

Γιατί πεθαίνουν οι Μητέρες ?

(Why Mothers Die)



Δεν έχω να
δηλώσω καμία
σύγκρουση
συμφερόντων

Ευστράτιος Α. Ασημακόπουλος

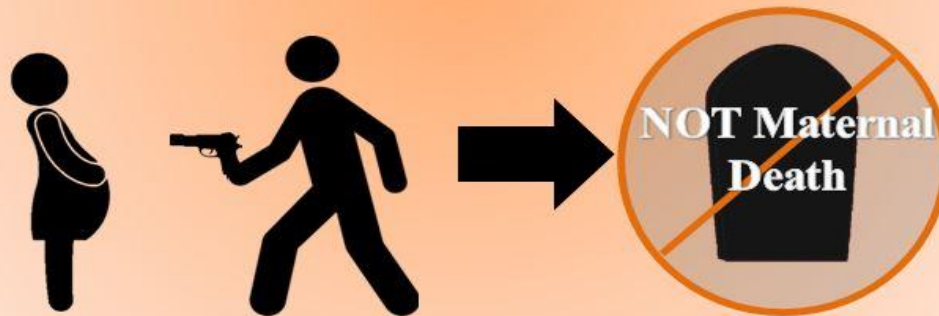
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Pregnancy related death: the death of a woman while pregnant (or within 42 days of termination of pregnancy, irrespective of the cause of death).



Maternal death: the death of a woman while pregnant, (or within 42 days of termination of pregnancy).

Accidental or incidental causes of death are not classified as maternal deaths.





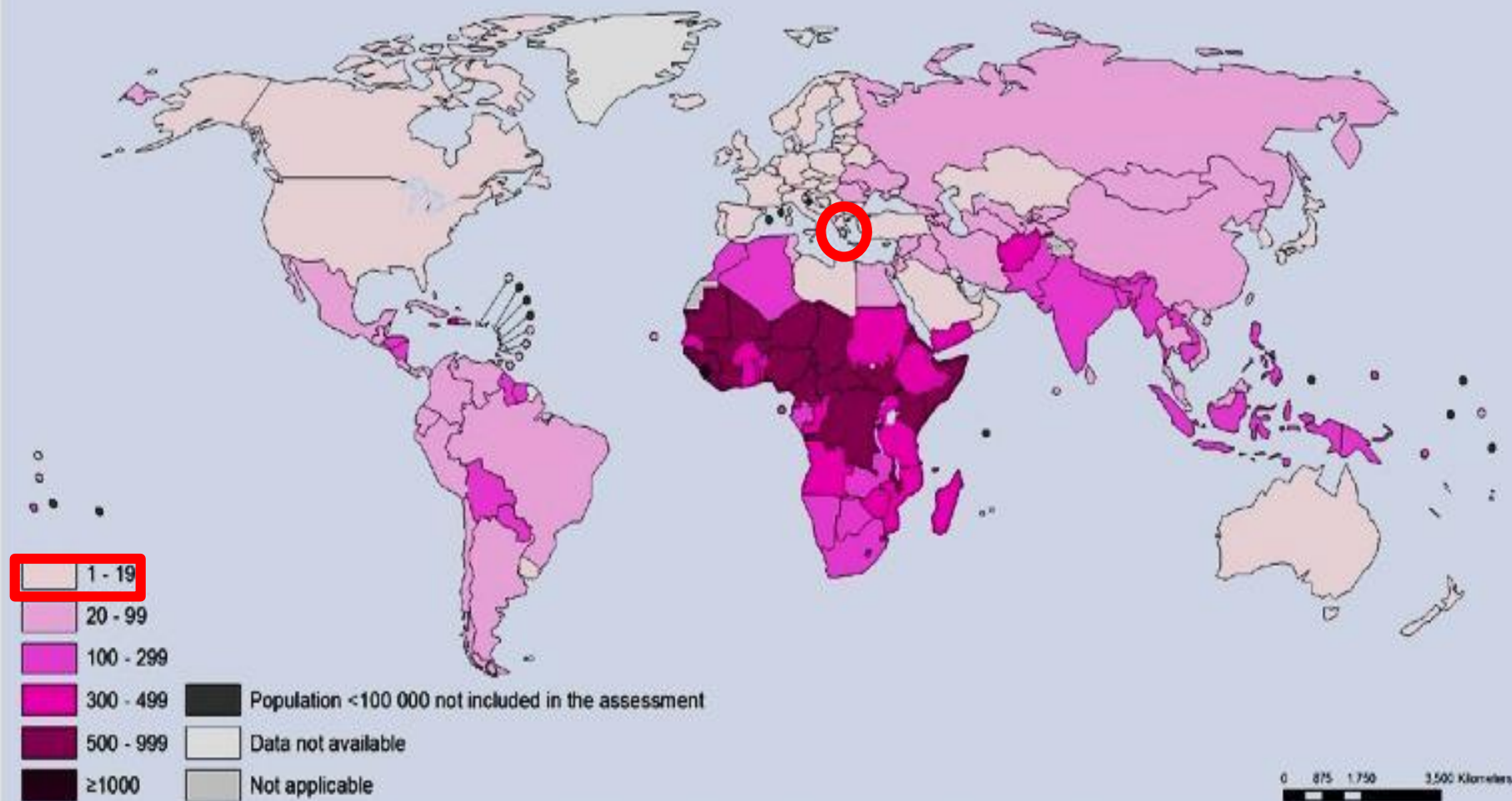
ABOUT 830 WOMEN DIE EACH DAY
due to complications in pregnancy and
childbirth.

This is despite a **44%** reduction in
maternal deaths between 1990 and 2015:



**NO WOMAN SHOULD DIE IN
PREGNANCY AND CHILDBIRTH**

Maternal mortality ratio (per 100 000 live births), 2015



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

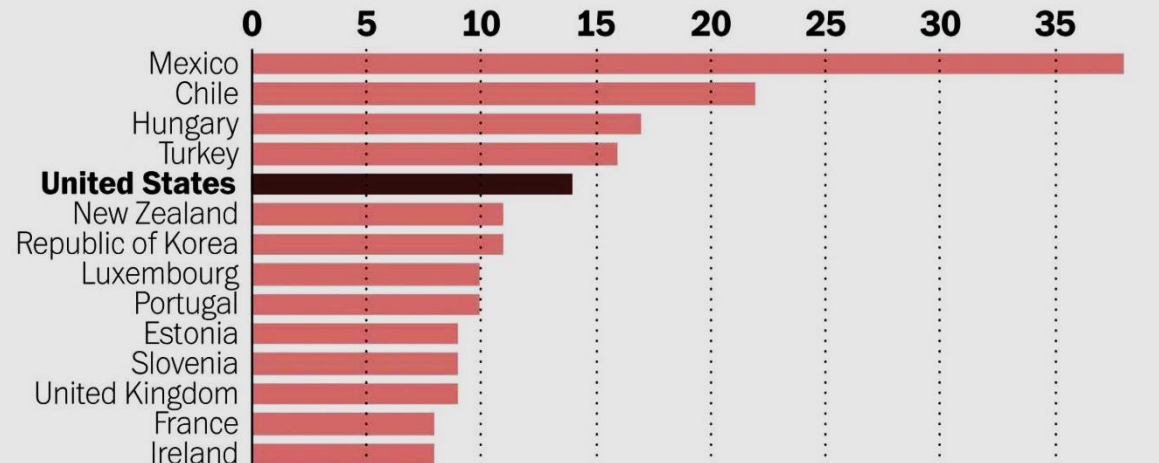
Data Source: World Health Organization
Map Production: Health Statistics and
Information Systems (HSI)
World Health Organization
Source - WHO Trends in Maternal Mortality 1990 to 2015



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U.S. lags behind other rich nations on maternal mortality

Maternal deaths due to pregnancy or labor complications per 100,000 live births, OECD countries



Stillbirths and infant, child, and maternal mortality in Greece (2003-12)

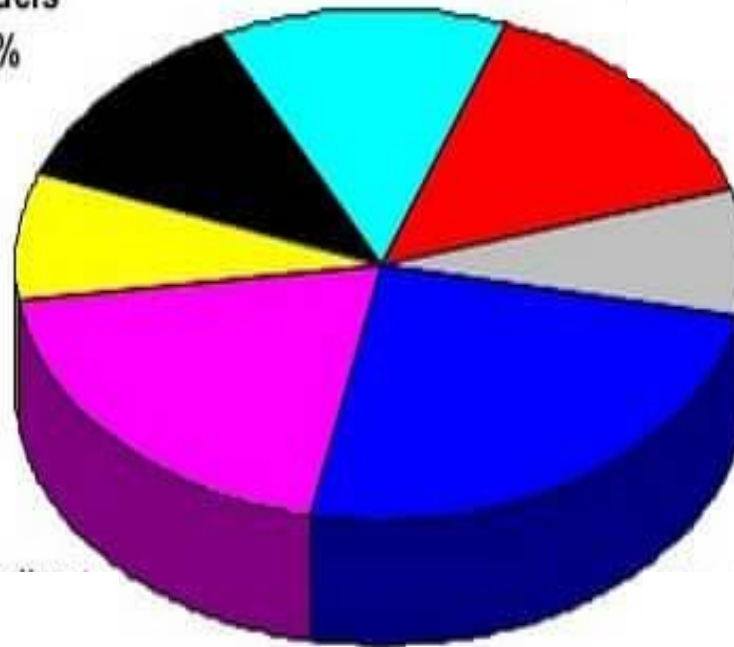
THE LANCET

	Infant deaths (<1year)	Child deaths (<5years)	Stillbirths	Maternal deaths	Livebirths	Infant mortality	Child mortality	Stillbirth rate	Maternal mortality ratio
2003	420	494	504	1	104420	4.02	4.73	4.83	1.0
2004	429	523	477	2	105655	4.06	4.95	4.51	1.9
2005	409	493	421	0	107545	3.80	4.58	3.91	0
2006	415	479	376	2	112042	3.70	4.28	3.36	1.8
2007	397	474	434	2	111926	3.55	4.23	3.88	1.8
2008	314	393	392	0	118302	2.65	3.32	3.31	0
2009	371	456	505	4	117933	3.15	3.87	4.28	3.4
2010	436	513	500	5	114766	3.80	4.47	4.36	4.4
2011	357	437	431	3	106428	3.35	4.11	4.05	2.8
2012	293	369	446	0	100371	2.92	3.68	4.44	0

Infant mortality, child mortality, and stillbirth rate are expressed per 1000 livebirths, whereas maternal mortality is expressed per 100 000 livebirths. Data for infant, child, and maternal deaths, stillbirths, and livebirths are derived from the Hellenic Statistical Authority (ELSTAT; the 2012 data are correct as of Aug 23, 2013).

Causes of maternal mortality (Global)

Hypertensive disorders
12%



Direct Obstetric Death: those deaths resulting from:

- obstetric complications of the pregnant state (pregnancy, labor and post-partum)
- interventions, omissions, or incorrect treatment
- or from a chain of events resulting from any of the above.



Population Research Institute: pop.org

Indirect Obstetric Death: those deaths resulting from previous existing disease (or from a disease that developed during pregnancy) and which was *not* due to **direct obstetric causes**, but which was **aggravated** by physiologic effects of pregnancy.



Population Research Institute: pop.org

Antenatal pulmonary embolism: risk factors, management and outcomes

M Knight on behalf of UKOSS

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Email marian.knight@npeu.ox.ac.uk

Accepted 7 November 2007. Published OnlineEarly 16 January 2008.

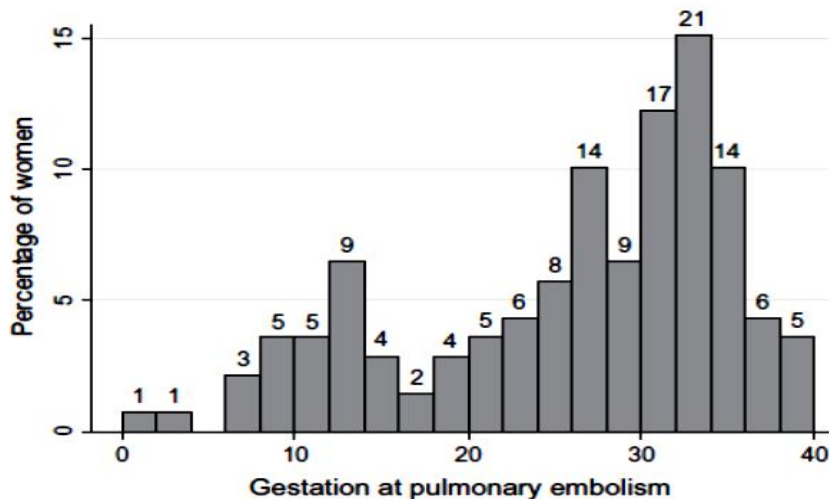
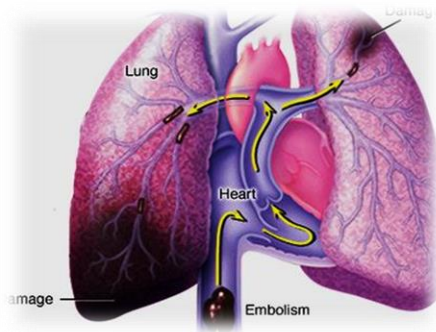


Figure 2. Gestational age at pulmonary embolism (completed weeks). Figures above bars show numbers of women.

143 antenatal pulmonary embolisms

- ✓ 1.3 / 10,000
- ✓ 70% had identifiable risk factors.
- ❖ Multiparity and body mass index ≥ 30
- 4% had a pulmonary embolism following antenatal prophylaxis with LMWH;
- 50% were receiving lower than recommended doses.
- ✓ 2 women had recurrent pulmonary emboli
- ✓ 5 women died

Incidence and Risk Factors for Amniotic-Fluid Embolism

VOL. 115, NO. 5, MAY 2010

Marian Knight, MBCAB, DPhil, Derek Tuffnell, MBCAB, Peter Brocklehurst, MBCAB, MS, Patsy Spark, BSc, and Jennifer J. Kurinczuk, MBCAB, MD, on behalf of the UK Obstetric Surveillance System

OBSTETRICS & GYNECOLOGY



60 women in UK with AFE (2005 - 2009)
1,227 women for the control group.

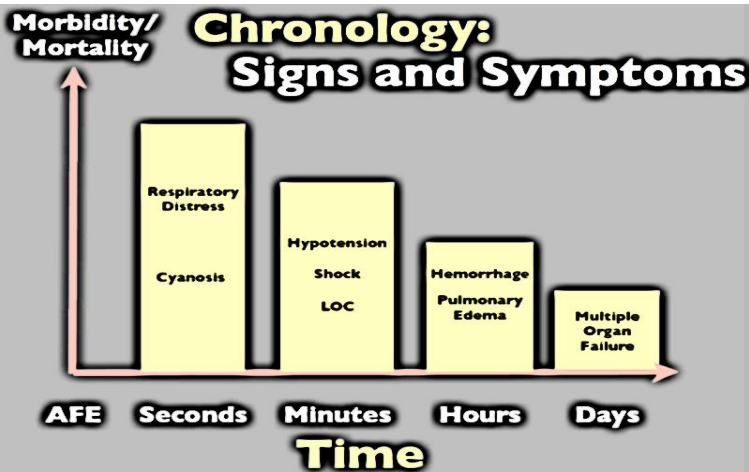
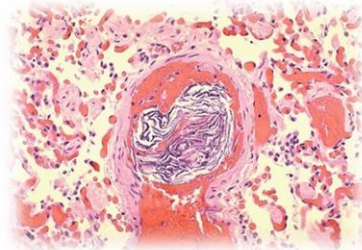
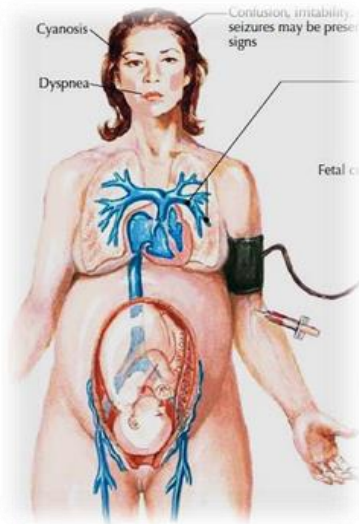
✓ 2.0 / 100,000 deliveries.

AFE associated with:

- induction of labor
- multiple pregnancy
- in older, ethnic
- minority women
- CS was associated with postnatal AFE

✓ 12 women died (fatality 20%)

✓ 5 of 37 newborns with AFE died (mortality 135 / 1,000 births)



Eclampsia in the United Kingdom 2005

M Knight on behalf of UKOSS

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Email marian.knight@npeu.ox.ac.uk

Accepted 13 May 2007. Published Online Early 6 July 2007.



κ. 155. Χαρακτηριστική εικόνα του εκλαμπτικού παύση (Vomiting of Pregnancy). Σαυότιον εις New Haven, 1932.

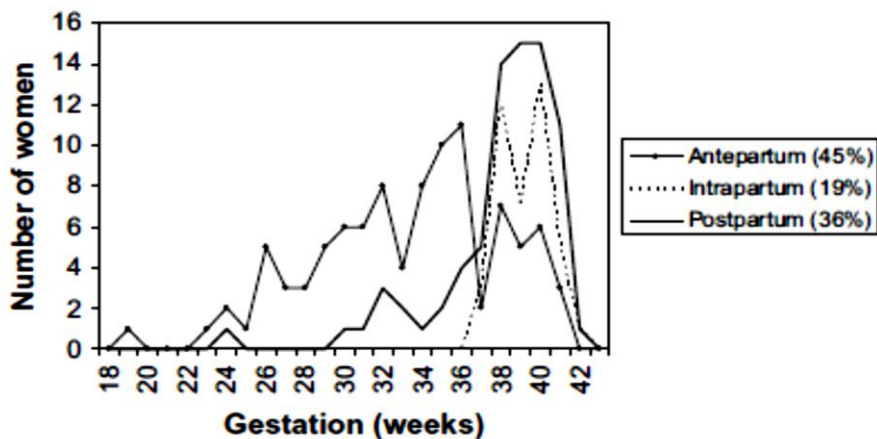


Figure 2. Gestational age at the time of the eclamptic episode (antepartum and intrapartum fits) or delivery (postpartum fits).

229 hospitals in UK. (2005 - 2006)

✓ 2.7 /10.000

■ 38% had hypertension and proteinuria in the week before their first fit.

■ 99% treated with magnesium sulphate.

No women in the study died.

■ 26% had recurrent fits.

■ 56% admitted to ICU for a median of 2 days

■ 10% had severe morbidity after the eclamptic episode.

✓ 8 infants were stillborn and

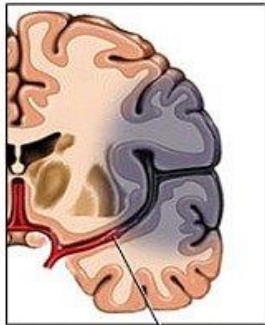
✓ 5 died in the neonatal period (mortality 59/1000 births).

Incidence, Risk Factors, Management, and Outcomes of Stroke in Pregnancy

VOL. 120, NO. 2, PART 1, AUGUST 2012

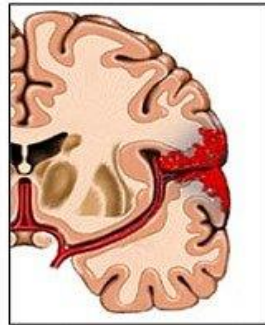
Catherine A. Scott, MBChB, MS; Susan Bewley, MA, MD, Anthony Rudd, FRCP (London), Patsy Spark, BSc, Jennifer J. Kurinczuk, MChB, MD, Peter Brocklehurst, MChB, MS, and Marian Knight, MChB, DPhil

Ischemic stroke

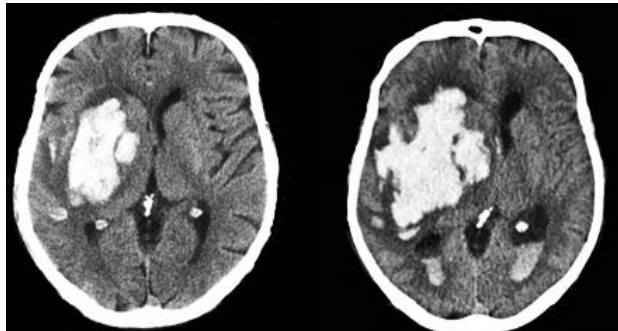


A clot blocks blood flow to an area of the brain

Hemorrhagic stroke



Bleeding occurs inside or around brain tissue



2.0 hours after onset 6.5 hours after onset

OBSTETRICS & GYNECOLOGY



30 cases of antenatal stroke (2007 - 2010)

✓ **1.5 / 100,000**

- Nonhemorrhagic 0.9 / 100,000
- Hemorrhagic stroke were 0.6 / 100,000

Factors associated with increased risk of antenatal stroke were:

- history of migraine
- gestational diabetes
- preeclampsia or eclampsia

6 stroke-related deaths - fatality 20% .
50% of hemorrhagic strokes 0.3 / 100,000.

Risk Factors, Management, and Outcomes of Hemolysis, Elevated Liver Enzymes, and Low Platelets Syndrome and Elevated Liver Enzymes, Low Platelets Syndrome

Kathryn E. Fitzpatrick, BA, MSc, Kim Hinshaw, MB BS, FRCOG, Jennifer J. Kurinczuk, MD, MSc, and Marian Knight, MBChB, DPhil

VOL. 123, NO. 3, MARCH 2014

E Elevated

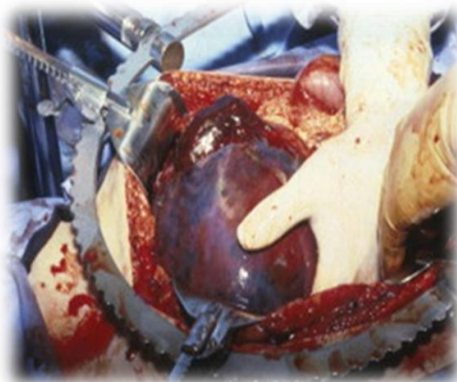
L Liver Enzymes

• AST or ALT \geq 2x upper limit of normal
• LDH \geq 2x upper limit of normal

L Low

P Platelet count

• $< 100,000/\text{mm}^3$



OBSTETRICS & GYNECOLOGY

129 HELLP, 81 ELLP, and 476 control (2011 - 2012)

HELLP were more likely in :

- 35+ years old
- nulliparous
- previous gestational hypertensive disorder
- multiple pregnancy

ELLP were more likely in :

- nulliparous
- previous gestational hypertensive disorder

Of the women diagnosed antenatally with HELLP or ELLP,

- 51% had immediate delivery
- 43% delivery within 48 hours
- 5% expectant (conservative) management.

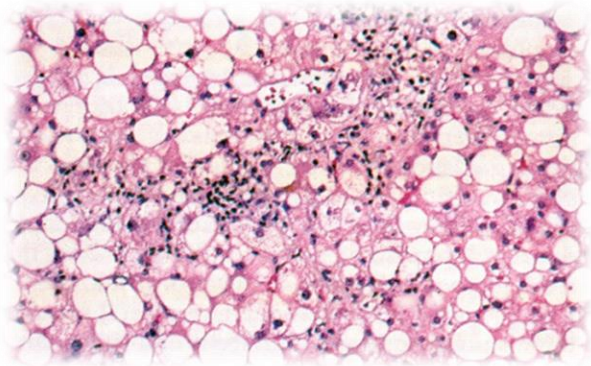
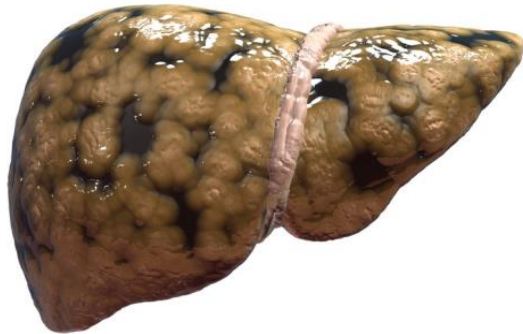
❖ **No differences between delivery within 48h and those who had immediate delivery, in terms of:**

- ✓ received blood products
- ✓ admitted to the ICU
- ✓ severe morbidity
- ✓ neonates with major complications

A prospective national study of acute fatty liver of pregnancy in the UK

M Knight,¹ C Nelson-Piercy,² J J Kurinczuk,¹ P Spark,¹ P Brocklehurst,¹ on behalf of UK Obstetric Surveillance System (UKOSS)

Gut 2008;**57**:951–956.



229 hospitals in the UK (2005–2006)

57 AFLP / 1 132 964 women delivering

✓ 5.0 /100 000

- 55 diagnostic criteria + clinical assessment
- 2 by clinical assessment alone

✓ 18% had twin pregnancies

✓ 20% were underweight (body mass index (BMI) <20).

❖ 60% were admitted to ICU

❖ 15% to specialist liver unit.

❖ One woman received a liver transplant.

❖ One woman died (fatality 1.8%).

❖ 7 deaths among 67 infants (104 / 1000).

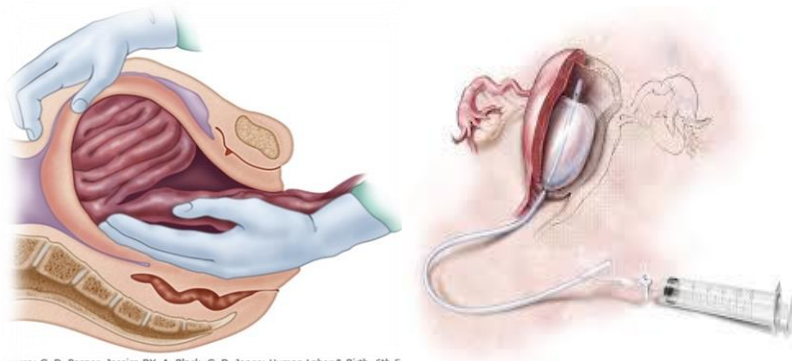
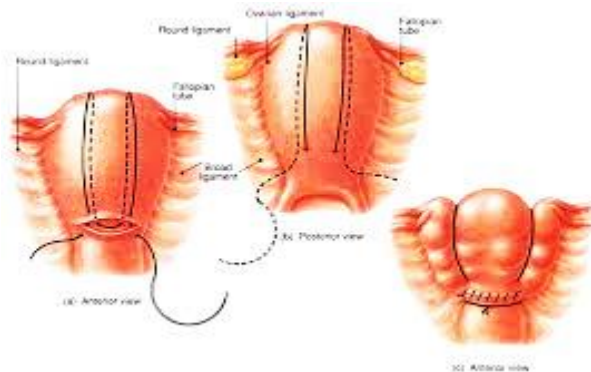
Specific second-line therapies for **postpartum haemorrhage**: a national cohort study

G Kayem,^a JJ Kurinczuk,^a Z Alfirevic,^b P Spark,^a P Brocklehurst,^a M Knight^a

^a National Perinatal Epidemiology Unit, University of Oxford, Oxford, UK ^b Division of Perinatal and Reproductive Medicine, University of Liverpool, Liverpool Women's Hospital, Liverpool, UK

Correspondence: Dr M Knight, National Perinatal Epidemiology Unit, University of Oxford, Old Road Campus, Oxford, UK. Email marian.knight@npeu.ox.ac.uk

Accepted 13 January 2011. Published Online 10 March 2011.



Source: G. D. Posner, Jessica DY, A. Black, G. D. Jones: Human Labor & Birth, 6th Ed
www.aboyan.medical.com

226 in the UK (2007 - 2009)

272 women.

✓ Rate 2.2 / 10,000

67 Women

- 25% intrauterine tamponade to treat PPH
- 75% uterine compression in 120 women
- 36% pelvic vessel ligation in 5 women
- 86% interventional radiology in 12 women
- 31% rFVIIa in 5 women

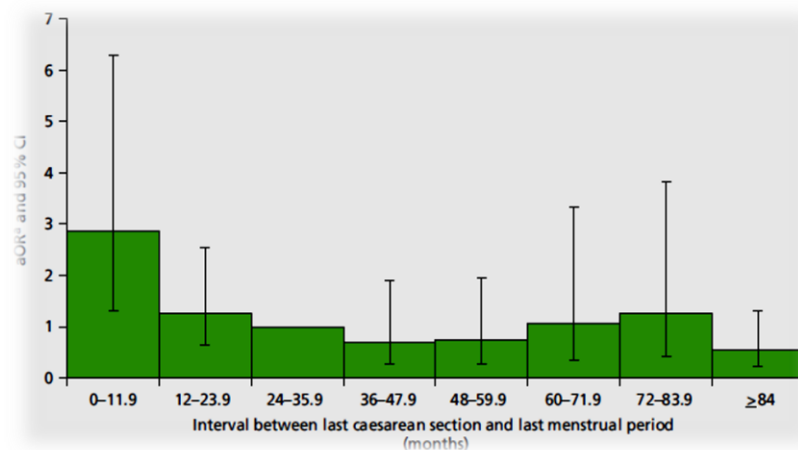
❖ Rates of success were not significantly different

❖ 26% (1/4) of the women had a hysterectomy.

Uterine Rupture by Intended Mode of Delivery in the UK: A National Case-Control Study

Kathryn E. Fitzpatrick¹, Jennifer J. Kurinczuk¹, Zarko Alfirevic², Patsy Spark¹, Peter Brocklehurst¹,
Marian Knight^{1*}

March 2012 | Volume 9 | Issue 3 | e1001184



- 159 with uterine rupture (2009 - 2010)
- 448 control with a previous CS

✓ **0.2 / 1,000**

- **2.1 / 1000 VBAC**
- **0.3 / 1,000 elective CS .**

Increased in women who had:

- **≥ 2 previous CS**
- **<12 months since their last CS**

A higher risk of rupture:

- **labour induction**
- **oxytocin use**

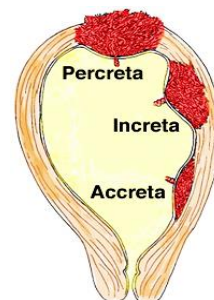
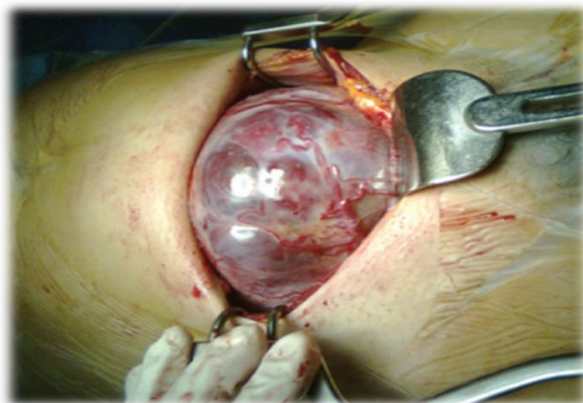
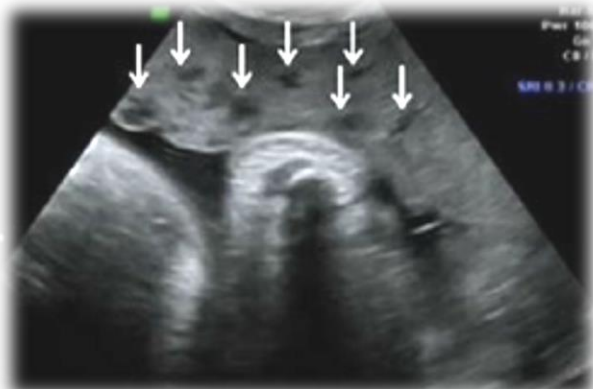
✓ **2 women with uterine rupture died (fatality 1.3%)**

✓ **18 deaths / 145 infants -mortality 124 / 1,000**

Incidence and Risk Factors for Placenta Accreta/Increta/Percreta in the UK: A National Case-Control Study

Kathryn E. Fitzpatrick¹, Susan Sellers², Patsy Spark¹, Jennifer J. Kurinczuk¹, Peter Brocklehurst³, Marian Knight^{1*}

December 2012 | Volume 7 | Issue 12 | e52893



- 134 with placenta accreta/increta/percreta
- 256 control (2010 - 2011)

✓ Accreta/increta/percreta 1.7/10,000

✓ 577 / 10,000 with previous CS + praevia.

Women who had:

- previous CS
- other previous uterine surgery
- IVF + placenta praevia had raised odds of accreta/increta/percreta.
- Older maternal age without a previous CS

Peripartum hysterectomy in the UK: management and outcomes of the associated haemorrhage

M Knight on behalf of UKOSS

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Correspondence: Dr M Knight, National Perinatal Epidemiology Unit, University of Oxford, Old Road Campus, Oxford OX3 7LF, UK.

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Accepted 15 May 2007. Published Online Early 18 September 2007.

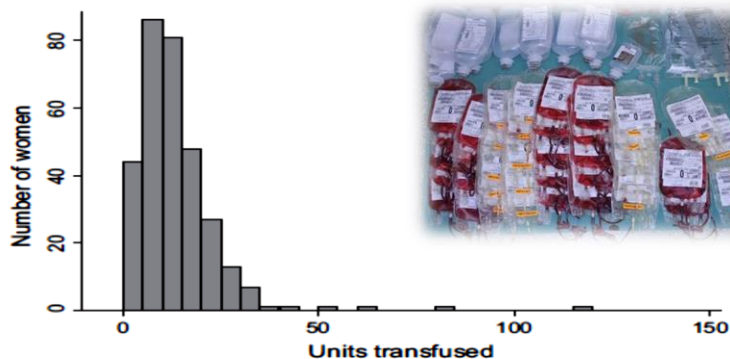
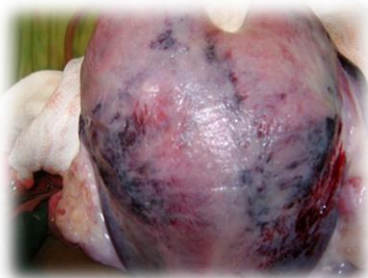


Figure 2. Blood transfusion requirements in women undergoing hysterectomy.

229 maternity units in the UK (2005 - 2006).

✓ **318 peripartum hysterectomies.**

Most common causes of haemorrhage:

- 53% uterine atony
- 39% morbidly adherent placenta

- ✓ 50 women were unsuccessfully managed with B-Lynch prior to hysterectomy,
- ✓ 28 with activated factor VII and
- ✓ 9 with arterial embolisation.

- 21% of women suffered damage to other structures
- 20% required a further operation and
- 19% had additional severe morbidity.

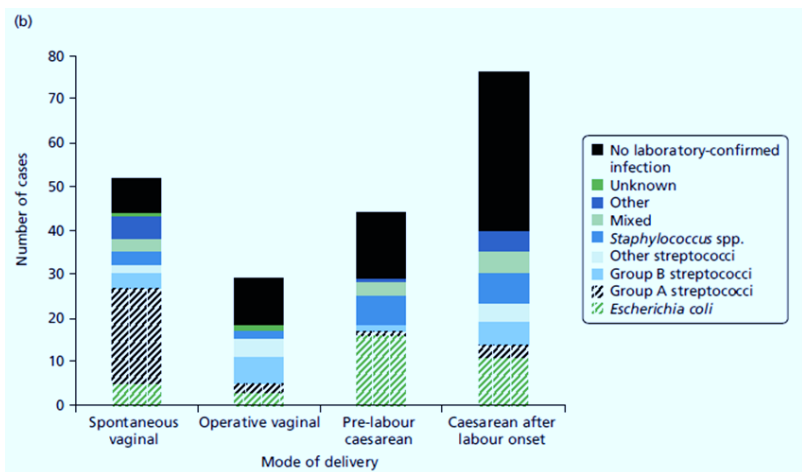
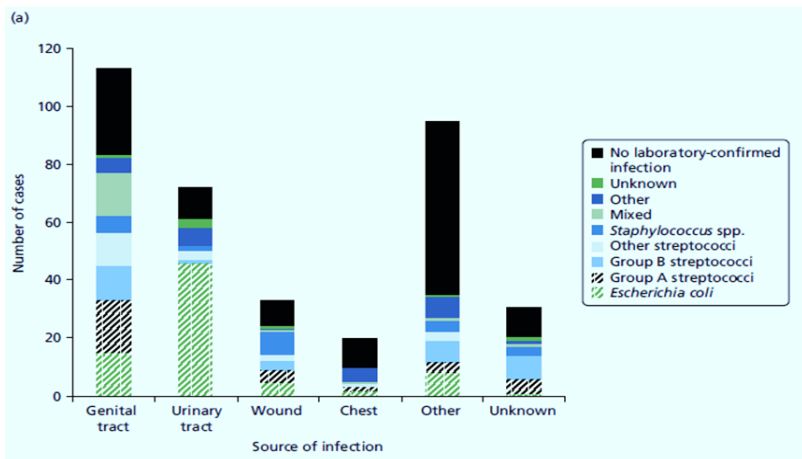
✓ **2 women died (fatality 0.6%).**

❖ Bladder damage was more likely with placenta accreta than uterine atony.

❖ No differences between total or subtotal hysterectomy.

The Continuum of Maternal Sepsis Severity: Incidence and Risk Factors in a Population-Based Cohort Study

Colleen D. Acosta^{1*}, Marian Knight¹, Henry C. Lee^{2,3}, Jennifer J. Kurinczuk¹, Jeffrey B. Gould^{2,3,5}, Audrey Lyndon^{4,5}



365 severe sepsis and 757 controls (2011 - 2012).

✓ Severe sepsis was 4.7 /10,000

▪ 19.5% developed septic shock.

✓ 1.4% women died.

✓

❖ 31.0% genital tract infection (Escherichia coli)

- black or other ethnic minority
- primiparous
- pre-existing medical problem
- operative vaginal delivery
- pre-labour CS
- CS after labour onset

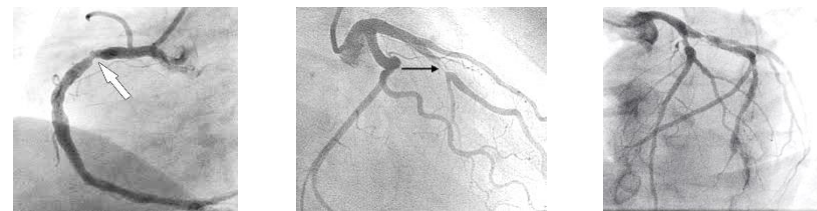
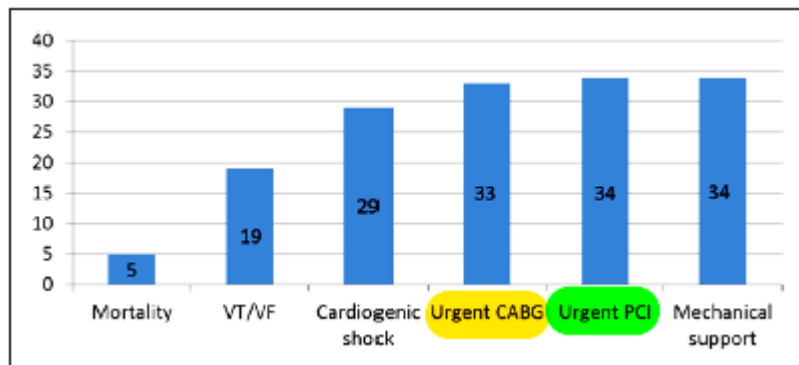
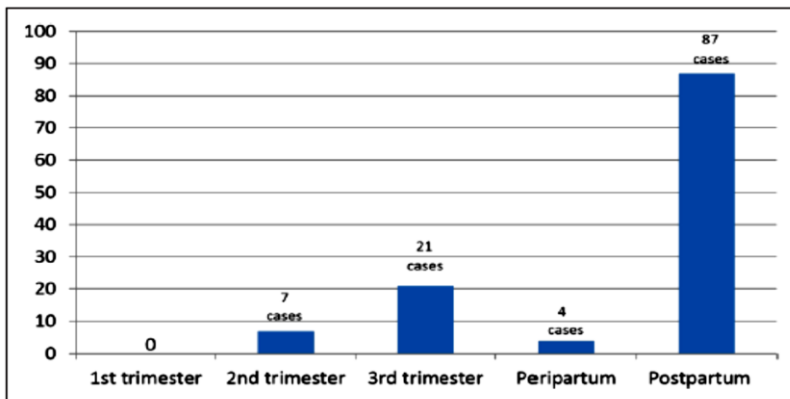
❖ Median time between delivery and sepsis was 3 days (1-7 d).

- Multiple pregnancy
- Group A streptococcus associated with septic shock.

Circ Cardiovasc Interv. 2017;10:

Pregnancy and the Risk of Spontaneous Coronary Artery Dissection: An Analysis of 120 Contemporary Cases

Ofer Havakuk, Sorel Goland, Anil Mehra and Uri Elkayam



120 cases (2000 - 2015)

- 75% presented with ST-elevation myocardial infarction
- 80% had anterior myocardial infarction.
- 72% Left anterior descending coronary artery
- 36% Left main segment
- 40% multivessel spontaneous coronary artery dissection.

50% only successful Percutaneous coronary intervention
44 cases was performed Coronary artery bypass.

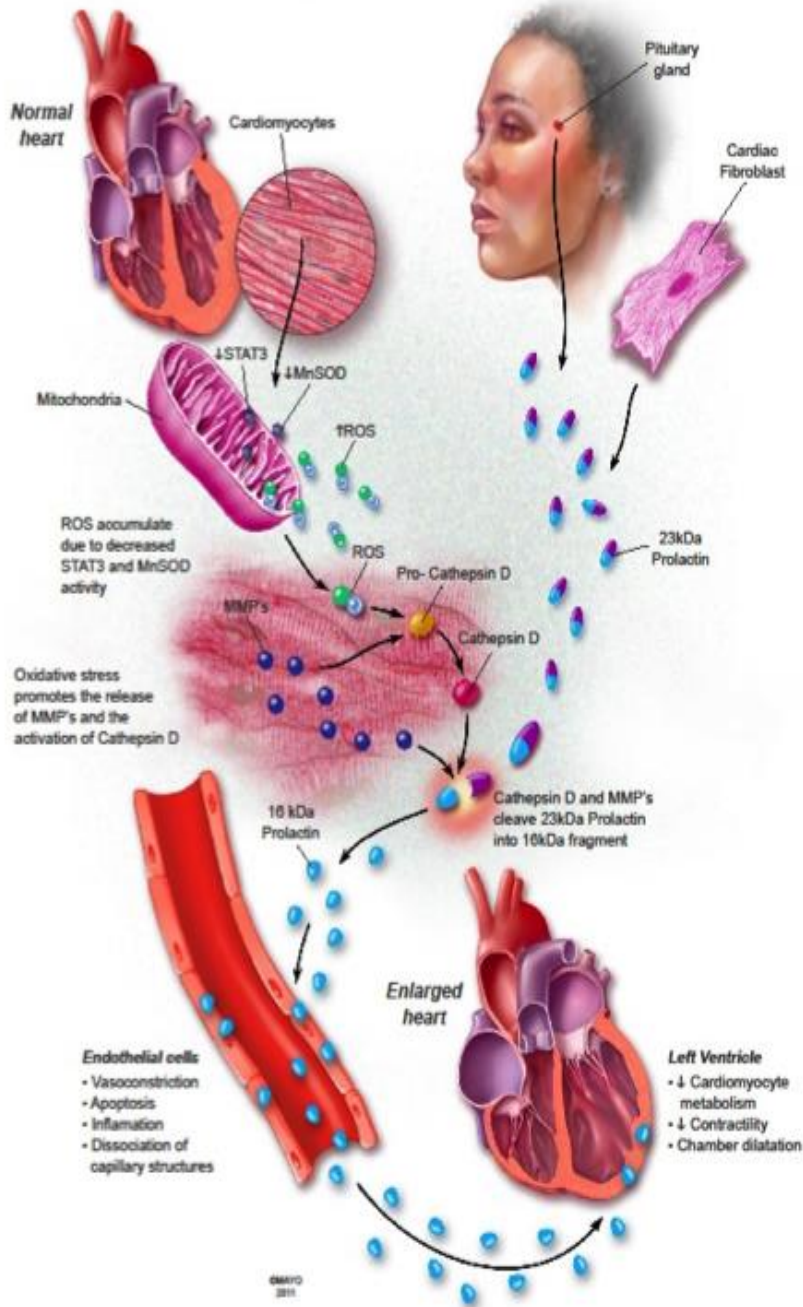
Maternal complications included:

- 24% cardiogenic shock
- 28% mechanical support
- 28% Urgent percutaneous coronary intervention
- 27.5% urgent coronary artery bypass surgery

- ✓ maternal mortality 4%
- ✓ fetal mortality 2.5%

✓ 5 women needed heart transplantation

Peripartum Cardiomyopathy



Heart

Heart. 2018 May 25. [Epub ahead of print]

Maternal and fetal outcomes in pregnant women with heart failure.

Ng AT, Duan L, Win T, Spencer HT, Lee MS.

2003 - 2014.

488 heart failure / 385 935 (0.13%)

- ✓ **126 / 100 000 pregnancies.**
- ✓ **8.2% Peripartum cardiomyopathy**

- Preterm birth
- caesarean delivery
- Neonatal death rate was 1.0%

During follow-up died:
1.4% in the heart failure
0.11% in the control

- ❖ **Heart failure was associated with a 7.7-fold increase risk of death**

SPECIAL ARTICLE

Anaesthesia-related maternal mortality in low-income and middle-income countries: a systematic review and meta-analysis

THE LANCET Vol 4 May 2016

Soha Sobhy*, Javier Zamora*, Kuhan Dharmarajah, David Arroyo-Manzana, Matthew Wilson, Ramesan Navaratnarajah, Arri Coomarasamy, Khalid S Khan, Shakila Thangaratnam

Anaesthesia chapter from *Saving Mothers' Lives; reviewing maternal deaths to make pregnancy safer*

G. M. Cooper^{1*} and J. H. McClure²

	Number of studies	Number of deaths from anaesthesia	Total number of maternal deaths	Anaesthesia-attributed mortality
Overall	95	987	36 144	2.8%
World Bank regions*				
Sub-Saharan Africa	50	675	24 873	2.9%
South Asia	18	89	4317	2.4%
Middle East and north Africa	10	136	2555	6.2%
East Asia and Pacific	9	49	3276	1.5%
Europe and central Asia	4	14	455	3.0%
Latin America and the Caribbean	4	24	668	3.6%

Table 1 Direct deaths attributed to anaesthesia and rate per 100 000 maternities; United Kingdom: 1985–2005

Triennium	Number	Percentage of Direct maternal deaths	Rate per 100 000 maternities	95% CI
1985–87	6	4.3	0.26	0.12 0.58
1988–90	4	2.8	0.17	0.07 0.44
1991–93	8	6.3	0.35	0.18 0.68
1994–96	1	0.7	0.05	0.01 0.26
1997–99	3	2.8	0.14	0.05 0.42
2000–02	6	5.7	0.30	0.14 0.66
2003–05	6	4.5	0.28	0.13 0.62

2003–05

6 women died from problems **directly** related to anaesthesia.

- 4 Obesity was a factor who died.
- 2 Inexperienced anaesthetists who failed to manage the airway
- 1 bupivacaine toxicity - local anaesthetic as intravenous fluid .

31 cases poor perioperative management may have **contributed** to death.

- Obesity was again a relevant factor.
- Poor recognition of women being sick
- Poor clinical management of haemorrhage, sepsis and of pre-eclampsia.



The prevalence and correlates of self-harm in pregnant women with psychotic disorder and bipolar disorder

Clare L. Taylor^{1,5} · Leontien M. van Ravesteyn² · Mijke P. Lambregtse van den Berg^{2,3} · Robert J. Stewart⁴ · Louise M. Howard¹



420 women (2007 - 2011)

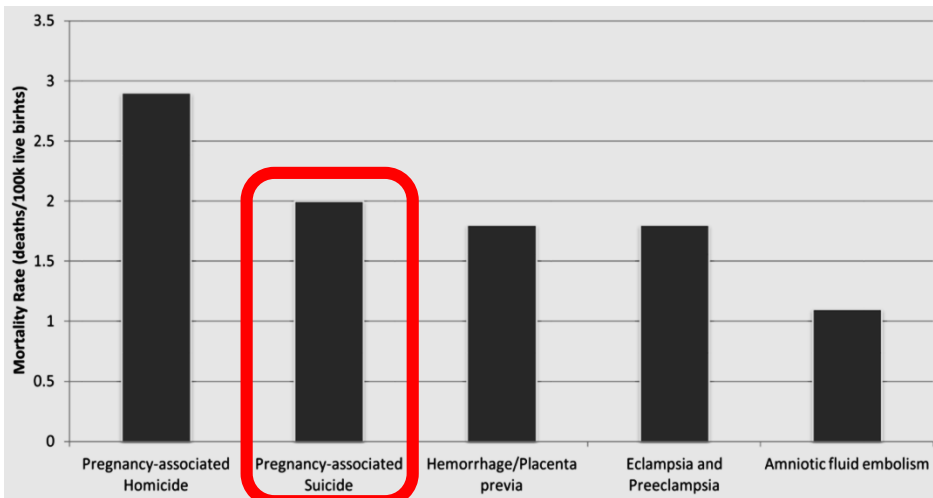
- ✓ 24.5 % had a record of suicidal ideation
- ✓ 7.9 % had self-harm recorded.

Self-harm was independently associated with:

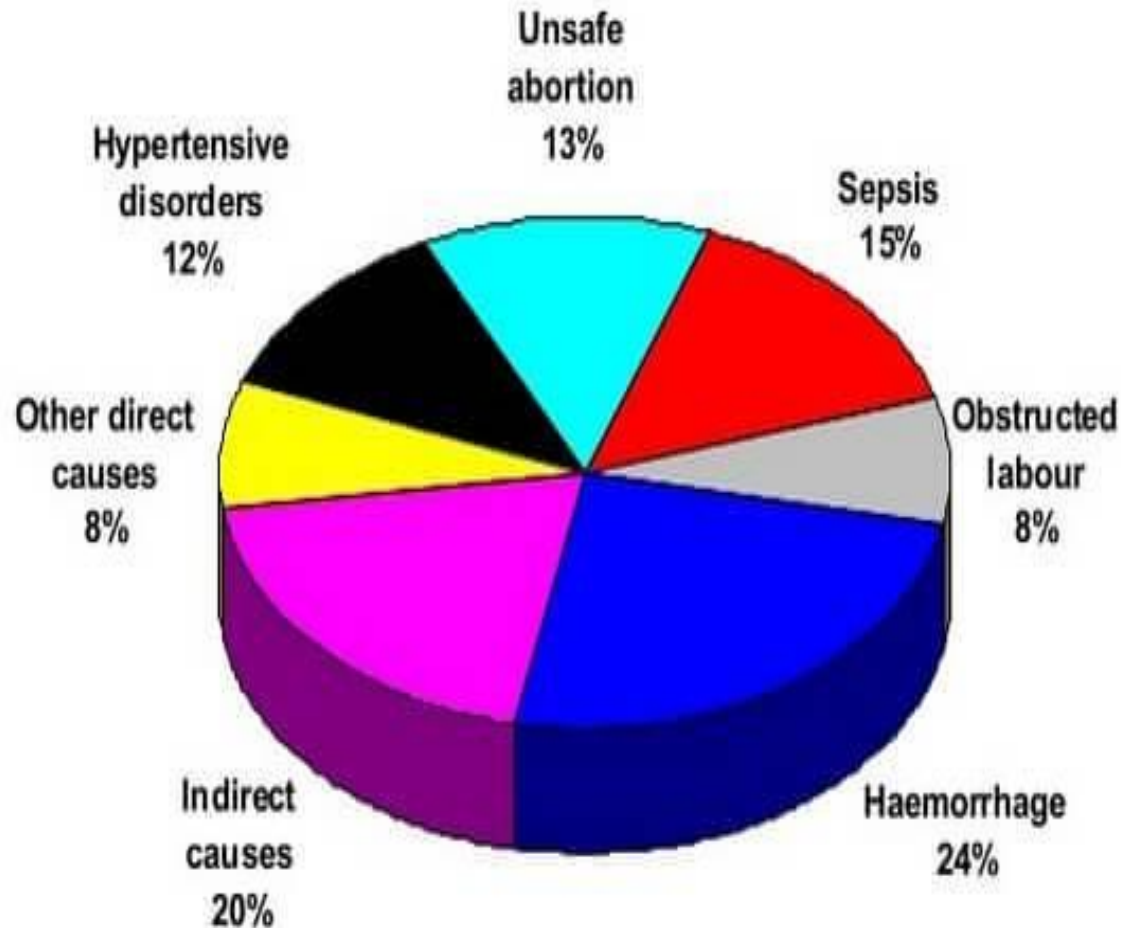
- younger age
- self-harm in the previous 2 years
- smoking

A higher prevalence of self-harm in:

- women with non-affective psychosis
- those who discontinued or switched medication
- no medication at the start of pregnancy,



Causes of maternal mortality (Global)





**No woman
should die**
whilst bringing
life into the world

ΕΥΧΑΡΙΣΤΩ