisation and delivery of maternity services will impact on ambulance provision and paramedical support. It is vital that the implications of providing different levels of maternity care on a regional basis are fully explored and that staff are equipped with the necessary confidence, education, skills and competencies to participate in this element of the service. Currently maternity care training for ambulance and paramedic staff is minimal and would benefit from a multi-professional approach. Furthermore, once initial skills and competencies have been achieved there should be a facility for ambulance staff to maintain these skills. Although maternity related calls account for only a small amount of total ambulance workload, it is still important to consider ways of enhancing existing service provision in emergency situations, for example through inclusion in Priority Based Dispatch.

## **ANAESTHESIA AND ANALGESIA**

65. Units should clearly state the level of service offered allowing mothers informed choice of the type of facility and level of service that they wish for the birth of their baby.

66. Obstetric anaesthesia requires specialist skill, which must be available at short notice. An obstetric anaesthetist must be skilled in central neuraxial block and emergency general anaesthesia in the pregnant patient: there is a requirement to train junior anaesthetists in safe obstetric anaesthesia and epidural analgesia. There are specific conditions in pregnancy, which make anaesthesia potentially hazardous e.g. obesity, full stomach, massive haemorrhage, sepsis and hypertensive disease. 24-hour service for anaesthesia, analgesia and resuscitation is expected in consultant obstetric units. This requires a resident consultant anaesthetist who will be on site during the working day supervising a trainee anaesthetist. Out of hours, at night and during weekends, emergency cover is currently provided by a trainee anaesthetist of at least one year's anaesthetic experience and supervision is provided by a consultant anaesthetist on call from home.

**Table 2.8: Typical Anaesthetic Workload in Level III Unit**

<b>Intervention</b>	<b>% of Total Deliveries</b>
Epidural Analgesia in Labour	20-30
Caesarean Section (Spinal/Epidural/GA)	18-25
High Dependency Care of the Sick Mother	5
Intensive Care of the Mother (with ventilatory and	0.1

circulatory life support)	
---------------------------	--

67. One in 1,000 mothers require intensive care often with life support most commonly because of haemorrhage, pre-eclampsia/eclampsia or sepsis. Mothers require access to intensive care facilities on site in a general hospital setting. High dependency care facilities should also be available in the obstetric unit for mothers with systemic illness who are sick, but not requiring intensive care.
68. Isolated consultant obstetric units at a distance from general hospitals present difficulties in terms of anaesthetic staffing and access to specialised medical or surgical care and intensive care. Smaller units with less than 3,000 deliveries per annum will share obstetric anaesthetic duties with other anaesthetic duties, e.g. general surgery emergencies or intensive care. Support services, including haematology and blood transfusion, should be available on site.
69. The reduction in service provided by trainee doctors due to training constraints (Calman) and reduced junior doctors' hours has had an impact on the ability to provide 'out of hours' anaesthetic cover in consultant obstetric units and "flying squad" rotas no longer exist.
70. CMUs (standalone or within a DGH setting without an adjacent consultant obstetric unit) are, therefore, no longer able to rely on "flying squad" backup for obstetric or neonatal emergencies. Complications in labour will require on-site resuscitation by midwives and rapid road or air ambulance transfer by a midwife and paramedic to a consultant obstetric unit.

**Table 2.9: Anaesthetic provision for obstetric care : Scotland 2002**

Regions by Hospital	City/Town	Approx number of deliveries	Anaes Cons NHDs	Epidural Service	ICU	Out of hours cover (trainee)
<b>NORTH</b>						
Aberdeen Mat	Aberdeen	4,500	10	Full	On site	Dedicated
Raigmore	Inverness	1,800	7	Full	On site	Shared duties
Dr Grays	Elgin	800	Nil	Nil	On site	No trainees
<b>SOUTH EAST</b>						
Simpson	Edinburgh	6,250	15	Full	On site	Dedicated
Borders General	Melrose	1,000	10	Obstetric or medical indication	On site	Shared duties
St John's	Livingston	2,500	10	Obstetric or medical indication	On site	Shared duties
Forth Park	Kirkcaldy	3,000	10	Full	Isolated	Dedicated
Ninewells	Dundee	3,000	10	Full	On site	Dedicated
Perth Royal	Perth	1,200	2	Full	On site	Shared duties
<b>WEST</b>						
Princess Royal Mat	Glasgow	4,500	15	Full	On site	Dedicated
Queen Mothers	Glasgow	3,500	10	Full	Isolated	Dedicated
Southern General	Glasgow	3,000	10	Full	On site	Dedicated
Royal Alexandra	Paisley	2,000	10	Full	On site	Dedicated
Inverclyde	Greenock	1,000	3	Obstetric or medical indication	On site	Shared duties
Vale of Leven	Alexandria	900	Nil	Full	On site	No trainees
Ayrshire Central	Irvine	3,500	10	Full	Isolated	Dedicated
Cresswell now attached to D&GH	Dumfries	1,200	2	Nil	On site	Shared duties
Wishaw	Wishaw	4,500	10	Full	On site	Dedicated
Stirling Royal } Falkirk Royal }	Stirling Falkirk	1,500 1,400	3 1	Full Obstetric or medical indication	On site On site	Shared duties Shared duties

*(Isolated = off site ICU)***Summary of Section II**

71. There is a huge variability in the location and levels of intrapartum maternity care provided throughout Scotland reflecting the population demands, needs and dispersion.

However, it is evident that the many identified needs of women and the subsequent provision of maternity care is now changing throughout Scotland and the provision of intrapartum care requires to be addressed.

## **SECTION III: INTERNATIONAL COMPARISONS OF MATERNITY CARE PROVISION**

### **Introduction**

1. This section provides some background setting Scottish maternity services within the international context, but is not exclusive or exhaustive. A description of a variety of international models of maternity care is contained in Annex (page 130 ).

### **Factors which influence maternity care provision**

2. *A nation's economy and social conditions* influence how much emphasis is placed on the health service and the nature of maternity care provision. Some countries place a heavier fiscal priority on areas other than health, and in countries where maternity services have a high priority, mortality and morbidity rates tend to be lower. Prosperous countries (e.g. Ireland, France, Canada, Australia) are more likely to invest in maternity services, whilst the poorer countries (such as Russia and India) may not have the resources or appropriate manpower to deliver a quality maternity service. The importance of maternity services to the public health agenda cannot be underestimated: 99% of maternal deaths occur in developing countries and, for every woman who dies, a further 30 will suffer some form of morbidity that will impact on the health of the family.
3. *Health and welfare services*: the nature, management and funding of the health service will influence the provision of maternity services. Countries such as Sweden, Norway, UK, Australia, Canada and USA tend to provide all women with a variably funded maternity service. Some countries have particular demographics or a specific philosophy of care (Sweden, The Netherlands, Canada, New Zealand), which influences how maternity services are provided. The type of maternity welfare benefit available to women and their partners impacts on maternity care provision and uptake and varies greatly from country to country: Spain and Ireland provide approximately 14 weeks of benefit and specify that at least 4 weeks of the leave must be taken prior to the birth. Alternatively, Norway provides a maximum benefit of 42 weeks at full pay or 52 weeks at 80%: this leave can be divided by the parents, but the mother must take the initial six weeks following the birth. In the UK, all employees are entitled to 18 weeks statutory maternity leave.

4. *Professional involvement and approaches to pregnancy and childbirth* differ across nations, but tends to reflect the health system and philosophical approach to pregnancy and childbirth. Where a medicalised approach to childbirth exists, the obstetrician provides the majority of care with some support from obstetric nurses or midwives during the intrapartum period and hospital stay. Midwives tend to be the lead professional where a sociological approach to birth exists, in many instances as part of a structure of combined care. Implicit in descriptions of maternity care seems to be an acknowledgement of the role of anaesthetists and paediatricians. The role and participation of the GP in maternity services is varied and may be related to education, manpower and demographics. Significant GP involvement in maternity care is only evident in countries including Ireland, UK, Finland, Holland Australia and New Zealand, although the nature of their input varies from country to country. Other medical and nursing personnel and Allied Health Care professionals play a crucial part in the delivery of maternity services, but do not tend to be acknowledged in the literature. In order to circumvent manpower problems, some countries provide maternity care courses for professionals working in remote areas.
  
5. The role of midwives and obstetricians can also differ. Most western countries now recognise the midwife as the most appropriate lead professional to deliver maternity care to low risk women and many have amended funding methods and contracts to reflect this. Others utilise specially trained nurses to provide ante- and postnatal care, whilst ensuring that midwives are the main professionals providing intrapartum care: the dilemma of achieving continuity of carer is superseded by ensuring sufficient midwifery manpower to provide skilled intrapartum care. Where there are no obstetric manpower problems, obstetricians are responsible for the majority of maternity care irrespective of the level of risk. Spain, Luxembourg and Greece have a similar number of obstetricians to midwives and, not surprisingly, the obstetricians provide the bulk of the care. The pre-requisite for maintaining clinical competencies are rarely explicit although certain countries have key criteria for maintaining registration and continuing to provide maternity care.

6. International evidence suggests that many maternity care professionals base their provision on avoiding litigation, generally through early intervention: USA and Ireland have a litigation culture, which greatly impacts on service provision and outcome.
7. *Private health care and its impact on the provision of maternity services:* in many instances, especially but not exclusively in the wealthier countries such as USA and Ireland and irrespective of the quality of State maternity care, women opt to be cared for privately. The type of private health insurance and the nature of payment, influences the choice of lead professional, the nature and philosophy of maternity care and the duration of stay in hospital. In Ireland, the UK, Australia, USA and Canada, private insurance companies identify obstetricians as the clinician to be responsible for maternity care with the insurance covering a limited postnatal hospital stay. Consequently, many midwives have a reduced role and may be no more than obstetric nurses. Intervention rates are high with early hospital discharge, usually without any form of postnatal support. Norway and Sweden provide maternity care for all women under a State health scheme with a strong focus on normality, and maternal and neonatal outcomes are good.
8. In some western countries the nature of private maternity care is the single biggest influence in the model of maternity care provision. If the private insurer specifies that the obstetrician should be the lead professional (e.g. Ireland), then it is likely that there will be a medical approach to pregnancy and childbirth irrespective of risk. Conversely, if the insurer enables the woman to choose her lead professional (e.g. Holland, New Zealand) then low risk women have the opportunity to be cared for by the professional of choice which may be midwife, GP or obstetrician. Advances in the provision of clinically effective maternity services may be hindered because of the funding model and nature of maternity care. It may be difficult to effect change in the models of maternity care provision unless accompanied by amendments to public and private pay structures and an emphasis towards women-centred care, rather than the provider driven focus.
9. *Philosophy of care and partnership working:* in countries where a medical model of maternity care predominates, intervention rates tend to be high and midwives have a diminished role, impacting on nature and quality of care provision. Midwives are in a difficult situation as they lack status, power and in some countries professional



recognition to influence change. A sociological approach to maternity care combined with a partnership working, which includes other organisations, institutions and professionals has benefits especially in terms of manpower, service provision, professional development, maternal choice and outcomes.

10. Many countries are using the available evidence to support the enhancement of midwifery roles and responsibilities, whilst others continue to have an obstetric led service. Sweden and Finland do not have an integrated midwifery service and while outcomes are good, there is a paucity of evidence related to satisfaction. Finland use skilled nurses to provide elements of ante and postnatal care with seemingly good outcomes. Countries experiencing manpower problems are seeking alternative solutions to existing models of care, including the use of maternity care assistants (Netherlands) and developing multi-professional courses for professionals involved in remote maternity care, (Canada, Australia) with enhanced referral and communication pathways and partnership working locally, regionally and nationally.
11. The review of international models of maternity care highlights the strengths and limitations of the existing models in Scotland, which has an infrastructure able to support change and service re-design. A partnership approach to care is supported, while there is a recognition that innovative working and service redesign must be seriously considered. The majority of countries put the woman at the centre of care and wherever possible provide locally accessible services, in particular for low risk women. Not all countries strive to deliver the seamless approach favoured by Scotland, nor is it possible to obtain quality outcome data thus making valid comparison difficult.

## **Summary**

12. This international 'snapshot' of maternity services provides an interesting contrast with the Scottish model of maternity care. Countries with robust outcome data such as the Netherlands, Norway and Sweden seem to have attractive models of care, but the transferability of such models to the Scottish situation is questionable due to differences in demography, culture and expectation. Comparison and evaluation of different models of maternity care is difficult due to many variables including culture,

demographics, manpower, education and funding. Many countries do not have the quality assurance mechanisms and outcome data that exists in Scotland. Countries are concerned about the increase in intervention rates and the impact that this has on public health and the subsequent health of the family. In order to sustain and build on the existing models and potential of maternity care, professionals must work in partnership developing the appropriate infrastructure, support and referral pathways to ensure a patient centred, seamless and quality of care provision.

## SECTION IV: EVIDENCE RELATED TO COMMUNITY MATERNITY UNITS

### Introduction

1. Midwifery models of care are an increasingly important development in the future configuration of maternity services in the UK and internationally. Midwifery managed units are sometimes called Community Maternity Units or Birth Centres. Within this report they will be referred to as **Community Maternity Units** (CMUs). *A Framework for Maternity Services in Scotland* recognised the unique contribution that CMUs can make to maternity services in Scotland. Models of midwifery led care include midwife services that may be free-standing, operating with or without GP input, sited within an acute or community setting or alongside a large maternity unit. This section provides a consensus of the available evidence surrounding midwifery managed units.
2. Recent obstetric and paediatric guidelines suggest annual delivery rates of >3,000 as being crucial to ensuring maintenance of clinical skills and competencies of all staff and supporting an effective and efficient neonatal intensive care unit (RCOG/RCM 1999). Centralisation of neonatal facilities and the rationalisation of management and clinical services of individual trusts has driven many of the changes in Scotland and the UK (Walsh D, 2001). Whilst there is general consensus regarding the site of antenatal and postnatal care provision, there is debate about place of birth. Some argue for centralising all births at units with over 3,000 deliveries/year where neonatal and adult intensive care facilities are readily available, whilst others support the provision of local CMUs for women with low obstetric risk. Although the majority of the available evidence is in favour of CMUs, there is some concern that, due to the relatively small numbers involved, the evidence to support or refute the safety of these units is more difficult to establish (Graham 1997). Even if better outcome data were available, the studies of women at low risk of obstetric complications and their babies have too few adverse outcomes to allow significant differences between different forms of care to be detected.
3. There is a trend in England to turn some unsustainable consultant units into CMUs (Bournemouth Midwifery Unit, Edgware Birth Centre, Trowbridge Hospital, Grantham, Goole). While these have been evaluated, figures are small making generalisation difficult. Current levels of activity in 99/00 in Scottish CMUs range from 1 to 193 deliveries per annum.

### **Promoting normality**

4. Promoting normality includes the use of available evidence to support care especially the use of skilled one-to-one midwifery care in labour. The recent study in North America to evaluate the effectiveness of continuous labour support by nurses demonstrated no difference in outcomes for women who received skilled one-to-one care or the 'normal' model of intrapartum care, however nurses in both arms of the trial followed hospital protocols which involved a high degree of intervention. The report concluded that reducing North American Caesarean Section rates and other interventions cannot be accomplished by only implementing a policy of continuous support. In order to achieve this aim all stakeholders must implement a comprehensive, multidisciplinary team approach to changing the environment in which care is provided (Hodnett et al. 2002)

### **Midwifery models of care**

5. CMUs offer a cost-effective, safe and satisfying alternative for women who are experiencing normal pregnancy and childbirth (Rosser et al 2001), and offer an opportunity for the midwife to utilise her skills and fulfil her role. The Royal College of Midwives (RCM) has defined a midwife service as one that:
  - is organised and run by midwives
  - offers midwife care for predominantly low-risk women throughout the antenatal, intrapartum and postnatal periods
  - is a discrete midwife service
  - has a midwife responsible for the service at an operational level (RCM 2000).

### **International evidence**

6. The international evidence highlights that outcomes for women who are cared for in Birth Centres (CMUs) are at least as good as for women in conventional units. The 1991 Birth Certificate data was examined for all singleton vaginal deliveries between 35 and 43 weeks gestation: after controlling for socio-demographic and medical risk factors, the outcomes for physicians and nurse-midwives were compared and demonstrated reduced CMU intervention rates and better neonatal outcomes (MacDorman, Marioan, et.al,

1998). The National Birth Centre Study (NBCS) in New York is the largest study to date and was a prospective observational survey of antenatal, intrapartum and postnatal care. It involved 84 free-standing birthing units (CMUs) and involved 12,000 women (Rooks et al, 1989, Rooks et al, 1992). A smaller prospective study of 2000 matched women of low obstetric risk, who gave birth in standard maternity hospitals, was undertaken: this study is limited due to the non-randomisation design and it included only 50% of the existing birth centres. Albers et al (1991) reviewed the outcomes of free-standing birth centres in the USA and differences in methodology, such as inclusion criteria, small samples and selection differences were identified. The paper concluded that non-hospital style birth settings have advantages to low risk women and that such settings were cheaper, there was less intervention in labour and outcomes were similar. Despite their large sample size, these studies, in keeping with other research of this nature, were not able to generalise or demonstrate significant trends.

7. The most recent publication of the systematic review of 'home-like versus conventional institutional settings for birth' (Hodnett, July 2002) involved 6 trials including 9000 women. Hodnett highlighted that substantial numbers of women were transferred to 'conventional' care antenatally, and this is consistent with other studies. Allocation to a home-like setting was associated with greater satisfaction with care, lower rates of intrapartum analgesia/anaesthesia, augmented labour, and operative delivery. There was a slight trend towards higher perinatal mortality in the home-like setting (odds ratio 1.49, 95% confidence interval 0.79 to 2.78), but this was not statistically significant. The review concluded that there are benefits from such models of care. It noted that increased support from care givers in labour may be particularly important in these settings.

### **United Kingdom evidence base**

8. Although the majority of the available evidence supports CMUs (Hodnett 2002), many professionals are still cautious. There continues to be concerns about safety. These concerns are largely due to the deficiencies in the available information and the small numbers involved in many of the studies. Graham (1997) suggests that there has not yet been a trial of midwifery managed care with significant numbers to reliably demonstrate safety on the grounds of stillbirth or neonatal death (although this is also the case for other models of care). Some small studies highlighted the effectiveness and positive

impact of small GP units in England (Young, 1987; Garrett et al, 1987; Lowe et al, 1987; Campbell 1997). Generally studies demonstrate reduced intervention, better satisfaction and similar outcomes to 'traditional' models of care. Qualitative research studies demonstrate some of the 'softer' outcomes of CMUs: women valued being in control, being able to have a safe birth, having good interpersonal relationships and being treated with dignity and respect. (Esposito, 1993). The advantages of CMUs identified from research are summarised in Table 4.1 (Annexe D, page 135 ).

## **Home birth**

9. There is much debate about the safety and appropriateness of home birth. When Zander and Chamberlain (1999) stated that 'the assumption that hospital provides a safer environment for women at low risk as well as the high risk mothers is not evidence based' much debate ensued. In a published letter to the BMJ Drife (1999) argued, based on 3 international studies (Anderson & Murphy 1995, Bastian, Keirse, Lancaster 1998, Murphy & Fullerton 1998) but discounting available UK data, that hospital delivery is now three to four times safer than home delivery for the baby in cases of normal birth. This is countered by McFarlane (1999) and Bullock (1999). They argue that between the 4 datasets comprising the 3 international studies and the CEMD 1997, there was no consistency in the definitions of categories of death, or in the overall groups of births with which the deaths were compared. In their view this invalidates any attempt to use these data to make direct comparisons between the outcomes of births in these settings.
  
10. There is sufficient UK data to support the argument, that a planned home birth is a safe option for mother and baby (Northern Regional Perinatal Mortality Survey Coordinating Group, 1996)). Over the 14 years of the studies, the risk of death during delivery or in the first four weeks of life, in a baby of normal birth weight and without a lethal abnormality, was higher in those born to the 1% of women who had booked for a home delivery (1 in 538) compared with all other such births (1 in 810). However, during the last 10 years of that period, when the midwife was always the community lead professional, mortality in this subgroup was lower in those booking for home vs hospital delivery (1 in 1890 vs 1 in 904). The overall conclusion was that the perinatal hazard associated with planned home birth in the few women who exercised the option was low and, based on confidential enquiries, mostly unavoidable. Delays occasioned by the need to arrange and effect

transfer probably contributed to only one neonatal death (Bulloch C 1999). Neither the National Birthday Trust Fund survey of 6044 planned home births in the United Kingdom (Chamberlain, Wraight, Crowley 1997) nor the prospective and retrospective studies in the former Northern Region of England (Davies, Hay, Reid & Young 1996, Northern Region Perinatal Mortality Survey Coordinating Group 1996) yielded results that would alter the key conclusion of *Where to be Born?*, which was that "there is no evidence to support the claim that the safest policy is for all women to give birth in hospital" (Campbell & Macfarlane 1994).

11. A Dutch study to investigate the relationship between the intended place of birth (home or hospital) and perinatal outcome in women with low risk pregnancies (after controlling for parity and social, medical, and obstetric background) analysed prospective data from 97 midwives and 1836 women. The results concluded that there was no relation between the planned place of birth and perinatal outcome in primiparous women, when controlling for a favourable or less favourable background. In multiparous women, perinatal outcome was significantly better for planned home births than for planned hospital births, with or without control for background variables (Wiegers, Keirse van der Zee, Berghs, 1996).
12. A meta-analysis of 6 observational studies, including 24,092 primarily low-risk pregnant women, examined the safety of planned home birth compared with planned hospital birth (Olsen & Ole. 1997). The principal difference in outcomes were a reduced frequency of low Apgar scores and fewer medical interventions in the home birth group. The study concluded that "home birth is an acceptable alternative to hospital confinement for selected pregnant women, and leads to reduced medical interventions." A Cochrane review of available evidence concluded that there is no strong evidence to favour either planned hospital birth or planned home birth for low risk pregnant women (Olsen O, Jewell MD, 2002 *last substantial amendment 1999*).

### **Assessing risk and risk management strategies for CMUs**

13. It is difficult to assess perinatal risk (Enkin, 1994; Institute of Medicine and National Research Council, 1992) and adopting a social model of childbirth will influence how risk is assessed. Nonetheless careful consideration must be given to using informed evidence

and local population profiles to develop risk assessment and management strategies. In the Wormerveer study (which excluded women booked to consultant care in Holland), the perinatal mortality rate was highest in those transferred in labour; the authors interpreted this finding to support the notion of good selection rather than an unacceptable risk to the transferred group (Van Alten, Eskes, Treffers, 1989).

14. The most recent review of 'low tech' versus conventional care in labour highlighted that caregivers and clients in home-like settings require to identify signs of maternal and fetal complications (Hodnett, 2002). If any model of midwifery managed care is to be introduced, then risk factors associated with location must be reviewed. The 5<sup>th</sup> CEMD Report UK (2001) stresses the importance of assessing, identifying and managing risk appropriately.

### **Inclusion and exclusion criteria for CMUs**

15. Establishing the clinical criteria to determine appropriate booking and transfer guidelines is the subject of much debate. There is international evidence that, the longer centres are established, the more liberal criteria become (Waldenstrom 1998). In the UK this is reflected in areas such as Edgware and Bournemouth, which have recently amended and expanded their entry criteria to its CMU adjacent to a consultant led obstetric unit. *It is important that entry and exit criteria are evidence based, agreed locally and adhered to.*

### **Transfer evidence for CMUs**

16. In the Leicester and Aberdeen trials (Hundley et al, 1994) only 46% of the women, who were randomised to deliver in the midwife managed unit, actually delivered there compared with 62% of women who booked and delivered in Bournemouth. Campbell et al (1999) argue that the adjacent proximity of the obstetric unit in Aberdeen and Leicester could affect decisions to transfer women and increases the likelihood of transfer. A common reason for transfer is for analgesia during labour, especially epidural analgesia. Evidence consistently demonstrates that the outcomes of CMUs are at least equal to consultant obstetric units.



Table 4.2: Recent data from two free standing midwifery delivery units (Scottish Level 1b equivalent)

	No. of bookings	No. of births	No. of transfers			
			antenatal	intrapartum	postnatal	
					mother	baby
Aberdare (Sept 97-Aug 98)	249	209	40 (16%)*	20 (10%)†	3 (1)†	2 (1)†
Crowborough (Apr 97-Mar 98)	331	179	109 (33%)*	17 (9)†	1	0

**Source: Zander & Chamberlain 1999** \* percentage of bookings

† percentage of births

17. An audit of women who delivered in a rural GP unit in Scotland (Stranraer) highlighted that the intrapartum transfer rate in women booked to deliver at the general practitioner unit was 12.8% (68/530); this included 18% of primiparous women (37) and 9% of multiparous women (31). The commonest reason for transfer was delay in the first stage of labour 21/68 (31%) transfers. Of the unplanned transfers in labour, 17 women had caesarean sections (25% of all transfers) and one a forceps delivery; the remaining 50 had normal deliveries. A further 68 women who were booked for consultant delivery elsewhere presented to this unit and required transfer by ambulance with midwife escort (120 km). Most of these women were considered to be in labour and represent the highest risk cases; they cause anxiety and have resource implications for the ambulance, midwife, and general practitioners (Baird et al, 1996). A study of a midwife managed unit in Norway (Holt et al, 2001) showed that of the 628 low risk women in the study, 152 (24.2%) were transferred antenatally, a further 41 (6.5%) were transferred in the intrapartum period. The study concluded that this model could be used in rural and remote areas as an alternative to centralisation of births.

### Quality of care in CMUs

18. Crucial to quality in midwifery managed care is a culture and value shift by many midwives and doctors. If birth is not treated as normal, women may not feel empowered. A recent study of home birth in Scotland highlighted that some midwives adopted the same medical model at home as they did in hospital (Edwards 2000). Professional support and development, peer review and sound midwifery supervision is central to good care. Walsh (2001) argues that all midwives should have:

- ongoing updating in evidence-based care for normal labour & birth (Walsh 2001).
- updating to maintain the necessary skills in emergency obstetric lifesaving procedures: postpartum haemorrhage; siting IV infusions; managing shoulder dystocia; Adult Advanced Life Support in Obstetrics (ALSO) and newborn resuscitation; examination of the newborn.
- systems for professional, managerial and supervisory support.
- good inter-professional communication, liaison and relationships.

19. Crucially, an effective model of midwife led care must:

- ensure appropriate guidelines and policies
- consider the available evidence, risk assessment and management processes, emergency support and backup
- set in place appropriate monitoring, data collection, evaluation and development strategies.

## Summary

20. This section has focused on intrapartum midwifery care *within Level I care, ie home delivery and CMU care*. It must be recognised that the majority of women want ‘one to one’ care in labour with a caring and competent midwife. Recent Scottish evidence suggests that women want continuity of care ante- and post-natally and to be seen by their community midwife. However, they recognise the demands of a modern day maternity service and acknowledge that, whilst in labour, trust and confidence in the midwife who will care for them throughout that labour is most important (Rennie et al, 1998).

21. The available evidence is incomplete in relation to assessing and managing risk in CMUs and specifically in relation to managing uncertainty. Furthermore, the intrapartum transfer data is minimal, evidence related to demographics, adverse outcomes during transfer and outcome of transfer are necessary to provide an overall picture of the efficacy of CMUs. The underlying tenet of maternity care provision is the recognition that pregnancy and birth are normal physiological processes, but since safety is paramount, it is implicit that care provision must be evidence based. The available evidence highlights the safety of evidence based, skilled midwifery care for low risk women and demonstrates, that there is less intervention by midwives, less analgesia is required,

women are less likely to have operative interventions or instrumental deliveries and satisfaction rates are high. Midwifery care is well evaluated and is the choice of care for many low risk women. Despite ongoing risk assessment it must be recognised, that there will be intrapartum transfer from CMUs to a higher level of maternity care for various reasons including for non emergency reasons. The percentage of transfer may be of the order of 10-20%.

## **SECTION V: RISK ASSESSMENT AND MANAGEMENT WITHIN MATERNITY SERVICES**

### **Background**

1. In recent decades the perception of risk has changed from an emphasis on the probability of risk to the current concern with danger and negative consequences (Douglas, 1990). While individuals may be aware of the potential negative consequences of engaging in risk taking behaviours, counteracting other threats may take priority (Wallman, 2000, Wallman 2001). This is particularly evident in maternity services where many women and professionals make choices about their maternity care based on a complex decision making process which includes demographics, provision of service, previous experience, personal circumstances, available evidence, expectations and need as well as risk. Furthermore in assessing and apportioning levels of risk within maternity services it must be acknowledged and highlighted to women, that there is no such thing as ‘zero’ risk and that risk cannot be the same for every woman. While maternity care experts can measure risk and communicate estimated levels to individuals, this information is filtered and may reflect professional and social bias. Risk perception is an active ‘sense-making’ process, which depends upon a host of contextual features and which is accomplished by audiences drawing upon collectively-held interpretative resources (Walker, Simmons et al, 1998, Petts, Horlick-Jones and Murdock, 2001)
2. There is an expectation that maternity care professionals will effectively manage health risk and minimise harm. One aspect of the increased concern with risk and safety within maternity services is the shift from need to risk. Traditionally maternity services have allocated resources and planned services to meet need, but recently there has been a shift from need to risk as a result of increasing concerns about safety and a concern to target services and resources more effectively.
3. Maternity care differs from other aspects of health care provision because in the majority of cases the clients are healthy and capable of making their own informed decisions about care. However the decisions women make about their care should be based on the best available unbiased information, professional advice and support given at appropriate times during the care episode.

4. Women can choose where and how they give birth and in many instances a compromise may be required, with need and quality of care taking priority over choice: if their choices are not met then they may opt for a home birth (planned or unplanned). In cases where risk assessment is carried out the key criteria tend to be 'default' criteria and centre on demographics, general medical/surgical health and obstetric history. Little attention is actually paid to the existing evidence base surrounding the promotion of 'normality', which highlights that avoidance of interventions in low risk women has positive outcomes and attention should also be paid to non obstetric-medical risk factors.
5. Much of the debate surrounding 'small' maternity units focuses on neonatal and anaesthetic support as well as the provision of backup support in emergency situations. Factored into this is access to appropriately trained neonatal carers who have the opportunity to maintain their expertise. In such cases distance to expert help is crucial. The key principals are that as much care as possible should be provided close to the woman's home, and that midwives, and where relevant GPs, should provide an integrated community-based service.

#### **Apportioning risk to levels of care**

6. Risk assessment should be based on exclusion, rather than inclusion, criteria and careful attention must be paid to the changing nature of risk during the pregnancy care episode, managing uncertainty and adopting strategies to minimise risk. Assessing and managing risk within maternity services is a complex and dynamic process and implicit in this is the acknowledgement that there is no such thing as 'zero' risk. Management of care must balance the risks between the available levels of maternity care and informed patient choice and local access. The decisions women make about their care should be based on the best available evidence given at appropriate times during the care episode. Women have the opportunity to make truly informed choices about their care, whilst simultaneously having the professional advice and support of professionals to help inform the decision. In these instances it is vital that there is a clear understanding by both parties of the nature of clinical and non-clinical risk.
7. Home Birth, stand-alone CMUs and CMUs attached to non-obstetric DGHs should have the **same exclusion criteria**, risk management strategy and emergency support

mechanisms. It was agreed, that using professionals with little experience of maternity services might in fact increase the risk to the mother and her baby, as interventions may be inappropriate or untimely. If women are led to believe that some form of medical emergency support is available on site, this might lead to an increase in expectations and associated dissatisfaction if expectations are not met. Women who do not fit the criteria for delivery in a CMU may opt to deliver in a CMU alongside a non-maternity DGH in the mistaken belief that there is more support to deal with emergency situations. In exceptional circumstances, remote and rural non-obstetric consultant hospitals (eg islands) may offer caesarean section if facilities and appropriately trained general surgeons and anaesthetists are available. CMUs require an adequate safety net as they no longer have “flying squad” backup for obstetric or neonatal emergencies. Complications in labour will require appropriate consultation, referral and on-site resuscitation and stabilisation by midwives and where relevant GPs.

8. Access to high dependency care facilities should also be available in all consultant led obstetric units for mothers with systemic illness, who are sick but not requiring intensive care. One in 1,000 mothers requires intensive care, often with life support, most commonly because of haemorrhage, pre-eclampsia/ eclampsia or sepsis and require access to intensive care facilities on-site in a general hospital setting. A maternal resuscitation service, a full obstetric and anaesthetic service and epidural analgesia in labour should be available in all consultant led obstetric units. Each region must provide appropriate levels of maternity care and have a multi-professional and team approach to service delivery.
9. Non-clinical risk issues must be considered and include:
  - Geography and weather conditions
  - Nature and condition of emergency equipment
  - Use of emergency equipment
  - Nature of emergency back-up and support
  - Expected gap between current and necessary transfer arrangements.
10. A professional consensus was reached in apportioning the level of maternal and fetal risk to each level of care identified within the Framework for Maternity Services. **Basic entry criteria** were identified for Level I low risk care and more complex Level III care. To

identify the range of maternal and fetal morbidities, which are appropriately managed in Levels I and III care maternity units, *exclusion criteria* have been developed for all levels of maternity care and these are identified in Annex E (Page 136 ).

### **Level Ia-d Maternity Care**

11. In addressing the risk assessment and management approach for women who deliver at home or in Level Ib-d units, it is important to highlight that all women should receive a holistic approach to care. Manpower in CMUs will largely consist of qualified midwives, some student midwives, maternity care assistants and where relevant allied health care professionals (AHPs) such as physiotherapists. In certain areas there may be GP involvement and support. It is envisaged that many healthy low risk women, who go into spontaneous labour at term and who do not wish epidural analgesia, will opt to deliver in a CMU. **The entry criteria to Levels Ia-d intrapartum care are identical and have been agreed as follows:**

- Low risk, healthy woman
- Singleton pregnancy
- Cephalic presentation
- Spontaneous labour between 37 weeks gestation and 40/52 + 10 days
- Primigravidae or multigravidae <5

12. The exit examples for Levels Ia-d are purposely not all inclusive and these should be considered and specifically agreed locally within the overall network of maternity provision. Any woman with criteria that are listed in Annex E1 under general characteristics, maternal medical and surgical history, poor past obstetric and neonatal history, present pregnancy morbidity should be referred for incremental care. A number of maternal and neonatal morbidities are identified within this Annex which should result in referral for advice regarding management or transfer depending on locally agreed guidelines (Annex E, page 136 ).

### **Level IIa-c Maternity Care**

13. All Level II units will provide facilities for low risk women as described in Level I but also will manage more complex conditions, and this will vary depending on the

designation of the unit being Level IIa, IIb and IIc. The exit examples are intended as a guide and will vary from unit to unit and should be considered on an individual patient basis depending on geography, existing services, manpower and morbidity. All units should clearly state the level of service offered, allowing mothers informed choice of the type of facility and level of service that they wish for the birth of their baby. These Level II units must have haematology and blood transfusion services available on site. Obstetric anaesthesia and epidural analgesia should be provided on a 24 hour basis. Isolated consultant obstetric units at a distance from general hospitals present difficulties in terms of anaesthetic staffing and access to specialised medical or surgical care and intensive care and stressed the importance of innovative approaches to managing care in these units, working towards location within a DGH site (CEMD (2001)).

### **Level IIa**

14. Entry to this level of care is similar to Level I and these units consist of a consultant-led maternity unit with <1000 deliveries per annum with no neonatal facility. This type of unit is suitable for healthy low risk women, essentially at term. Women who choose to deliver in Level IIa units will be able to undergo caesarean section, operative vaginal delivery and normally will have access to a limited epidural analgesia service. Although this unit will be able to carry out obstetric intervention, any woman with a significant past medical or surgical morbidity, poor past obstetric or neonatal history and identified current pregnancy morbidities might not be a suitable candidate for delivery in a unit, without adult intensive care or neonatal support. The exclusion criteria for Level IIa care are identified in Annex E2. Once again criteria for maternal or neonatal referrals have been identified.

15. Referral may be for advice regarding management or transfer depending on locally agreed guidelines. In Level IIa units it is crucial that appropriate referral pathways are used for any mother and baby who gives cause for concern. It is not advisable for any at risk fetus to be delivered in this type of unit.

### **Level IIb Maternity Care**



16. This refers to a consultant-led maternity unit with <1000 deliveries per annum, with 24 hour paediatric cover and a SCBU. Units of this nature will provide Level II neonatal care (Table 1.2, page 9) and ill neonates will only be transferred after resuscitation and stabilisation, should neonatal intensive care be required. A table of exit criteria for Level IIb care is identified in Annex E3. It is envisaged that a local and regional referral pathway with agreed criteria will be developed and adopted to ensure that all woman and babies receive the highest quality of care as locally as possible. As well as midwives and obstetricians, the skill mix for this level of care will include anaesthetists providing 24 hour cover for anaesthesia, analgesia and resuscitation. Due to the likely workload in a Level II unit, it is envisaged that the obstetric anaesthesia duties will be shared with other duties such as intensive care.
17. Special Care Baby Units in Level IIb units will have resident paediatric staff. Out of hours this will be a trainee, a non consultant career grade doctor with a minimum of one year's experience in paediatrics including the minimum of 6 months experience in a neonatal intensive care unit, or in some units an Advanced Neonatal Nurse Practitioner (ANNP). Each unit will have a consultant paediatrician with a designated responsibility for direction and management of the unit including the monitoring of clinical policies, practice and standards. Consultants appointed to posts with responsibility for providing cover for Level II b units should have had at least one year of specialist training in a post or posts approved for neonatal training and they should maintain their professional development in the care of newborn babies: this should include regular revalidation in Newborn Life Support.
18. Referral for maternal and fetal conditions may be for advice regarding management or actual transfer, in line with locally agreed guidelines. Exit examples for Level IIb units are identified in Annex E3. All Level II b units must have clearly identified referral pathways to designated professionals and maternity units for an escalation in intrapartum care.

### **Level IIc Maternity Care**

19. These consist of consultant-led obstetric units of approximately 1,000-3,000 deliveries per annum (but this may be significantly more) with neonatal intensive care facilities and

comprehensive general, specialist medical and support services. These units, while providing all levels of lower risk care, will provide intrapartum care for most woman. Isolated consultant obstetric units at a distance from general hospitals present difficulties in terms of medical staffing and access to specialist medical and surgical care, support care and intensive care should co-locate within DGH sites (CEMD 2001).

20. Mothers and infants should be transferred to a regional Level III facility if sub-specialist maternal-fetal or specialised medical care is required, particularly from units without adult intensive care. The exit examples for Level IIc care are shown in Annex E4.

### **Level III Care**

21. These consist of consultant led specialist maternal fetal units of over 3,000 deliveries per annum and will provide care for women with complex maternities, but will also offer a range of intrapartum care options for women requesting low tech care. These units should have on-site adult intensive care, neonatal intensive care (Level IV neonatal facilities) and neonatal surgery, either on-site or close-by. The typical anaesthetic workload in a Level III consultant obstetric unit is identified on page [ ]. The four Level III maternity units in Scotland are capable of caring for the majority of maternal and neonatal morbidities, the one specific exception being the management of hypoplastic left heart syndrome in the neonate which necessitates transfer outwith Scotland. The criteria for transfer to a specialist facility should be at the discretion of the referring hospital following referral, consultation and agreement between the appropriate senior specialists in both units. A list of entry examples for Level III care, in which identified maternal and fetal morbidities are appropriately treated in a specialist centre, are identified in Annex E5.

### **Summary**

22. Professional consensus was reached by the Expert Group that maternity care provision in Scotland should be in accordance with the principles identified in the Framework for Maternity Services. While care should be given as locally as possible, it is not feasible to offer all women a locally based comprehensive service irrespective of profile, risk category and demographics: some women may need to travel for intrapartum care. Risk

management should be based on exclusion criteria and be an integral part of all maternity services, acknowledging that zero risk attainment is unrealistic in all locations of care.

23. Many tenets of care within the Framework are achievable irrespective of demographics and these should be provided. The normality of intrapartum care is important, but there should also be a clear and explicit pattern of escalating care with easy and clear transition between the different levels of care, appropriate to the case mix and morbidity within the regional maternity network. All consultant-led maternity units must have a comprehensive emergency support mechanism and access to high dependency or intensive care as appropriate. All CMUs must have basic emergency support to mothers and babies and have appropriate transfer mechanisms identified within the network.

***In order to provide a safe, high quality, comprehensive and efficient maternity service in Scotland, a regional approach to planning, management and delivery of care based on local needs and provision is essential within a comprehensive and explicit network infrastructure.***

## SECTION VI: EDUCATION AND CLINICAL COMPETENCIES

### Introduction

1. The report of Education, Training and Workforce Issues Subgroup of the *Framework* highlighted education and workforce deficiencies and concerns within maternity care professionals in Scotland. This concluded that local solutions combined with significant resources are required to ensure a high quality maternity service to all women in Scotland irrespective of geography. The Education and Clinical Competencies subgroup of EGAMS was tasked with identifying educational requirements and providing innovative approaches to meeting the educational needs of professionals involved in maternity care. For the initial 2 meetings, the groups met separately but shared the notes of the respective meetings, for the remaining two meetings the groups amalgamated and a professional consensus was reached.

### Context

2. The *Framework* identified the midwife as the most appropriate professional to care for low risk women during the pregnancy episode, and stressed the benefits of one-to one midwifery care in labour. The existing evidence base surrounding the promotion of 'normality' highlights that avoidance of interventions in low risk women has positive outcomes. Studies highlight that the key component in promoting spontaneous vaginal birth is the continuous presence of the midwife (Chamberlain, Steer 1999, SAPMEL, Hodnett 2002). Evidence suggests that not all midwives have the competencies to provide all elements of maternity care for low risk women (Prakashban, Hisock, Mitchell 1997) and many argue that the 'medicalisation' of childbirth has resulted in midwives losing core skills (Johansan et al 2002, Rosser 2001). Regardless of whether or not midwives have these skills, many midwives have lost confidence in their ability to take responsibility for the care low risk women.
3. Maternity care differs from other aspects of health care provision because in the majority of cases the clients are healthy, but this makes the identification and management of 'ill' or at risk women all the more critical. Attention should be paid to non obstetric-medical risk factors such as socio-economic status and domestic violence etc as cited by the fifth report of CEMD (2001), which highlighted 60.4% of direct deaths as having some form

of substandard care. CEMD recommended that continuing professional development should be accepted as the responsibility of the practitioner, as well as the employer, and knowledge and skills should be regularly updated using current research evidence. Units should organise regular drill for obstetric emergencies such as cases of massive haemorrhage and these drills should include all members of staff.

4. More recently the *Review of the Scottish Medical Workforce* (Temple 2002) highlighted that the medical workforce in Scotland is under pressure and suggested that the service will only survive with change. *“Travel time increases clinical risk for emergency care, but so can lack of capacity, critical mass or experience in a small unit ...this applies across the whole of Scotland.”* (Temple 2002). Implicit in this is multiprofessional working and a service re-design, which involves a regional approach to care. Central to this is a cohesive and well resourced paramedical service.

## Education

5. There are a number of academic institutions in Scotland which provide undergraduate courses in medicine and midwifery and there are some examples of shared learning by medical and midwifery students (eg Dundee). Currently a limited number of institutions also provide an 18 month shortened midwifery course for registered nurses. There is much debate about the efficacy of direct entry midwifery programmes, but all the available evidence concludes that, regardless of educational preparation (3 year or 18 month), all newly qualified midwives are capable of providing care for women and babies in normal midwifery situations (Fleming et al, 2001, Fraser et al 1997, Maggs C 1989, Maggs 1994, Maggs & Rapport 1996). However, there is a paucity of evidence to identify midwives' competence in caring for *at risk or ill women* during the pregnancy episode and professionals within both groups highlighted the importance of all midwives being able to recognise and care for 'ill' women during their pregnancy episode. This was considered particularly important for midwives working in isolation or in remote units.
6. The educational opportunities available for qualified midwives tends to be in the form of top-up degrees of postgraduate diploma and degree courses. Only one university in Scotland (Napier) offers an Advanced Neonatal Nurse Practitioner course (which has a

clinical component and set at Masters level), whilst another is developing Masters level courses which will have clinical components (Dundee). The majority of clinically focused courses are offered and delivered by local Trusts. Some are in-house and may involve partnership with academic institutions whilst others are ‘bought in’ examples of the former include IV cannulation for nurses and midwives and obstetric emergency ‘drill’ courses for all maternity care professionals. The most popular courses to fit into the latter category include ALSO and NALS. Traditionally universities in Scotland have not offered postgraduate courses with a clinical focus.

### **Core Maternity Competencies**

7. *Core competencies necessary for all staff providing intrapartum care* were identified and a team approach was considered crucial to the delivery of maternity services in each unit. Once competencies are achieved it is vital that the level of skill and expertise is maintained. All competencies correlate to established good practice; implicit in this is maintaining patient safety and clinical governance. It is important that all professionals working in these environments have the confidence, clinical governance, skills and professional judgement to provide a consistently high standard of care for the woman and her baby. Core and additional competencies required by practitioners working in all types of maternity units are specified.

### **Promote Normality – supporting normal labour and childbirth birth**

8. This includes providing psychosocial and physical support to women in labour and the majority of existing skills inventories include technical skills and competencies necessary in an emergency. The identification and prioritisation of these skills is central to a quality midwifery service, ensuring that midwives will have the confidence to work in these environments and make clinical decisions about care (Downe, S, 2001). The range of core skills required mainly by midwives but relevant to all staff in order to keep birth normal are as follows Hunter (2000):
  - Confident to provide intrapartum care in a low technology setting
  - Comfortable to use embodied knowledge and skills to assess a woman and her baby as opposed to using technology
  - Able to let labour ‘be’ and not interfere unnecessarily

- Confident to avert or manage problems that might arise
  - Willing to employ other options to manage pain without access to epidurals
  - Responsible for outcomes without access to on site specialist assistance
  - Confident to trust the process of labour and be flexible with respect to time
9. Promoting normality also includes the use of available evidence to support care (one-to-one care in labour) There are a variety of ways of ensuring that midwives have and maintain these essential skills – but implicit in this must be the use of evidence based care. Central to this is team working and peer and multiprofessional support.

### **Clinical judgement and decision making skills**

10. All maternity care professionals must have the clinical judgement and decision making skills required to work in Level I areas. In many instances midwives may be aware of the appropriate line of diagnosis and care, but will refer to a midwife or doctor for assurance that the decision is right. The appropriate referral mechanism should be utilised. This option may not be available to a midwife working in a CMU. (However even though the unit may be geographically distant to the consultant unit, there should always be an explicit network for advice and management of increasing levels of care.)

### **Maternal history taking**

11. CEMD (2001) highlighted the importance of good history taking at booking. It stressed the importance of a risk and needs assessment at booking which should be reviewed regularly. Crucial to ensuring a quality service for each woman and her family is the management of risk and identification and prevention of complications.

### **Counselling and communication skills**

12. The professional must have the skill to communicate clearly with women, their partners and maternity care team members particularly when problems become evident. These skills are also central to obtaining good maternal history and providing informed choice about care options.

### **Risk assessment and management skills**

Although midwives working in maternity units have many of these skills, the nature and environment of a CMU will mean that the type of risk management and decisions about care will differ to those of a midwife working in an obstetric maternity unit. Frequent updating and 'emergency drill' scenarios will be necessary. Included in this is the management of uncertainty. All health service professionals who are involved in maternity care in remote areas must have these skills

### **Venepuncture and intravenous cannulation and the subsequent management of IV fluid replacement**

13. Not all midwives have this skill although most units run courses and there are anatomically correct models which can be used for practise purposes. Both subgroups stressed that as well as being able to cannulate the professional must have the skills to manage IV fluid replacement. There are opportunities for professionals to refresh these skills in areas such as day surgery.

### **Recognition of the ill mother and baby**

14. Substandard care is sometimes difficult to evaluate but CEMD assessors for 1997-1999 Enquiry classified 60.4% of direct deaths and 22% of indirect deaths as having some form of substandard care. CEMD (2001) identified that for the first time the number of indirect deaths from medical conditions exacerbated by pregnancy was greater than from conditions which directly arise from pregnancy. Nearly half of the deaths in the indirect category were from diseases of the central nervous system, including cerebral haemorrhage and epilepsy. The remainder died of mainly infectious diseases, asthma, diabetes and blood disorders. The report highlighted the importance of identification and support of women with higher risk pregnancies who appear unsuitable for midwife-led care and made the explicit statement that midwives should be prepared to decline to take responsibility for high risk cases where involvement of an obstetrician is essential. Integral to the provision of a quality maternity service is the ability to identify and care for ill women and babies. All maternity care practitioners must have the necessary skills to recognise and initiate appropriate care for ill women and their babies.



### **Adult resuscitation**

15. CEMD (2001) stressed the importance of managing emergencies such as severe haemorrhage. This is a core skill of every midwife and health care professional but in order to maintain competency midwives must attend an annual update course. This course must include early identification of and care of the ill woman, including the recognition of sepsis.

### **Management of obstetric emergencies**

16. Obstetric emergencies such as severe haemorrhage, cord prolapse, shoulder dystocia, breech delivery and postpartum haemorrhage are addressed in the ALSO course (see Annex F), however many units have now introduced their own obstetric life support courses which all maternity care professionals must attend and then refresh annually.

### **Neonatal resuscitation**

17. All staff must have the skills and competencies to assess, resuscitate and stabilise the neonate prior to on-going management. The appropriate skills would include ventilatory support by *bag and mask* as opposed to tracheal neonatal intubation. Particular emphasis should be paid to the recognition of the ill neonate.

### **Examination of the baby.**

18. Currently this examination is completed by a paediatrician and in some cases a GP. In order to provide a seamless service, especially in remote areas and with early postnatal discharge, midwives and GPs must be able to complete the gross initial inspection and detailed examination of the baby. The healthcare professionals must be able to understand the relevance of the examination, to examine assess and identify normality and abnormality, and be able to refer appropriately.

### **Pain management**

19. Units in remote areas will not offer epidural analgesia so midwives and GPs must have sound understanding of pain assessment and management. Included in this is a knowledge of the variety of pain management techniques (pharmacological and otherwise) which are appropriate and effective for intrapartum care (e.g. use of

hydrotherapy). It was noted that the route of administration of diamorphine should be reviewed in the light of available evidence, currently diamorphine is administered intramuscularly by midwives but intravenous administration of small divided doses was considered more effective.

### **Assessment, suturing and management of perineal injury**

20. This should include management of perineal pain, adequate assessment of perineal trauma, skilled technique to repair the perineum and to refer appropriately.

### **Prescription of Drugs**

21. This is an area of concern as current systems (PGDs and Nurse/Midwife prescribing codes) do not cover drugs that midwives might require to prescribe in a CMU. Work in this area is ongoing. The maternity care professional working in an CMU must have the skills and ability to prescribe and dispense appropriate drugs, especially analgesia in labour, drugs used in resuscitation and those involved in normal childbirth such as Konakian and Anti D.

### **Additional competency which will be required for remote units**

22. In remote areas the following areas of competencies should be achieved by at least one team member:

- ***Ultrasonic scanning*** – currently some midwives and GPs provide an ultrasound scanning service. Basic scanning skills are required with the possible development of some level of fetal anomaly scanning with adequate expert support
- ***Ventouse lift-out delivery*** - a common complication and cause for referral in low risk women is delay in the second stage of labour, it was agreed that Ventouse delivery should be considered as a team competency.

### **Competencies in Level II Units**

**Level IIa:** In addition to the previously cited competencies, the following should be available in a Level IIA unit:

- Detailed ultrasonic scanning

- Pre and post operative care of woman
- Instrumental delivery (Ventouse /forceps)
- Caesarean section
- Anaesthetic support (epidural and GA services)
- Management of an 'ill' woman, including resuscitation and stabilisation
- Neonatal assessment, resuscitation and stabilisation.

**LEVEL IIB: all the above competencies should be available in these Units. However additional competencies set out below refer to requirements for skills in caring for the neonate.**

- Fetal blood sampling
- **NEONATAL ASSESSMENT AND MANAGEMENT OF THE ILL BABY.**
- Intubation and stabilisation of ill baby prior to transfer
- Care of pre-term baby
- Care of baby with IUGR

**Level IIc:** Additional competencies required for maternity care professionals working in Level IIc units include:

- Management of abnormal pregnancy and labour which will cover most obstetric morbidities and co morbidities
- Management of 'ill' neonate: competencies to care for all levels of neonatal care including neonatal intensive care required.

### **Competencies in Level III Units**

23. This unit will have the facilities and a team of professionals capable of caring for any woman, fetus or baby irrespective of risk or morbidity. The maternity team should have specialist obstetric, anaesthetic, intensive care, paediatric surgery, neonatal and midwifery

staff with the skills and competencies to care for women and babies and are able to carry out specialist investigations and procedures.

### **Maintaining Clinical Skills and Competencies**

24. Having achieved the requisite competencies appropriate to work in these specific levels of care, it is essential that maternity care professionals maintain and wherever possible develop these skills. In the larger units with a high throughput of women this may be relatively easy to achieve. However, even in the Level III units it is important not to be complacent about maintaining skills as these units may have many professionals vying to obtain and maintain experience in specific clinic areas. Thus it is crucial for all professionals to be responsible for their personal updating and maintenance of clinical skills. Some of the skills required by maternity care professionals are not specifically 'maternity' skills, examples include: risk assessment and management, care of the 'ill' woman, cannulation and fluid replacement, suturing, counselling, emergency drills such as severe haemorrhage. In such cases every opportunity should be used to work with other disciplines and health care professionals
25. For professionals working in small or remote clinical areas it may be more difficult to maintain competence in elements of maternity care. These individuals should utilise computer based simulation programmes as 'drill' scenarios to help maintain competence and skills and will need to spend allocated blocks of time in larger maternity units within their region. Video conferencing was identified as a way in which maternity care professionals can get support and maintain skills without actually being on-site.
26. Manpower in CMUs will largely consist of qualified midwives, some student midwives, maternity care assistants and where relevant allied health care professionals (AHPs) such as physiotherapists. In certain areas there may be GP involvement and support. All CMUs be part of an explicit and linked referral network but will not have on site access to obstetricians, paediatricians or anaesthetists, although these will be part of the referral network. Integral to this is teamwork, multiprofessional and interdisciplinary working, communication and education. A vital support and emergency backup for midwives and GPs in remote areas will be the paramedic service. Annex G provides a description of the existing courses available in Scotland and the potential for further development.

### **Education and training for the Scottish Ambulance Service**

27. Although paramedic training has recently improved a multiprofessional maternity care course would provide paramedics with sufficient background information and training to ensure effective care for maternity and neonatal care.
28. The maintenance of skills is crucial and given the low exposure of ambulance staff to this client group, it is an area that must be addressed. Inclusion in local peer support groups, training and multidisciplinary exercises would help support the initial training, and would allow the individual to address any training or confidence difficulties they may have.
29. Additional training will be required by Paramedics to enable them to provide an appropriate level of care either to the expectant mother or the newly born baby. This training must reflect a more multidisciplinary approach than is currently taken. Areas of training that need to be covered are NLS, NALS, ASLO and early recognition of obstetric emergencies. Integral to this are frequent refresher courses.
30. There is little opportunity for paramedics to have supervised “hands-on training”. Core training can be delivered using mannequins. However, this style of training may not provide sufficient experience to promote confident practice. Therefore training should be more practical in focus and include in-hospital exposure under the mentorship of a lead clinician, such as the Midwife or Obstetrician.

### **Role and Function of Professionals**

31. It is important that maternity care professionals receive the education and support required to ensure sufficient confidence in the decision-making process about providing intrapartum care and referral when appropriate. This requires clinical leadership to ensure skills maintenance and networking with other maternity units in the region. The changing health care environment and the available evidence, combined with enhanced and extended roles and medical manpower concerns (Temple 2002) has resulted in a blurring of professional boundaries. There should be multiprofessional maternity courses for midwives, GPs, paramedics and other appropriate healthcare professionals, especially for those working in remote and rural areas. The existing role and function of some

professions should be reviewed as it is evident that many midwives undertake a significant number of non-midwifery duties, such as being the scrub nurse at caesarean sections. The majority of GPs will be involved directly or indirectly in the delivery of maternity care to low risk women, especially with women who have existing co-morbidities or intercurrent illness which may require GP input. It was suggested that 'by default' GPs should have minimum set of maternity skills to manage such situations. It was acknowledged that GPs in rural and especially remote areas must have the education and competencies to care for a pregnant woman and her baby.

32. Remoteness presents particular challenges for the provision of maternity care in Scotland and innovative ways to accommodate and support pregnant, labouring and postnatal women in remote parts of Scotland must be considered. Professionals in Scotland have always acknowledged the diverse patterns of healthcare provision which exist, but are now in a position to devise innovative solutions to local problems. These might include developing skills and competencies not necessarily historically associated with that specific profession. Although there is no specific evidence related to maternity care, a meta analysis of care by nurse practitioners versus general practitioner care found that increasing availability of nurse practitioners in primary care is likely to lead to high levels of patient satisfaction and high quality care (Horrocks, Anderson & Salisbury 2002).

## Summary

33. The main issues centre on the competencies required in caring for low risk women and the management of obstetric emergencies within remote and low tech units. It was agreed that **all** midwives, obstetricians and general practitioners involved in intrapartum care, irrespective of location, should have and maintain these core skills. Each level of maternity care should have the appropriate skill mix for that level and every professional working in a maternity unit achieving and maintaining identified core competencies. The identification and management of risk was identified as crucial to successful maternity care, with training vital to support maternity care professionals in successfully managing obstetric emergencies as well as caring for 'ill' women. Confidence and decision making skills will be enhanced if professionals (midwives, obstetricians, paramedics and where relevant GPs) are equipped with the necessary skills and competencies, have the professional backup and resources to support their role irrespective of demographics. The importance of a team and multiprofessional approach to education, training and service

provision on a local and regional basis was emphasised as being crucial. All maternity care professionals must possess core competencies and have the necessary skills to cope with obstetric and neonatal emergencies and manage uncertainty. As well as providing the appropriate courses to meet professional needs, innovative ways of maintaining skills and competencies are advocated.

## **SECTION VII: WORKFORCE ISSUES**

### **Introduction**

1. In earlier sections of the report, mention has been made of how recent and ongoing reforms affecting medical and nursing staff groups, and the healthcare workforce in general, will have a profound impact on the shape of health services. Maternity services are not immune to these trends, and in some cases the special features of the service pose particular challenges. Solutions will require NHS Boards and Trusts, individually and collectively, to take an active lead in identifying and planning workforce requirements for the full range of maternity services in their areas. It is no longer appropriate to address workforce issues in a simplistic, numbers-driven manner: traditional 'manpower planning' approaches are not sustainable in the fast-changing NHS of today. Meeting the needs of the future will involve creative thinking about the best way of ensuring that multi-professional teams have, collectively, the skills identified elsewhere in this report to meet the demands of providing the highest standards of care for every pregnant woman. Options to address the problems caused by workforce issues will need to include alternative working patterns and changes in the composition and use of staff from different professions and disciplines.
2. Some of the key workforce drivers are concerned with moves to achieve safer working conditions for NHS employees and, thereby, safer treatment of patients. The enforcement of limits on the extent to which care can be provided by trainees, and constraints on medical and nursing hours combine to increase pressure on services. The problem is especially acute for medical positions. Both New Deal for Junior Doctors and the European Working Time Directive requirements are likely to require increases in medical establishment, but this will not be the only solution to a complex problem exacerbated by increasing specialisation and long term staffing shortages in particular fields and specialties. It is vital to plan now a model for the future - those in medical school at present will be consultants in 2020.
3. Add to these pressures the changing demography of the nursing and medical workforces (midwives are predominantly female and over 60% of the current intake of medical students is female) and it is clear that intrapartum care in existing maternity units cannot



be sustained 24 hours per day, 7 days per week. The challenge is not only for obstetricians and midwives: manpower and training issues apply equally to anaesthesia, neonatology and paediatrics.

4. In this chapter the issues facing some of the key staff groups will be examined and possible solutions presented in the context of the new arrangements in Scotland for dealing with workforce issues in an integrated way.

## **Pressures**

### ***Midwives***

5. Midwives are the key staff group providing care to pregnant women throughout pregnancy, childbirth and the post natal period. Throughout the report, it has been recognised that delivering care in line with the principles set out in the *Framework for Maternity Services* will require adequate numbers of appropriately skilled midwives. NHS Boards are moving towards one to one midwifery care during labour and childbirth which has implications for the way in which current working patterns operate and for how midwives discharge their care. There is currently no shortage in the supply of midwives in Scotland and the midwifery workforce is the most static of the whole nursing workforce. The challenge that this staff group faces is in moving towards a different model of service which requires that midwives build on, enhance and refresh skills in order to deliver care within a different framework. This brings with it more autonomy and different working relationships within maternity service delivery teams. Investment in time to enhance existing skills will be required without detracting from the level of service provided currently.
6. The Scottish Executive has, through its '*Facing the Future*' initiative, initiated a wide programme of measures aimed at improving the recruitment and retention of nurses and midwives in Scotland including action on careers, leadership, education and training and new roles. This will benefit midwives and other nursing staff such as health visitors who provide maternity care.

### ***Hospital Doctors***

7. Doctors in training have traditionally provided much direct medical care. The *Calman Review* of medical education and training arrangements for Specialist Registrars in 1993 concluded that medical training took too long and was too reliant on experiential learning, through practice on wards and in the service. The review recommended that training should be programme based, and should meet minimum requirements for components of formal education alongside experiential learning. Calman introduced standards and regulation of medical training for the registrar grade. Medical schools have enforced implementation by removing approval from particular posts for specialist training purposes. Reducing the extent of care by trainees has put aspects of the service under pressure, particularly those, such as labour wards, in which there is a need for regular out of hours cover.
  
8. There are proposals to extend application of the Calman recommendations to Senior House Officers. In August 2002, the Scottish Executive began consulting on Sir Liam Donaldson's report '*Unfinished Business*' which set out proposals for the reform of the SHO grade. The report agrees that training should be programme based, which will provide a broad base for all trainees. Training should be flexible and provide individually tailored programmes to meet specific needs, allowing movement of doctors into and out of training and between training programmes. It is proposed that, after graduation, all doctors will enter a two-year foundation programme. The first year will comprise of the current pre-registration year. The second year will allow basic specialist training in one of approximately eight broad-based programmes, which would include obstetrics & gynaecology, anaesthetics and general practice.
  
9. Continuing tension between training and service delivery in the SHO grade is expected as working and learning cannot always be easily separated. However, there are variations in the amount of service provided by SHOs in different posts and in the quality of training they receive. The reform of training at SHO level will impact on the amount of service delivery made by SHOs and therefore on the working patterns of doctors at other grades and other members of the clinical team.

10. The expectation that consultants will provide an increasing proportion of direct care is now enshrined in the proposed new consultant contract, which would also revise remuneration for out of hours work. The new contract offers an opportunity to recruit and retain consultant obstetricians for labour room work.

### ***General Practitioners***

11. The importance of the GP role in intrapartum care, particularly in remote and rural areas, has already been acknowledged in this report, but it appears that fewer GPs are willing to be actively involved in intrapartum care. The new GP contract designates maternity care as an 'additional' or 'enhanced' service and this may have an impact on the GPs contribute to intrapartum care in the future.

12. The General Practitioners Committee (GPC) of the BMA issued interim guidance until the new contract in July 1997 and May 1999. The role of the GP depends on the education and training and the consequent competence they have achieved and the limitations placed on their ability by other commitments. The woman should also understand in advance which skills the GP can or cannot provide.

13. The present duties of a GP with respect to Maternity Medical Services are:-

- To provide impartial advice regarding the availability of local services.
- To discuss alternative courses of action with the patient based on current evidence based medical opinion and enable her to make an informed choice.
- To arrange provision of care according to one of the locally available options.
- To explain the range of care that the GP can provide in connection with normal labour and the range of care that the GP cannot provide.
- To act within the limits of his/her competence.
- To refer appropriately.

14. There are three levels of involvement which GPs may have in intrapartum care.

- The GP can provide appropriate information and advice as above. If the patient wishes to have a type of care that the GP cannot offer, the GP continues to have a role in providing general medical care while referring the woman to another professional

to provide the maternity care that she wishes (midwife, another GP or a Hospital consultant).

- The GP may attend a woman in labour in order to provide personal support to her and non-specialist back up for the midwife. The GP does not need extra training in obstetrics except to maintain an appropriate level of adult and neonatal general resuscitative skills.
- GPs with suitable education, training and experience may be able to provide intrapartum care. GPs must have and maintain skills over and above those of the average GP but not comparable to that of a career obstetrician.

15. The GPs are able at present, to opt out of intrapartum care but others do provide intrapartum care and other maternity medical services e.g at present there are 3 GP led Maternity beds in Victoria hospital, Rothesay in the Isle of Bute. As the new GP contract will be practice based, the contract for maternity services with the practice will depend on the skills available to the practice as a whole and not the GP alone. GPs are being encouraged to develop special interests (GPwSI) as part of their career structure and one of the areas is Women and Child Health. LHCCs through the vehicle of PMS Pilots are using an alternative contractual arrangement to the GMS contract (which the majority of GPs are currently under), to redesign services to the locality using GPs with Special Interests and using the community hospitals and intermediate care in innovative ways

### **Developing the maternity workforce - a new infrastructure**

16. In 1999, under the Chairmanship of Professor Gillian Needham, Postgraduate Dean for Aberdeen, the Scottish Integrated Workforce Planning Group began a review of workforce issues facing the NHS in Scotland. Their January 2002 report *Planning Together* set the direction for further work in this area and established important principles that have guided subsequent developments. Amongst these principles are the important conclusions that workforce development needs to be more clearly linked to service planning in future and that the infrastructure at local, regional and national levels will have to be strengthened to make this happen more effectively.

17. Also significant is the Review of medical workforce planning conducted by Professor John Temple, President of the Royal College of Surgeons of Edinburgh. The Group's report *Future Practice: A Review of the Scottish Medical Workforce* was published in July 2002 and provides the context for future planning of the medical workforce in maternity care, as in other specialities. The review concluded that:

- more doctors will be needed to staff NHS in Scotland adequately
- that practice will need to change with other professionals taking on aspects of work presently carried out by doctors, and
- the NHS must redesign services to identify sustainable ways of working.

18. The Scottish Executive published *Working for Health: The Workforce Development Action Plan for NHSScotland* on 1 August 2002. The Action Plan acknowledges the clear role that workforce development has in any reform of NHSScotland. Implementation of the Action Plan will be taken forward by a National Workforce Committee supported by a National Workforce Unit in SEHD. NHS Boards will be expected to identify Workforce Officers to participate in workforce planning and development activity. For maternity service planners, these developments offer an opportunity to take a strategic look at workforce issues.

### **Developing the maternity workforce - investing in skills**

19. The core importance of taking a dynamic approach to workforce issues and of addressing skills shortages has been acknowledged. Earlier sections of this report have identified, in some detail, the particular skills that maternity care professionals need and have identified innovative approaches to meeting the educational and training needs. This analysis will help drive the formulation of integrated workforce plans for maternity service in Scotland, and the involvement of the full range of educational providers in this process will be essential. It has been recognised that multidisciplinary teams are critical to the delivery of maternity care - the opportunities for multidisciplinary training and development need therefore to be maximised.

### **Developing the maternity workforce - a regional approach**

20. Throughout this report, the need to plan and organise maternity services at a regional level has been emphasised - this is entirely consistent with the general thrust of the new workforce arrangements: integrating workforce planning with service planning at a regional level. Already, with level III maternity specialist sites in the North, East and West there is a sound basis for consolidating models of service provision - and with them the concomitant workforce arrangements - that are necessary to meet the various requirements of the service.
21. For workforce development in general, three Regional Workforce Co-ordinators are being appointed to liaise with Regional Service Planning Groups and Workforce Officers at local level. The Regional Co-ordinators will work closely with the National Workforce Committee, developing national strategies for workforce issues for all staff groups and specialities.

### **Summary**

22. The maternity services workforce faces similar pressures to the rest of the health workforce and the solutions, for the various professional groups involved, will follow the same pattern. Under the new arrangements for considering workforce development alongside service planning, and overseen by a new Maternity Services Workforce Group, the move to a skills and competency driven team-based approach will be promoted. Multidisciplinary training and development will be a feature and special consideration will be given to the issues in remote and rural areas.

## **SECTIONS IX:KEY PRINCIPLES**

1. This report has identified the context for maternity services development in Scotland and produced a specification for the provision of acute maternity services within the context of the *Framework for Maternity Services*, essentially within existing resources. EGAMS considered the planning of maternity services and endorsed the innovative approaches to intrapartum care identified within the principles set out in the Framework. The specification will assist NHS Boards to plan, configure and provide acute maternity services in the context of local, regional and national planning. The maternity care team consists of a variety of healthcare professionals, including midwives, obstetricians, anaesthetists, paediatricians, general practitioners, paramedics, nurses and allied healthcare professionals.

## **I: CORE PRINCIPLES**

1. Intrapartum care must be of high quality and clinically effective, consistent with the available evidence, women-centred, seamless within a real multiprofessional team approach.
2. There is a general consensus that the present provision and configuration of intrapartum care is no longer sustainable in the light of demographic, training, manpower and clinical cost effective practice.
3. The principles identified within the Framework for Maternity Services in Scotland are accepted, reinforced and should be fully implemented. This specifically includes the tiered level approach for intrapartum and neonatal care.
4. Women must be informed of the concept and nature of risk with unbiased, evidence based information when deciding on the nature of their individual intrapartum care. This decision should take account of, and balance, maternal choice, demand and need against risk assessment and available service.
5. The concept of zero risk is unattainable.
6. Risk assessment and management is an integral part of intrapartum care.
7. The promotion of normality of childbirth is integral to a quality maternity service, but it is essential that recognition of the ill mother and infant is paramount.
8. Intrapartum care must be provided to women as locally as possible, balancing safe clinical care with informed maternal choice.
9. All levels of maternity care must have the appropriately trained manpower to meet the competencies and skills required to provide intrapartum care.
10. Maternity services, including intrapartum care, should be planned and commissioned on a local basis consistent within a regional context to ensure local solutions reflect the regional and national priorities.
11. A comprehensive network for intrapartum care should be developed Scotland-wide on a consistent local, regional and national basis. This will enable the provision of seamless intrapartum care, irrespective of morbidity, within a clear and explicit network identifying entry points, referral pathways, levels of care, transport services and communication pathways.
12. Information management and communication should be developed to aid the planning, provision and monitoring of intrapartum care throughout Scotland.
13. All maternity units must state the level of intrapartum and postnatal service offered, including the arrangements for transfer.



## II: Education

- Every professional working in a CMU must have and maintain the identified core competencies.
- Each unit must identify the core team and individual competencies required for that level of care, consisting of generic, sub-specialist and specialist skills. These will include maternal fetal skills, non-maternal skills and non-clinical skills. The generic skills for low risk women include identification of the ill patient, resuscitation and stabilisation of the mother and baby and appropriate referral transfer and retrieval skills and competencies.
- Skills maintenance and retention must be addressed for all staff.
- Obstetric anaesthesia and neonatal care require specialist training.
- There must be a multiprofessional approach to education and training to meet the individual needs of professionals providing different levels of maternity care. This should include: clinical placements and rotations, multiprofessional alliances between Trusts, professional bodies and postgraduate providers and have the potential of achieving a number of shared qualifications.
- Paramedic education and training should be within a multidisciplinary setting and include supervised practical instruction within an acute hospital setting.
- Consideration should be given to facilitating an attitudinal and cultural change to rolls, skill mix, team working and location of care.
- Education should be provided on a national, regional and local basis. Consideration should be given to a National Maternity Services Educational Co-ordinator (possibly within NHS Education for Scotland).
- The role and infrastructure of RARARI must be maximised to ensure that all professionals included in the delivery of intrapartum care in remote and rural settings have and maintain the necessary skills and competencies. There should include a comprehensive maternity care course for professionals working in remote and rural areas.
- Primary care doctors and professionals require basic training in routine neonatal care, including examination of the newborn.

### **III: Risk**

- The recognition and acceptance that zero risk is impossible irrespective of the level of intrapartum care provision.
- Risk is a dynamic and complex process which requires appropriate and regular monitoring, assessment and management and is a core function within intrapartum care. Protocols, guidance, a risk management strategy and fire drill scenarios should be part of the multiprofessional Labour Ward Forum identified within the Framework.
- Risk factors must include clinical and non-clinical issues.
- Risk is designed by process of exclusion and the exit and entry criteria for the levels of care should be used as a basis for intrapartum care provision.

### **IV: Manpower**

- There must be appropriate manpower planning within each unit. This should include a working group to consider the impact of manpower planning and contractual changes on the multiprofessional workforce in each unit.
- Innovative approaches to manpower planning and service delivery should include:
  - A real multiprofessional approach to maternity care.
  - Regional contracts should be considered for some staff.
  - A seamless provision of primary and acute care.
  - Recognition of the role, skills, competencies and potential of maternity care professionals whilst acknowledging the potential to enhance roles and improve quality of care and service provision.
  - Maximise the potential of specialist professionals, such as midwifery consultants, advance neonatal nurse practitioners, paramedics and others who contribute to intrapartum care provision.
  - A clarify of professional roles and responsibilities.

## Provision

### V: General principles

- All women should be booked by a midwife and assigned to the appropriate level of care.
- There should be a lead named professional for each birth – this will usually be the midwife for normal pregnancy and care, but will be the obstetrician for women with identified risk factors.
- One to one skilled midwifery care should be provided in labour.
- Women and their partners should receive unbiased evidence and advice regarding their intrapartum care options.
- Intrapartum care should be provided locally as appropriate, feasible and practical.
- Irrespective of the planned location of care, the Birth Plan should incorporate entry into the network for escalation of intrapartum care.
- All maternity units and labour wards should have a lead named midwife, obstetrician, paediatrician and anaesthetist.

### VI: Planning

- Local and regional planning of intrapartum care will result in a review of Levels I and II of intrapartum care and special and intensive care for infants.
- The appointment of Regional Maternity Service Co-ordinators to support the National Co-ordinator.
- The present identified Regional Planning Groups should set up Regional Maternity Planning Sub-groups, which should meet regularly as a National Group. However, the composition of the Regional Planning Group should be flexible to reflect the changing demographic and provision of intrapartum care throughout Scotland.
- Maternity services should consider developing Managed Clinical Networks on a regional and/or local basis in line with the recent Health Department letter.

## VII: The network

- Each region must ensure that Levels I, II and III maternity and I-IV neonatal care are available to women.
- A consensus has been reached regarding the appropriate apportionment of risk in case mix to each level of care and these should be considered in the light of local and regional circumstances.
- The evidence relating to community midwifery units has been presented and supports the view, that they do have an integral role within the intrapartum care continuum in Scotland. They should be considered within the local intrapartum care context.
- All units providing interpartum care must provide 24 hour neonatal resuscitation, short term support for sick infants, access to neonatal transfer and complete routine neonatal care. Optimal care is provided by a multi disciplinary core team consisting of midwife, neonatal nurse and paediatrician.
- Consultant obstetric units require a 24 hour anaesthesia and analgesia service with consultant supervision, adult high dependency and access to intensive care, haematology blood transfusion and other DGH support services and an integrated obstetric and neonatal care service.
- Complex interpartum cases require integrated multi professional specialist management and direct consultant involvement. Significant neonatal morbidity may only be available in few specialist sites.
- The 4 Level III centres in Scotland should develop a sub-network for the management of complex maternal fetal cases throughout Scotland.
- The local and regional intrapartum care network must include the following:
  - Single entry into the network with clear communication channels for advice and the provision of escalating intrapartum care.
  - Criteria for care and transfer within levels of care with any transfer decision being made at a senior identified level.
  - Clear and consistent guidance for local resuscitation and stabilisation in all maternity units.
  - Criteria and provision for access to adult and neonatal special, high dependency and intensive care.
- Criteria and provision for access to specialist neonatal services.

## VIII: Transport

- Planned prenatal in utero transfer is the method of choice.
- Where it is likely that the ambulance staff may be part of the acute pregnancy care team (such as a rural high risk pregnancy) the mother should be given the opportunity to familiarise herself with the SAS provision including the equipped used. The possibility of a “named crew” in rural settings should be explored.
- With the SAS reorganisation to 3 regionally based Emergency Despatch Centres and a single National Transport Centre for air transport must take account of the changing provision of intrapartum care throughout Scotland to ensure appropriate provision is made.
- The implementation for the transfer of urgent or emergency in-uteral, intrapartum or immediately post-natal transfers must be specifically considered with the introduction of Priority Based Despatch. A one call entry system for clinicians to access the SAS for intrapartum transfer throughout the Transport Co-ordination Desk should be implemented. This would identify, within the discussion, the most effective and available method of transport for each individual case, including additional aspects, such as appropriate equipment, crew skill mix, police escort, possible clinical complications, and crew journey time and cover, especially within longer transports.
- There should be a regional/local review of the vehicle fleet and air transport capability and suitability for transport function to meet the identified need.

## **IX: Information**

- The development of National Core Dataset for maternal fetal medicine must be consistent with the Scottish Birth Record and the Scottish Child Health Information Project. A National Hand-held Maternity Record should be developed.
- A comprehensive system of local and regional maternity care audit and evaluation, especially intrapartum care, should be carried out to monitor the changes in intrapartum care throughout Scotland. This should include maternal and fetal care outcomes, location of care, modes of delivery, maternal and fetal post-natal care, access to maternal and fetal specialist care, transfer and transport support and critical incidence reporting to support local labour ward risk management programmes.
- The role of telemedicine within maternity and intrapartum care should be explored, especially in remote and rural Level I facilities. Possible roles include support within the intrapartum care network, training and education courses, clinical skills programme, image transmission, communication and advice, direct patient care and professional support networks. Wherever possible CMUs should have direct access by video link to their incremental care referral centre.
- Any consultation process on changes to maternity or intrapartum care should involve planners, providers and consumers of the service.
- As identified within the Framework, each Health Board should already have a Maternity Services Liaison Committee and consideration should be given to strengthening their role and the possibility of a National Association of MSLCs has been suggested.

## **X: Change Management**

- Develop a regional and local information and education process to inform all stakeholders of the content and implications of this EGAMS report. This should facilitate the changed management process to ensure a real, planning, incremental and appropriate change in intrapartum care occurs throughout Scotland consistent with a quality service.

## REFERENCES

Ackermann-Liebrich U, Voegeli T, Gunter-Witt K et al. Home versus hospital deliveries: follow up study of matched pairs for procedures and outcome. *BMJ* 1996 313:1313-1318.

Albers L & Katz V (1991) Birth setting for low risk pregnancies: an analysis of the current literature. *Journal of Nurse Midwifery* 36:215-2.

Acheson, D. (1999). Independent enquiry into inequalities in health. The Stationary Office, London.

Anderson RE, Murphy PA. Outcomes of 11,788 planned home births attended by certified nurse-midwives. A retrospective descriptive study. *J Nurse Midwifery* 1995; 40: 483-492.

Annandale E (1988) How midwives accomplish natural birth: managing risk and balancing expectation. *Social Problems* 35(2): 95-110.

Audit Commission (1997) *First Class Delivery: A National Survey of Women's Views of Maternity Care* Abingdon: Audit Commission Publications.

Baird, Bwell, Walker Management of labour in an isolated rural maternity hospital *BMJ* 1996; 312: 223-226.

Baird D, Jewell B and Walker J. Management of labour in an isolated rural maternity hospital. *BMJ* 1996; 312: 223-226.

Ball J., Washbrook M (19 ) Birthrate Plus.

Bastian H, Keirse MJNC, Lancaster PL. Perinatal deaths associated with planned home births in Australia: population based study. *BMJ* 1998; 317: 384-388.

Berryman J & Windridge K. *Motherhood After 35 - A Report on the Leicester Motherhood Project*. Leicester University, Leicester, 1995.

*BMJ.com*, 5 Apr 2000 .

Brown DJ. Opinions of general practitioners in Nottinghamshire about provision of intrapartum care. *BMJ* 1994; 309:777-9.

Bull MJV. Ten years' experience in a general practice obstetric unit. *J R Coll Gen Pract* 1980; 30:208-15.

Campbell R (1997) Place of birth reconsidered. In Alexander J, Levy V, Roth C (eds.) *Midwifery Practice: Core Topics 2*. London, MacMillan.

Campbell R, MacFarlane A, Hemsall V, Hatchard, K. (1999) evaluation of midwife-led care provided at the Royal Bournemouth Hospital. *Midwifery* 15, pp183-193.

Campbell R, Macfarlane A. *Where to be born? The debate and the evidence*. 2nd ed. Oxford: National Perinatal Epidemiology Unit, 1994.

Cavenagh AJM, Phillips KM, Sheridan B, Williams EMJ. Contribution of isolated general practitioner maternity units. *BMJ* 1984; 288:1438-40.

Chamberlain G, Wraight A, Crowley P. Home births. Report of the 1994 confidential enquiry by the National Birthday Trust Fund. Carnforth: Parthenon, 1997:107-113.

Bullough C (Oct 22 1999) [Re: Audit of babies safety during home delivery](#).

Cheyne, H, Hillan, E.M., Morris, A., Reid, L. & Lyall, H. (1999). Women's Health after Childbirth. Unpublished Research Report, Glasgow Royal Maternity Hospital & University of Glasgow.

Confidential Enquiry into Maternal Deaths. (2002). Why Mothers Die. Report on Confidential Enquiries into Maternal Deaths. 1997-99.

Confidential Enquiry into Stillbirths and Deaths in Infancy. Fourth annual report: concentrating on intrapartum deaths 1994-95. London: Maternal and Child Health Research Consortium, 1997.

Confidential Enquiry into Stillbirths and Deaths in Infancy. Fifth annual report. London: Maternal and Child Health Research Consortium, 1998:51-62.

David M, Von Schwarzenfeld H, Dimer J, Kantenich H (1999) Perinatal outcome in hospital and birth centre obstetric care. *International Journal of Gynaecology & Obstetrics* 65(2): 149-56.

Davies J, Hey E, Reid W, Young G. Prospective regional study of planned home birth. *BMJ* 1996; 313: 1302-1306.

Department of Health (1993) Changing Childbirth: The Report Of The Expert Maternity Group London HMSO.

Department of Health (1994) Report on confidential enquiries into maternal deaths 1988-90. London: HMSO.

Douglas, M. (1990) Risk as a forensic resource, *Daedalus, Journal of the American Academy of Arts and Sciences*, 119, 1-16.

Drife J. Data on babies' safety during hospital births are being ignored. *BMJ* 1999; 319: 1008 (9 October).

Editorial (23/11/96) Home births for high risk women result in high death rates. *BMJ* 1998; 317:

Edwards N (2000) Women planning homebirths: their own views on their relationship with their midwives. In Kirkham (ed.) *The midwife-mother relationship*. London, MacMillan.

Emons J.K, Luiten M.I.J, (2001) Midwifery in Europe. The European Midwives Liaison Committee, The Netherlands

Enkin M (1994) Risk in pregnancy: the reality, the perception and the concept. *Birth* 21(3): 131-134.

Ernst EKM (1986) Nurse-Midwifery in the free-standing birth centre. In: Rooks J, Haas J, (Eds.) *Nurse Midwifery in America. A Report of the American College of Nurse-Midwives*. American College of Nurse-Midwives Foundation, Washington DC: 32-5.

Esposito N (1993) Giving back the body: ethnography of a birthing centre. Columbia University Teachers College.

Esposito N (1999) Marginalised women's comparisons of their hospital and free-standing birth centre experience: a contract of inner city birthing centres. *Health Care for Women International* 20(2): 111-26.

Feldman E, Hunt M (1987) Outcomes and procedures in low risk birth: a comparison of hospital and birth centre settings. *Birth* 14(1): 18-24.

Fleming-V; Poat-H; Curzio-J (2001) Competencies of midwives with single or dual qualifications at the point of registration in Scotland. *Midwifery*. 2001. Dec. 17(4). p295-301.

Fraser D (1997) How do we know that midwives are competent to



practice? *Br-J-Midwifery*. 1997. Mar. 5(3). p126

Fraser WD, Roy C, Turcot L. Early amniotomy and early oxytocin for delay in nulliparae compared with routine care. [Protocol] *Cochrane Pregnancy and Childbirth Group Cochrane Database of Systematic Reviews*. Issue 2, 2002.

Fullerton J., Severino R. (1992) In-hospital care for low-risk childbirth: comparison with results from the National Birth Centre Study. *Journal of Nurse-Midwifery* Vol. 37, No. 5, September/October 331-340.

Garrett T, et al. (1987) Outcome of women booked into an isolated general practice maternity unit over eight years. *Journal of the Royal College of General Practitioners*, 37: 488-490.

Graham W (1997) Midwife-Led Care. *British Journal of Obstetrics and Gynaecology*, 104: 398-400.

Halpern SH, Leighton BL, Ohlsson A, et al (1998) Effect of epidural vs parenteral opioid analgesia on the progress of labor. *JAMA*; 280:2105- 2110.

Hepburn M, Elliott L. (1997) A community obstetric outcome for women with special needs. *British Journal of Midwifery*. August 1997, 5(8), 485-488

Hemminki E. Perinatal mortality distributed by type of hospital in the central hospital district of Helsinki, Finland. *Scand J Soc Med* 1985;13:113-8.

Hillan EM, McGuire M, Reid L. (1997) *Midwives and Woman Centred Care*. Edinburgh: RCM.

Hodnett E, Lowe N, Hannah M, Gafni A, Muir H, Ohlsson A, Stevens B, Willam A. (2002) The Nursing SCIL (Supportive Care in Labour) Trial. Paper presented at..Normal Labour and Birth Research Conference, University of Central Lancashire, Preston. 29<sup>th</sup> October 2002.

Hodnett ED. Home-like versus conventional institutional settings for birth (Cochrane Review). In: *The Cochrane Library*, Issue 3 2002. Oxford: Update Software.

Horrockes, Anderson, Salbury, 2002 Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *BMJ*. 2002 Apr 6;324(7341):819-23. Review.

Howell CJ. (1999) Epidural compared with non-epidural forms of pain relief in labour (Cochrane Review). In: *The Cochrane Library*, Issue 4. Oxford: Update Software.

Hundley V, Cruickshank F, Lang G. et al. (1994) Midwifery managed delivery unit: a randomised controlled comparison with consultant led care. *BMJ* 309:1400-1404.

Hundley V, Cruickshank F, Milne J, Glazener C, Lang G, Turner M, Blyth D, Mollison J. (1994) Satisfaction and continuity of care: staff views of care in a midwife –managed unit. *Midwifery* 11: 163-173.

Hurley J. (1998) Midwives and research–based practice. *British Journal of Midwifery*, May 1998, Vol. 6, No. 5.

Institute of Medicine and National Research Council (1982) *Research issues in the assessment of birth settings*. Washington, National Academy Press.

Jacoby A. (1987) Women’s preferences for and satisfaction with current procedures in childbirth – findings from a national study. *Midwifery*, 3: 117-124.

Johanson R, Newburn M, Macfarlane A (2002) Has the medicalisation of childbirth gone too far? *BMJ* Vol 324, 13 April 2002.

Kucera L. (1987) Making birth as simple as ABC. *East West* 17 (1): 58-62.

Lowe S, et al (1987) Comparison of outcomes of low-risk labour in an isolated general practice maternity unit and a specialist maternity hospital, *Journal of the Royal College of General Practitioners*, 37:484-487.

Lowe SW, House W, Garrett T. Comparison of outcome of low-risk labour in an isolated general practice maternity unit and a specialist maternity hospital. *J R Coll Gen Pract* 1987; 37:484-7.

Macvicar J, Dobbie G, Owen-Johnstone L, Jagger C, Hopkins M, Kennedy J. Simulated home delivery in hospital: a randomised controlled trial. *Br J Obstet Gyn* 1993; 100:316-23.

Maggs C, Rapport F (1996) Getting a job and growing in confidence: the dual experience of newly qualified midwives prepared by the pre-registration route. *NT-Research*. 1996. Jan./Feb. 1(1). p68-78.

Mander R. (1997) Choosing the choices in the USA: examples in maternity care. *Journal of Advanced Nursing*. 25, 1192-1197

Marsh GN, Channing DM. Audit of 26 years of obstetrics in general practice. *BMJ* 1989; 298:1077-80.

McCourt C, Page L (1997) Report on the Evaluation of One to One Midwifery. London: Thames Valley University.

McCrea H, Crute V (1991) Midwife/client relationship: Midwives' perspectives. *Midwifery*, 7: 183-192.

Mires, Williams, Howie (2001) Randomised controlled trial of cardiotocography versus Doppler auscultation of fetal heart at admission in labour in low risk obstetric population 2001; 322:1457-1462 (16 June).

Murphy P (1994) Risk, risk assessment and risk labels. *Journal of Nurse Midwifery* 39(2): 67-9.

Murphy PA, Fullerton J. Outcomes of intended home births in nurse-midwifery practice: a prospective descriptive study. *Obstetric Gynaecology* 1998; 92: 461-470.

Mustard C.A. & Ross, N.P. (1994). The relationship of prenatal care and pregnancy complications to birthweight in Winnipeg, Canada. *American Journal of Public Health*, 84 (9) 1450 – 1457.

NASAL (2000) Risk Management Standards and Procedures. Standard 10: Maternity Care Clinical Negligence Scheme for Trusts. NHS Litigation Authority, London.

Northern Region Perinatal Mortality Survey Coordinating Group Collaborative survey of perinatal loss in planned and unplanned home births. *BMJ* 1996; 313:1306-1309.

Northern Region Perinatal Mortality Survey Coordinating Group. Collaborative survey of perinatal loss in planned and unplanned home births. *BMJ* 1996; 313: 1306-1309.

Northern Regional Perinatal Mortality Survey Coordinating Group. an audit of former Northern Regional Health Authority area during 1981-94.

Northern Regional Perinatal Mortality Survey Coordinating Group. Collaborative survey of perinatal loss in planned and unplanned home births. *BMJ* 1996:313; 1306-9.

O'Driscoll K, Meagher D, Boylan P. Active management of labor. London: Mosby, 1993.

Olsen O, Jewell MD. Home versus hospital birth (Cochrane Review). In: The Cochrane Library, Issue 3 2002. Oxford: Update Software.

Olsen, Ole. (1997) Meta-analysis of the safety of home birth. *Birth* 24(1): 4-13.

Oppenheim C (1993) *Poverty the facts*, Child Poverty Action Group, London.

Penney G, Graham W, Hundley V, Teglingen, Rennie AM, Fitzmaurice A, Heddle M (1999) *Maternity Care Matters - An Audit of Maternity Services in Scotland* Scottish Programme for Clinical Effectiveness in Reproductive Health. Dugald Baird Centre for Research in Woman's Health. Aberdeen.

Parkashban, Hisock, Mitchell, 1997 *Midwives and perinatology. (Extended role of midwife in perinatal mortality enquiries).* *British Journal of Midwifery* 4(1) Jan 1996 20-21

Petts, J., Horlick-Jones, T. and Murdock, G. (2001) *Social Amplification of Risk: the Media and the Public* Contract Research Report 329/2001 HSE Books, Sudbury.

RCM (1999) *Support Workers In the Maternity Services (previously the Place of Healthcare Assistants in the Maternity Services).* (Position Paper 5a) September. London.

RCM (2000) *Vision 2000 Policy Document.* London, RCM.

RCOG, RCM (1999) *Towards Safer Childbirth: Minimum Standards for the Organisation of Labour Wards.* Report of Joint Working Party, London, RCOG Bookshop.

Registrar General's Annual Review of Demographic Trends in Scotland's Population 2001. General Register Office for Scotland, 2002

Reinharz D, Blais R, Fraser W (2000) Cost-effectiveness of midwifery services vs. medical services in Quebec. *Canadian Journal of Public Health* 91(1): 112-5.

Rennie AM, Hundley V, Gurney E, Graham W. (1998) *Women's Priorities For Care Before and After Delivery.* *British Journal of Midwifery* Vol 6, No 7. Pp434-438.

Reynolds JL, Yudkin PL, Bull MJV. General practitioner obstetrics: does risk prediction work? *J R Coll Gen Pract* 1988; 38:307-10.

Rooks J, Weatherby N, Ernst E (1992) *The National Birth Centre Study. Part 11 – Intrapartum and immediate postpartum and neonatal care.* *Journal of Nurse Midwifery* 37(5): 301-30.

Rooks J, Weatherby N, Ernst R et al (1989) *Outcomes of care in birth centres: the national birth centre study.* *New England Journal of Medicine* 321(26): 1804-1811.

Rosenblatt RA, Reinken J, Shoemack P. *Is obstetrics safe in small hospitals?* *Lancet* 1985;i: 429-33.

Rosser J & Anderson T (2000) *What next? Taking normal birth out of the labour ward.* *The Practising Midwife* 3(4): 4-5.

Rosser J, (2001) *Birth Centres- the key to modernising the maternity services.* MIDIRS Midwifery Digest (Sept 2001) 11.3: Supplement 2.

Rosser J, Turner L, Manero E, Walker J, Anderson T, Hallett R (2001) *Briefing Paper for the all Parliamentary Group on the Maternity Services.* East Sussex Press.

Saunders D, Boulton M, Chapple J, Ratcliffe J, Levitan J (2000) *Evaluation of the Edgware Birth Centre.* Middlesex, North Thames Perinatal Public Health.

Saxell L (2000) Risk: theoretical or actual. In Page (ed.) *The New Midwifery: Science & Sensitivity in Practice*. London, Churchill Livingstone.

Scottish Executive (2002) *Working for Health – the Workforce Development Action Plan*. SEHD August 2002.

Scottish Executive (2002) *Future Practice – A review of the Scottish Medical workforce (Temple Report)*. SEHD

Scottish Executive (2001) *A Framework for Maternity Services in Scotland*. SEHD February 2001.

Scottish Executive (2000) *Our national Health. A plan for action, a plan for change*. Scottish executive Health Department, December 2000.

Scottish Office Department of Health (1997) *Designed to Care - Renewing the National Health Service in Scotland*. Edinburgh: HMSO.

Scottish Office Home and Health Department (1993) *Provision of Maternity Services in Scotland: A Policy Review*. Edinburgh: HMSO.

Scottish Office Home and Health Department (1993). *The Review of Specialist Registrar Training (Calman)*

Scupholme A, McLeod A, Robertson E (1986) A birth centre affiliated with the tertiary centre: comparison of outcome. *Obstetrics & Gynaecology* 67(4): 598-603.

Spitzer M. (1995) Birth Centres: Economy, Safety and Empowerment *Journal of Nurse-Midwifery* Vol. 40, No. 4 July/August pp371-375.

Street P, Gannon MJ, Holt EM. Community obstetric care in West Berkshire. *BMJ* 1991; 302:698-700.

T A Wieggers, M J N C Keirse, J van der Zee, and G A H Berghs (1996) Outcome of planned home and planned hospital births in low risk pregnancies: prospective study in midwifery practices in the Netherlands) *BMJ* 1996; 313: 1309-1313.

Taylor GW, Edgar W, Taylor BA, Neal DG. How safe is general practitioner obstetrics? *Lancet* 1980;ii: 1287-9.

Thomson A (2000) Is there evidence for the medicalisation of maternity care? *MIDIRS Midwifery Digest* 10; 4.

Townsend P, Davidson N (1982) *Inequalities in Health: The Black Report*. Penguin, Harmondsworth.

Tucker J, Florey CduV, Howie P, McIlwaine G, Hall M. Is antenatal care apportioned according to obstetric risk? The Scottish antenatal care study. *J Pub Health Med* 1994; 16:60-70.

Turnbull D, Reid M, McGinley M, Shields N. (1995) Changes in midwives' attitudes to their professional role following the implementation of the Midwifery Development Unit. *Midwifery* 11 p 110-119.

Useful contact::

Birth Centre Network UK e-group at: [www.e.groups.com/group/birthcentres](http://www.e.groups.com/group/birthcentres)

Van Alten D, Eskes M, Treffers PE. Midwifery in the Netherlands. The Wormerveer study: selection, mode of delivery, perinatal mortality and infant morbidity. *Br J Obstet Gyn* 1989; 96:656-62.

Waldenstrom U & Lawson J (1998) Birth centre practices in Australia. *Australian & New Zealand Journal of Obstetrics & Gynaecology* 38(1): 42-50.

Waldenstrom U, Nilsson CA, Winbladh B, 1997. The Stockholm Birth Centre trial; Maternal and infant outcome. *Br J Obstet Gyn* 1997; 104: 410-18.

Walker J (2000) Personal communication with author.

Walker J (2000) Women's experiences of transfer from a midwife-led to a consultant-led maternity unit in the UK during late pregnancy and labour. *Journal of Midwifery & Women's Health* 45(2): 161-68.

Walker, G., Simmons, P. et al (1998) *Public Perceptions of Risks Associated with Major Accident Hazards* HSE Books, Sudbury.

Walsh D (2000) Evidence Based Care Series 2: Free standing birth centres. *British Journal of Midwifery* Vol 8, No 6.

Wallman, S. (2000) Risk, STD and HIV infection in Kampala, *Health, Risk and Society*, 2, pp. 198-203.

Wallman, S. (2001) Global threats, local options, personal risk: dimensions of migrant sex work in Europe *Health, Risk and Society*, 3, pp. 75-87.

Weigers T, van de Zee J, Kierse M (1998) Transfer from home to hospital: What is its effect on the experience of childbirth? *Birth* 25(1): 19-24.

White V. (1996) Midwives' perception of research based practice in McCormick F, Renfrew M, Eds *The Midwifery Research database/MIRIAD 2ND edn.* Books for Midwives Press. Cheshire.

Williams D. (1990) Socio-economic differentials in health: a review and re-direction. *Social Psychology Quarterly* 53 (2) 81-99

Young D, Lees A, Twaddle S (1997) The costs to the NHS of maternity care: midwife – managed vs. shared. *British Journal of Midwifery* 5(8) 465-471.

Young G (1987) Are isolated maternity units run by general practitioners dangerous? *British Medical Journal*, 294:744-746.

Young G, Campbell R, MacFarlane A. General practitioner maternity units. *BMJ* 1990; 301:665-6, 983-4.

Young G. Are isolated maternity units run by general practitioners dangerous? *BMJ* 1987;294:744-6.

Young G, MacFarlane A, McCandlish R, Campbell R, Chamberlain G, Drife J (2000) Choosing between home and hospital delivery. *BMJ*, March 18: 320(7237): 798-798

Zander L, Chamberlain G. ABC of labour care: Place of birth. *BMJ* 1999; 318: 721-723.

## **ANNEX A: REMIT AND MEMBERSHIP OF EXPERT GROUP ON ACUTE MATERNITY SERVICES**

### **Remit of the group**

1. The Group is tasked to produce a model specification for the provision of acute maternity services within the context of *A Framework for Maternity Services in Scotland*, and essentially within existing resources. The Group should consider national, regional and local planning of maternity services, and promote innovative approaches to intrapartum care, consistent with the principles set out in the Framework. The specification will assist NHS Boards to plan and configure their acute maternity services.
2. The Group should review and summarise international approaches to intrapartum care and describe the present configuration of acute maternity services in Scotland. It should apply appropriate models of acute maternity care and delivery, consistent with the Framework, to Scottish geography and demography to ensure a woman-centred, safe service, available to women as close to their home as possible. The model service specification should describe how to maximise patient choice, whilst ensuring proper assessment and safe management of risk. The group should consider development of a regional approach to the management of high risk obstetric care, based on the hub and spoke model set out in the *Acute Services Review*.
3. The Group should include in the model specification for acute maternity services
  - The range of professional skills required by the Scottish obstetric workforce, and practical proposals to achieve this;
  - Describe the range of maternity care providers, patterns of work and employment contracts;
  - Recommend arrangements for enhancing the skills and responsibilities of midwives;
  - Describe midwives' role and responsibilities in midwife led services, and how they can be deployed as consultants;
  - Identify innovative approaches to training and education for obstetric professionals; and
  - Describe the support services required for the development of modern maternity services in Scotland, and in particular arrangements for transfer between services, transfer and retrieval and telemedicine.

## Membership of the Group

### Chair: Mrs Mary Mulligan, Deputy Minister for Health and Community Care

Miss Gill Allan	Senior Clinical Midwife, Labour Ward, Ninewells Hospital, Dundee
Ms Ann Bethune	Implementation Group for Maternity Services, Highland NHS Board
Ms Yvonne Bronsky	Midwife & Service Manager, Women and Children's Directorate, Wishaw General Hospital
Professor Andrew Calder	Chair of the RCOG Scottish Executive & Professor of Obstetrics and Gynaecology, University of Edinburgh
Dr Alan Cameron	Consultant Obstetrician and Feto-maternal Specialist, Queen Mother's Hospital, Yorkhill
Dr Jim Chalmers	Consultant in Public Health Medicine, Information Services Division
Mrs Fiona Dagge-Bell	Senior Midwife, NMPDU
Mrs Mareth Irving	Member of Maternity Services Liaison Committee, Dumfries & Galloway NHS Board
Dr John McClure	Consultant Anaesthetist, Royal Infirmary of Edinburgh
Dr Sheena MacDonald	General Practitioner, Earlston, Berwickshire
Dr Graeme McLeod	Consultant Paediatrician, Royal Alexandra Hospital, Paisley
Professor Stuart Macpherson	Postgraduate Dean
Mr Gerry Marr	Chief Executive, Tayside University Hospitals NHS Trust
Dr Andrew Marsden	Medical Director, Scottish Ambulance Service
Dr Alan Mathers	Consultant Obstetrician and Maternal Fetal Specialist, Princess Royal Maternity Hospital, Glasgow
Ms Anne Mitchell	Advanced Neonatal Nurse Practitioner, Simpson's Memorial Maternity Pavilion
Dr Catriona Morton	General Practitioner Principal, Craigmillar, Edinburgh
Mr John Mullin	Chairman, Argyll & Clyde NHS Board
Ms Patricia Purton	Director, Royal College of Midwives
Dr Judith Steel	Associate Specialist in Diabetes, Victoria Hospital, Kirkcaldy
Dr Graham Stewart	Consultant Paediatrician, Royal Alexandra Hospital, Paisley
Dr Tom Turner	Consultant Paediatrician, Queen Mother Hospital, Yorkhill
Dr Ewen Walker	Consultant Obstetrician/Gynaecologist, Ayrshire & Arran Acute Hospitals NHS Trust
Dr Mac Armstrong	Chief Medical Officer, Scottish Executive Health Department
Miss Anne Jarvie	Chief Nursing Officer, Scottish Executive Health Department
Marilyn Barrett	Directorate of Human Resources, Scottish Executive Health Department
Dr Ian Bashford	Senior Medical Officer, Scottish Executive Health

Dr Margaret McGuire	Department
Ms Jackie McRae	Midwifery Development Officer, NHSScotland, RCM
	Head of Women and Children's Unit, Scottish
	Executive Health Department
David Robb	Directorate of Human Resources, Scottish Executive
	Health Department
Iain Ross	Women and Children's Unit, Scottish Executive
	Health Department
Alexandra Simpson	Women and Children's Unit, Scottish Executive
	Health Department
Mrs Jean Swaffield	Nursing Officer, Scottish Executive Health
	Department



### **Education and clinical competency subgroup**

Dr Margaret McGuire	Midwife (Chair)
Dr Ian Bashford	Senior Medical Officer
Mrs Jean Swaffield	Nursing Officer
Dr Alan Mathers	Obstetrician
Dr Ian Laing	Paediatrician
Dr Mike Taylor	Director of Postgraduate GP Education
Dr Catriona Morton	GP
Dr Ewen Walker	Obstetrician
Ms Gill Allan	Clinical Midwife, Ninewells
Mrs Yvonne Bronsky	Midwife Manager, Wishaw General
Mrs Fiona Dagge-Bell	Senior Midwife (NMPDU)
Dr Graeme McLeod	Anaesthetist
Mrs Monica Thompson	NES

### **Remit**

The Education and Clinical Competency subgroup was tasked to:

1. Describe and match the competencies and skills required for each model with each professional group:
  - a. range of professional skills;
  - b. professional group.
  
2. **Identify education and training programmes and opportunities that will ensure:**
  - a. that clinicians have the required skills, competencies, confidence and decision making skills to successfully implement the identified model of maternity care;
  - b. that clinicians maintain the necessary skills and competencies in order to delivery quality, evidence based maternity care.
  
3. Identify innovative approaches to the education and training of maternity care professionals.

4. Consider how demographics might impact on the nature of care provision, differing educational requirements and maintaining clinical skills and competencies.
  
5. Identify ways in which telemedicine can impact on the education and skill maintenance of maternity care professionals in remote and rural settings.

### **Risk management subgroup**

Dr Alan Cameron	Obstetrician (Chair)
Dr Ian Bashford	Senior Medical Officer
Dr Sheena McDonald	GP
Mrs Fiona Dagge-Bell	Senior Midwife, NMPDU
Miss Eleanor Stenhouse	Senior Midwife
Dr Graham Stewart	Paediatrician
Dr Tom Turner	Paediatrician
Dr Ian Lowles	Obstetrician
Dr Margaret McGuire	Midwife
Dr John McClure	Anaesthetist
Dr Andrew Marsden	Scottish Ambulance Service

### **Remit**

The Risk Management Subgroup was tasked to:

1. Identify models of maternity care and apply appropriate risk assessment structures to each model.
2. Develop a regional approach to the management of high risk obstetric care (hub and spoke model).
3. Describe the support services required for the development of a modern maternity service, especially:
  - a. transfer between services;
  - b. transfer and retrieval;
  - c. telemedicine.
4. Identify and specify national and regional risk management strategies.

## ANNEX B: TABLES AND STATISTICS ON MATERNITY SERVICES IN THE YEAR 1999-2000 FOR SCOTLAND.

These returns are based on the Information and Services Division of the CSA returns.

**Table A.1: Maternity locations in Scotland at March 2000**

NHS Board	Hospital	Abbreviation	Levels of Intrapartum Care	Location
A&C	Royal Alexandra Hospital	RAH	IIC	Paisley
	Inverclyde Royal Hospital	IRH	IIC	Gourock
	Vale of Leven Hospital	VLH	IIB	Alexandria
	Lorne & Island DGH	LIDGH	IC	Oban
	Dunoon & District General Hospital	DDGH	IC	Dunoon
	Campbeltown Hospital	CH	IB	Campbeltown
	Victoria Hospital	VH	IB	Rothsay
	Mid Argyll Hospital	MAH	IB	Lochgilphead
	Islay Hospital	IH	IB	Bowmore (Islay)
A&A	Ayrshire Central Maternity Hospital	ACMH	IIC	Girvan
	Isle of Arran War Memorial Hospital	IAWMH	IB	Arran
	Davidson Cottage Hospital	DCH	IB	Irvine
Borders	Borders General Hospital	BGH	IIB	Melrose
D&G	Cresswell Maternity Hospital	CMH	IIC	Dumfries
	Dalrymple Hospital	DH	IB	Stranraer
Fife	Forth Park Maternity Hospital	FPMH	IIC	Kirkcaldy
FV	Falkirk & District Royal Infirmary	FDRI	IIC	Falkirk
	Stirling Royal Infirmary	SRI	IIC	Stirling
Grampian	Aberdeen Maternity Hospital	AMH	III	Aberdeen
	Dr Gray's Hospital	DGH	IIB	Elgin
	Insch and District War Memorial Hospital	IDWMH	IB	Insch
	Jubilee Hospital	JH	IB	Huntly
	Kincardine O'Neil War Memorial Hospital	KOWMH	IB	Torphins
	Chalmers Hospital	CH	IB	Banff
	Fraserburgh Hospital	FH	IB	Fraserburgh
	Peterhead Cottage Hospital	PCH	IB	Peterhead
GG	Princess Royal Maternity Hospital	PRMH	III	Glasgow
	Queen Mother's Hospital	QMH	III	Glasgow
	Southern General Hospital	SGH	IIC	Glasgow
Highland	Raigmore Hospital	RH	IIC	Inverness
	Caithness General Hospital	CGH	IIA	Wick
	Belford Hospital	BH	IC	Fort William
	Portree Hospital	PH	IB	Portree, Skye
	Mackinnon Memorial Hospital	MMH	IB	Broadford, Skye
Lanarkshire	Wishaw General Hospital	WGH	IIC	Wishaw
Lothian	Simpson Maternity Memorial Pavilion	SMMP	III	Edinburgh
	St John's Hospital	SJH	IIC	Livingston
Orkney	Gilbert Bain Maternity Hospital	GBMH	IC	Lerwick
Shetland	Balfour Hospital	BH	IC	Kirkwall
Tayside	Ninewells Hospital	NH	IIC	Dundee
	Perth Royal Infirmary	PRI	IIC	Perth
	Arbroath Infirmary	AI	IB	Arbroath

## Expert Group on Acute Maternity Services - Reference Report

	Montrose Royal Infirmary	MRI	Ib	Montrose
	Whitehills Hospital	WH	Ib	Forfar
WI	Western Isles Hospital	WIH	Iib	Stornoway
	Daliburgh Hospital	DH	Ib	Daliburgh

**Table A.2: Number of deliveries by NHS Board and Hospital**

NHS Board/Hospital	Population as at 1999	No of Maternities				Home Birth 1998 -planned and unplanned	Levels of IP Care	Levels of P Care
		1992-93	1997-98	1999-00	2000-01			
<b>Argyll &amp; Clyde</b>	<b>87,620</b>	<b>5,015</b>	<b>4,517</b>	<b>4,163</b>	<b>3981</b>	<b>29</b>		
Royal Alexandra		2,444	2,306	2,155	2047		IIC	
Inverclyde Royal		-	1,056	1,017	984		IIC	
Rankin Memorial		1,196	-	-	-			
Vale of Leven DGH		1,197	1,043	870	862		IIB	
Oban Maternity Hospital		57	-	-	-		IC	
Dunoon & District General		34	33	31	21		IC	
Lorn & Islands DGH		-	38	49	39		IC	
Campbeltown Hospital		9	12	6	5		IB	
Victoria Hospital		28	18	12	9		IB	
Mid Argyll		11	9	22	14		IB	
Calton Hospital		32	-	-	-			
Islay Hospital		7	2	1	-		IB	
<b>Ayrshire &amp; Arran</b>	<b>76,213</b>	<b>4,246</b>	<b>3,864</b>	<b>3,529</b>	<b>3516</b>	<b>26</b>		
Ayrshire Central		4,228	3,843	3,517	3504		IIC	
Isle of Arran War Memorial Hospital		12	17	9	7		IB	
Davidson Cottage		6	4	3	1		IB	
Crosshouse Hospital		-	-	-	4			
<b>Borders</b>	<b>18,877</b>	<b>1,086</b>	<b>973</b>	<b>985</b>	<b>976</b>	<b>12</b>		
Borders General		1,086	973	985	976		IIB	
<b>Dumfries and Galloway</b>	<b>27,037</b>	<b>1,665</b>	<b>1,531</b>	<b>1,366</b>	<b>1326</b>	<b>18</b>		
Cresswell		1,551	1,432	1,293	1230		IIC	
Dalrymple		114	99	73	96		IB	
<b>Fife</b>	<b>72,037</b>	<b>3,795</b>	<b>3,181</b>	<b>2,974</b>	<b>2941</b>	<b>58</b>		
Forth Park		2,474	3,181	2,973	2941		IIC	
Queen Margaret		-	-	1	-			
Dunfermline Maternity		1,321	-	-	-			
<b>Forth Valley</b>	<b>58,477</b>	<b>3,528</b>	<b>3,288</b>	<b>3,079</b>	<b>3025</b>	<b>29</b>		
Stirling RI		1,796	1,657	1,598	1547		IIC	
Falkirk & District RI		1,732	1,631	1,481	1478		IIC	
<b>Grampian</b>	<b>110,252</b>	<b>6,619</b>	<b>6,041</b>	<b>5,716</b>	<b>5302</b>	<b>44</b>		
Aberdeen Mat		5,717	4,720	4,519	4157		III	
Dr Gray's		-	951	867	825		IIB	
Insch & District War Mem		23	19	20	18		IB	
Jubilee		36	35	16	19		IB	
Kincardine O'Neil War Mem		55	23	37	39		IB	
Chalmers		72	66	57	56		IB	
Fraserburgh		183	104	86	78		IB	
Peterhead Cottage		130	122	114	110		IB	
Inverurie Hospital		-	1	-	-			
Seafield Hospital		92	-	-	-			
Turner Memorial Hospital		32	-	-	-			
Leancoil Hospital		42	-	-	-			
Maryhill Maternity Ward		237	-	-	-			
<b>Greater Glasgow</b>	<b>207,255</b>	<b>14,264</b>	<b>12,930</b>	<b>10,694</b>	<b>8771</b>	<b>57</b>		
Glasgow Royal Mat		4,718	4,525	4,266	2636		III	

Expert Group on Acute Maternity Services - Reference Report

Queen Mothers		3,613	3,629	3,589	3379		III	
Southern General		2,289	2,252	2,839	2756		IIc	
Rutherglen Maternity		3,009	2,520	-	-			
Stobhill		635	-	-	-			
Glasgow Royal Infirmary		-	4	-	-			
<b>Highland</b>	<b>39,959</b>	<b>2,894</b>	<b>2,393</b>	<b>2,157</b>	<b>2184</b>	44		
Raigmore		2,441	2,058	1,890	1895		IIc	
Caithness General		329	263	227	239		IIa	
Belford		52	50	28	36		Ic	
Portree		17	14	8	10		Ib	
Mackinnon Memorial		10	8	4	4		Ib	

Expert Group on Acute Maternity Services - Reference Report

NHS Board/Hospital	Population as at 1999	No of Maternities				Home Birth 1998 -planned and unplanned	Levels of IP Care	Levels of P Care
		1992-93	1997-98	199900	2000-01			
<b>Lanarkshire</b>	<b>122,138</b>	<b>5,018</b>	<b>4,636</b>	<b>4,912</b>	<b>4856</b>	<b>35</b>		
Bellshill		3,783	3,286	3,488	3467		IIC	
Law		343	1,350	1,424	1388		IIC	
William Smellie Maternity Hospital		892	-	-				
Wishaw General Hospital	-	-	-	-	1			
<b>Lothian</b>	<b>176,253</b>	<b>9,678</b>	<b>9,056</b>	<b>8,733</b>	<b>8364</b>	<b>106</b>		
SMMP		5,218	4,893	6,353	6019		III	
St John's		2,189	2,192	2,380	2345		IIC	
Eastern General		2,271	1,971	-	-			
<b>Orkney</b>	<b>3,597</b>	<b>142</b>	<b>127</b>	<b>101</b>	<b>94</b>	<b>6</b>		
Balfour		142	127	101	94		Ic	
<b>Shetland</b>	<b>4,527</b>	<b>248</b>	<b>193</b>	<b>193</b>	<b>144</b>	<b>0</b>		
Gilbert Bain		248	193	193	144		Ic	
<b>Tayside</b>	<b>77,080</b>	<b>5,221</b>	<b>4,678</b>	<b>4,339</b>	<b>4188</b>	<b>37</b>		
Ninewells		3,519	3,059	2,847	2770		IIC	
Perth RI		1,347	1,337	1,282	1206		IIC	
Montrose RI		79	106	81	84		Ib	
Arbroath Infirmary		150	93	68	85		Ib	
Whitehills		-	83	61	43		Ib	
Fyfe Jamieson Maternity Home		126	-	-	-			
<b>Western Isles</b>	<b>4,876</b>	<b>234</b>	<b>197</b>	<b>119</b>	<b>-</b>	<b>6</b>		
Western Isles		83	197	119	-		IIB	
Lewis Hospital		140	-	-	-			
Daliburgh Hospital		11	-	-	-			
<b>Home</b>		<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>			
<b>Total</b>		<b>63,608</b>	<b>57,605</b>	<b>53,061</b>	<b>49668</b>			



**Table A.3: Number of deliveries by hospital and deprivation quintile**

	Deprivation Score - Quintiles						Total
	1	2	3	4	5	nk	
<b>Argyll &amp; Clyde</b>	<b>663</b>	<b>588</b>	<b>504</b>	<b>1,067</b>	<b>1,191</b>	<b>89</b>	<b>4,102</b>
Royal Alexandra	452	272	169	526	663	41	2,123
Inverclyde Royal	65	96	179	164	468	25	997
Vale of Leven DGH	142	178	97	365	60	19	861
Lorn & Islands DGH	1	14	32	-	-	2	49
Dunoon & District General	-	14	17	-	-	-	31
Campbeltown Hospital	-	-	6	-	-	-	6
Victoria Hospital	-	-	-	12	-	-	12
Mid Argyll	3	14	4	-	-	1	22
Islay Hospital	-	-	-	-	-	1	1
<b>Ayrshire &amp; Arran</b>	<b>441</b>	<b>394</b>	<b>913</b>	<b>948</b>	<b>707</b>	<b>78</b>	<b>3,481</b>
Ayrshire Central	441	385	910	948	707	78	3,469
Isle of Arran War Memorial	-	9	-	-	-	-	9
Davidson Cottage	-	-	3	-	-	-	3
<b>Borders</b>	<b>208</b>	<b>484</b>	<b>159</b>	<b>66</b>	<b>2</b>	<b>52</b>	<b>871</b>
Borders General	208	484	159	66	2	52	971
<b>Dumfries &amp; Galloway</b>	<b>265</b>	<b>519</b>	<b>200</b>	<b>350</b>	<b>1</b>	<b>15</b>	<b>1,350</b>
Cresswell	260	502	189	311	1	14	1,277
Dalrymple	5	17	11	39	-	1	73
<b>Fife</b>	<b>213</b>	<b>419</b>	<b>1,321</b>	<b>743</b>	<b>126</b>	<b>115</b>	<b>2,937</b>
Forth Park	213	419	1,321	742	126	115	2,936
Queen Margaret	-	-	-	1	-	-	1
<b>Forth Valley</b>	<b>529</b>	<b>587</b>	<b>984</b>	<b>704</b>	<b>186</b>	<b>46</b>	<b>3,036</b>
Falkirk & District RI	228	224	472	515	7	18	1,464
Stirling RI	301	363	512	189	179	28	1,572
<b>Grampian</b>	<b>2,526</b>	<b>1,050</b>	<b>828</b>	<b>760</b>	<b>149</b>	<b>307</b>	<b>5,620</b>
Aberdeen Maternity	2,352	611	600	635	149	88	4,435
Dr Gray's	99	337	148	56	-	215	855
Insch & District War Mem	19	-	1	-	-	-	20
Jubilee	4	8	4	-	-	-	16
Kincardine O'Neil War Mem	31	6	-	-	-	-	37
Chalmers	1	21	18	17	-	-	57
Fraserburgh	2	31	-	52	-	1	86
Peterhead Cottage	18	36	57	-	-	3	114
<b>Greater Glasgow</b>	<b>1575</b>	<b>1150</b>	<b>1279</b>	<b>1377</b>	<b>4928</b>	<b>243</b>	<b>10,552</b>
Glasgow Royal Mat	338	591	385	760	2,040	103	4,217
Queen Mothers	734	339	526	312	1,567	59	3,537
Southern General	503	220	368	305	1,321	81	2,798
<b>Highland</b>	<b>255</b>	<b>784</b>	<b>675</b>	<b>197</b>	<b>17</b>	<b>197</b>	<b>2,125</b>
Raigmore	240	718	500	194	13	194	1,859
Caithness General	15	63	146	-	-	2	226
Belford	-	1	22	3	2	-	28
Portree	-	2	5	-	-	1	8
MacKinnon Memorial	-	-	2	-	2	-	4
<b>Lanarkshire</b>	<b>173</b>	<b>788</b>	<b>862</b>	<b>1,106</b>	<b>1,818</b>	<b>109</b>	<b>4,856</b>
Bellshill	124	541	486	759	1,451	84	3,445
Law	49	247	376	347	367	25	1,411
<b>Lothian</b>	<b>1,794</b>	<b>1,535</b>	<b>1,826</b>	<b>2,645</b>	<b>645</b>	<b>165</b>	<b>8,610</b>
SMMP	1,283	1,074	1,231	1,955	585	126	6,254
St John's	511	461	595	690	60	39	2,356
<b>Orkney</b>	<b>-</b>	<b>101</b>	<b>b-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>101</b>

Expert Group on Acute Maternity Services - Reference Report

Balfour		-	101	-	-	-	101
<b>Shetland</b>	<b>7</b>	<b>123</b>	<b>61</b>	-	-	<b>2</b>	<b>193</b>
Gilbert Bain	7	123	61	-	-	2	193
<b>Tayside</b>	<b>1,065</b>	<b>1,085</b>	<b>603</b>	<b>582</b>	<b>823</b>	<b>115</b>	<b>4,273</b>
Ninewells	645	536	495	236	823	55	2,790
Perth RI	402	474	56	283	-	58	1,273
Arbroath Infirmary	8	11	12	36	-	1	68
Montrose RI	3	29	22	27	-	-	81
Whitehills	7	35	18	-	-	1	61
<b>Western Isles</b>	-	<b>54</b>	<b>52</b>	<b>3</b>	<b>9</b>	-	<b>118</b>
Western Isles	-	54	52	3	9	-	118
<b>Home</b>	-	-	<b>1</b>	-	-	-	<b>1</b>
<b>Total</b>	<b>9,714</b>	<b>9,661</b>	<b>10,268</b>	<b>10,548</b>	<b>10,602</b>	<b>1,533</b>	<b>53,326</b>

**Table A.3a: Percentage deliveries by hospital and deprivation quintiles**

	Deprivation Score – Quintiles						Total
	1	2	3	4	5	nk	
<b>Argyll &amp; Clyde</b>	<b>16.2</b>	<b>14.3</b>	<b>12.3</b>	<b>26.0</b>	<b>29.0</b>	<b>2.2</b>	<b>100.0</b>
Royal Alexandra	21.3	12.8	8.0	24.8	31.2	1.9	100.0
Inverclyde Royal	6.5	9.6	18.0	16.4	46.9	2.5	100.0
Vale of Leven DGH	16.5	20.7	11.3	42.4	7.0	2.2	100.0
Lorn & Islands DGH	2.0	28.6	65.3	-	-	4.1	100.0
Dunoon & District General	-	45.2	54.8	-	-	-	100.0
Campbeltown Hospital	-	-	100.0	-	-	-	100.0
Victoria Hospital	-	-	-	100.0	-	-	100.0
Mid Argyll	13.6	63.6	18.2	-	-	4.5	100.0
Islay Hospital	-	-	-	-	-	100.0	100.0
<b>Ayrshire &amp; Arran</b>	<b>12.7</b>	<b>11.3</b>	<b>26.2</b>	<b>27.2</b>	<b>20.3</b>	<b>2.2</b>	<b>100.0</b>
Ayrshire Central	12.7	11.1	26.2	27.3	20.42	2.2	100.0
Isle of Arran War Memorial	-	100.0	-	-	-	-	100.0
Davidson Cottage	-	-	100.0	-	-	-	100.0
<b>Borders</b>	<b>21.4</b>	<b>49.8</b>	<b>16.4</b>	<b>6.8</b>	<b>0.2</b>	<b>5.4</b>	<b>100.0</b>
Borders General	21.4	49.8	16.4	6.8	0.2	5.4	100.0
<b>Dumfries &amp; Galloway</b>	<b>19.6</b>	<b>38.4</b>	<b>14.8</b>	<b>25.9</b>	<b>0.1</b>	<b>1.1</b>	<b>100.0</b>
Cresswell	20.4	39.3	14.8	24.4	0.1	1.1	100.0
Dalrymple	6.8	23.3	15.1	53.4	-	1.4	100.0
<b>Fife</b>	<b>7.3</b>	<b>14.3</b>	<b>45.0</b>	<b>25.3</b>	<b>4.3</b>	<b>3.9</b>	<b>100.0</b>
Forth Park	7.3	14.3	45.0	25.3	4.3	3.9	100.0
Queen Margaret	-	-	-	100.0	-	-	100.0
<b>Forth Valley</b>	<b>17.4</b>	<b>19.3</b>	<b>32.4</b>	<b>23.2</b>	<b>6.1</b>	<b>1.5</b>	<b>100.0</b>
Falkirk & District RI	15.6	15.3	32.2	35.2	0.5	1.2	100.0
Stirling RI	19.1	23.1	32.6	12.0	11.4	1.8	100.0
<b>Grampian</b>	<b>44.9</b>	<b>18.7</b>	<b>14.7</b>	<b>13.5</b>	<b>2.7</b>	<b>5.5</b>	<b>100.0</b>
Aberdeen Maternity	53.0	13.8	13.5	14.3	3.4	2.0	100.0
Dr Gray's	11.6	39.4	17.3	6.5	-	25.1	100.0
Insch & District War Mem	95.0	-	5.0	-	-	-	100.0
Jubilee	25.0	50.0	25.0	-	-	-	100.0
Kincardine O'Neil War Mem	83.3	16.2	-	-	-	-	100.0
Chalmers	1.8	36.8	31.6	29.8	-	-	100.0
Fraserburgh	2.3	36.0	-	60.5	-	1.2	100.0
Peterhead Cottage	15.8	31.6	50.0	-	-	2.6	100.0
<b>Greater Glasgow</b>	<b>14.9</b>	<b>10.9</b>	<b>12.1</b>	<b>13.0</b>	<b>46.7</b>	<b>2.3</b>	<b>100.0</b>
Glasgow Royal Mat	8.0	14.0	9.1	18.0	48.4	2.4	100.0
Queen Mothers	20.8	9.6	14.9	8.8	44.3	1.7	100.0
Southern General	18.0	7.9	13.2	10.9	47.2	2.9	100.0
<b>Highland</b>	<b>12.0</b>	<b>36.9</b>	<b>31.8</b>	<b>9.3</b>	<b>0.8</b>	<b>9.3</b>	<b>100.0</b>
Raigmore	12.9	38.6	26.9	10.4	0.7	10.4	100.0
Caithness General	6.6	27.9	64.6	-	-	0.9	100.0
Belford	-	3.6	78.6	10.7	7.1	-	100.0
Portree	-	25.0	62.5	-	-	12.5	100.0
MacKinnon Memorial	-	-	50.0	-	50.0	-	100.0
<b>Lanarkshire</b>	<b>3.6</b>	<b>16.2</b>	<b>17.8</b>	<b>22.8</b>	<b>37.4</b>	<b>2.2</b>	<b>100.0</b>
Bellshill	3.6	15.7	14.1	22.0	42.1	2.4	100.0
Law	3.5	17.5	26.6	24.6	26.0	1.8	100.0
<b>Lothian</b>	<b>20.8</b>	<b>17.8</b>	<b>21.2</b>	<b>30.7</b>	<b>7.5</b>	<b>1.9</b>	<b>100.0</b>
SMMP	20.5	17.2	19.7	31.3	9.4	2.0	100.0
St John's	21.7	19.6	25.3	29.3	2.5	1.7	100.0
<b>Orkney</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>

Expert Group on Acute Maternity Services - Reference Report

Balfour	-	100.0	-	-	-	-	100.0
<b>Shetland</b>	<b>3.6</b>	<b>63.7</b>	<b>31.6</b>	-	-	<b>1.0</b>	<b>100.0</b>
Gilbert Bain	3.6	63.7	31.6	-	-	1.0	100.0
<b>Tayside</b>	<b>24.9</b>	<b>25.4</b>	<b>14.1</b>	<b>13.6</b>	<b>19.3</b>	<b>2.7</b>	<b>100.0</b>
Ninewells	23.1	19.2	17.7	8.5	29.5	2.0	100.0
Perth RI	31.6	37.2	4.4	22.2	-	4.6	100.0
Arbroath Infirmary	11.8	16.2	17.6	52.9	-	1.5	100.0
Montrose RI	3.7	35.8	27.2	33.3	-	-	100.0
Whitehills	11.5	57.4	29.5	-	-	1.6	100.0
<b>Western Isles</b>	-	<b>45.8</b>	<b>44.1</b>	<b>2.5</b>	<b>7.6</b>	-	<b>100.0</b>
Western Isles	-	45.8	44.1	2.5	7.6	-	100.0
<b>Home</b>	-	-	<b>100.0</b>	-	-	-	<b>100.0</b>
<b>Total</b>	<b>18.6</b>	<b>18.5</b>	<b>19.6</b>	<b>20.2</b>	<b>20.3</b>	<b>2.9</b>	<b>100.0</b>

**Table A.4: Number of singleton deliveries by hospital and mother's age on admission**

	Mother's age on admission			Total
	13-19	20-34	35+	
<b>Argyll &amp; Clyde</b>	<b>404</b>	<b>3,103</b>	<b>595</b>	<b>4,102</b>
Royal Alexandra	186	1,608	329	2,123
Inverclyde Royal	129	740	128	997
Vale of Leven DgH	80	666	115	861
Lorn & Islands DGH	1	38	10	49
Dunoon & District General	3	21	7	31
Campbeltown Hospital	-	5	1	6
Victoria Hospital	2	8	2	12
Mid Argyll	3	16	3	22
Islay Hospital	-	1	-	1
<b>Ayrshire &amp; Arran</b>	<b>402</b>	<b>2,657</b>	<b>422</b>	<b>3,481</b>
Ayrshire Central	402	2,648	419	3,469
Isle of Arran War Memorial	-	6	3	9
Davidson Cottage	-	3	-	3
<b>Borders</b>	<b>59</b>	<b>772</b>	<b>140</b>	<b>971</b>
Borders General	59	772	140	971
<b>Dumfries &amp; Galloway</b>	<b>139</b>	<b>1,030</b>	<b>181</b>	<b>1,350</b>
Cresswell	127	977	173	1,277
Dalrymple	12	53	8	73
<b>Fife</b>	<b>316</b>	<b>2,280</b>	<b>341</b>	<b>2,937</b>
Forth Park	316	2,279	341	2,936
Queen Margaret	-	1	-	1
<b>Forth Valley</b>	<b>263</b>	<b>2,348</b>	<b>189</b>	<b>1,464</b>
Falkirk & District RI	131	1,144	189	1,464
Stirling RI	132	1,204	236	1,572
<b>Grampian</b>	<b>368</b>	<b>4,441</b>	<b>811</b>	<b>5,620</b>
Aberdeen Maternity	299	3,447	689	4,435
Dr Gray's	51	718	86	855
Insch & District War Mem	2	14	4	20
Jubilee	1	12	3	16
Kincardine O'Neill War Mem	2	29	6	37
Chalmers	4	48	5	57
Fraserburgh	3	77	6	86
Peterhead Cottage	6	96	12	114
<b>Greater Glasgow</b>	<b>941</b>	<b>7,816</b>	<b>1,795</b>	<b>10,552</b>
Glasgow Royal Mat	459	3,136	622	4,217
Queen Mothers	254	2,587	696	3,537
Southern General	228	2,093	477	2,798
<b>Highland</b>	<b>200</b>	<b>1,579</b>	<b>346</b>	<b>2,125</b>
Raigmore	174	1,367	318	1,859
Caithness General	24	178	24	226
Belford	2	24	2	28
Portree	-	8	8	8
MacKinnon Memorial	-	2	2	4
<b>Lanarkshire</b>	<b>426</b>	<b>3,864</b>	<b>566</b>	<b>4,856</b>
Bellshill	311	2,721	413	3,445
Law	115	1,143	153	1,411
<b>Lothian</b>	<b>708</b>	<b>6,381</b>	<b>1,521</b>	<b>8,610</b>
SMMP	504	4,525	1,225	6,254
St Johns	204	1,856	296	2,356

Expert Group on Acute Maternity Services - Reference Report

<b>Orkney</b>	<b>8</b>	<b>89</b>	<b>4</b>	<b>101</b>
Balfour	8	89	4	101
<b>Shetland</b>	<b>12</b>	<b>157</b>	<b>24</b>	<b>193</b>
Gilbert Bain	12	157	24	193
<b>Tayside</b>	<b>434</b>	<b>3,291</b>	<b>548</b>	<b>4,273</b>
Ninewells	317	2,146	327	2,790
Perth RI	91	974	208	1,273
Arbroath Infirmary	11	53	4	68
Montrose RI	12	67	2	81
Whitehills	3	51	7	61
<b>Western Isles</b>	<b>2</b>	<b>95</b>	<b>21</b>	<b>118</b>
Western Isles	2	95	21	118
<b>Home</b>	<b>-</b>	<b>1</b>		<b>1</b>
<b>Total</b>	<b>4,682</b>	<b>39,90</b>	<b>7,740</b>	<b>52,326</b>
		<b>4</b>		

**Table A.5: Percentage of singleton deliveries by hospital and parity**

	Parity				
	0	<3	3+	nk	Total
<b>Argyll &amp; Clyde</b>	<b>45.3</b>	<b>48.8</b>	<b>5.9</b>	<b>-</b>	<b>100.0</b>
Royal Alexandra	46.4	47.8	5.7	-	100.0
Inverclyde Royal	46.9	46.3	6.7	-	100.0
Vale of Leven DGH	45.2	49.7	5.1	-	100.0
Lorn & Islands DGH	14.3	81.6	4.1	-	100.0
Dunoon & District General	12.9	83.9	3.2	-	100.0
Campbeltown Hosp	-	50.0	50.0	-	100.0
Victoria Hospital	-	91.7	8.3	-	100.0
Mid Argyll	13.6	77.3	9.1	-	100.0
Islay Hospital	-	100.0	-	-	100.0
<b>Ayrshire &amp; Arran</b>	<b>47.1</b>	<b>46.6</b>	<b>6.3</b>	<b>-</b>	<b>100.0</b>
Ayrshire Central	47.3	46.6	6.2	-	100.0
Isle of Arran War Memorial	-	66.7	33.3	-	100.0
Davidson Cottage	-	66.7	33.3	-	100.0
<b>Borders</b>	<b>42.1</b>	<b>50.3</b>	<b>7.5</b>	<b>0.1</b>	<b>100.0</b>
Borders General	42.1	50.3	7.5	0.1	100.0
<b>Dumfries &amp; Galloway</b>	<b>42.2</b>	<b>51.0</b>	<b>6.7</b>	<b>0.1</b>	<b>100.0</b>
Cresswell	42.8	50.6	6.6	0.1	100.0
Dalrymple	32.9	58.9	8.2	-	100.0
<b>Fife</b>	<b>46.3</b>	<b>46.8</b>	<b>6.7</b>	<b>0.2</b>	<b>100.0</b>
Forth Park	46.3	46.8	6.7	0.2	100.0
Queen Margaret	-	100.0	-	-	100.0
<b>Forth Valley</b>	<b>45.6</b>	<b>48.7</b>	<b>5.8</b>	<b>-</b>	<b>100.0</b>
Falkirk & District RI	46.4	47.9	5.7	-	100.0
Stirling RI	44.8	49.4	5.8	-	100.0
<b>Grampian</b>	<b>46.9</b>	<b>47.4</b>	<b>5.4</b>	<b>0.2</b>	<b>100.0</b>
Aberdeen Mat	48.8	46.0	5.0	0.2	100.0
Dr Grays	42.5	50.3	7.0	0.2	100.0
Insch & District War Mem	45.0	55.0	-	-	100.0
Jubilee	25.0	75.0	-	-	100.0
Kincardine O Neil War Mem	16.2	67.6	16.2	-	100.0
Chalmers	17.5	71.9	8.8	1.8	100.0
Fraserburgh	29.1	62.8	8.1	-	100.0
Peterhead Cottage	49.1	46.5	4.4	-	100.0
<b>Greater Glasgow</b>	<b>46.1</b>	<b>46.7</b>	<b>7.1</b>	<b>0.0</b>	<b>100.0</b>
Glasgow Royal Mat	47.3	46.2	6.4	0.1	100.0
Queen Mothers	45.7	47.2	7.0	-	100.0
Southern General	44.8	46.9	8.3	-	100.0
<b>Highland</b>	<b>45.5</b>	<b>46.7</b>	<b>7.6</b>	<b>0.2</b>	<b>100.0</b>
Raigmore	46.5	45.8	7.5	0.2	100.0
Caithness General	43.8	48.2	7.5	0.4	100.0
Belford	3.6	82.1	14.3	-	100.0
Portree	12.5	75.0	12.5	-	100.0
MacKinnon Memorial	25.0	75.0	-	-	100.0
<b>Lanarkshire</b>	<b>45.6</b>	<b>48.2</b>	<b>6.2</b>	<b>-</b>	<b>100.0</b>
Bellshill	45.7	48.1	6.3	-	100.0
Law	45.3	48.6	6.1	-	100.0
<b>Lothian</b>	<b>48.3</b>	<b>45.8</b>	<b>5.8</b>	<b>0.2</b>	<b>100.0</b>
SMMP	48.4	45.5	5.9	0.2	100.0
St Johns	47.8	46.6	5.4	0.1	100.0
<b>Orkney</b>	<b>46.5</b>	<b>48.5</b>	<b>5.0</b>	<b>-</b>	<b>100.0</b>

Expert Group on Acute Maternity Services - Reference Report

Balfour	46.5	48.5	5.0	-	100.0
<b>Shetland</b>	<b>40.9</b>	<b>47.7</b>	<b>11.4</b>	-	<b>100.0</b>
Gilbert Bain	40.9	47.7	11.4	-	100.0
<b>Tayside</b>	<b>44.5</b>	<b>49.1</b>	<b>5.9</b>	<b>0.5</b>	<b>100.0</b>
Ninewells	47.0	47.1	5.3	0.7	100.0
Perth RI	42.9	50.7	6.4	-	100.0
Arbroath Infirmary	30.9	55.9	13.2	-	100.0
Montrose RI	23.5	65.4	11.1	-	100.0
Whitehills	9.8	78.7	11.5	-	100.0



Expert Group on Acute Maternity Services - Reference Report

	Parity				
	0	<3	3+	nk	Total
<b>Western Isles</b>	<b>39.8</b>	<b>53.4</b>	<b>6.8</b>	<b>-</b>	<b>100.0</b>
Western Isles	39.8	53.4	6.8	-	100.0
<b>Home</b>	<b>-</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>100.0</b>
<b>Total</b>	<b>46.1</b>	<b>47.5</b>	<b>6.3</b>	<b>0.1</b>	<b>100.0</b>

**Table A.6: Percentage of singleton deliveries by induction of labour**

	Induction of Labour				Total
	induced	not induced	nk	blank	
<b>Argyll &amp; Clyde</b>	<b>31.7</b>	<b>68.3</b>	-	-	<b>100.0</b>
Royal Alexandra	33.8	66.2	-	-	100.0
Inverclyde Royal	31.3	68.7	-	-	100.0
Vale of Leven DGH	31.2	68.8	-	-	100.0
Lorn & Islands DGH	-	100.0	-	-	100.0
Dunoon & District General	-	100.0	-	-	100.0
Campbeltown Hosp	-	100.0	-	-	100.0
Victoria Hospital	-	100.0	-	-	100.0
Mid Argyll	-	100.0	-	-	100.0
Islay Hospital	-	100.0	-	-	100.0
<b>Ayrshire &amp; Arran</b>	<b>28.7</b>	<b>71.3</b>	<b>0.0</b>	-	<b>100.0</b>
Ayrshire Central	28.8	71.2	-	-	100.0
Isle of Arran War Memorial	-	100.0	-	-	100.0
Davidson Cottage	-	66.7	33.3	-	100.0
<b>Borders</b>	<b>27.4</b>	<b>72.5</b>	<b>0.1</b>	-	<b>100.0</b>
Borders General	27.4	72.5	0.1	-	100.0
<b>Dumfries &amp; Galloway</b>	<b>33.0</b>	<b>67.0</b>	-	-	<b>100.0</b>
Cresswell	34.8	65.2	-	-	100.0
Dalrymple	-	100.0	-	-	100.0
<b>Fife</b>	<b>22.9</b>	<b>77.1</b>	-	-	<b>100.0</b>
Forth Park	22.9	77.1	-	-	100.0
Queen Margaret	-	100.0	-	-	100.0
<b>Forth Valley</b>	<b>33.4</b>	<b>66.6</b>	-	-	<b>100.0</b>
Falkirk & District RI	23.4	76.6	-	-	100.0
Stirling RI	42.6	57.4	-	-	100.0
<b>Grampian</b>	<b>25.1</b>	<b>74.8</b>	<b>0.0</b>	-	<b>100.0</b>
Aberdeen Mat	24.8	75.2	-	-	100.0
Dr Grays	32.3	67.6	0.1	-	100.0
Insch & District War Mem	-	100.0	-	-	100.0
Jubilee	-	100.0	-	-	100.0
Kincardine O Neil War Mem	10.8	89.2	-	-	100.0
Chalmers	-	100.0	-	-	100.0
Fraserburgh	33.7	66.3	-	-	100.0
Peterhead Cottage	4.4	95.6	-	-	100.0
<b>Greater Glasgow</b>	<b>30.8</b>	<b>69.1</b>	<b>0.0</b>	-	<b>100.0</b>
Glasgow Royal Mat	40.0	59.9	0.0	-	100.0
Queen Mothers	26.1	73.9	-	-	100.0
Southern General	23.0	76.9	0.1	-	100.0
<b>Highland</b>	<b>31.2</b>	<b>68.8</b>	-	-	<b>100.0</b>
Raigmore	32.2	67.8	-	-	100.0
Caithness General	28.3	71.7	-	-	100.0
Belford	-	100.0	-	-	100.0
Portree	-	100.0	-	-	100.0
MacKinnon Memorial	-	100.0	-	-	100.0
<b>Lanarkshire</b>	<b>24.8</b>	<b>75.1</b>	-	<b>0.2</b>	<b>100.0</b>
Bellshill	23.7	76.2	-	0.1	100.0
Law	27.4	72.4	-	0.2	100.0
<b>Lothian</b>	<b>24.3</b>	<b>75.7</b>	-	-	<b>100.0</b>
SMMP	23.6	76.4	-	-	100.0
St Johns	26.1	73.9	-	-	100.0

Expert Group on Acute Maternity Services - Reference Report

<b>Orkney</b>	<b>1.0</b>	<b>99.0</b>	-	-	<b>100.0</b>
Balfour	1.0	99.0	-	-	100.0
<b>Shetland</b>	<b>1.0</b>	<b>99.0</b>	-	-	<b>100.0</b>
Gilbert Bain	14.5	85.5	-	-	100.0
<b>Tayside</b>	<b>24.4</b>	<b>75.6</b>	-	<b>0.1</b>	<b>100.0</b>
Ninewells	25.7	74.3	-	-	100.0
Perth RI	25.5	74.3	-	0.2	100.0
Arbroath Infirmary	1.5	98.5	-	-	100.0
Montrose RI	-	100.0	-	-	100.0
Whitehills	-	100.0	-	-	100.0
<b>Western Isles</b>	<b>38.1</b>	<b>61.9</b>	-	-	<b>100.0</b>
Western Isles	38.1	61.9	-	-	100.0
<b>Home</b>	-	<b>100.0</b>	-	-	<b>100.0</b>
<b>Total</b>	<b>27.6</b>	<b>72.4</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>

**Table A.7a: Percentage of births by hospital and mode of delivery**

	Mode of Delivery <sup>1</sup>							Total
	svd	vaginal breech	assisted delivery 1	elcs	emcs	all cs	nk	
<b>Argyll &amp; Clyde</b>	<b>64.1</b>	<b>0.6</b>	<b>14.2</b>	<b>8.8</b>	<b>12.2</b>	<b>21.0</b>	<b>-</b>	<b>100.0</b>
Royal Alexandra	57.4	0.5	16.5	11.1	14.5	25.6	-	100.0
Inverclyde Royal	71.1	0.9	13.1	5.4	9.5	14.9	-	100.0
Vale of Leven DGH	67.7	0.8	11.8	8.4	11.3	19.7	-	100.0
Lorn & Islands DGH	100.0	-	-	-	-	-	-	100.0
Dunoon & District General	96.8	-	3.2	-	-	-	-	100.0
Campbeltown Hosp	100.0	-	-	-	-	-	-	100.0
Victoria Hospital	100.0	-	-	-	-	-	-	100.0
Mid Argyll	100.0	-	-	-	-	-	-	100.0
Islay Hospital	100.0	-	-	-	-	-	-	100.0
<b>Ayrshire &amp; Arran</b>	<b>67.9</b>	<b>0.3</b>	<b>9.7</b>	<b>7.9</b>	<b>14.2</b>	<b>22.1</b>	<b>-</b>	<b>100.0</b>
Ayrshire Central	67.8	0.3	9.7	7.9	14.3	22.1	-	100.0
Isle of Arran War Memorial	100.0	-	-	-	-	-	-	100.0
Davidson Cottage	100.0	-	-	-	-	-	-	100.0
<b>Borders</b>	<b>61.1</b>	<b>0.5</b>	<b>17.2</b>	<b>6.5</b>	<b>14.6</b>	<b>21.1</b>	<b>0.1</b>	<b>100.0</b>
Borders General	61.1	0.5	17.2	6.5	14.6	21.1	0.1	100.0
<b>Dumfries &amp; Galloway</b>	<b>75.1</b>	<b>0.1</b>	<b>4.8</b>	<b>8.2</b>	<b>11.8</b>	<b>20.0</b>	<b>-</b>	<b>100.0</b>
Cresswell	73.7	0.2	5.0	8.6	12.5	21.1	-	100.0
Dalrymple	100.0	-	-	-	-	-	-	100.0
<b>Fife</b>	<b>72.6</b>	<b>0.3</b>	<b>8.7</b>	<b>6.8</b>	<b>11.5</b>	<b>18.3</b>	<b>0.0</b>	<b>100.0</b>
Forth Park	72.6	0.3	8.7	6.8	11.5	18.3	0.0	100.0
Queen Margaret	100.0	-	-	-	-	-	-	100.0
<b>Forth Valley</b>	<b>69.3</b>	<b>0.7</b>	<b>11.6</b>	<b>5.2</b>	<b>13.3</b>	<b>18.4</b>	<b>-</b>	<b>100.0</b>
Falkirk & District RI	73.0	0.9	10.6	4.3	11.1	15.4	-	100.0
Stirling RI	65.8	0.6	12.5	5.9	15.3	21.2	-	100.0
<b>Grampian</b>	<b>61.2</b>	<b>1.1</b>	<b>15.4</b>	<b>6.5</b>	<b>15.7</b>	<b>22.2</b>	<b>0.0</b>	<b>100.0</b>
Aberdeen Mat	56.6	1.3	17.8	6.6	17.6	24.2	0.0	100.0
Dr Grays	71.1	0.6	8.4	8.2	11.6	19.8	0.1	100.0
Insch & District War Mem	100.0	-	-	-	-	-	-	100.0
Jubilee	100.0	-	-	-	-	-	-	100.0
Kincardine O Neil War Mem	100.0	-	-	-	-	-	-	100.0
Chalmers	100.0	-	-	-	-	-	-	100.0
Fraserburgh	100.0	-	-	-	-	-	-	100.0
Peterhead Cottage	100.0	-	-	-	-	-	-	100.0
<b>Greater Glasgow</b>	<b>63.3</b>	<b>0.6</b>	<b>14.2</b>	<b>7.9</b>	<b>13.9</b>	<b>21.8</b>	<b>-</b>	<b>100.0</b>
Glasgow Royal Mat	65.0	0.5	13.5	6.7	14.3	21.0	-	100.0
Queen Mothers	56.0	0.5	17.3	9.6	16.6	26.3	-	100.0
Southern General	70.2	0.9	11.5	7.3	10.0	17.4	-	100.0
<b>Highland</b>	<b>66.2</b>	<b>0.7</b>	<b>12.1</b>	<b>6.4</b>	<b>14.5</b>	<b>21.0</b>	<b>-</b>	<b>100.0</b>
Raigmore	65.5	0.8	12.1	6.5	15.1	21.6	-	100.0
Caithness General	66.7	-	14.0	7.5	11.8	19.3	-	100.0
Belford	100.0	-	-	-	-	-	-	100.0
Portree	100.0	-	-	-	-	-	-	100.0
MacKinnon Memorial	100.0	-	-	-	-	-	-	100.0
<b>Lanarkshire</b>	<b>71.9</b>	<b>0.6</b>	<b>8.7</b>	<b>8.8</b>	<b>10.0</b>	<b>18.8</b>	<b>0.0</b>	<b>100.0</b>
Bellshill	70.8	0.6	9.5	9.8	9.2	19.0	0.0	100.0
Law	74.5	0.5	6.7	6.1	12.1	18.2	0.1	100.0
<b>Lothian</b>	<b>66.1</b>	<b>0.7</b>	<b>11.4</b>	<b>6.7</b>	<b>15.1</b>	<b>21.8</b>	<b>-</b>	<b>100.0</b>
SMMP	64.2	0.9	12.7	6.2	16.1	22.3	-	100.0
St Johns	71.4	0.2	7.9	8.0	12.4	20.4	-	100.0
<b>Orkney</b>	<b>79.2</b>	<b>-</b>	<b>3.0</b>	<b>8.9</b>	<b>8.9</b>	<b>17.8</b>	<b>-</b>	<b>100.0</b>

Expert Group on Acute Maternity Services - Reference Report

Balfour	79.2	-	3.0	8.9	8.9	17.8	-	100.0
<b>Shetland</b>	<b>86.5</b>	<b>0.5</b>	<b>5.7</b>	<b>-</b>	<b>7.3</b>	<b>7.3</b>	<b>-</b>	<b>100.0</b>
Gilbert Bain	86.5	0.5	5.7	-	7.3	7.3	-	100.0
<b>Tayside</b>	<b>65.3</b>	<b>0.7</b>	<b>15.3</b>	<b>7.9</b>	<b>10.7</b>	<b>18.6</b>	<b>0.1</b>	<b>100.0</b>
Ninewells	60.6	0.8	17.8	8.9	11.9	20.7	0.1	100.0
Perth RI	70.4	0.5	12.1	7.1	9.8	17.0	-	100.0
Arbroath Infirmary	98.5	-	1.5	-	-	-	-	100.0
Montrose RI	98.8	1.2	-	-	-	-	-	100.0
Whitehills	100.0	-	-	-	-	-	-	100.0

	Mode of Delivery <sup>1</sup>							Total
	svd	vaginal breech	assisted delivery 1	elcs	emcs	all cs	nk	
<b>Western Isles</b>	<b>69.2</b>	-	<b>15.0</b>	<b>7.5</b>	<b>8.3</b>	<b>15.8</b>	-	100.0
Western Isles	69.2	-	15.0	7.5	8.3	15.8	-	100.0
<b>Home</b>	<b>100.0</b>	-	-	-	-	-	-	100.0
<b>Total</b>	<b>66.3</b>	<b>0.6</b>	<b>12.4</b>	<b>7.4</b>	<b>13.3</b>	<b>20.7</b>	<b>0.0</b>	<b>100.0</b>

1. Assisted delivery includes ventouse and forceps deliveries.
2. elcs – elective caesarean section.
3. emcs – emergency caesarean section.

**Table A.7b: Percentage of births by hospital and mode of delivery**

	Mode of Delivery Baby1					Total
	svd	operative/asst vag del 1	all cs	total asst del 2	nk	
<b>Argyll &amp; Clyde</b>	<b>64.1</b>	<b>14.9</b>	<b>21.0</b>	<b>35.9</b>	<b>-</b>	<b>100.0</b>
Royal Alexandra	57.4	17.0	25.6	42.6	-	100.0
Inverclyde Royal	71.1	14.0	14.9	28.9	-	100.0
Vale of Leven DGH	67.7	12.6	19.7	32.3	-	100.0
Lorn & Islands DGH	100.0	-	-	-	-	100.0
Dunoon & District General	96.8	3.2	-	3.2	-	100.0
Campbeltown Hosp	100.0	-	-	-	-	100.0
Victoria Hospital	100.0	-	-	-	-	100.0
Mid Argyll	100.0	-	-	-	-	100.0
Islay Hospital	100.0	-	-	-	-	100.0
<b>Ayrshire &amp; Arran</b>	<b>67.9</b>	<b>10.0</b>	<b>22.1</b>	<b>32.1</b>	<b>-</b>	<b>100.0</b>
Ayrshire Central	67.8	10.0	22.1	32.2	-	100.0
Isle of Arran War Memorial	100.0	-	-	-	-	100.0
Davidson Cottage	100.0	-	-	-	-	100.0
<b>Borders</b>	<b>61.1</b>	<b>17.7</b>	<b>21.1</b>	<b>38.8</b>	<b>0.1</b>	<b>100.0</b>
Borders General	61.1	17.7	21.1	38.8	0.1	100.0
<b>Dumfries &amp; Galloway</b>	<b>75.1</b>	<b>4.9</b>	<b>20.0</b>	<b>24.9</b>	<b>-</b>	<b>100.0</b>
Cresswell	73.7	5.2	21.1	26.3	-	100.0
Dalrymple	100.0	-	-	-	-	100.0
<b>Fife</b>	<b>72.6</b>	<b>9.0</b>	<b>18.3</b>	<b>27.3</b>	<b>0.0</b>	<b>100.0</b>
Forth Park	72.6	9.0	18.3	27.3	0.0	100.0
Queen Margaret	100.0	-	-	-	-	100.0
<b>Forth Valley</b>	<b>69.3</b>	<b>2.3</b>	<b>8.4</b>	<b>30.7</b>	<b>-</b>	<b>100.0</b>
Falkirk & District RI	73.0	1.5	5.4	27.0	-	100.0
Stirling RI	65.8	3.1	1.2	34.2	-	100.0
<b>Grampian</b>	<b>61.2</b>	<b>6.5</b>	<b>2.2</b>	<b>38.7</b>	<b>0.0</b>	<b>100.0</b>
Aberdeen Mat	56.6	9.2	24.2	43.4	0.0	100.0
Dr Grays	71.1	9.0	19.8	28.8	0.1	100.0
Insch & District War Mem	100.0	-	-	-	-	100.0
Jubilee	100.0	-	-	-	-	100.0
Kincardine O Neil War Mem	100.0	-	-	-	-	100.0
Chalmers	100.0	-	-	-	-	100.0
Fraserburgh	100.0	-	-	-	-	100.0
Peterhead Cottage	100.0	-	-	-	-	100.0
<b>Greater Glasgow</b>	<b>63.3</b>	<b>14.8</b>	<b>21.8</b>	<b>36.7</b>	<b>-</b>	<b>100.0</b>
Glasgow Royal Mat	65.0	14.0	21.0	35.0	-	100.0
Queen Mothers	56.0	17.7	26.3	44.0	-	100.0
Southern General	70.2	12.5	17.4	29.8	-	100.0
<b>Highland</b>	<b>66.2</b>	<b>12.8</b>	<b>21.0</b>	<b>33.8</b>	<b>-</b>	<b>100.0</b>
Raigmore	65.5	12.9	21.6	34.5	-	100.0
Caithness General	66.7	14.0	19.3	33.3	-	100.0
Belford	100.0	-	-	-	-	100.0
Portree	100.0	-	-	-	-	100.0
MacKinnon Memorial	100.0	-	-	-	-	100.0
<b>Lanarkshire</b>	<b>71.9</b>	<b>9.3</b>	<b>18.8</b>	<b>28.1</b>	<b>0.0</b>	<b>100.0</b>
Bellshill	70.8	10.2	19.0	29.2	0.0	100.0
Law	74.5	7.2	18.2	25.4	0.1	100.0
<b>Lothian</b>	<b>66.1</b>	<b>12.1</b>	<b>21.8</b>	<b>33.9</b>	<b>-</b>	<b>100.0</b>
SMMP	64.2	13.6	22.3	35.8	-	100.0
St Johns	71.4	8.1	20.4	28.6	-	100.0

Expert Group on Acute Maternity Services - Reference Report

<b>Orkney</b>	<b>79.2</b>	<b>3.0</b>	<b>17.8</b>	<b>20.8</b>	<b>-</b>	<b>100.0</b>
Balfour	79.2	3.0	17.8	20.8	-	100.0
<b>Shetland</b>	<b>86.5</b>	<b>6.2</b>	<b>7.3</b>	<b>13.5</b>	<b>-</b>	<b>100.0</b>
Gilbert Bain	86.5	6.2	7.3	13.5	-	100.0
<b>Tayside</b>	<b>65.3</b>	<b>16.0</b>	<b>18.6</b>	<b>34.7</b>	<b>0.1</b>	<b>100.0</b>
Ninewells	60.6	18.6	20.7	39.3	0.1	100.0
Perth RI	70.4	12.6	17.0	29.6	-	100.0
Arbroath Infirmary	98.5	1.5	-	1.5	-	100.0
Montrose RI	98.8	1.2	-	1.2	-	100.0
Whitehills	100.0	-	-	-	-	100.0
<b>Western Isles</b>	<b>69.2</b>	<b>15.0</b>	<b>15.8</b>	<b>30.8</b>	<b>-</b>	<b>100.0</b>
Western Isles	69.2	15.0	15.8	30.8	-	100.0
<b>Home</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>100.0</b>
<b>Total</b>	<b>66.3</b>	<b>13.0</b>	<b>20.7</b>	<b>33.7</b>	<b>0.0</b>	<b>100.0</b>

- 1 includes vaginal breech, high forceps, low forceps and ventouse
- 2 includes vaginal breech, high forceps, low forceps, ventouse and c section



**Table A.8: Number of deliveries by hospital and gestation**

	Est Gest Premature Groups					Total
	<28	28-31	32-36	37+	nk	
<b>Argyll &amp; Clyde</b>	<b>19</b>	<b>30</b>	<b>290</b>	<b>382</b>	<b>1</b>	<b>4163</b>
Royal Alexandra	11	24	162	38	-	2155
Inverclyde Royal	1	4	55	957	-	1017
Vale of Leven DGH	6	2	66	796	-	870
Lorn & Islands DGH	-	-	4	44	1	49
Dunoon & District General	1	-	2	28	-	31
Campbeltown Hosp	-	-	1	5	-	6
Victoria Hospital	-	-	-	12	-	12
Mid Argyll	-	-	-	22	-	22
Islay Hospital	-	-	-	1	-	1
<b>Ayrshire &amp; Arran</b>	<b>12</b>	<b>27</b>	<b>226</b>	<b>326</b>	<b>-</b>	<b>3529</b>
Ayrshire Central	12	27	226	325	-	3517
Isle of Arran War Memorial	-	-	-	9	-	9
Davidson Cottage	-	-	-	3	-	3
<b>Borders</b>	<b>1</b>	<b>3</b>	<b>55</b>	<b>923</b>	<b>3</b>	<b>985</b>
Borders General	1	3	55	923	3	985
<b>Dumfries &amp; Galloway</b>	<b>-</b>	<b>6</b>	<b>74</b>	<b>128</b>	<b>3</b>	<b>1366</b>
Cresswell	-	6	73	121	2	1293
Dalrymple	-	-	1	71	1	73
<b>Fife</b>	<b>10</b>	<b>27</b>	<b>167</b>	<b>276</b>	<b>1</b>	<b>2974</b>
Forth Park	10	27	167	276	1	2973
Queen Margaret	-	-	-	1	-	1
<b>Forth Valley</b>	<b>13</b>	<b>26</b>	<b>171</b>	<b>286</b>	<b>1</b>	<b>3079</b>
Falkirk & District RI	4	9	68	140	-	1481
Stirling RI	9	17	103	146	1	1598
<b>Grampian</b>	<b>21</b>	<b>39</b>	<b>316</b>	<b>533</b>	<b>5</b>	<b>5716</b>
Aberdeen Mat	20	35	284	417	4	4519
Dr Grays	1	3	30	833	-	867
Insch & District War Mem	-	-	-	20	-	20
Jubilee	-	-	-	15	1	16
Kincardine O Neil War Mem	-	-	1	36	-	37
Chalmers	-	-	-	57	-	57
Fraserburgh	-	1	-	85	-	86
Peterhead Cottage	-	-	1	113	-	114
<b>Greater Glasgow</b>	<b>65</b>	<b>113</b>	<b>665</b>	<b>984</b>	<b>2</b>	<b>10694</b>
Glasgow Royal Mat	20	40	262	394	-	4266
Queen Mothers	31	48	224	328	2	3589

Expert Group on Acute Maternity Services - Reference Report

				4		
Southern General	14	25	179	262	-	2839
				1		
<b>Highland</b>	<b>7</b>	<b>17</b>	<b>125</b>	<b>200</b>	<b>1</b>	<b>2157</b>
				7		
Raigmore	7	17	122	174	1	1890
				3		
Caithness General	-	-	3	224	-	227
Belford	-	-	-	28	-	28
Portree	-	-	-	8	-	8
MacKinnon Memorial	-	-	-	4	-	4
<b>Lanarkshire</b>	<b>17</b>	<b>30</b>	<b>230</b>	<b>463</b>	-	<b>4912</b>
				5		
Bellshill	12	30	146	330	-	3488
				0		
Law	5	-	84	133	-	1424
				5		
<b>Lothian</b>	<b>44</b>	<b>68</b>	<b>456</b>	<b>816</b>	<b>1</b>	<b>8733</b>
				4		
SMMP	41	66	337	590	-	6353
				9		
St Johns	3	2	119	225	1	2380
				5		
<b>Orkney</b>	<b>1</b>	<b>-</b>	<b>4</b>	<b>96</b>	<b>-</b>	<b>101</b>
Balfour	1	-	4	96	-	101
<b>Shetland</b>	<b>-</b>	<b>-</b>	<b>4</b>	<b>189</b>	<b>-</b>	<b>193</b>
Gilbert Bain	-	-	4	189	-	193
<b>Tayside</b>	<b>17</b>	<b>32</b>	<b>245</b>	<b>404</b>	<b>-</b>	<b>4339</b>
				5		
Ninewells	16	30	179	262	-	2847
				2		
Perth RI	1	2	64	121	-	1282
				5		
Arbroath Infirmary	-	-	-	68	-	68
Montrose RI	-	-	2	79	-	81
Whitehills	-	-	-	61	-	61

Expert Group on Acute Maternity Services - Reference Report

	Est Gest Premature Groups					
	<28	28-31	32-36	37+	nk	Total
<b>Western Isles</b>	-	-	1	118	-	119
Western Isles	-	-	1	118	-	119
<b>Home</b>	-	-	-	1	-	1
<b>Total</b>	227	418	3029	493	18	53061
				69		

**Table A.9: Number of deliveries by hospital and birthweight**

	Birthweight Baby1					Total
	<1500	1500-2499	2500-4499	4500+	nk	
<b>Argyll &amp; Clyde</b>	<b>54</b>	<b>285</b>	<b>3821</b>	<b>62</b>	<b>2</b>	<b>4224</b>
Royal Alexandra	31	167	1960	29	-	2187
Inverclyde Royal	8	55	953	20	1	1037
Vale of Leven DGH	14	58	794	12	1	879
Lorn & Islands DGH	-	4	45	-	-	49
Dunoon & District General	1	-	30	-	-	31
Campbeltown Hosp	-	1	5	-	-	6
Victoria Hospital	-	-	12	-	-	12
Mid Argyll	-	-	21	1	-	22
Islay Hospital	-	-	1	-	-	1
<b>Ayrshire &amp; Arran</b>	<b>43</b>	<b>245</b>	<b>3208</b>	<b>79</b>	<b>-</b>	<b>3575</b>
Ayrshire Central	43	245	3197	78	-	3563
Isle of Arran War Memorial	-	-	8	1	-	9
Davidson Cottage	-	-	3	-	-	3
<b>Borders</b>	<b>3</b>	<b>54</b>	<b>916</b>	<b>26</b>	<b>-</b>	<b>999</b>
Borders General	3	54	916	26	-	999
<b>Dumfries &amp; Galloway</b>	<b>5</b>	<b>76</b>	<b>1280</b>	<b>21</b>	<b>-</b>	<b>1382</b>
Cresswell	5	76	1208	20	-	1309
Dalrymple	-	-	72	1	-	73
<b>Fife</b>	<b>32</b>	<b>190</b>	<b>2751</b>	<b>38</b>	<b>-</b>	<b>3011</b>
Forth Park	32	190	2750	38	-	3010
Queen Margaret	-	-	1	-	-	1
<b>Forth Valley</b>	<b>32</b>	<b>185</b>	<b>2836</b>	<b>68</b>	<b>1</b>	<b>3122</b>
Falkirk & District RI	13	69	1377	39	-	1498
Stirling RI	19	116	1459	29	1	1624
<b>Grampian</b>	<b>62</b>	<b>339</b>	<b>5279</b>	<b>128</b>	<b>-</b>	<b>5808</b>
Aberdeen Mat	58	298	4141	102	-	4599
Dr Grays	4	36	816	23	-	879
Insch & District War Mem	-	-	20	-	-	20
Jubilee	-	-	15	1	-	16
Kincardine O Neil War Mem	-	1	36	-	-	37
Chalmers	-	-	56	1	-	57
Fraserburgh	-	1	85	-	-	86
Peterhead Cottage	-	3	110	1	-	114
<b>Greater Glasgow</b>	<b>171</b>	<b>740</b>	<b>9714</b>	<b>198</b>	<b>7</b>	<b>10830</b>
Glasgow Royal Mat	62	295	3878	76	2	4313
Queen Mothers	74	243	3250	65	5	3637
Southern General	35	202	2586	57	-	2880
<b>Highland</b>	<b>23</b>	<b>137</b>	<b>1994</b>	<b>35</b>	<b>-</b>	<b>2189</b>
Raigmore	23	133	1734	31	-	1921
Caithness General	-	3	221	4	-	228
Belford	-	1	27	-	-	28
Portree	-	-	8	-	-	8
MacKinnon Memorial	-	-	4	-	-	4
<b>Lanarkshire</b>	<b>46</b>	<b>291</b>	<b>4532</b>	<b>96</b>	<b>3</b>	<b>4968</b>
Bellshill	42	216	3202	71	-	3531
Law	4	75	1330	25	3	1437
<b>Lothian</b>	<b>119</b>	<b>517</b>	<b>8030</b>	<b>182</b>	<b>2</b>	<b>8850</b>
SMMP	113	380	5820	133	2	6448
St Johns	6	137	2210	49	-	2402

Expert Group on Acute Maternity Services - Reference Report

<b>Orkney</b>	<b>1</b>	<b>2</b>	<b>97</b>	<b>-</b>	<b>1</b>	<b>101</b>
Balfour	1	2	97	-	1	101
<b>Shetland</b>	<b>-</b>	<b>5</b>	<b>183</b>	<b>5</b>	<b>-</b>	<b>193</b>
Gilbert Bain	-	5	183	5	-	193
<b>Tayside</b>	<b>53</b>	<b>249</b>	<b>3996</b>	<b>93</b>	<b>10</b>	<b>4401</b>
Ninewells	50	184	2610	54	2	2900
Perth RI	3	64	1189	34	1	1291
Arbroath Infirmary	-	-	66	2	-	68
Montrose RI	-	1	76	2	2	81
Whitehills	-	-	55	1	5	61

Expert Group on Acute Maternity Services - Reference Report

	Birthweight Baby1					Total
	<1500	1500-2499	2500-4499	4500+	nk	
<b>Western Isles</b>	-	2	116	2	-	<b>120</b>
Western Isles	-	2	116	2	-	120
<b>Home</b>	-	-	1	-	-	<b>1</b>
<b>Total</b>	<b>644</b>	<b>3317</b>	<b>48754</b>	<b>1033</b>	<b>26</b>	<b>53774</b>

**Table A.10: Number of antenatal episodes by length of stay**

	Total Stay (days)			
	<4	4+	other	Total
<b>Argyll &amp; Clyde</b>	<b>8621</b>	<b>262</b>	<b>-</b>	<b>8883</b>
Royal Alexandra	6226	163	-	6389
Inverclyde Royal	1110	57	-	1167
Vale of Leven DGH	1062	34	-	1096
Lorn & Islands DGH	112	2	-	114
Dunoon & District General	53	-	-	53
Campbeltown Hosp	34	5	-	39
Victoria Hospital	15	1	-	16
Mid Argyll	1	-	-	1
Islay Hospital	8	-	-	8
<b>Ayrshire &amp; Arran</b>	<b>6357</b>	<b>230</b>	<b>-</b>	<b>6587</b>
Ayrshire Central	6344	230	-	6574
Isle of Arran War Memorial	11	-	-	11
Davidson Cottage	1	-	-	1
Lady Margaret	1	-	-	1
<b>Borders</b>	<b>703</b>	<b>18</b>	<b>-</b>	<b>721</b>
Borders General	703	18	-	721
<b>Dumfries &amp; Galloway</b>	<b>190</b>	<b>16</b>	<b>-</b>	<b>206</b>
Dalrymple	190	16	-	206
<b>Fife</b>	<b>8773</b>	<b>238</b>	<b>-</b>	<b>9011</b>
Forth Park	4144	81	-	4225
Queen Margaret	4629	157	-	4786
<b>Forth Valley</b>	<b>2998</b>	<b>167</b>	<b>-</b>	<b>3165</b>
Falkirk & District RI	2135	52	-	2187
Stirling RI	863	115	-	978
<b>Grampian</b>	<b>4347</b>	<b>318</b>	<b>-</b>	<b>4665</b>
Aberdeen Mat	3882	301	-	4183
Dr Grays	248	15	-	263
Insch & District War Mem	2	-	-	2
Jubilee	7	-	-	7
Kincardine O Neil War Mem	10	1	-	11
Chalmers	84	-	-	84
Fraserburgh	64	-	-	64
Peterhead Cottage	50	1	-	51
<b>Greater Glasgow</b>	<b>6647</b>	<b>269</b>	<b>1</b>	<b>6917</b>
Glasgow Royal Mat	2891	151	-	3042
Southern General	3756	118	1	3875
<b>Highland</b>	<b>1288</b>	<b>127</b>	<b>-</b>	<b>1415</b>
Raigmore	890	115	-	1005
Caithness General	389	12	-	401
Belford	8	-	-	8
Portree	1	-	-	1
<b>Lanarkshire</b>	<b>4966</b>	<b>140</b>	<b>-</b>	<b>5106</b>
Bellshill	2863	101	-	2964
Law	2103	39	-	2142
<b>Lothian</b>	<b>1036</b>	<b>224</b>	<b>-</b>	<b>1058</b>
	4			8
SMMP	6393	179	-	6572
St Johns	3971	45	-	4016
<b>Orkney</b>	<b>50</b>	<b>3</b>	<b>-</b>	<b>53</b>
Balfour	50	3	-	53

Expert Group on Acute Maternity Services - Reference Report

<b>Shetland</b>	<b>84</b>	<b>1</b>	<b>-</b>	<b>85</b>
Gilbert Bain	84	1	-	85
<b>Tayside</b>	<b>1241</b>	<b>140</b>	<b>-</b>	<b>1381</b>
Ninewells	796	111	-	907
Perth RI	347	24	-	371
Arbroath Infirmary	38	5	-	43
Montrose RI	47	-	-	47
Whitehills	13	-	-	13



Expert Group on Acute Maternity Services - Reference Report

	<b>Total Stay (days)</b>			
	<b>&lt;4</b>	<b>4+</b>	<b>Other</b>	<b>Total</b>
<b>Western Isles</b>	<b>55</b>	<b>18</b>	<b>-</b>	<b>73</b>
Western Isles	55	18	-	73
Cresswell	1744	39	-	1783
<b>Total</b>	<b>5842</b>	<b>2210</b>	<b>1</b>	<b>6063</b>
	<b>8</b>			<b>9</b>

**Table A.11: Deliveries transferred from another hospital by type of admission, financial year 99/00**

	Admission Reason			Total
	preg not in lab	in labour	bba	
<b>Argyll &amp; Clyde</b>	<b>10</b>	<b>14</b>	<b>1</b>	<b>25</b>
Royal Alexandra Hospital	n/a	n/a	n/a	n/a
Inverclyde Royal	6	9	-	15
Vale of Leven DGH	4	5	-	9
Victoria Hospital	-	-	1	1
<b>Ayrshire &amp; Arran</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>
Ayrshire Central	2	-	-	2
<b>Borders</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>3</b>
Borders General	1	2	-	3
<b>Dumfries &amp; Galloway</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>
Cresswell	1	-	-	1
<b>Fife</b>	<b>17</b>	<b>7</b>	<b>-</b>	<b>24</b>
Forth Park	2	-	-	2
Queen Mothers	15	7	-	22
<b>Grampian</b>	<b>120</b>	<b>130</b>	<b>3</b>	<b>253</b>
Aberdeen Mat	120	130	3	253
<b>Greater Glasgow</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>
Glasgow Royal Mat	1	-	-	1
Southern General	1	-	-	1
<b>Highland</b>	<b>12</b>	<b>17</b>	<b>-</b>	<b>29</b>
Raigmore	12	17	-	29
<b>Lanarkshire</b>	<b>7</b>	<b>1</b>	<b>-</b>	<b>8</b>
Bellshill	7	1	-	8
<b>Lothian</b>	<b>10</b>	<b>4</b>	<b>-</b>	<b>14</b>
SMMP	10	4	-	14
<b>Tayside</b>	<b>115</b>	<b>109</b>	<b>1</b>	<b>225</b>
Ninewells	115	109	1	225
<b>Total</b>	<b>297</b>	<b>284</b>	<b>5</b>	<b>586</b>

**Table A.12: Number of postnatal episodes by length of stay**

	Total Stay (days)			
	<4	4-6	7+	Total
<b>Argyll &amp; Clyde</b>	<b>512</b>	<b>80</b>	<b>16</b>	<b>608</b>
Royal Alexandra	234	8	8	250
Inverclyde Royal	73	11	3	87
Vale of Leven DGH	29	2	1	32
Lorn & Islands DGH	61	29	3	93
Dunoon & District General	61	15	-	76
Campbeltown Hosp	32	8	1	41
Victoria Hospital	19	7	-	26
Islay Hospital	3	-	-	3
<b>Ayrshire &amp; Arran</b>	<b>129</b>	<b>12</b>	<b>6</b>	<b>147</b>
Ayrshire Central	127	11	6	144
Isle of Arran War Memorial	-	1	-	1
Lady Margaret	2	-	-	2
<b>Borders</b>	<b>60</b>	<b>3</b>	<b>1</b>	<b>64</b>
Borders General	60	3	1	64
<b>Dumfries &amp; Galloway</b>	<b>111</b>	<b>36</b>	<b>4</b>	<b>151</b>
Cresswell	21	4	1	26
Dalrymple	90	32	3	125
<b>Fife</b>	<b>15</b>	<b>-</b>	<b>1</b>	<b>16</b>
Forth Park	15	-	1	16
<b>Forth Valley</b>	<b>85</b>	<b>12</b>	<b>10</b>	<b>107</b>
Falkirk & District RI	38	2	1	41
Stirling RI	47	10	9	66
<b>Grampian</b>	<b>558</b>	<b>258</b>	<b>44</b>	<b>860</b>
Aberdeen Mat	192	42	29	263
Dr Grays	30	4	1	35
Insch & District War Mem	21	9	-	30
Jubilee	36	21	-	57
Kincardine O Neil War Mem	62	58	5	125
Chalmers	88	28	2	118
Fraserburgh	57	57	5	119
Peterhead Cottage	72	39	2	113
<b>Greater Glasgow</b>	<b>339</b>	<b>39</b>	<b>11</b>	<b>389</b>
Glasgow Royal Mat	121	18	5	144
Queen Mothers	73	8	2	83
Southern General	145	13	4	162
<b>Highland</b>	<b>167</b>	<b>43</b>	<b>15</b>	<b>225</b>
Raigmore	62	11	13	86
Caithness General	12	-	-	12
Belford	84	31	2	117
Portree	3	1	-	4
MacKinnon Memorial	6	-	-	6
<b>Lanarkshire</b>	<b>176</b>	<b>13</b>	<b>4</b>	<b>193</b>
Bellshill	97	10	4	111
Law	79	3	-	82
<b>Lothian</b>	<b>221</b>	<b>22</b>	<b>17</b>	<b>260</b>
SMMP	206	20	16	242
St Johns	15	2	1	18
<b>Orkney</b>	<b>24</b>	<b>5</b>	<b>2</b>	<b>31</b>
Balfour	24	5	2	31

Expert Group on Acute Maternity Services - Reference Report

<b>Shetland</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>
Gilbert Bain	2	-	-	2
<b>Tayside</b>	<b>339</b>	<b>189</b>	<b>37</b>	<b>565</b>
Ninewells	58	19	12	89
Perth RI	71	8	14	93
Arbroath Infirmary	114	114	10	238
Montrose RI	96	48	1	145
<b>Western Isles</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>
Western Isles	3	-	-	3
<b>Total</b>	<b>2741</b>	<b>712</b>	<b>168</b>	<b>3621</b>

## **ANNEX C: INTERNATIONAL MODELS OF MATERNITY CARE**

### **Examples of Care Provision Worldwide**

Drawing comparisons from international models of maternity care can be problematic but it is a useful comparator if only to prompt debate. The countries identified are just a random sample of models of maternity care and are intended as to illustrate the issues surrounding the provision of maternity care.

#### **Sweden**

Sweden has a population of almost nine million and an average of 90,000 births annually. It has a national health service, which provides all elements of maternity care. Most care is provided by the midwife. The midwife refers to an obstetrician when necessary, although two visits to the obstetrician are factored into routine antenatal care. Very few GPs are involved in maternity care. Sweden has two birth centres, but elsewhere the midwife is the lead professional for low risk women. 99% of women receive their maternity care via a highly co-ordinated system of clinics for antenatal and postnatal care (mothercare centres) and hospital. For this reason continuity of care is not usual in Sweden, as midwives who work in the clinics do not work in hospitals. The vast majority of births take place in hospital (99%) and home births are rare. The infant mortality rate is the third lowest in developed countries (behind Finland and Japan). Much of the emphasis is placed on social issues and multidisciplinary team work. There is a general shortage of obstetricians. The caesarean section rate in 1998 was 13.4% and breastfeeding rates are very high.

#### **Finland**

Finland has a population of 5.1 million and an average of 56, 700 births annually. Finland is divided into 452 municipalities and has 21 hospital districts with responsibility for proving and co-ordinating care in that district. Maternity care is provided by a variety of professionals (midwife, public health nurse, GP and gynaecologist). Municipalities can employ midwives and public health nurses to provide ante- and postnatal care (over 60% do not employ midwives). Most of the

antenatal care is provided by the midwife or public health nurse in community based clinics. The service is not integrated and these staff will not be involved with intrapartum care in hospital. There is quite an intensive antenatal care regime even for low risk women, who are cared for locally until referral to the hospital for intrapartum care. Although midwives are responsible for caring for low risk women, this is under the supervision of the gynaecologist. Outcomes are good, mortality and morbidity rates are very low and breastfeeding rates are high.

## **Ireland**

Ireland has a population of 3.5 million and approximately 55, 000 babies are born annually. Over 40% of these babies are born in one of the three maternity units in Dublin. Health boards provide free maternity services for all expectant mothers for the period of the pregnancy and for 6 weeks after the birth. This service is provided by the GP in combination with a maternity unit or hospital. Most women, and especially private patients, choose the obstetrician to be their primary care provider and midwives tend to be hospital based. The majority of births take place in hospital (99.6%). National outcome statistics are difficult to obtain, but breastfeeding rates are very poor. There is one private birthcentre in Dublin and currently there are plans to open Ireland's first public CMU in Dublin. Unlike in the UK, midwives do not need to register an intention to practice annually, thus making it difficult to establish how many midwives are actually practising at any time. There is a medical, nursing and midwifery manpower crisis in Ireland and many professionals are being recruited from abroad.

## **Netherlands**

The Netherlands has a population of 16 million and approximately 200,000 babies are born each year. It is a relatively small and densely populated country: population per square kilometre is 351 compared with the UK where it is 233 (Mander, 1995). It has a dual health insurance scheme - a public one for people below a certain income and a private system for those who do not qualify for the former. The focus of maternity care in The Netherlands is 'normality' and the care is based on 'graded' risk assessment. For low risk women the midwife or GP are the first and only point of

professional contact throughout pregnancy, collaborative working and clear guidelines exist. Professionals seem to work well together. The culture and demographics are different to the UK and midwives must be within 20 minutes of a woman who has requested a home birth. The home birth rate is high (33%) and the majority of low risk women deliver in midwifery units. Because of the way in which maternity care is funded, women are discharged within 24 hours and midwives do not provide postnatal care. Those who are insured can pay for a maternity care assistant to provide support in the postnatal period.

## **Norway**

Norway has a population of 4.5 million, on average 60,000 births per year and 60 maternity units. The state health scheme provides free maternity care for all women and is used by over 99% of women. Geographically, Norway covers an area equivalent to approximately half of France, but 25% of its population live in or near Oslo. It is divided into five health regions, each with one tertiary referral centre. Within each region there are several small local hospitals and maternity homes (small maternity units run by midwives without hospital facilities or supervision by other than the local GP). Most of the care for low risk women is midwifery led, and there is close partnership with GPs and obstetricians. Women are expected to choose the geographically nearest maternity unit where appropriate. The home birth rate LOW (<0.5%), intervention rates are approximately 25% (caesarean section and instrumental delivery) and breastfeeding rates are over 99%.

## **USA**

The funding of maternity services in the USA is via 'Medicaid', which is a partnership between the federal government and participating state governments. States given authority to set reimbursement rates for health provide nurse/midwives who treat Medicaid patients. Legislation varies from state to state and there are lay midwives and, in some States, certified nurse/midwives. Birth centres and birth 'farms' are becoming a popular option for women and these vary in size and manpower. Generally, maternity care is obstetric led and there is a high uptake of private obstetric care, only 6.5% of births managed by a certified nurse/midwife

(National Centre for Health Statistics, 1998). Intervention rates are high, with a caesarean section rate of 23% in 2000, but other outcome figures are difficult to establish.

### **Australia**

The Federal Department of Health & Ageing funds the State based health services. 'Medicare' is health insurance for all, funded from a Commonwealth Government tax on all salaries. How hospitals allocate maternity funds is up to the individual hospital. Once pregnancy is confirmed, the woman can choose who she attends for maternity care. This can be a midwife or be based on a shared care model (similar to UK). If the woman opts for private maternity care, all antenatal care will be provided by the obstetrician and she may not see a midwife until she is admitted in labour, but even then it is the obstetrician who will carry out the delivery. In 1999, there were 257,394 babies born to 253,352 mothers which were notified to perinatal data collections in the States and Territories, a 0.7% increase in the number of births compared with 1998. This represents a birth every 2 minutes, with approximately 705 births per day in Australia in 1999. In 1999, more than 1 in 5 (21.9%) births were by caesarean section. South Australia (24.9%) had the highest caesarean rate in 1999 and the Australian Capital Territory (19.6%) the lowest. Caesarean rates were higher among older mothers, those having their first baby and those who were private patients. Mothers without private health insurance had shorter postnatal stays than those with private health insurance. Manpower and demographic problems have resulted in a drive to enhance midwifery care for low risk women.

### **Canada**

Maternity services are covered in Canada by a Canadian Public Health System, each state having a health insurance plan. Traditionally, maternity services were obstetrically led and intrapartum care was supported by obstetric nurses. Obstetricians have a regional approach to maternity care and until recently midwives were not recognised in Canada. Some states now have registered midwives but the numbers are few - in Ontario in 2001 only 3% of deliveries were by a midwife - and intervention rates are high. However, manpower problems exist: there is a difficulty in



recruiting obstetric staff and, as midwifery is relatively new, there are deficits in staffing in this field. One suggestion by a large Canadian University is to develop courses for Acute Care Nurse Practitioners (Maternity Care) educated to Masters level. It is anticipated that these professionals will be able to fill some of the existing maternity manpower gaps.

## **New Zealand**

The past decade has seen changes in legislation and in how maternity care is provided in New Zealand. The National Health Service funds all elements of maternity care, although there is some obstetric managed private care. In 1990, a change in the law brought about a system whereby pregnant women can choose a midwife, a GP or an obstetrician to lead her maternity care. All women must have access to a maternity care facility which, in conjunction with the midwife, provides inpatient services during labour and birth and in the immediate postnatal period until discharge home. A professional consensus by all disciplines on referral guidelines has been agreed. There are many birth centres for low risk women and breastfeeding rates are high (approximately 80%).

**ANNEX D: ADVANTAGES OF BIRTH CENTRES**

Increased consumer satisfaction	Ernst 1986, Rooks et al, 1989; Spitzer 1995; Campbell R 1997; Gillis SL (1995); Hayes KE.(1996); Saunders et al 2000
High midwifery job satisfaction	Saunders et al, 2000
More appropriate use of midwifery skills, more autonomy	Saunders et al, 2000; Ernst 1986
Women/ families able to make own birth decisions	Kucera 1987
Women felt empowered	Spitzer 1995
Higher normal delivery rates	David et al, 1999; Saunders et al. 2000; Wladenstrom et al 1997; Durand, AM. (1992)
Lower forceps and Ventouse rates	David et al, 1999; Feldman & Hunt 1987; Durand, AM. 1992; Rosenblatt, Roger A et.al. 1997
Lower caesarean section rate	Feldman & Hunt 1987; Saunders et al. 2000, Durand AM. (1992); Rosenblatt, Roger A., et.al. 1997
Fewer inductions	Saunders et al. 2000
Lower augmentation rates	Scupholme et al. 1986; Feldman & Hunt 1987; Rooks et al. 1992; Law YY, Lam KY (1999)
Fewer epidurals	Rooks et al. 1992; Feldman & Hunt 1987; Saunders et al..2000; Rosenblatt, Roger A. et.al. 1997
Less pethidine	Rooks et al. 1992; Spitzer 1995; Saunders et al. 2000
Fewer episiotomies	David et al. 1999; Rooks et .1992; Campbell et al 1999; Saunders et al. 2000
Less electronic fetal monitoring	Rooks et al. 1992; Spitzer 1995
Fewer amniotomies	Rooks et al. 1992; Spitzer 1995
Fewer intravenous infusions	Rooks et al. 1992; Feldman & Hunt 1987
Fewer vaginal examinations	Rooks et al. 1992; Spitzer 1995
Lower incidence of shoulder dystocia	Scupholme et al. 1986
Shorter labours	Albers & Katz 1991; Saunders et al. 2000
More likely to eat during labour	Rooks et al. 1992
More use of hydrotherapy	Rooks et al. 1992
Less fetal distress	Fullerton & Severino 1992
Less difficulty establishing respiration	Fullerton & Severino 1992
Increased chance of successful breastfeeding	Ernst 1986; Albers & Katz 1991; Spitzer 1995; De Koninck et al. (2001)
Cost effectiveness	Saunders et al. 2000; Reinharz et al. 2000; Spitzer 1995; Rosser 2001; American Public Health Association 2001; Anderson RE, Anderson, DA. (1999); Gabay M and Wolfe SM 1999

**Source: Walsh, D. 2001, amended**

**Interventions not available in a Level I unit include amniotomy, caesarean section, electronic fetal monitoring, repeat analgesia and forceps delivery.**

**Definition of Birth Centre** = A home-like facility, existing within a healthcare system with a programme of care in the wellness model of pregnancy and birth. These centres are guided by the principles of prevention, sensitivity, safety (appropriate medical intervention), and cost effectiveness. These units provide family centred care for health women before, during and after normal pregnancy, labour and birth (National Association of Childbearing Centres, 1995) <http://www.birthcenters.org>

## ANNEX E: EXIT AND ENTRY EXAMPLES TO LEVELS OF MATERNITY CARE

1. Section V explained the rationale for the identified entry and exclusion criteria to the different levels of maternity care. The attached tables provide examples of morbidities and co-morbidities, which would not be suitable for delivery in the specified units, but this requires local and regional agreement and the development of guidelines and explicit networks. This list is not all-inclusive and examples are given for clarity. The identification criteria may be for; referral at any level of care for advice regarding management, or transfer to a higher level of care, depending on local agreements. It must be stressed that any woman with significant morbidity is **not** suitable for delivery in levels 1a-d. It is crucial that appropriate referral pathways are used for any mother and baby who give cause for concern.
2. Level 11a exit criteria, especially for maternal reasons, will require consultant obstetrician involvement and care will depend on the available level of service, local facilities and emergency support. Level 11c units should be able to care for the majority of pregnancies.
3. Though the document has concentrated on exclusion criteria, the following table identifies the women who are suitable to level 1a-d of maternity care.

### Entry examples for Levels 1a-d care

<b>Age</b>	Primigravidae > 16 years Primigravidae < 40 years Multigravidae < 40 years
<b>Parity</b>	Multigravida < 5
<b>Height</b>	Height >150 cms.
<b>Weight</b>	Booking or 36 week weight BMI of > 20 or < 32

## Annex E1:

**Exit examples Level 1a-d: Maternal medical/surgical history**

<b>Significant Respiratory Disease</b>	<b>Significant Neurological Disease</b>	<b>Cardiac Disorders</b>
Significant asthma i.e. requiring previous hospitalisation or parenteral steroid therapy Cystic fibrosis Congenital abnormality Emphysema (COPD)	Neurological disorders, including ME, MS Epilepsy Spina bifida /hydrocephaly Paraplegia	Essential hypertension Heart disease: acquired, ischaemic heart disease, cardiomyopathy Heart disease: congenital heart disease corrected or uncorrected
<b>Haematological Disorders</b>	<b>Endocrine Disorders</b>	<b>Significant Gastro-intestinal Disorders</b>
Haematological disease: eg thrombocytopenia, aplastic anaemia Coagulation abnormality: thrombophilia, disseminated intravascular coagulation (DIC, DVT), pulmonary embolus (any history) Rhesus iso-immunisation including KELL Haemoglobinopathies	Any endocrine disease Diabetes (Type 1 and 11) or gestational diabetes Thyroid disease – (hypo and hyper) Adrenal disease e.g. Addisons	Cholelithiasis Fatty liver of pregnancy Hepatobiliary disease Crohn's disease Ulcerative colitis
<b>Reproductive/Genital Tract</b>	<b>Musculo-Skeletal Disorders</b>	<b>Renal disease</b>
Malformations of reproductive/genital tract Uterine surgery Significant pelvic or cervical surgery	Trauma to pelvis, CDH, Kyphosis <b>Significant connective tissue disorder</b>	<b>Renal failure, impairment or dialysis</b>
<b>Infection</b>	<b>Malignant Disease</b>	<b>Significant Mental Illness</b>
Significant infection e.g. Group B haemolytic streptococci Any blood borne virus (HIV, Hep B, Hep C) Sepsis	Previous malignancy	Diagnosed schizophrenia Manic depressive psychosis Postnatal depression
<b>Drug or Alcohol Intake</b>	<b>Surgery &amp; Anaesthesia</b>	<b>Transplant Surgery</b>
History of drug or alcohol abuse There should be a review if the woman uses therapeutic medication	<b>Any history of significant surgery or anaesthetic complication must be considered.</b>	<b>Heart</b> Lung Liver Kidney
<b>Genetic Disorders</b>	<b>Special Needs in Pregnancy</b>	
Marfan's syndrome Ehlers Danlos syndrome	Will need to be independently considered, e.g.: Learning disability Social exclusion Refugee mother	

**Exit examples Level 1a-d: Past Obstetric and Neonatal History**

Antenatal	Fetal/Baby	Past delivery details	Neonatal
Antepartum Haemorrhage (including recurrent placental abruption)	IUGR baby (< 10 <sup>th</sup> centile for gestational age)	Proven or suspected CPD	Stillbirth or neonatal death –case review required
	Large Baby (> than 90 <sup>th</sup> centile for gestational age)	Caesarean section	Previous neonatal birth injury
Preterm labour (<37 weeks gestation)	Shoulder Dystocia	Previous assisted mid cavity instrumental delivery	Previous baby with haemorrhagic disease of the newborn
Pregnancy induced hypertension, Eclampsia		Postpartum Haemorrhage (> 500 ml. primary or secondary)	Risk of, or known, inherited disease
Specific infections, e.g. HIV, Hepatitis Carrier, Hep B, Hep C, Group B Streptococcal),		Retained Placenta	Previous iso-immunisation or ABO incompatibility
		Perineal tear involving the anal sphincter (3 <sup>rd</sup> or 4 <sup>th</sup> degree tear)	
		Pelvic floor repair or cervical surgery	

**Exit examples Level 1a-d: Present Pregnancy**

Maternal	Fetal	Combined
Maternal choice	Post-maturity > 40/52+10 days	Multiple Pregnancy
Hyperemesis gravidarum	Suspected or proven fetal abnormality	Preterm labour < 37 completed wks
Suspected PIH, raised BP	Intrauterine death	Membrane rupture < 37 completed wks
Cholestasis (including fatty liver of pregnancy and HELPP)		Malpresentation > 37 completed wks (including breech)
Raised AFP with abnormal growth scan at 34-36 weeks		IUGR by U/S (below 10 <sup>th</sup> centile)
Anaemia (Hb < 10 g/dl at 34-36 wks).		Large for dates by U/S (over 90 <sup>th</sup> centile)
Significant antepartum haemorrhage		ABO, rhesus iso -immunisation
Placental abruption		Current substance or alcohol misuse
Placenta praevia		Current therapeutic drug use ((Benzodiazepines, any psychotropic drugs)
New medical disease not previously identified.		Term rupture of membranes >12 hours
Maternal wish for epidural analgesia		Oligohydramnios
Maternal wish for caesarean section or induction		Polyhydramnios
Newly identified malignancy		Maternal infection (HIV, Hepatitis Carrier, Hep B, Hep C, Group B Streptococcal)
		Active viral infections such as chickenpox, rubella, measles, parvo-virus

**Exit examples Level 1a-d : Intrapartum**

Unstable lie	Maternal pyrexia >38°C on two occasions (30 mins apart)	Retained Placenta	Infants of <36 weeks gestation
Requirement for epidural analgesia	Intrapartum haemorrhage		Congenital malformation
Established labour > 12 hours review evidence from partogram and guidelines (NICE/RCOG)	Meconium stained liquor Hypertension: diastolic of >100 mm/Hg on 2 occasions or a rise of 20 mm/Hg suspicion of developing pre-eclampsia		Respiratory difficulties after resuscitation (resp. rate > 60/min or requiring supplementary oxygen to maintain saturation > 92%)
Prolonged rupture of membranes > 12 hours	Prolonged active Second Stage		Birth weight < 2200g
Abnormal fetal auscultation – fetal distress	3 <sup>rd</sup> or 4 <sup>th</sup> degree perineal tear		Apgar score 6 or less at 5 minutes of age
Malpresentation	Postpartum haemorrhage (>500 mls)		Infant gives cause for concern

**Exit examples Level 1a-d: Postnatal**

<b>Maternal</b>	<b>Neonatal</b>	<b>Neonatal</b>	<b>Neonatal</b>
Postpartum haemorrhage	Neonatal seizures	Feeding difficulties persisting at 36 hours of age	Persisting hypoglycaemia
Sepsis	Persisting hypothermia	Failure to pass urine in first 24 hours	Failure to pass meconium in first 36 hours
Mother gives cause for concern			Jaundice in first 24 hours or positive Coombe's test

**Annex E2:Exit examples for Level 11a :Past History**

<b>Significant Respiratory Disease</b>	<b>Significant Neurological Disease</b>	<b>Cardiac Disorders</b>
Significant asthma i.e. requiring previous hospitalisation or parenteral steroid therapy Cystic fibrosis Congenital abnormality Emphysema (COPD) Certain congenital abnormalities	Neurological disorders, including ME, MS Epilepsy Spina bifida /hydrocephaly Paraplegia	Essential hypertension Heart disease: acquired, ischaemic heart disease, cardiomyopathy Heart disease: congenital heart disease corrected or uncorrected
<b>Haematological Disorders</b>	<b>Endocrine Disorders</b>	<b>Significant Gastro-intestinal Disorders</b>
Haematological disease: eg thrombocytopenia, aplastic anaemia Coagulation abnormality: thrombophilia, disseminated intravascular coagulation (DIC, DVT), pulmonary embolus (any history) Rhesus iso-immunisation including KELL Haemoglobinopathies	Significant endocrine disease Significant medical disease especially if unstable (Diabetes, Thyroid , Adrenal disease e.g. Addison's)	Fatty liver of pregnancy Hepatobiliary disease Crohn's disease Ulcerative colitis
<b>Reproductive/Genital Tract</b>	<b>Musculo-Skeletal Disorders</b>	<b>Renal disease</b>
Cancer	Significant connective tissue disorder	Renal disease Renal failure, impairment dialysis
<b>Infection</b>	<b>Transplant Surgery</b>	<b>Significant Mental Illness</b>
Significant infection e.g. Group B haemolytic streptococci Any blood borne virus (HIV, Hep B, Hep C) Sepsis	Heart Lung Liver Kidney	Diagnosed schizophrenia Manic depressive psychosis
<b>Drug or Alcohol Intake</b>	<b>Surgery &amp; Anaesthesia</b>	<b>Genetic Disorders</b>
History of drug or alcohol abuse There should be a review if the woman uses therapeutic medication	Any history of significant surgery or anaesthetic complication must be considered.	Marfan's syndrome Ehlers Danlos syndrome
<b>Special Needs in Pregnancy</b>	<b>Neonatal history</b>	
Will need to be independently considered e.g.: Learning disability Social exclusion Refugee mother	Any history of intrapartum asphyxia should be reviewed. Previous neonatal birth injury Previous baby with haemorrhagic disease of the newborn Risk of, or known, inherited disease Previous iso-immunisation or ABO incompatibility	<i>It is not advisable for any 'at risk' fetus to be delivered in a Level 11a unit</i>

**Exit examples Level 11a: Present Pregnancy**

<b>Maternal</b>	<b>Fetal/Combined</b>	<b>Fetal/ Combined</b>
Maternal choice	Maternal infection (HIV, Hepatitis Carrier, Hep B, Hep C, Group B Streptococcal)	Post-maturity > 40/52+10 days
New medical disease not previously identified.	Polyhydramnios	Suspected or proven fetal abnormality
Significant antepartum haemorrhage	Oligohydramnios	Intrauterine death

Cholestasis (including fatty liver of pregnancy and HELPP)	Multiple Pregnancy	Current therapeutic drug use ((Benzodiazepines, any psychotropic drugs)
Severe Pregnancy Induced Hypertension	Preterm labour < 37 completed wks	Large for dates by U/S (over 90 <sup>th</sup> centile )
Women at high obstetric anaesthetic risk	Membrane rupture < 37 completed wks	ABO, rhesus iso -immunisation
Women at high risk of obstetric interventions which may require assistance of interventional radiology (e.g. placenta accreta) or severe PPH >4000mls.	Malpresentation > 37 completed wks (including breech)	'at risk' fetus
Raised AFP with abnormal growth scan at 34-36 weeks		
Placental abruption		
Placenta praevia		
Active viral infections such as chickenpox, rubella, measles, parvo-virus		
Newly Diagnosed Cancer		

### Exit examples Level 11a: Intrapartum

Maternal	Maternal/Combined	Fetus/Baby
Postpartum Haemorrhage (>500 mls)	Intrapartum haemorrhage	Birth weight <2200g
3 <sup>rd</sup> or 4 <sup>th</sup> degree perineal tear		
		Large Baby >4000g
Mother gives cause for concern	Maternal pyrexia >38°C on two occasions (30 mins apart)	Apgar score 6 or less at 5 minutes of age
Retained Placenta		Respiratory difficulties after resuscitation (resp. rate >60/min or requiring supplementary oxygen to maintain saturation >92%)
Placenta Acreta	Newly diagnosed medical disease or morbidity	Infant gives cause for concern

### Exit examples Level 11a: Postnatal

Maternal	Neonatal		
Postpartum haemorrhage	Neonatal seizures	Feeding difficulties persisting at 36 hours of age	Persisting hypoglycaemia
Sepsis	Persisting hypothermia	Failure to pass urine in first 24 hours	Failure to pass meconium in first 36 hours
Mother gives cause for concern		Baby gives cause for concern	Jaundice in first 24 hours/ pos Coombes test

### Annex E3: Exit Examples for Level 11b: Past History

Significant Respiratory Disease	Significant Neurological Disease	Cardiac Disorders
Emphysema (COPD) Cystic fibrosis Congenital abnormality	Spina bifida /hydrocephaly Paraplegia	Heart disease – congenital heart disease corrected or uncorrected Heart disease – acquired – ischaemic heart disease, cardiomyopathy



<b>Haematological Disorders</b>	<b>Endocrine Disorders</b>	<b>Transplant Surgery</b>
Haematological disease: eg thrombocytopenia, aplastic anaemia Coagulation abnormality: thrombophilia, disseminated intravascular coagulation (DIC, DVT), pulmonary embolus (any history) Rhesus iso-immunisation including KELL Haemoglobinopathies	Significant medical disease especially if unstable (Diabetes Type 1, Thyroid, Adrenal disease e.g. Addison's Disease)	Heart Lung Liver Kidney
<b>Reproductive/Genital Tract</b>	<b>Musculo-Skeletal Disorder</b>	<b>Renal disease</b>
Cancer	Significant connective tissue disorder	Renal failure, impairment or dialysis
<b>Infection</b>	<b>Genetic Disorders</b>	<b>Significant Mental Illness</b>
Significant infection e.g. Group B haemolytic streptococci	Marfan's syndrome Ehlers Danlos syndrome	Manic depressive psychosis
		<b>Fetus/Neonate</b>
		Any history of low birthweight babies should be reviewed

### Exit Examples for Level 11b: Present pregnancy

Maternal	Fetal	Combined
Maternal choice	Below 10 <sup>th</sup> centile for gestational age	Malpresentation <32 completed weeks
	Suspected or proven fetal abnormality including, cardiac, metabolic disorders, CNS or facial abnormality.	Preterm labour < 32 completed wks
Malignancy identified in early pregnancy or any significant newly diagnosed morbidity	Ultrasound identified twin-twin transfusion	Membrane rupture < 32 completed wks
Women at high obstetric anaesthetic risk	Congenital diaphragmatic hernia	Severe Pregnancy Induced Hypertension (early onset, < 28 weeks gestation)
Women at high risk of obstetric interventions which may require assistance of interventional radiology (e.g. placenta accreta) or severe PPH >4000mls.	Abdominal wall defect	Severe IUGR (<1000g with delivery likely)
	Urogenital malformations (genital malformations, posterior urethral valves)	High multiple pregnancies
	Viral infection	

**Annex E4:****Exit Examples for Level 11c: Past History**

<b>Significant Respiratory Disease</b>	<b>Significant Neurological Disease</b>	<b>Cardiac Disorders</b>
Infection Significant infection	Spina bifida /hydrocephaly Paraplegia	Heart disease – congenital heart disease corrected or uncorrected Heart disease – acquired – ischaemic heart disease, cardiomyopathy
<b>Haematological Disorders</b>	<b>Endocrine Disorders</b>	<b>Transplant Surgery</b>
Haematological disease – e.g. thrombocytopenia, aplastic anaemia Coagulation abnormality – thrombophilia, disseminated intravascular coagulation (DIC)	Significant medical disease especially if unstable (Diabetes, Thyroid , Adrenal disease e.g. Addisons	Heart Lung Liver Kidney
<b>Genetic Disorders</b>	<b>Musculo-Skeletal Disorders</b>	<b>Renal disease</b>
Marfan’s syndrome Ehlers Danlos syndrome	Significant connective tissue disorder	Renal failure, impairment or dialysis

**Exit Examples for Level 11c: Present Pregnancy**

<b>Maternal</b>	<b>Fetal</b>	<b>Combined</b>
Women at high obstetric anaesthetic risk	Suspected or proven fetal abnormality including, cardiac, metabolic disorders, CNS or facial abnormality.	Severe Pregnancy Induced Hypertension (early onset, < 28 weeks gestation)
Women at high risk of obstetric interventions which may require assistance of interventional radiology (e.g. placenta accreta) or severe PPH >4000mls.	Congenital diaphragmatic hernia	Severe IUGR (<1000g with delivery likely)
Malignancy identified in early pregnancy	Abdominal wall defect	High multiple pregnancies (depending on SCBU facilities)
	Ultrasound identified twin-twin transfusion	
	Viral infection	
	Urogenital malformations (genital malformations, posterior urethral valves)	

**Annex E5: Entry examples for Level III**

<b>Maternal</b>	<b>Fetal</b>	<b>Neonate</b>
Renal failure, impairment or dialysis	Suspected or proven fetal abnormality including, cardiac, metabolic disorders, CNS or facial abnormality.	Need for assisted ventilation beyond initial resuscitation
Transplant Surgery (Heart, Lung, Liver, Kidney)	congenital diaphragmatic hernia	Persistent central cyanosis
Genetic Disorders (Marfan's syndrome, Ehlers Danlos syndrome)	Abdominal wall defect	Congenital abnormality needing urgent surgical intervention
	Ultrasound identified twin-twin transfusion	Necrotising enterocolitis (discretion of the consultant paediatrician)
	Viral infection	Neonate less than 28 weeks gestation
	Skeletal malformations	Need for specialist investigation and treatment e.g. metabolic problem which may require extraordinary therapies such as dialysis
	Urogenital malformations (genital malformations, posterior urethral valves)	

## **ANNEX F SUMMARY OF REPORT ON NEONATAL TRANSPORT**

### **Introduction**

The Neonatal Transport Working Group remit was:

- To consider the present arrangements for neonatal retrieval services in Scotland.
- To develop and recommend arrangements for a revised service, which would include:
  - Criteria for transport of neonates.
  - Guidance on outreach resuscitation and stabilisation pre-transfer.
  - Recommendations for a Scotland-wide co-ordinated neonatal transport system in conjunction with the Scottish Ambulance Service, which would identify issues relating to appropriately trained manpower, equipment, modalities of transport, access, training and education, and regional and national audit.

Neonatal transport services have developed in an ad-hoc and inconsistent fashion throughout Scotland, outwith a defined organisational structure and with no dedicated transport staff. The cost of this service is currently unknown, but the majority of cost and responsibility for the service is presently borne mainly by the tertiary centres in Glasgow, Edinburgh, Aberdeen and Dundee. However, units in Inverness, Paisley and Ayrshire presently carry out a number of transports utilising resource capacity from within their own units. Transport incubator/ventilator systems are complex and costly, currently most funded through charitable sources. However, a significant amount of equipment is facing obsolescence and new regulations with Health and Safety Executive and Civil Aviation Authority approval will require a development and revision of equipment. With a reduction in the manpower availability (see earlier), possible rationalisation of peri-natal services in Scotland and equipment constraints, many professionals now believe the neonatal transport service to be unsustainable and in crisis. Recently the units in Glasgow, Edinburgh, Aberdeen and Dundee have intimated that they can no longer guarantee a neonatal retrieval service to other neonatal and maternity units in Scotland.

### **The Study**

There were 25 neonatal units in Scotland providing Level 2 support and 13 neonatal intensive care units with Level 3 support. Due to the paucity of transport data, the Working Group undertook a 3 month prospective audit between 1 May 2000 and 31 July 2000 which captured data on 100% of neonatal transfers in Scotland:

209 transfers in total.

153 (73%) originated Monday to Friday within normal working hours of 09.00-17.00. 56 (27%) were outwith normal working hours and weekends, with higher rates in Highland and Aberdeen reflecting remoteness and rurality.

50 transports required mechanical ventilator support: 24% overall, but 39% in out-of-hours cases reflecting their emergency nature.

55% of transfers were in west, 35% in the south-east and 9% in the north.

The rate of neonatal transport of this study was 15 per 1,000 live births compared to a previous study in 1995 of 5.6 per 1,000 live births (Scottish Neonatal Consultants Study 1995). Extrapolation of these figures, albeit on a small sample size and time, would suggest 836 neonatal transfers per annum in Scotland. With the possible rationalisation of feto-maternal care and the possibility of midwifery managed units, the Group suggested that a projection of between 900 and 1,000 neonatal transports per annum in Scotland was a working hypothesis. Neonatal transfers are a relatively common occurrence in Scotland and the level of intensity of care required during transport is variable depending on the case mix: it is usually for step-up to a higher level of neonatal intensive care, access to specialist neonatal services, such as cardiology, cardiac surgery or neonatal surgery and the more elective “back transfers”. Location of the referring hospital, weather conditions and terrain are factors in the determination of whether land or air transport is the most appropriate option.

### The Option Appraisal

An Option Appraisal was carried out using 6 agreed and weighted criteria, which were developed from an initial 16, and they are as follows:

Staffing

Co-ordination

Equipment

Patient benefit

Training and service pressures

Response time and accessibility

The options, with final weighting scores attached are identified as follows:

1.	Status quo with no modification	55	-
2.	Status quo with modification	45	+
3.	13 NNIC Units with individual transport systems	30	-
4.	3 Regional Transport Groups	210	+
5.	1 National Transport System	145	+

A 3 Regional Group co-ordinated service was the preferred option and is supported by the Scottish Neonatal Consultants Group and the Royal College of Paediatrics and Child Health Scottish Committee. While different from the conventional regional groupings in Scotland, they are identified as follows:

North	Covering Grampian, Tayside, Highland, Orkney and Shetland with 3 transport teams operating as locally as possible from Ninewells, Raigmore and Aberdeen Maternity, but with regional back-up depending on case mix
-------	--

South	Covering Fife, Lothian and Borders with one transport team located within Simpson Centre for Reproductive Biology
West	Covering Greater Glasgow, Argyll and Clyde, Ayrshire and Arran, Forth Valley, Lanarkshire, Dumfries and Galloway, with 2 complementary teams operating from PRMH and QMH

### **Summary of Working Group Recommendations**

Establish a 24 hour safe and reliable national service based in 3 Regional Transport Groups with all stakeholders involved in the development and implementation.

Appoint a National Neonatal Transport Co-ordinator, 3 Regional Transport Co-ordinators, identify unit lead clinicians (already within the FMS) and a National Audit Co-ordinator.

Guidelines should be developed for an integrated neonatal transport network and include resuscitation and stabilisation, criteria for transfer, transfer and aftercare, and entry into the network.

Referral and retrieval should be arranged by senior staff with advice for pre-care transfer and transport modality with a single telephone call referral entry into the network.

A lead Scottish Ambulance Service should be appointed to co-ordinate both air and land transport and develop a central SAS co-ordinating centre with a one telephone call system entry and to review an innovative approach to back transfers.

A critically ill newborn infant should only undergo one episode of transport.

Information: develop standardised transfer documents, agree a minimum dataset for pre, intra and post transfer, the application of a unique identifying transport number, national audit and feedback and the development of parent/carer information packs.

Supply of appropriate equipment for land and air transport and work towards standardisation consistent with CAA, SAS and HSE requirements – from central funding.

Adequate staffing levels for 24 hour retrieval team capability with adequate experience and qualifications.

Training and education – development and funding of a multiprofessional programme of generic and specialist training for transport staff depending on competency level and outreach education for referring unit staff. Essential to acquire and maintain skills.

Adequate insurance cover for all members of the transport team.

**ANNEX G COMPETENCIES AND COURSES**

<b>Competency</b>	<b>Existing Courses</b>	<b>Proposals</b>	<b>Maintaining skills and support.</b>
a. Supporting normality. Incorporated into this course will be professional judgement and decision making	One MM 'normality module, (Dundee) to commence April 2003.	Develop regional multi-professional courses set at two levels	Ensure that those caring for high risk pregnancies will have continued experience of managing normality
b. Counselling skills, History taking	Some local courses and university module courses	Course – interpersonal skills and history taking	Updating and peer support.
c. Risk assessment, management and managing uncertainty	Some local ad-hoc courses and modules in degree courses	Specific courses to supplement a & b	Frequent drills and simulation activities. Exchange with larger units
d. Adult resuscitation and obstetric emergencies	Specific courses such as ALSO but also locally organised courses	Develop regional courses with annual update for all involved in delivery of maternity care	Frequent drills and simulation activities. Exchange with larger units
e. Neonatal emergencies	NALS or locally developed courses.	Develop regional courses with annual revision for all involved in delivery of maternity care	Frequent drills and simulation activities. Use of telemedicine
f. IV cannulation and IV fluid replacement	Local courses	Develop a multi-professional maternity care skills course	
g. Perineal care and suturing	Local courses and clinical experience	Regional approach	Experience and updating
h. Examination of the Newborn	No course in Scotland	Develop local courses (like Trowbridge)	
i. Midwife prescribing	Generic nurse prescribing courses	Develop midwifery specific course	Need legislation change
j. management of pain	No specific course but should be integral to a managing normality course	Include in managing normality and midwife prescribing course	
k. Ventouse Delivery	No course in Scotland	Develop regional clinically focused courses	Maintain competency and skills, telemedicine
l. Ultrasonic scanning	A few local courses to develop basic	Develop courses set at two levels - easily	Use of telemedicine to support scanning

	scanning skills. Advanced two year course (Aberdeen, Newcastle)	accessible	skills and interpretation
--	--	------------	------------------------------