Confidential Enquiry into Maternal and Child Health

CEMACH

Saving Mothers' Lives:

Reviewing maternal deaths to make motherhood safer - 2003-2005

Executive Summary and Key Recommendations

December 2007

CEMACH Mission statement

Our aim is to improve the health of mothers, babies and children by carrying out confidential enquiries on a nationwide basis and by widely disseminating our findings and recommendations.

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Introduction

The overwhelming strength of successive Confidential Enquiry Reports has been the impact their findings have had on maternal and newborn health in the United Kingdom and further afield. Over the years there have been many impressive examples of how the implementation of their recommendations and guidelines have improved maternal health policies, procedures and practice and saved mothers' and babies' lives. The findings of this latest Report continue to underline its continuing importance as a vital component of maternity services in the UK.

This, the seventh Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom (UK) enquires into maternal deaths and has a new title, "Saving Mothers' Lives". The change has been made to more accurately reflect the purpose of this, the longest running example of a maternal death review in the world. The Enquiry's aim is to stimulate and promote beneficial clinical actions and health and social service changes that will save yet more mothers' and babies' lives in future. By acting on the recommendations and results contained in the Report, the inequalities in pregnancy outcomes that currently exist between the most advantaged and most vulnerable and excluded mothers and babies in society should reduce, as should the numbers of those who suffer the consequences of severe morbidity. In addition, and perhaps of most importance, all mothers, infants and families will benefit from accessible maternity services whose staff are proud to provide them with the safest and best possible individualised care that meets all their medical and other needs.

Summary of key findings 2003-2005

Maternal death rates

Maternal deaths are extremely rare in the United Kingdom. In terms of international comparison, by identifying deaths related to pregnancy through causes stated on death certificates, the method used by other countries, 149 women died from obstetric related causes in the UK between 2003-05; a maternal death rate of 7 per 100,000 maternities.

However, due to the proactive and inclusive nature of this Enquiry, where UK maternity health professionals identify all pregnant and recently delivered women, whether or not their cases would have been picked up on a death certificate, the mortality rate calculated in this manner is always far higher than reported by official statistics alone. After a full assessment of all the deaths in pregnant women or those who died within 42 days of giving birth between the years 2003 and 2005 inclusive, Enquiry assessors considered 295 women died from conditions directly or indirectly related to pregnancy, out of more than two million births. This gives an Enquiry derived maternal mortality rate of 13.95 per 100,000 maternities. Although this is a slight increase from the last Report, it is not statistically significant.

The maternal mortality rate for mothers whose deaths could have been caused by pregnancy or birth such as haemorrhage or eclampsia, i.e. *Direct* deaths, has increased slightly compared to the last Report. This is not statistically significant but highlights the necessity for further vigilance and for these Reports to continue.

The mortality rate for mothers' deaths from *Indirect* causes, i.e. from pre-existing or new medical or mental conditions aggravated by pregnancy such as heart disease or puerperal psychosis, has not changed since the last Report. Although the overall maternal death rate from *Indirect* causes is still higher than for deaths from *Direct* causes, the gap between them is narrower.

The possible reasons for the lack of decline of the overall mortality rate are multi-factorial. The mean age of motherhood is increasing, although no association between maternal death and age has been shown in the current Report. In general, the women who died appeared to be in poorer overall health, smoked more and over half of the women whose Body Mass Index (BMI) was known, were overweight or obese (BMI 25 or above). The rise in deaths from cardiac disease highlights the need for hard-hitting health education programmes and pre-conception counselling for those at most risk, including the obese.

The rate is also almost certainly influenced by the increasing number of deaths in migrant women, whose numbers have risen. Many of these women have poorer obstetric histories, have more complicated pregnancies or serious underlying medical conditions and may also be in poorer general health.

The clinical causes of mothers' deaths

In contrast to the global figures, where the vast majority of women die from obstetric bleeding, obstructed labour, infection, eclampsia and the consequences of illegal abortion, these conditions combined only totalled 14% of the maternal deaths in the UK for 2003-05.

The commonest cause of *Direct* death was again thromboembolism, the rates for which remain largely unchanged since 1997-1999. There has been a slight rise in deaths from sepsis and pre-eclampsia but declines in deaths from haemorrhage, anaesthesia and uterine trauma. There has also been an apparently inexplicable rise in deaths from amniotic fluid embolism, a rare and largely unavoidable condition.

Cardiac disease was the most common cause of *Indirect* death, as well as for maternal deaths overall. In the main this reflects the growing incidence of acquired heart disease in younger women related to poor diets, smoking, alcohol and the growing epidemic of obesity.

Table 1
Numbers and rates per 100,000 maternities of maternal deaths reported to the Enquiry by cause; United Kingdom: 1985-2005.

Cause of death	1985-87	1988-90	1991-93	1994-96	1997-99	2000-02	2003-05	1985-87	1988-90	1991-93	1994-96	1997-99	2000-02	2003-05
	Numbers							*Rates per 100,000 maternities*						
***Direct* deaths**														
Thrombosis and thromboembolism	32	33	35	48	35	30	**41**	*1.41*	*1.40*	*1.51*	*2.18*	*1.65*	*1.50*	*1.94*
Pre-eclampsia and eclampsia*	27	27	20	20	16	14	**18**	*1.19*	*1.14*	*0.86*	*0.91*	*0.75*	*0.70*	*0.85*
Haemorrhage*	10	22	15	12	7	17	**14**	*0.44*	*0.93*	*0.65*	*0.55*	*0.33*	*0.85*	*0.66*
Amniotic fluid embolism	9	11	10	17	8	5	**17**	*0.40*	*0.47*	*0.43*	*0.77*	*0.38*	*0.25*	*0.80*
Early pregnancy deaths	16	24	17	15	17	15	**14**	*0.71*	*1.02*	*0.73*	*0.68*	*0.80*	*0.75*	*0.66*
Ectopic	11	15	9	12	13	11	**10**	*0.48*	*0.64*	*0.39*	*0.55*	*0.61*	*0.55*	*0.47*
Spontaneous miscarriage	4	6	3	2	2	1	**1**	*0.18*	*0.25*	*0.13*	*0.09*	*0.09*	*0.05*	*0.05*
Legal termination	1	3	5	1	2	3	**2**	*0.04*	*0.13*	*0.22*	*0.05*	*0.09*	*0.15*	*0.09*
Other	0	0	2	0	0	0	**1**	*0.00*	*0.00*	*0.09*	*0.00*	*0.00*	*0.00*	*0.14*
Genital tract sepsis**	9	17	15	16	18	13	**18**	*0.40*	*0.72*	*0.65*	*0.73*	*0.85*	*0.65*	*0.85*
Other *Direct*	27	17	14	7	7	8	**4**	*1.19*	*0.72*	*0.60*	*0.32*	*0.33*	*0.40*	*0.19*
Genital tract trauma	6	3	4	5	2	1	**3***	*0.26*	*0.13*	*0.17*	*0.23*	*0.09*	*0.05*	*0.14*
Fatty liver	6	5	2	2	4	3	**1***	*0.26*	*0.21*	*0.09*	*0.09*	*0.19*	*0.15*	*0.05*
Other causes	15	9	8	0	1	4	**0**	*0.66*	*0.38*	*0.35*	*0.00*	*0.05*	*0.20*	*0.00*
Anaesthetic	6	4	8	1	3	6	**6**	*0.26*	*0.17*	*0.35*	*0.05*	*0.14*	*0.30*	*0.28*
All *Direct*	**139**	**145**	**128**	**134**	**106**	**106**	**132**	***6.13***	***6.14***	***5.53***	***6.10***	***4.99***	***5.31***	***6.24***
Indirect														
Cardiac	23	18	37	39	35	44	**48**	*1.01*	*0.76*	*1.60*	*1.77*	*1.65*	*2.20*	*2.27*
Psychiatric *Indirect*	-	-	-	9	15	16	**18**	-	-	-	*0.41*	*0.71*	*0.80*	*0.85*
Other *Indirect*	62	75	63	86	75	90	**87**	*2.73*	*3.18*	*2.72*	*3.91*	*3.53*	*4.51*	*4.12*
Indirect malignancies	-	-	-	-	11	5	**10*****	-	-	-	-	*0.52*	*0.25*	*0.47*
All *Indirect*	**84**	**93**	**100**	**134**	**136**	**155**	**163**	***3.70***	***3.94***	***4.32***	***6.10***	***6.40***	***7.76***	***7.71***
Coincidental	**26**	**39**	**46**	**36**	**29**	**36**	**55**	***1.15***	***1.65***	***1.99***	***1.64***	***1.37***	***1.80***	***2.60***
Late														
Direct	-	13	10	4	7	4	**11**							
Indirect	-	10	23	32	39	45	**71******							

* Three cases of uterine rupture are counted in Chapter 4, haemorrhage and one of fatty liver in Chapter 3, pre-eclampsia and eclampsia.
** Including early pregnancy deaths due to sepsis.
*** Includes one death from choriocarninoma which ideally should be regarded as a *Direct* death.
**** Rise due to improved case ascertainment.
- Data not previously collected separately.

There has been a welcome decrease in the rate of suicide, the overall leading cause of death in the last Report. If sustained in the next Report, this decline may indicate that the recommendations made in the last two Reports concerning identifying women at potential risk in the antenatal period, and developing management plans for them are having a beneficial effect.

This Report has identified that many of the women who died from pre-existing diseases or conditions which may seriously affect the outcome of their pregnancies, or which may require different management or specialised services during pregnancy, did not have pre-pregnancy counselling. This was particularly the case for several women with major risk factors for maternal death who received treatment for assisted reproduction, including obesity.

More than half of all the women who died from *Direct* or *Indirect* causes, for whom information was available, were either overweight or obese. More than 15% of all women who died from *Direct* or *Indirect* causes were morbidly or super morbidly obese. The risks were particularly high for cardiac disease, thrombosis and infection although the risk was raised for all causes of mortality.

Where possible, obese women should be helped to lose weight prior to conception or any form of assisted reproduction.

Avoidable factors

Some maternal deaths remain unavoidable and the care many of these women received was of extremely high quality. However, whilst there has been no increase in the overall percentage of maternal deaths considered to have had avoidable or remediable factors, the assessors were struck by the number of health care professionals who appeared to fail to be able to identify and manage common medical conditions or potential emergencies outside their immediate area of expertise. Resuscitation skills were also considered poor in an unacceptably high number of cases.

In many cases the care provided was hampered by a lack of cross disciplinary or cross agency working and problems with communication. These included:

- poor or non-existent team working
- inappropriate delegation to junior staff
- inappropriate or too short consultations by phone
- the lack of sharing of relevant information between health professionals, including between General Practitioners (GPs) and the maternity team
- poor interpersonal skills.

There were also a number of cases where significant information, particularly regarding a risk of self-harm and child safety, were not shared between the health and social services, and an assumption by social services that their pregnant clients were attending for maternity care.

Each individual Chapter of the Report contains specific clinical learning points as well as more general recommendations. A list of the ‘top ten’ overarching recommendations made in the current Report is contained at the end of this Executive Summary.

Vulnerability

The link between adverse pregnancy outcomes and vulnerability and social exclusion are never more starkly demonstrated than by this Enquiry. Children born to women from more vulnerable groups also experience a higher risk of death or morbidity and face problems with pre-term labour, intrauterine growth restriction, low birth weight, low levels of breastfeeding and higher levels of neonatal complications. The findings of this Report demonstrate yet again that those women who need maternity services most use them the least. The stark inequalities demonstrated by the risk factors for maternal deaths continue to highlight that a disproportionate number of the women who died came from the most vulnerable and excluded groups of our society.

Vulnerable women with socially complex lives who died were far less likely to seek antenatal care early in pregnancy or to stay in regular contact with maternity services. Overall 17% of the women who died from *Direct* or *Indirect* causes booked for maternity care after 22 weeks of gestational age or had missed over four routine antenatal visits compared to 5% of women who were employed themselves, or who had a partner in employment. Of the women who died from any cause, including those unrelated to pregnancy:

- 14% self-declared that they were subject to domestic abuse
- 11% had problems with substance abuse, 60% of whom were registered addicts
- 10% lived in families known to the child protection services.

A third of all women who died were either single and unemployed or in a relationship where both partners were unemployed. Women with partners who were unemployed, many of whom had features of social exclusion, were up to seven times more likely to die than women with partners who were employed. In England, women who lived in the most deprived areas were five times more likely to die than women living in the least deprived areas.

Black African women, including asylum seekers and newly arrived refugees have a mortality rate nearly six times higher than White women. To a lesser extent, Black Caribbean and Middle Eastern women also had a significantly higher mortality rate.

Socially complex pregnancies and child protection issues

In the period of this Report it is estimated that at least 360 existing children and 160 live newborn babies lost their mother to a maternal death. Of the existing children, 112, almost a third, were already in the care of social services. Any child whose mother dies faces a far poorer start to life and the fact that so many of the children were already living in complex and excluded families, or were in care, underscores the important public health dimension of this Enquiry.

Many women with socially complex pregnancies were known to social services, and/or the child protection services. Not only did some try to conceal their pregnancies from social services, but many women also actively avoided maternity care despite knowing they were at higher risk of medical or mental health problems. Even when social services knew a woman was pregnant it was assumed, usually erroneously, that she was receiving maternity care. Her risks were further compounded by the stress of child protection case conferences and the removal of infants into care. In all, 41 women died after a child protection case conference had been held, 34 of whom were substance misusers. In 23 cases the mother died after the removal of her infant into care. These comprised five deaths from suicide and eighteen from substance misuse which could not be proved or disproved as an intentional act.

Whilst the needs of the child must remain paramount, the medical and social support and vigilance needed for the mother at such a distressing time was generally lacking, and any communication there had been between the agencies involved in her care ceased once the baby was removed. It is therefore crucially important that social workers should liaise with and refer pregnant women in their care to the local maternity services if necessary, and that support and care for these women is stepped up rather then decreased or stopped, particularly if her child is removed.

The 'top ten'

Over time, as new specialties have come on board and with the expansion of the Enquiry into the wider social and public health determinants of maternal health, the number of recommendations has inevitably grown. Whilst this is as it should be, the increasing numbers make it difficult for commissioners and service providers to identify those that require action as a top priority. Therefore, in order to ensure the key overarching or most crucial issues are not lost, this triennium, the Report contains a list of the new 'top ten' recommendations which every commissioner, provider, policy maker and other stakeholder involved in providing maternity services should plan to introduce, and audit, as soon as possible. This new list adds to, but does not replace, recommendations made in earlier Reports.

Whilst these 'top ten' recommendations are of general importance, the individual chapters in the Report contain more targeted recommendations for the identification and management of particular conditions for specific services or professional groups. These are no less important and should be addressed by any relevant national bodies as well as by local service commissioners, providers and individual health care staff.

The Confidential Enquiries into Maternal and Child Health (CEMACH) will be working with key stakeholders, including the Health Care Commission for England, to consider how the implementation and auditing of the 'top ten', as well as the more specific recommendations, might best be achieved.

A copy of the full Report can be purchased, or is available to download from, the CEMACH website - www.cemach.org.uk

The ‘top ten’ key recommendations

Pre-conception care

1. **Pre-conception counselling and support, both opportunistic and planned, should be provided for women of childbearing age with pre-existing serious medical or mental health conditions that may be aggravated by pregnancy. This includes obesity. This recommendation especially applies to women prior to having assisted reproduction and other fertility treatments.**

   The commoner conditions that require pre-pregnancy counselling and advice include:

   - **Epilepsy**
   - **Diabetes**
   - **Congenital or known acquired cardiac disease**
   - **Auto-immune disorders**
   - **Obesity: a BMI of 30 or more**
   - **Severe pre existing or past mental illness.**

Access to care

2. **Maternity service providers should ensure that antenatal services are accessible and welcoming so that all women, including those who currently find it difficult to access maternity care, can reach them easily and earlier in their pregnancy. Women should also have had their first full booking visit and hand held record completed by 12 completed weeks of pregnancy.**

3. **Pregnant women who, on referral to maternity services, are already 12 or more weeks pregnant should be seen within two weeks of the referral.**

Migrant women

4. **All pregnant mothers from countries where women may experience poorer overall general health, and who have not previously had a full medical examination in the United Kingdom, should have a medical history taken and clinical assessment made of their overall health, including a cardio-vascular examination at booking, or as soon as possible thereafter. This should be performed by an appropriately trained doctor, who could be their usual GP. Women from countries where genital mutilation or cutting is prevalent should be sensitively asked about this during their pregnancy and management plans for delivery agreed during the antenatal period.**

Systolic hypertension requires treatment

5. **All pregnant women with a systolic blood pressure of 160 mm/Hg or more require anti-hypertensive treatment. Consideration should also be given to initiating treatment at lower pressures if the overall clinical picture suggests rapid deterioration and/or where the development of severe hypertension can be anticipated.**

Caesarean section

6. **Whilst recognising that for some mothers and/or their babies caesarean section (CS) may be the safest mode of delivery, mothers must be advised that caesarean section is not a risk-free procedure and can cause problems in current and future pregnancies.**

   Women who have had a previous caesarean section must have placental localisation in their current pregnancy to exclude placenta praevia, but, if present, to enable further investigation to try to identify praevia accreta and enable the development of safe management strategies.

Clinical skills

7. **Service providers and clinical directors must ensure that all clinical staff caring for pregnant women actually learn from any critical events and serious untoward incidents (SUIs) occurring in their Trust or practice. How this is planned to be achieved should be documented at the end of each incident report form.**

8. **All clinical staff must undertake regular, written, documented and audited training for:**

   - **The identification and management of serious medical and mental health conditions which, although unrelated to pregnancy, may affect pregnant women or recently delivered mothers**
   - **The early recognition and management of severely ill pregnant women and impending maternal collapse**
   - **The improvement of basic, immediate and advanced life support skills. A number of courses provide additional training for staff caring for pregnant women and newborn babies.**

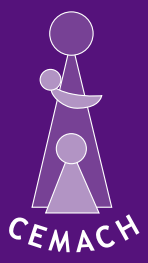
   There is also a need for staff to recognise their limitations and to know when, how and whom to call for assistance.

Early warning scoring system

9. **There is an urgent need for the routine use of a national obstetric early warning chart, similar to those in use in other areas of clinical practice, which can be used for all obstetric women which will help in the more timely recognition, treatment and referral of women who have, or are developing, a critical illness. In the meantime all Trusts should adopt one of the existing early warning scoring systems of the type described in the Chapter on Critical Care, which will help in the more timely recognition of women who have, or are developing, critical illness. It is important these charts also be used for pregnant women being cared for outside the obstetric setting for example in Gynaecology, Emergency Departments and in Critical Care Units.**

10. **Guidelines are urgently required for the management of:**

    - **The obese pregnant woman**
    - **Sepsis in pregnancy**
    - **Pain and bleeding in early pregnancy.**



A more detailed explanation of the Report findings and supporting evidence can be found in the full Report, which is available to download from the CEMACH website.

To purchase a copy of the full Report please go to **www.cemach.org.uk**.

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