

Saving Lives, Improving Mothers' Care: Executive Summary



Maternal deaths have decreased

from **11** (2006-08) to **10** (2010-12) per 100,000 women giving birth

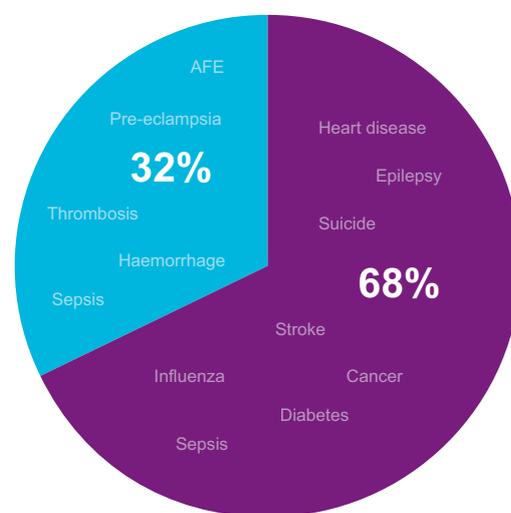
Causes of mothers' deaths

Two thirds of mothers died from medical and mental health problems in pregnancy and **only one third** from direct complications of pregnancy such as bleeding.

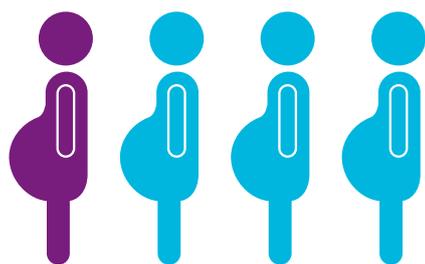
Three quarters of women who died had medical or mental health problems before they became pregnant.

Women with pre-existing medical and mental health problems need:

- Pre-pregnancy advice
- Joint specialist and maternity care



Think Sepsis



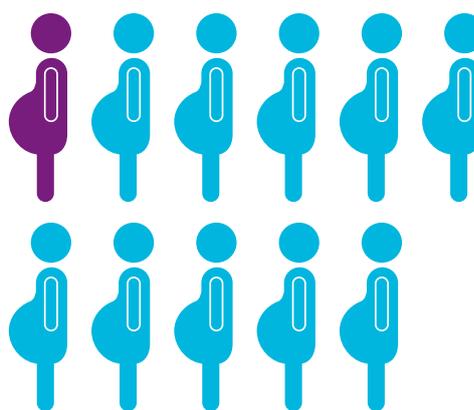
Almost a quarter of women who died had **Sepsis** (severe infection).

Women with sepsis need:

- Early diagnosis
- Rapid antibiotics
- Review by senior doctors and midwives

Prompt treatment and action can make the difference between life and death

Prevent Flu



1 in 11 of the women died from **Flu**

More than half of these women's deaths could have been prevented by a flu jab.

Flu vaccination will save mothers' and babies' lives

Key areas for action

For Policy-makers, Service Planners and Commissioners, Public Health and Professional Organisations

- Two thirds of women died from indirect causes and almost three quarters of all women who died had co-existing medical complications. High level actions are needed to ensure that physicians are appropriately trained in, and engaged with, the care of pregnant women, and that services are designed for women with medical conditions which provide appropriate and evidence-based care across the entire pathway, including pre-pregnancy, during pregnancy and delivery, and postpartum.
- One in eleven women died from influenza. Increasing immunisation rates in pregnancy against seasonal influenza must remain a public health priority.
- Access to antenatal care remains an issue amongst women who died and ensuring access to appropriate care for all groups must remain part of service planning. More than two thirds of women who died did not receive the nationally recommended level of antenatal care; a quarter did not receive a minimum level of antenatal care.
- Multi-agency evidence based operational guidance is urgently required to standardise and improve the care of pregnant women with epilepsy.

For Medical Directors, Clinical Directors, Heads of Midwifery and Clinical Service Managers

- Women with pre-existing medical conditions should have pre-pregnancy counselling by doctors with experience of managing their disorder in pregnancy.
- Women with medical disorders in pregnancy should have access to a coordinated multidisciplinary obstetric and medical clinic, thereby avoiding the need to attend multiple appointments and poor communication between senior specialists responsible for their care.
- There should be adequate provision of appropriate critical care support for the management of a pregnant woman who becomes unwell. Plans should be in place for provision of critical care on delivery units or maternity care on critical care units, depending on most appropriate setting for a pregnant or postpartum woman to receive care.
- The deaths of all women should undergo multidisciplinary review at a local level.

For Doctors, Midwives and Allied Health Professionals

- All women with any symptoms or signs of ill health, including those who are postnatal, should have a full set of basic observations taken (temperature, pulse rate, respiratory rate and blood pressure), and the results documented and acted upon. Normality cannot be presumed without measurement.
- The key actions for diagnosis and management of sepsis are:
 - Timely recognition
 - Fast administration of intravenous antibiotics
 - Quick involvement of experts - senior review is essential
- Junior staff should not hesitate to seek senior advice.
- Consultant to consultant referral is appropriate when specialist advice is needed.
- All staff should participate in the review of care for the Confidential Enquiry. Individual clinician's perspectives on the care they have provided to women who die or have severe morbidity is invaluable to identify fully the lessons to be learned.

Causes and trends

In 2009-12, 357 women died during, or within six weeks of the end of their pregnancy in the UK. This represents a statistically significant decrease in the maternal mortality rate, which is now 10.12 per 100,000 maternities. The decrease is predominantly due to a reduction in deaths due to direct (obstetric) causes; the mortality rate from hypertensive disorders of pregnancy is now the lowest since the inception of the Confidential Enquiry in 1952. It is clear, however, that maternal deaths from indirect (medical and psychiatric) causes are still not being addressed effectively. Nearly three-quarters of women who died had a co-existing medical complication. There has been no significant change in the rate of indirect maternal death over the last 10 years, a time during which direct maternal deaths have halved; the rate of indirect maternal deaths (6.87 per 100,000 maternities) is now twice that of direct deaths (3.25 per 100,000 maternities). Actions are urgently needed to address deaths from indirect causes.

For the first time this report includes detailed Confidential Enquiries into the care of both women who died during or after pregnancy in the Republic of Ireland as well as the UK, and the review of the care of women with severe morbidity.

It also represents a move towards annual reports from the previous triennial reports. Care is reviewed against national guidance, such as from the National Institute of Health and Care Excellence (NICE), where such guidance exists. The messages for care are presented by topic, and each topic will be included once every three years. This report includes topic-specific reviews of deaths and morbidity due to sepsis, and deaths from haemorrhage, amniotic fluid embolism, anaesthetic-related causes, neurological and other indirect causes. For the purposes of this report the care of 237 women was subject to Confidential Enquiry; the 203 women who died from sepsis, haemorrhage, amniotic fluid embolism, anaesthetic-related causes, neurological and other indirect causes between 2009 and 2012 and a sample of 34 women with septic shock who survived.

Influenza was an important cause of death during this period; more than half of the women died after a vaccine became available and their deaths can therefore be considered preventable. The importance of influenza immunisation for pregnant women cannot be over-emphasised.

The maternal mortality rate from genital tract sepsis more than halved between 2006-8 and 2010-12, which is encouraging. However, women dying from genital tract sepsis represented fewer than a quarter of the women who died from infectious causes during or after pregnancy, and detailed review of the care of both women who died from sepsis and women who survived an episode of septic shock showed that there remain a number of key areas in which care can be improved.

Key topic-specific messages for care

Think Sepsis

- 'Think Sepsis' at an early stage when presented with an unwell pregnant or recently pregnant woman, take all appropriate observations and act on them.
- The key actions for diagnosis and management of sepsis are:
 - Timely recognition
 - Rapid administration of intravenous antibiotics
 - Quick involvement of experts - senior review is essential
- Repeated presentation to the general practitioner, or community midwife or alternatively repeated self-referral to the obstetric triage or day assessment unit should be considered a 'red flag' and warrant a thorough assessment of the woman to investigate for signs of sepsis.
- Early advice from an infectious diseases physician or microbiologist should be sought; this is essential in instances where the woman fails to respond to the first choice antibiotic.
- To avoid preventable deaths, the benefits of influenza vaccination to pregnant women should be promoted and pregnant women at any stage of pregnancy should be offered vaccination.

Prevention and treatment of haemorrhage

- Haemoglobin levels below the normal range for pregnancy should be investigated and iron supplementation considered if indicated to optimise haemoglobin before delivery.
- Stimulating or augmenting uterine contractions should be done in accordance with current guidance and paying particular attention to avoiding uterine tachysystole or hyperstimulation.
- Fluid resuscitation and blood transfusion should not be delayed because of false reassurance from a single haemoglobin result.
- Whilst significant haemorrhage may be apparent from observed physiological disturbances, young fit pregnant women compensate remarkably well. A tachycardia commonly develops but there can be a paradoxical bradycardia. Hypotension is always a very late sign, therefore ongoing bleeding should be acted on without delay.
- In a woman who is bleeding and is likely to develop a coagulopathy or has evidence of a coagulopathy, it is prudent to give blood components before coagulation indices deteriorate.
- Early recourse to hysterectomy is recommended if simpler medical and surgical interventions prove ineffective.

Caring for women with Amniotic Fluid Embolism

- Perimortem caesarean section should be carried out within five minutes or as soon as possible after cardiac arrest and is carried out for the benefit of the woman; there is no need to confirm fetal viability, to do so wastes valuable time.
- It is prudent to trigger the massive obstetric haemorrhage protocol in an undelivered woman at the time the decision to proceed to perimortem caesarean section is made.

- The effectiveness of replacement and supportive therapy should be continuously monitored by the signs and symptoms of adequate oxygen delivery and tissue perfusion.

Lessons for Anaesthesia

- Subdural haematoma and cerebral venous sinus thrombosis are well recognised complications of dural puncture and pregnancy, respectively. Both should always be included in the differential diagnosis of persistent headache after dural tap or post dural puncture headache.
- Anaesthetists should practice drills for managing perioperative airway crises including severe bronchospasm, mechanical obstruction, and difficult intubation/oesophageal intubation.
- Pregnant or postpartum women recovering from anaesthesia require the same standard of postoperative monitoring, including documentation, as non-obstetric patients.
- Anaesthetists must be ready at all times to deal with the adverse effects of local anaesthetics including accidental intrathecal or intravenous injection, and minimise the use of strong concentrations as far as possible.
- All ambulance services should ensure their staff are trained in the relief of aortocaval compression during transfer of all pregnant women. How this was achieved must be routinely documented for each woman.

Learning from neurological complications

- Epilepsy remains a high risk condition in pregnancy and should continue to be managed as such in antenatal and postnatal care. Services should be commissioned and organised to support joint obstetric and neurological care of women with epilepsy during pregnancy.
- Multi-agency evidence-based guidelines are urgently required to standardise and improve the care of pregnant and postpartum women with epilepsy.
- Pre-conception counselling for women with epilepsy is not always provided effectively and should be robustly delivered in all care settings on an opportunistic basis.
- Neurological examination including assessment for neck stiffness is mandatory in all new onset headaches or headache with atypical features, particularly focal symptoms.
- Pregnancy should not alter the standard of care for women with stroke. All women with stroke, pregnant or not, should be admitted to a Hyperacute Stroke Unit.
- Neither pregnancy, caesarean section delivery nor the immediate postpartum state are absolute contraindications to thrombolysis (intravenous or intra-arterial), clot retrieval or craniectomy.

Caring for women with other medical and surgical complications

- A single identified professional should be responsible for co-ordinating the care of women with pre-existing medical conditions.
- Appropriately trained senior physicians should be involved in the care of pregnant and postpartum women with new onset symptoms suggestive of or known underlying medical disorders.
- Routine advice for pregnant women with diabetes mellitus should include the increased risk of hypoglycaemia and education of family members about optimal management of this condition.
- All women with proteinuria should have this quantified and further investigated if found to be significant.
- Senior surgical opinion is essential when dealing with surgical complications in pregnancy or postpartum and should not be delayed by team hierarchy. Early discussion between consultant obstetrician and consultant surgeon is vital.

Conclusions

The decreased maternal mortality rate at a time when maternity services are challenged with greater numbers of women giving birth as well as providing care for women with increasingly complex pregnancies emphasises the importance of continual improvements to care through Confidential Enquiry programmes such as this. This report has identified clear opportunities to improve care in the future. Basic observations and rapid actions have the potential to save women's lives, particularly in relation to sepsis. Events leading to catastrophic haemorrhage can be prevented by cautious and appropriate use of uterotonic drugs. Above all, there is a need for coordinated and concerted action at all levels to improve the care of women with medical complications before, during and after pregnancy. The reviews clearly illustrate that timely recognition of risk, the severity of the condition, accurate diagnosis, involvement of the correct senior staff from multiple disciplines, escalation and prompt treatment and action can make the difference between life and death.