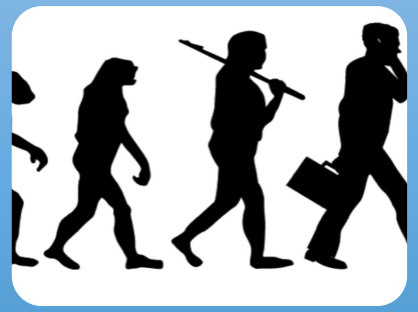
Lessons from MBRRACE

Mother & Babies

Reducing Risk through Audit & Confidential Enquiries

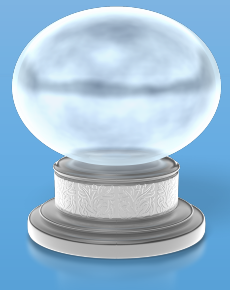
Nuala Lucas

- OAA committee
- MBRRACE assessor
- NAP5
- nuala@tuesday5.co.uk



Evolution of the enquiry

Findings



The future of the enquiry

Evolution of the enquiry

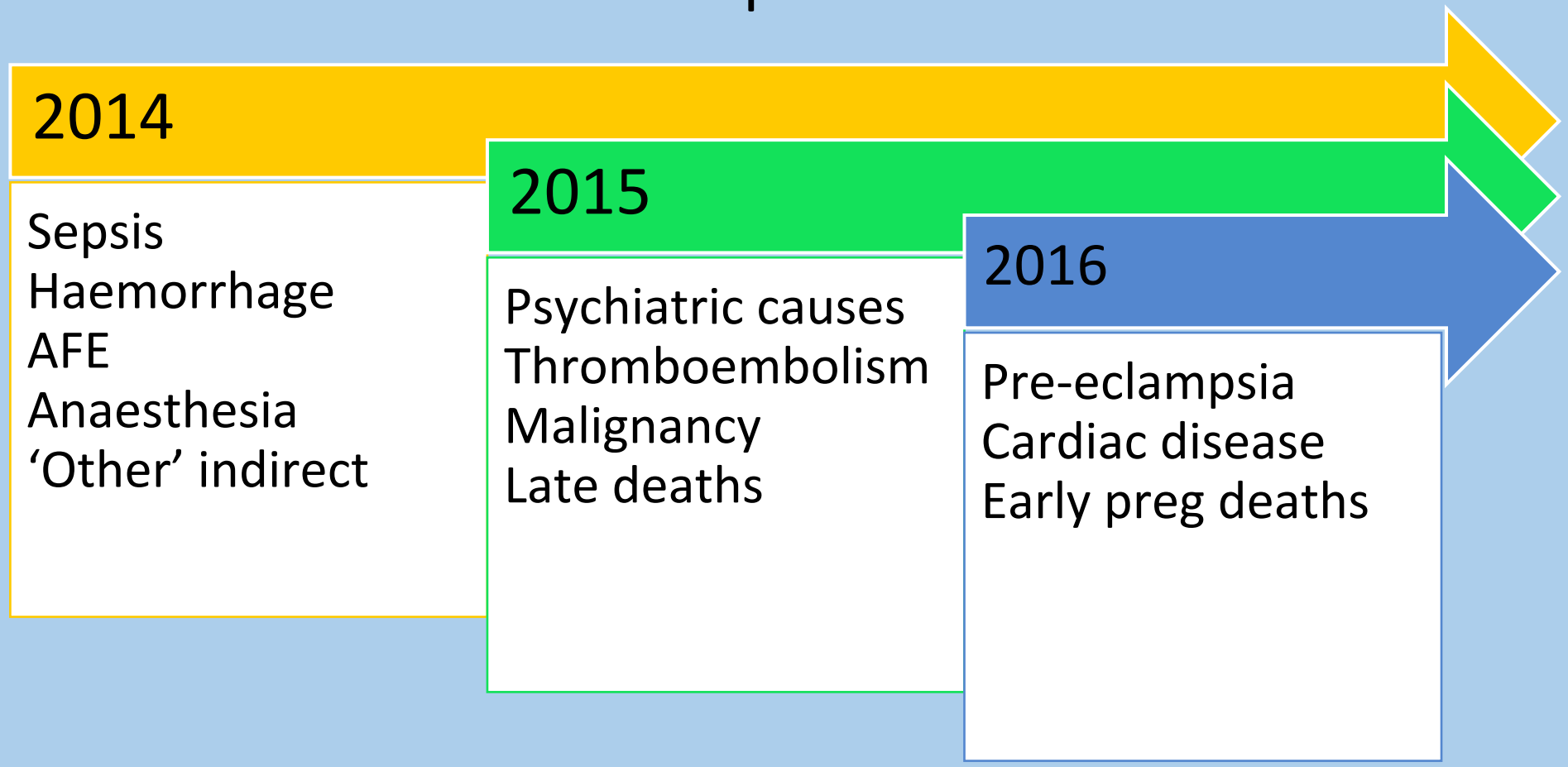
1952-4

2009-12

- Confidential Enquiry into Maternal Deaths (CEMD) 1957
- Confidential Enquiry into Maternal and Child Health (CEMACH) 2003
- Centre for Maternal and Child Enquiries (CMACE) 2008
- Mothers and Babies Reducing Risk through Audit and Confidential Enquiry (MBRRACE)

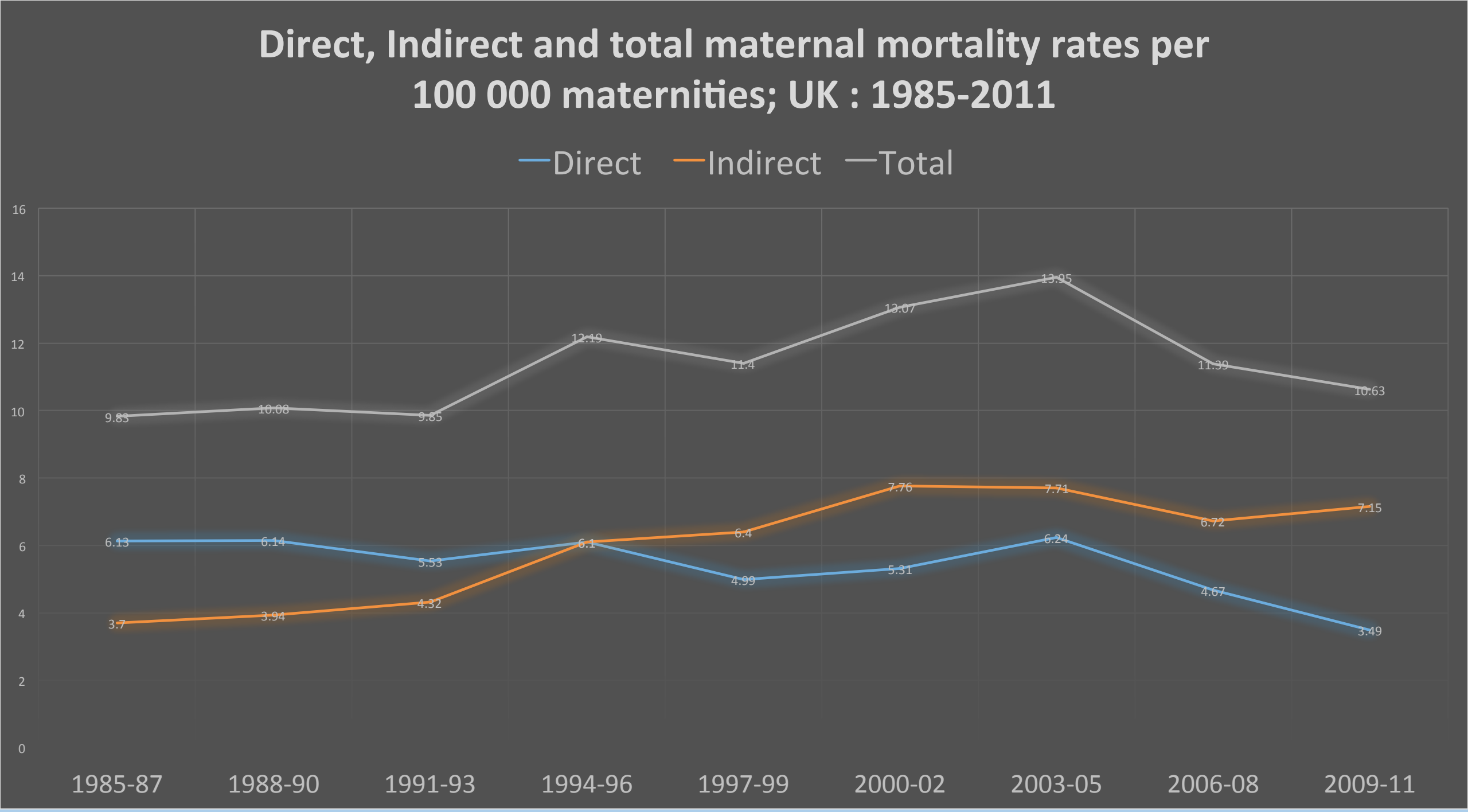
- Annual reports
- Topic review on rolling cycle
- Inclusion of *morbidity* as well as mortality data
- Greater emphasis on 'learning'
- Meticulous case ascertainment
  - Local reporting cross checked with ONS data

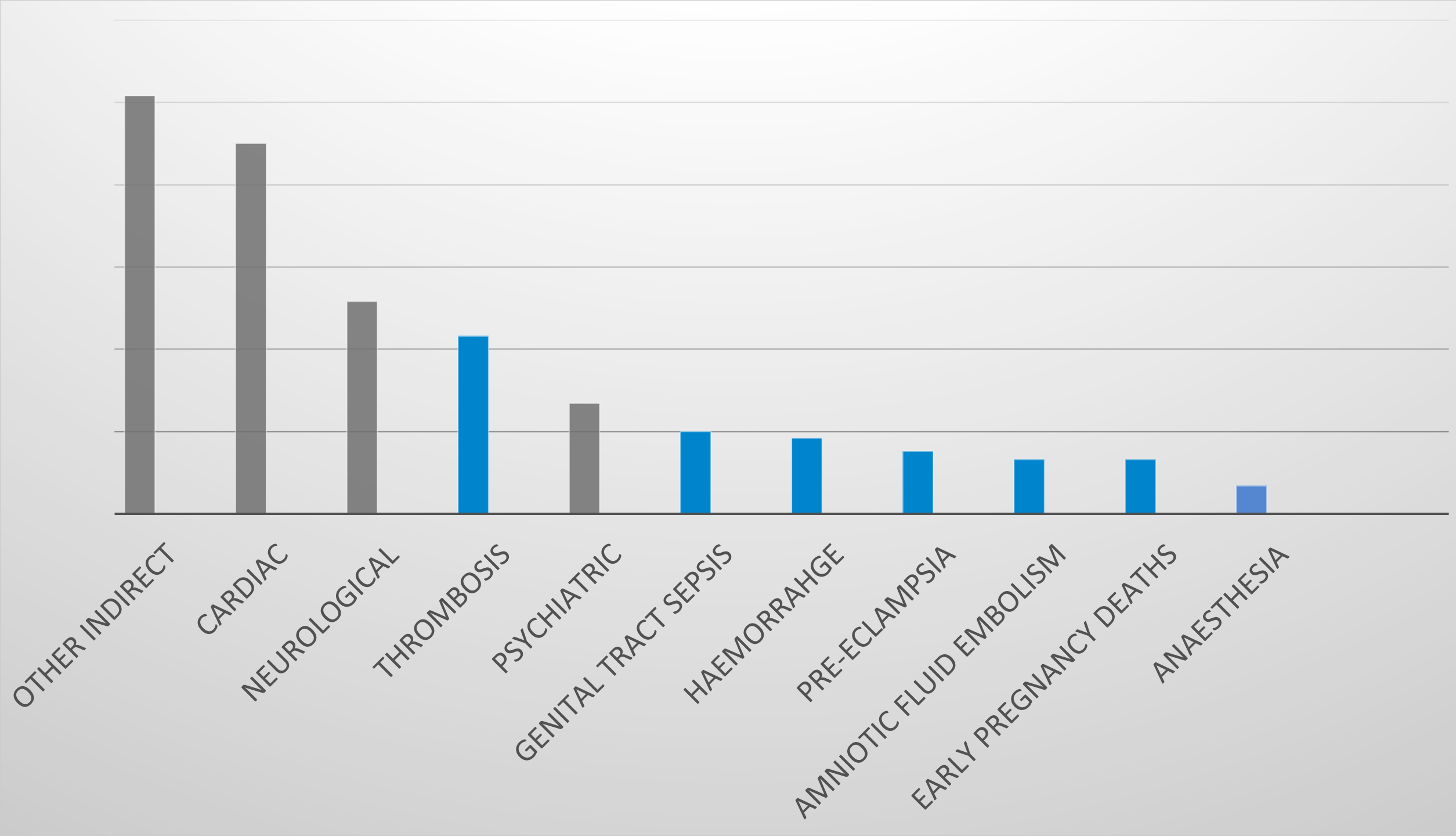
Planned annual topic review



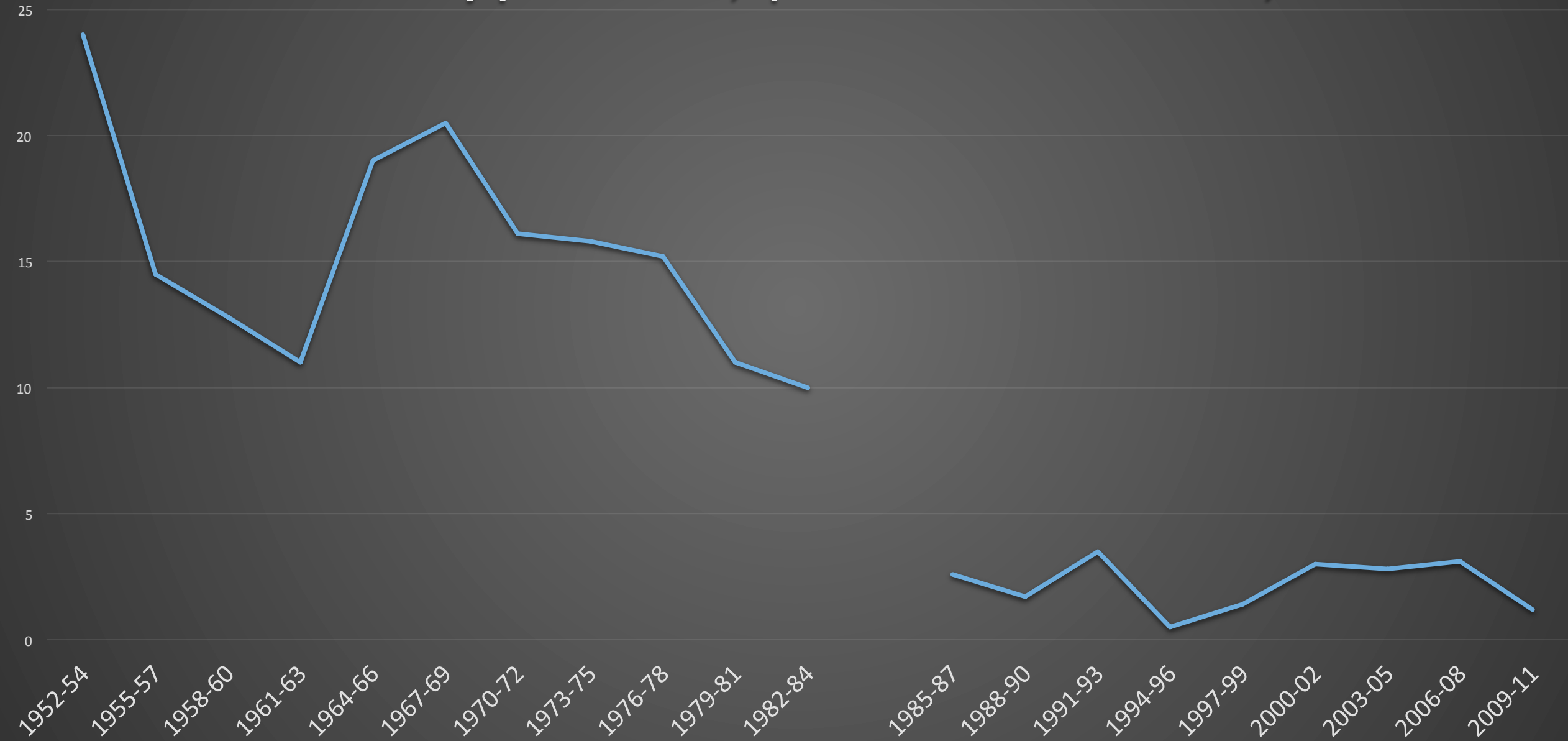
Findings of the report

Direct, Indirect and total maternal mortality rates per 100 000 maternities; UK : 1985-2011

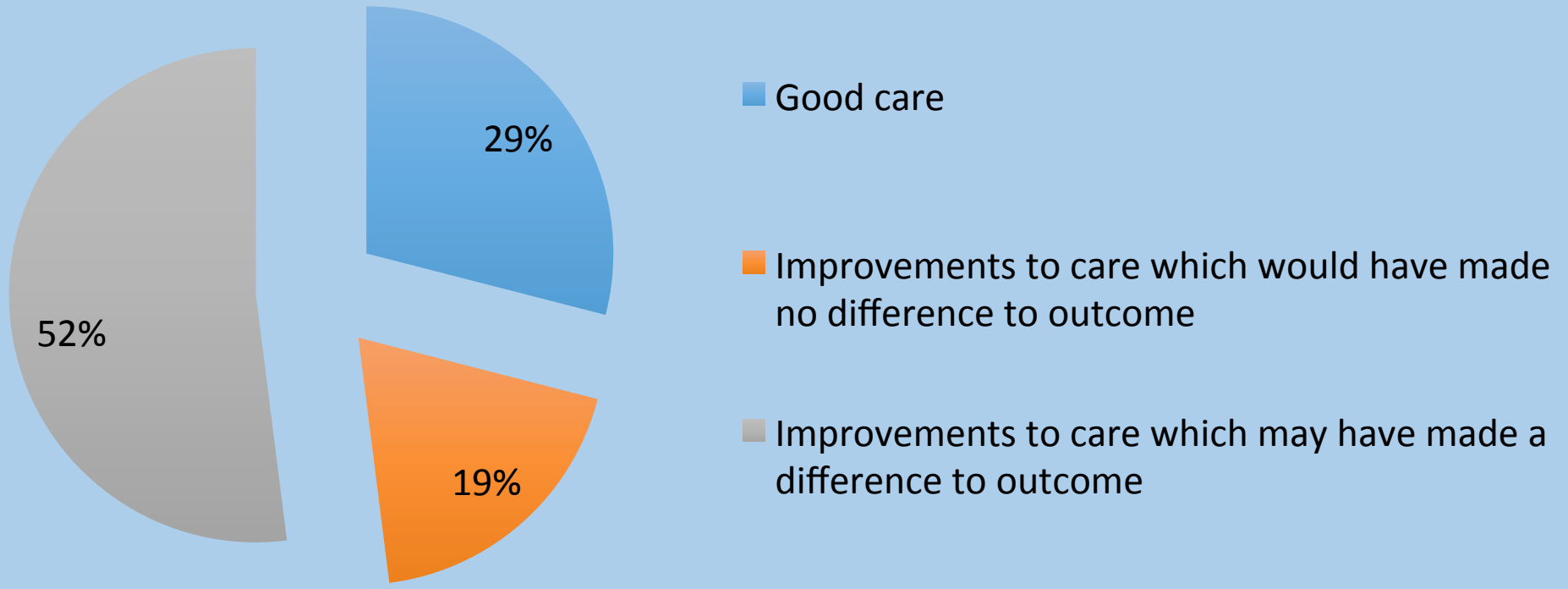



OTHER INDIRECT
CARDIAC
NEUROLOGICAL
THROMBOSIS
PSYCHIATRIC
GENITAL TRACT SEPSIS
HAEMORRAHGE
PRE-ECLAMPSIA
AMNIOTIC FLUID EMBOLISM
EARLY PREGNANCY DEATHS
ANAESTHESIA

Maternal death rates from anaesthesia for all obstetric or maternity procedures, per 100 000 maternities, 1952-2011



Maternal deaths due to ‘supoptimal care’ UK



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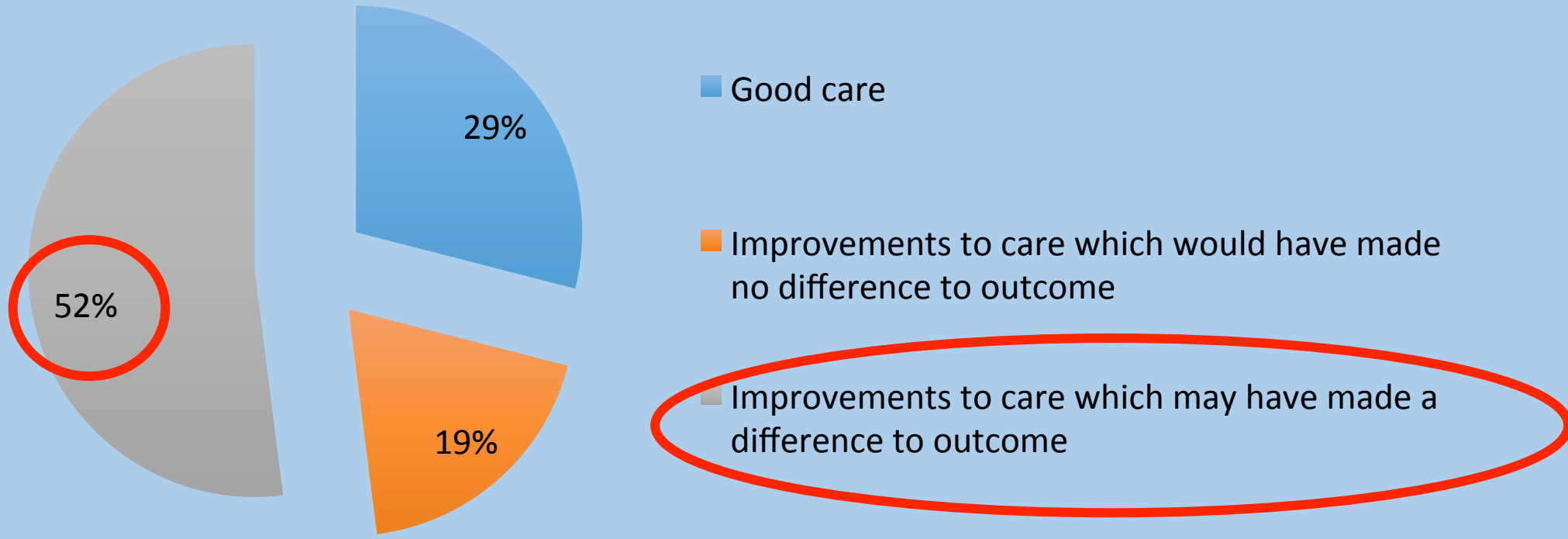

Maternal deaths due to ‘supoptimal care’

FRANCE • 60%	*Saucedo M, et al. Obstet Gynecol. 2013; 122: 752-60.*
U.K. • 61%	*Lewis G, et al. BJOG. 2011; 118:1-203.*
NETHERLANDS • 55%	*Schutte JM, et al. BJOG. 2010; 117: 399-406.*
U.S.* • 40-50%	*Berg CJ, et al. Obstet Gynecol. 2005; 106: 1228-34.*
NEW ZEALAND • 37%	*Farquhar C, et al. AJOG. 2011; 205: 331e1-8.*

Saucedo M, et al. ObstetGynecol. 2013; 122: 752-60

Timing of deaths in relation to pregnancy

Time period of deaths in the pregnancy care pathway	Direct (n=106) Frequency (%)	Indirect (n=215) Frequency (%)
Antenatal	29 (27.4)	66 (30.7)
Postnatal	76 (71.7)	148 (68.8)
Not known	1 (0.9)	1 (0.5)

- Anaesthetic chapter now called ‘Lessons for Anaesthesia’
- Reflects lower number of anaesthetic deaths & change in emphasis of the whole report
- Actual number of anaesthetic deaths low, many women who died received anaesthesia

Anaesthetic deaths

- 4 deaths
- 2 from prolonged hypoventilation associated with GA
  - One likely secondary to undiagnosed bronchospasm
  - One following extubation

- MESSAGES
- Training
- Role of human factors
  - Fixation error

Fixation error

- ‘Fixation errors occur when the practitioner concentrates solely upon a single aspect of a case to the detriment of other more relevant aspects’

- Recurring theme throughout report
  - Delayed in diagnosis
  - Failure to change management (switch to plan B when plan A fails)

Anaesthetic deaths

- 4 deaths
- 2 deaths from complications following accidental dural tap
  - One from cerebral vein thrombosis
  - One from subdural haematoma
  - *'Neither women had hospital or GP follow-up after discharge '*

- MESSAGES
- Follow-up
- Communication with GP

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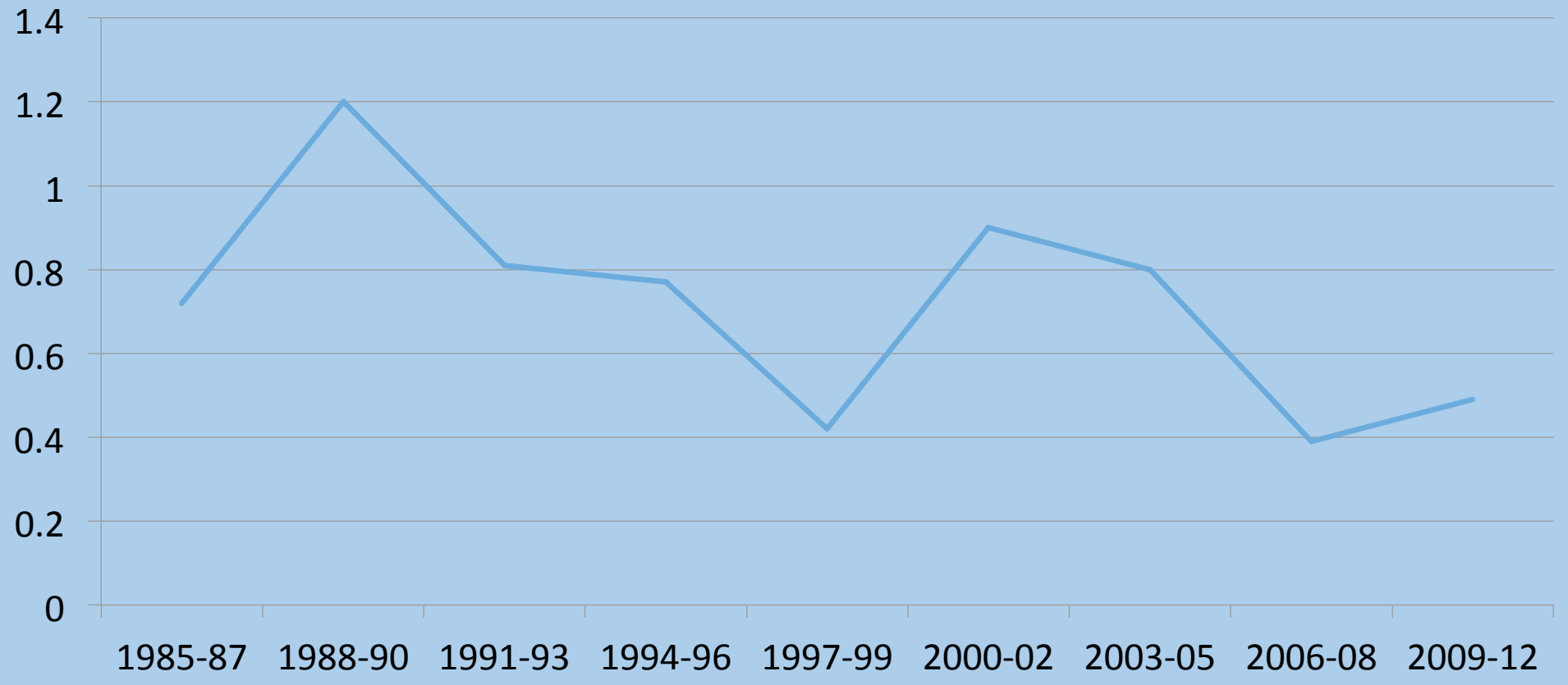
- MESSAGES
- Follow-up
- Communication with GP

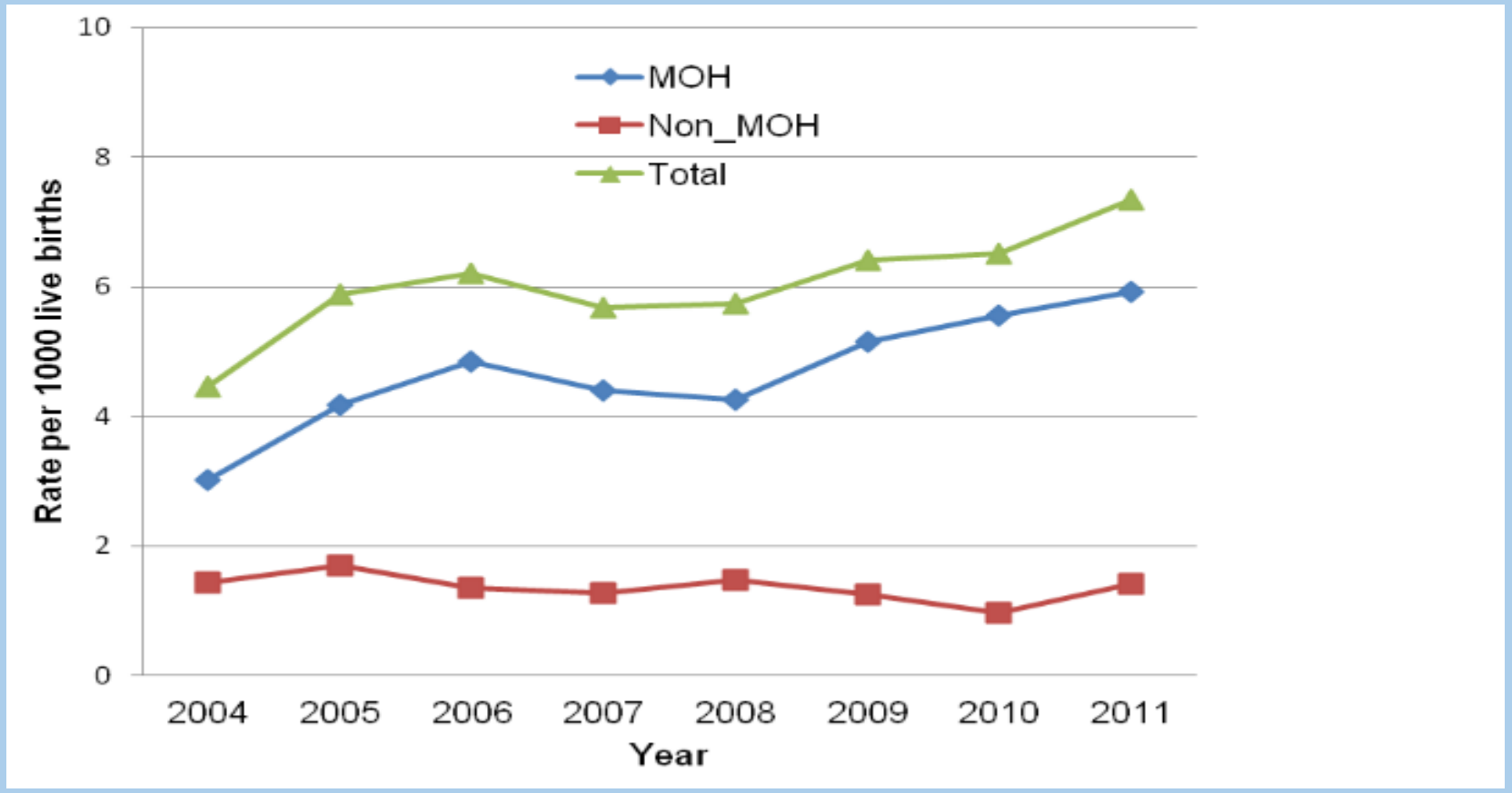
Messages for anaesthetic practice

1) Communication with GP's
2) Education for GP's
3) What constitutes 'routine follow-up' for PDPH

Maternal mortality rate per 100 000 maternities



Obstetric haemorrhage – epidemiology - morbidity



Scottish Maternal morbidity audit , 2011

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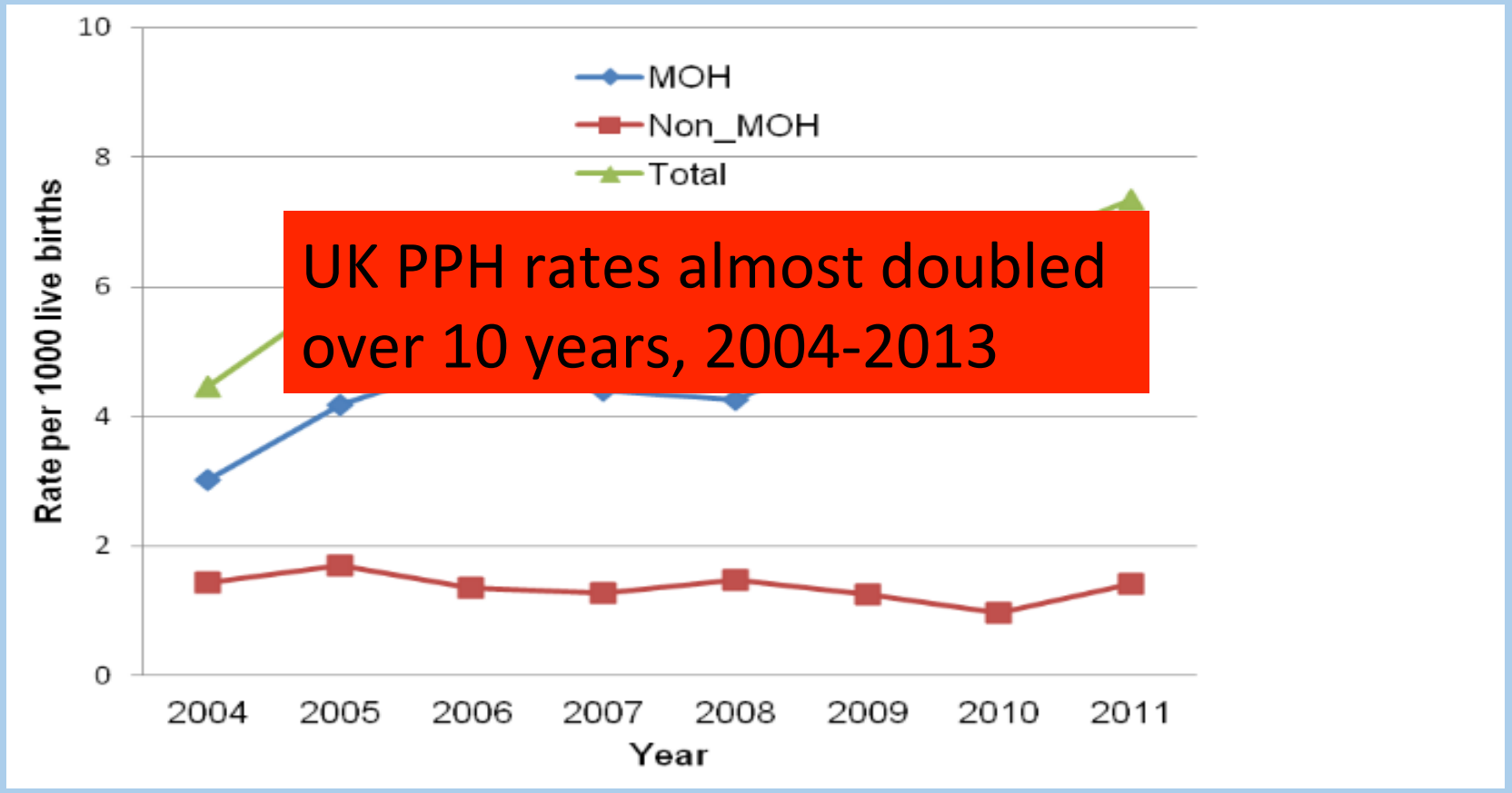
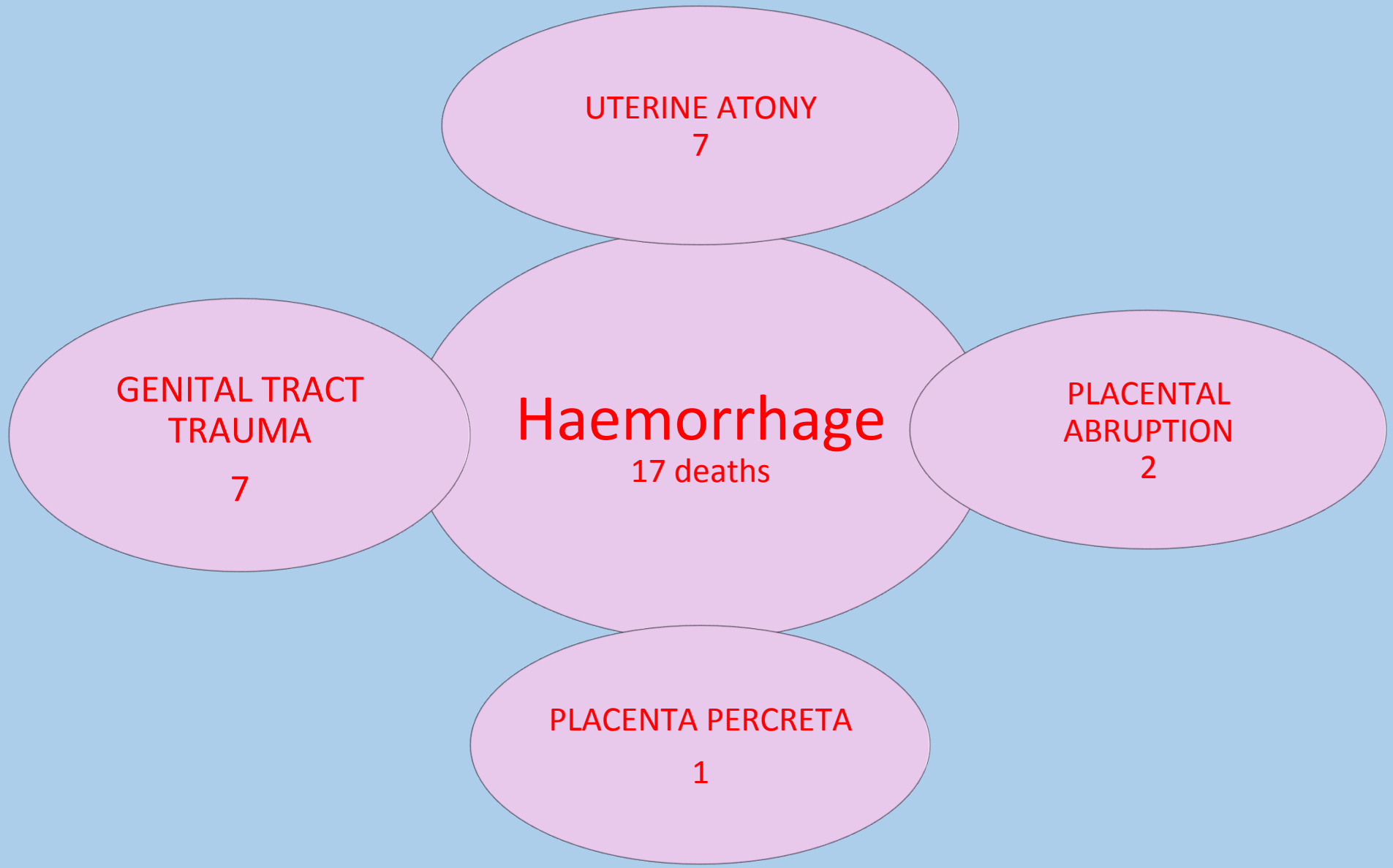


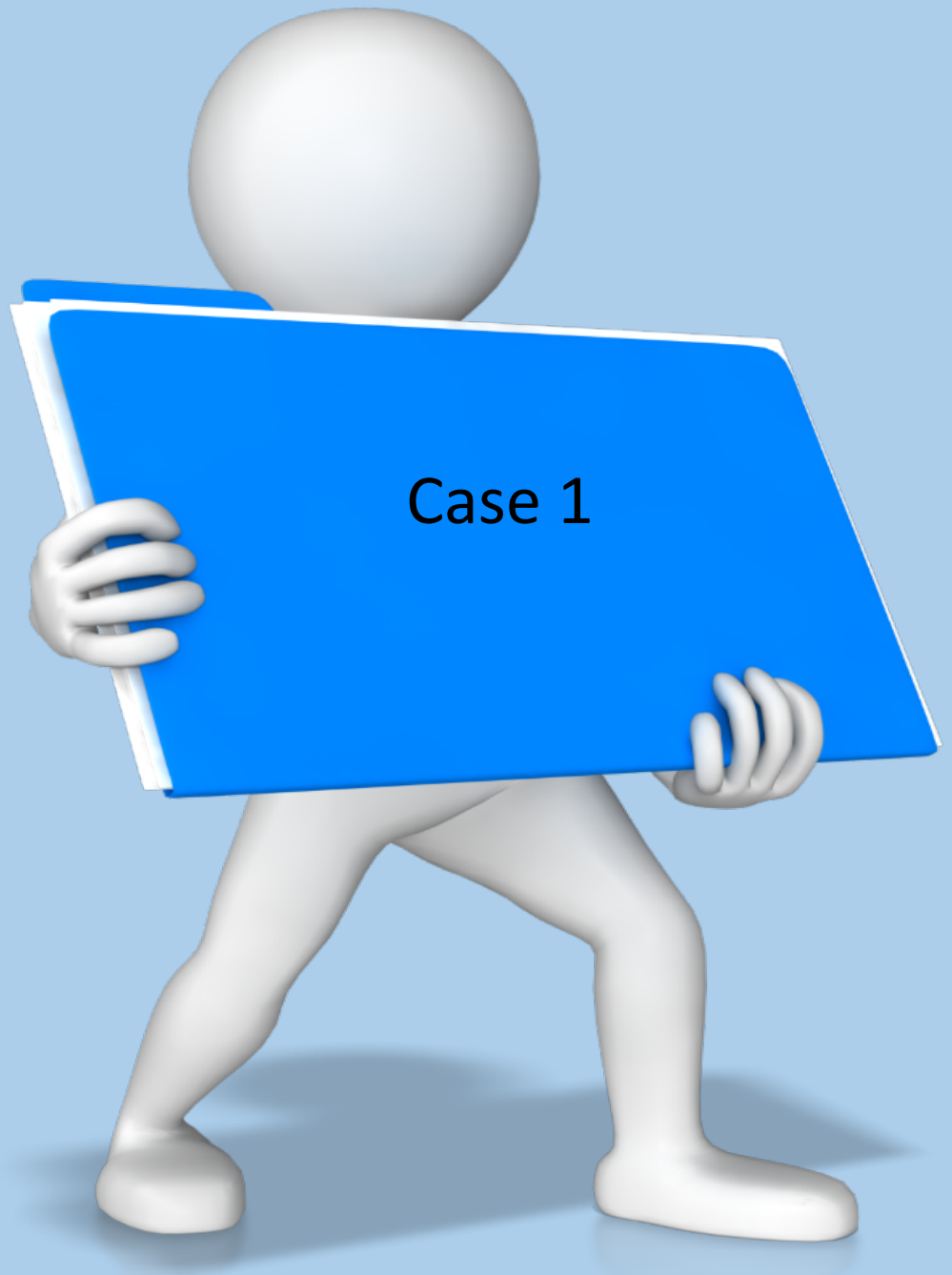
Scottish Maternal morbidity audit , 2011

Incidence, Risk Factors, and Temporal Trends in Severe Postpartum Haemorrhage in the US: 1999-2008

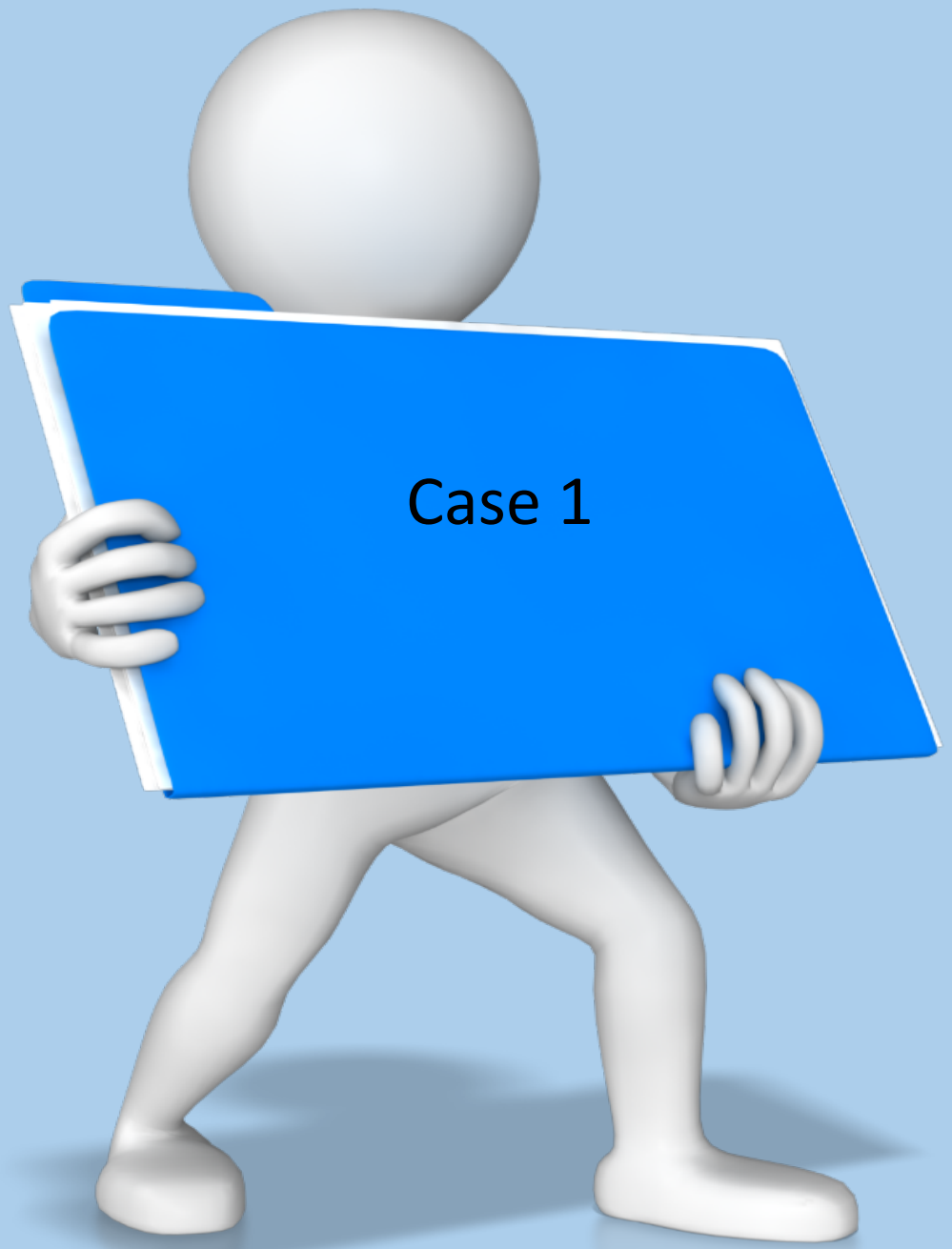
- Doubling of PPH from 1999 to 2008
  - (1.9/1,000 deliveries to 4.2/1,000 deliveries)
- Many expected risk factors present
  - Advanced maternal age, multiples gestation, cervical laceration, preeclampsia, caesarean delivery

Kramer MS, et al. Am J ObstetGynecol. 2013; 209: 449 e1-7.


UTERINE ATONY
7
GENITAL TRACT TRAUMA
7
Haemorrhage
17 deaths
PLACENTAL ABRUPTION
2
PLACENTA PERCRETA
1



An anaemic woman had a CS after a very prolonged labour. She was of small stature and lost almost 1000mls. No blood was ordered. Three hours later when she then bled 2500mls vaginally from an atonic uterus she was initially resuscitated with fluids, receiving 8L of crystalloid and 2L of colloid before blood was available for her. She developed pulmonary oedema and was transferred to ITU where she died from ARDS, sepsis and multi- organ failure



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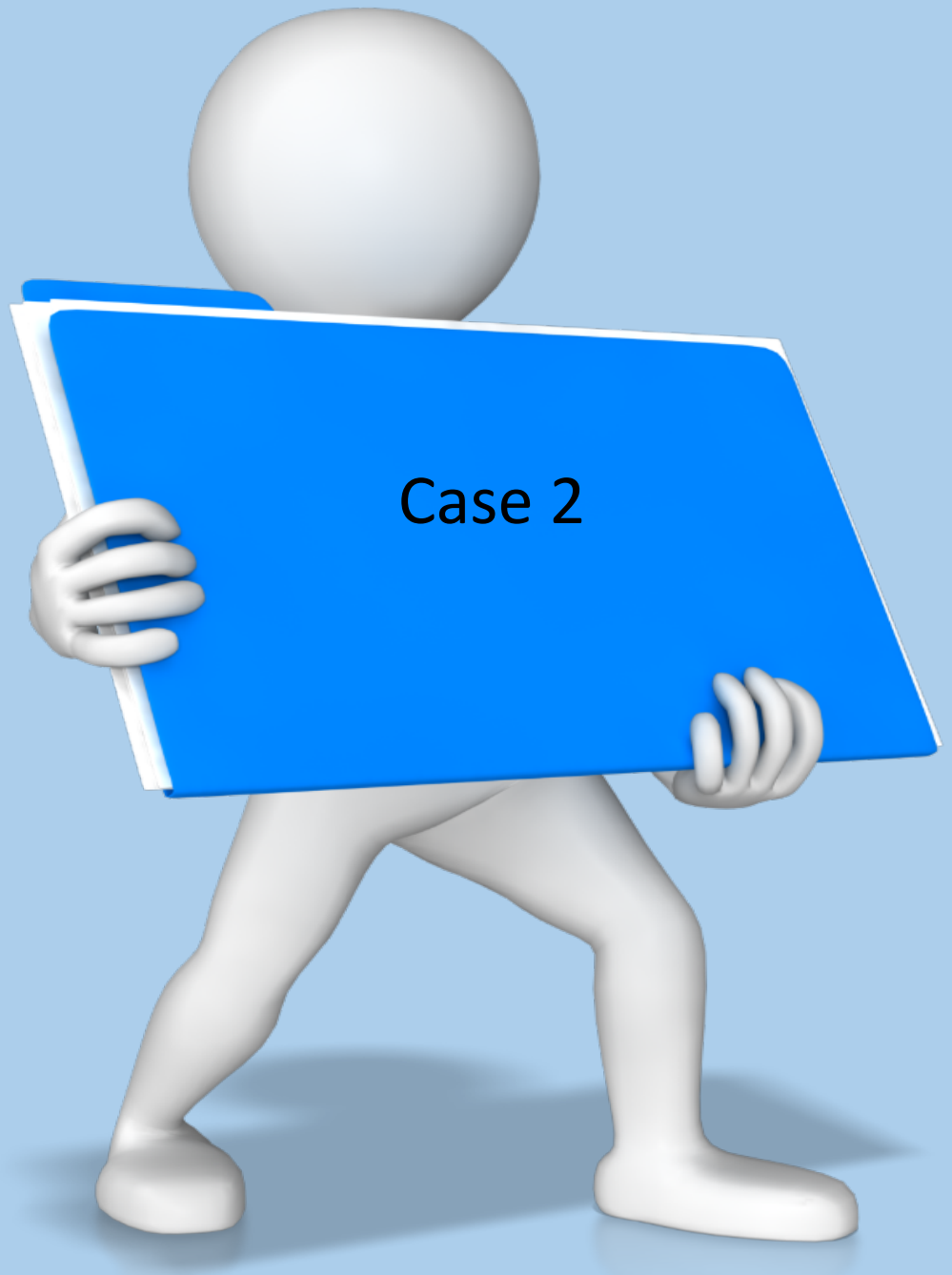
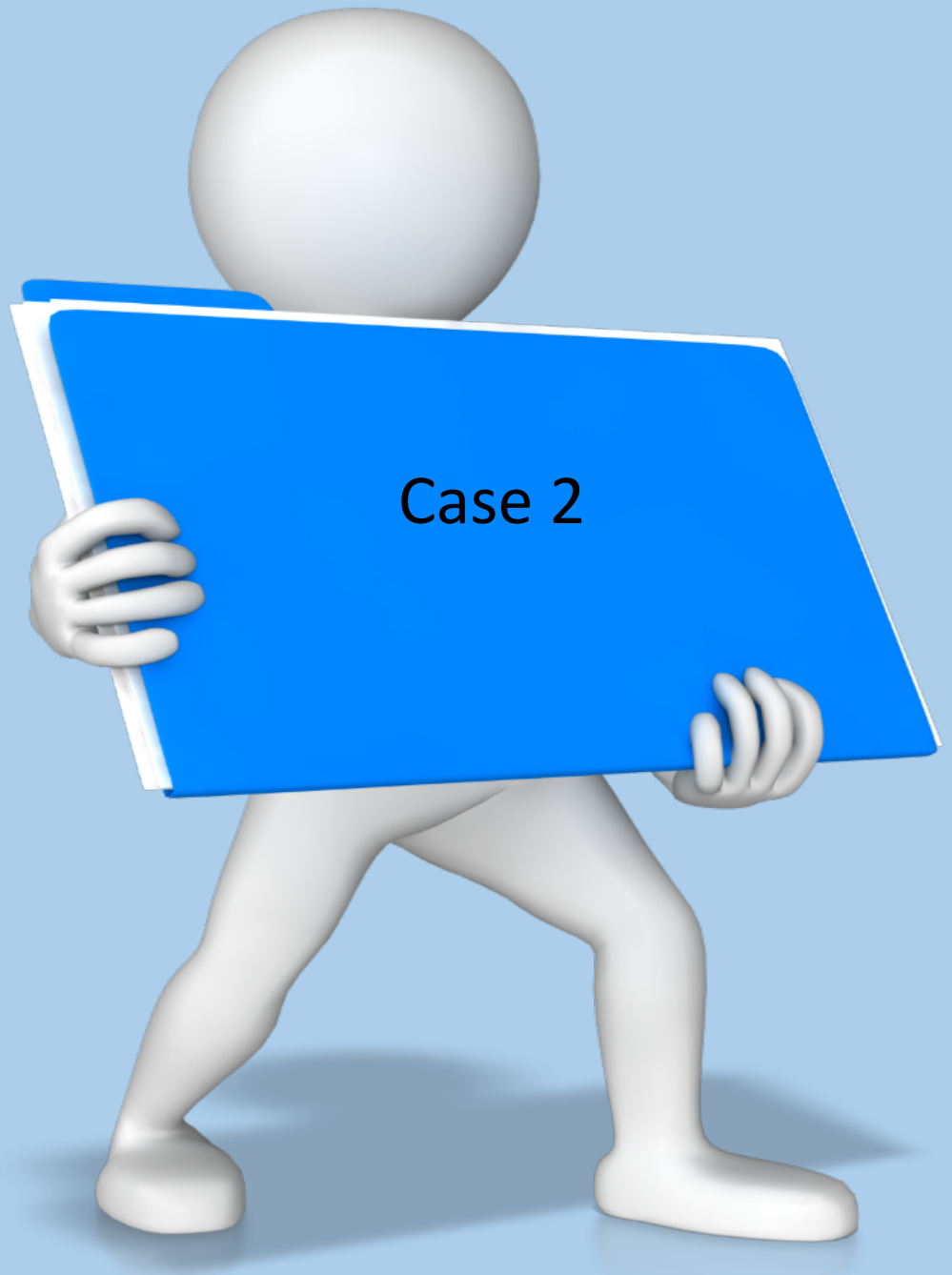
Failure to recognise extent of haemorrhage

Failure to recognise effect of weight on BV



A woman had a ventouse delivery after the forceps blades had failed to lock. She immediately bled torrentially from vaginal tears and was taken to theatre. The extent of the bleeding in the room (2500ml) was not conveyed to the anaesthetist in theatre. After a further 2500ml of blood loss by the end of the repair in theatre she had only had ONE unit of blood as the anaesthetist had been reassured by a result from an acute point of care haemoglobin measurement which recorded a haemoglobin concentration of 110g/l.



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False reassurance from point of care testing

Point of care testing

- Detecting post delivery haemorrhage
    - Heart rate, blood pressure, lochia
    - <u>Fundal height & urine output</u>
- Low threshold for **<u>serial</u>** hemocue assessments

Failure to recognise extent of haemorrhage (61%)

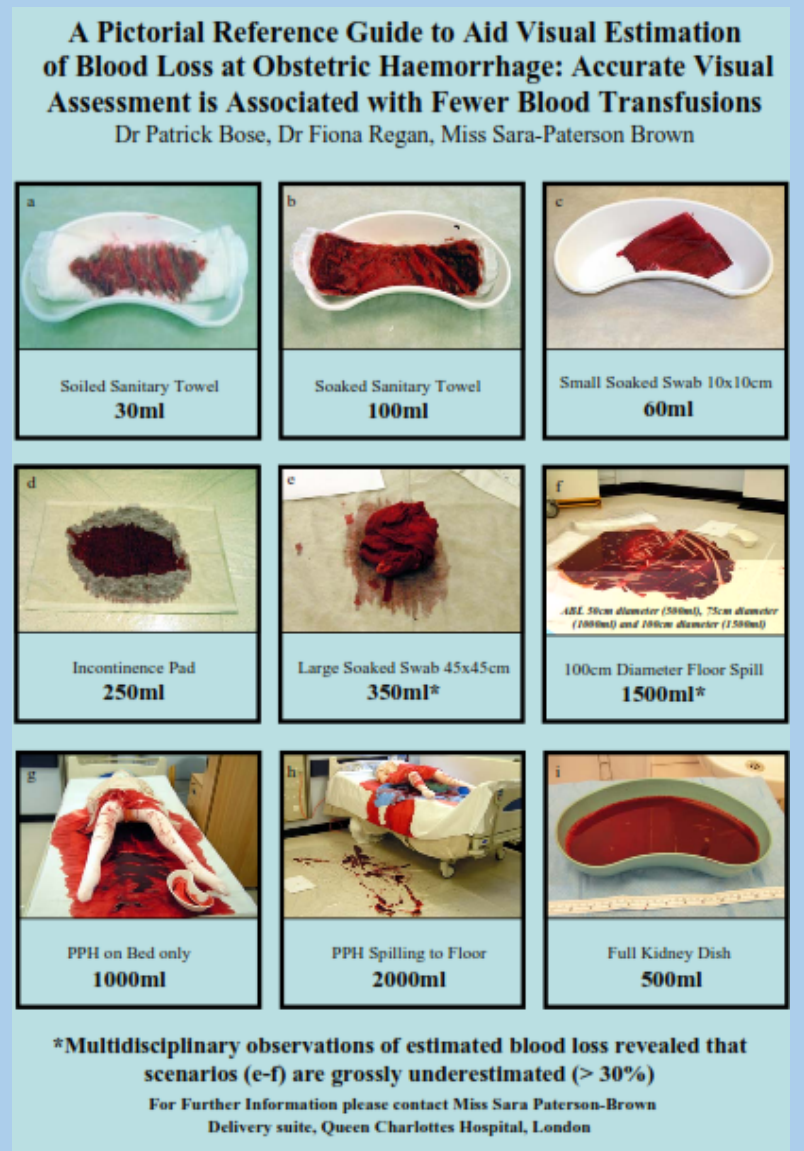
> “Midwives and doctors underestimate blood loss at delivery by 30 – 50%”

Glover P. Blood loss at delivery: how accurate is your estimation? *Aust J Midwifery* 2003;16:21-4

DOI: 10.1111/j.1471-0528.2006.01018.x
www.blackwellpublishing.com/bjog
General o

Improving the accuracy of estimated blood loss at obstetric haemorrhage using clinical reconstructions

P Bose,[a] F Regan,[b] S Paterson-Brown[a]

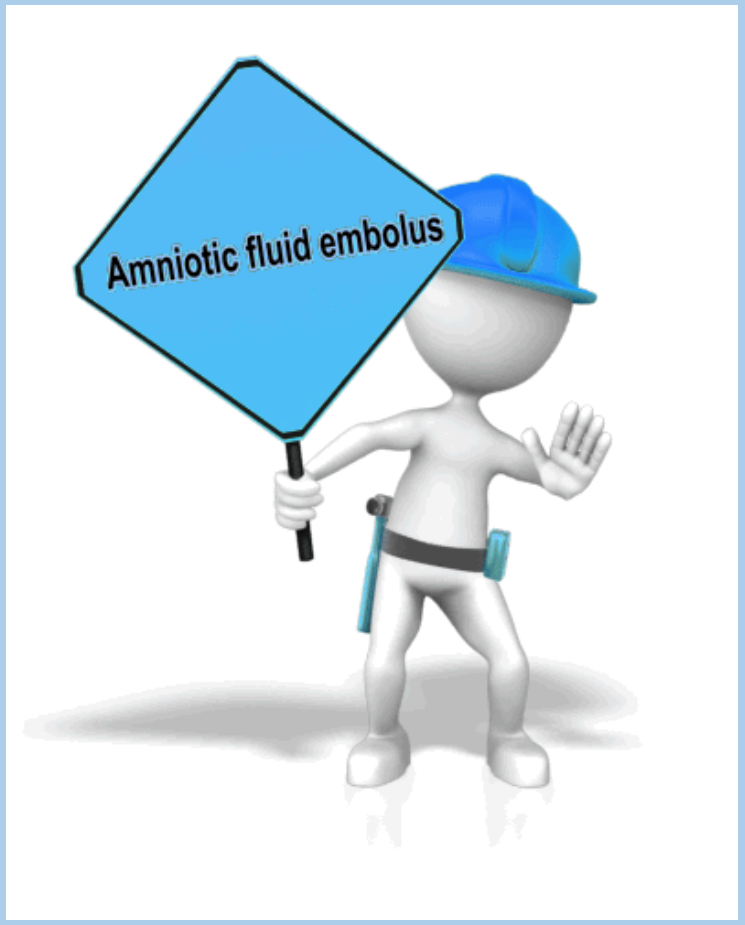


Effect of body weight on blood volume

Weight	Total BV	15% BV loss	40% BV loss
50 kg	5000 mls	750 mls	2000 mls
55 kg	5500 mls	825 mls	2200 mls
60 kg	6000 mls	900 mls	2400 mls
65 kg	6500 mls	975 mls	2600 mls
70 kg	7000 mls	1050 mls	2800 mls

A final thought….

- When pharmacological measures are not gaining control, surgical haemostasis and hysterectomy should be considered **<u>early</u>** on in the course of the haemorrhage



- AFE affects 1/50 000 women giving birth
- Case fatalilty rates 11-61%
  - *but declining*

Key messages for AFE

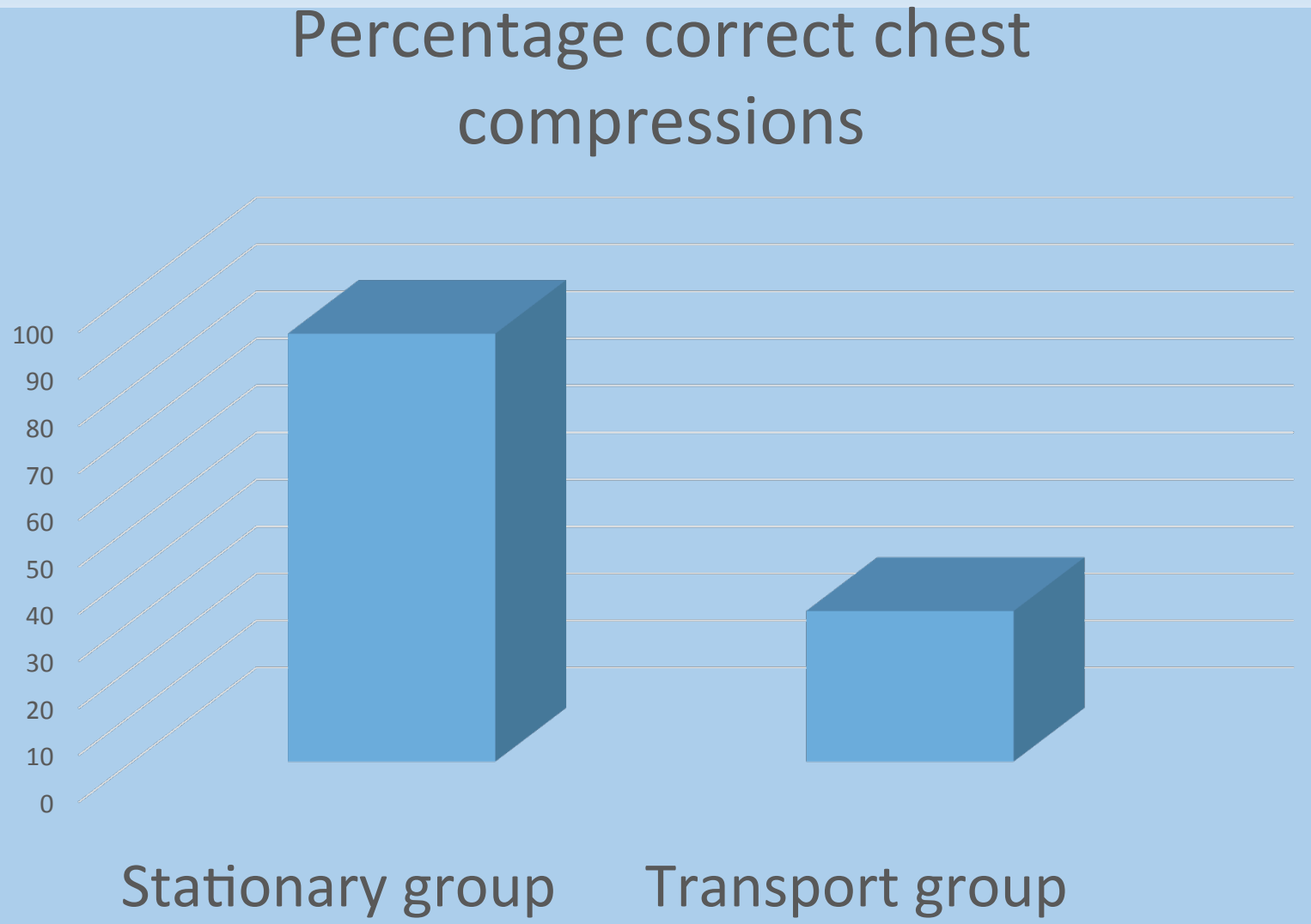
- Care with uterotonics
  - Avoid uterine hyperstimulation
- Resus skills must be maintained for all the team

Maternal cardiac arrest

LipmanSS, et al. Anesth Analg2013; 116: 162-167

- **RANDOMIZED SIMULATION STUDY**
- 26 teams, 2 providers
- **PRIMARY OUTCOME**
  - % correctly delivered chest compressions
- **SECONDARY OUTCOME**
  - Interruption in compressions, position of providers, ventilation tidal volume

Maternal cardiac arrest



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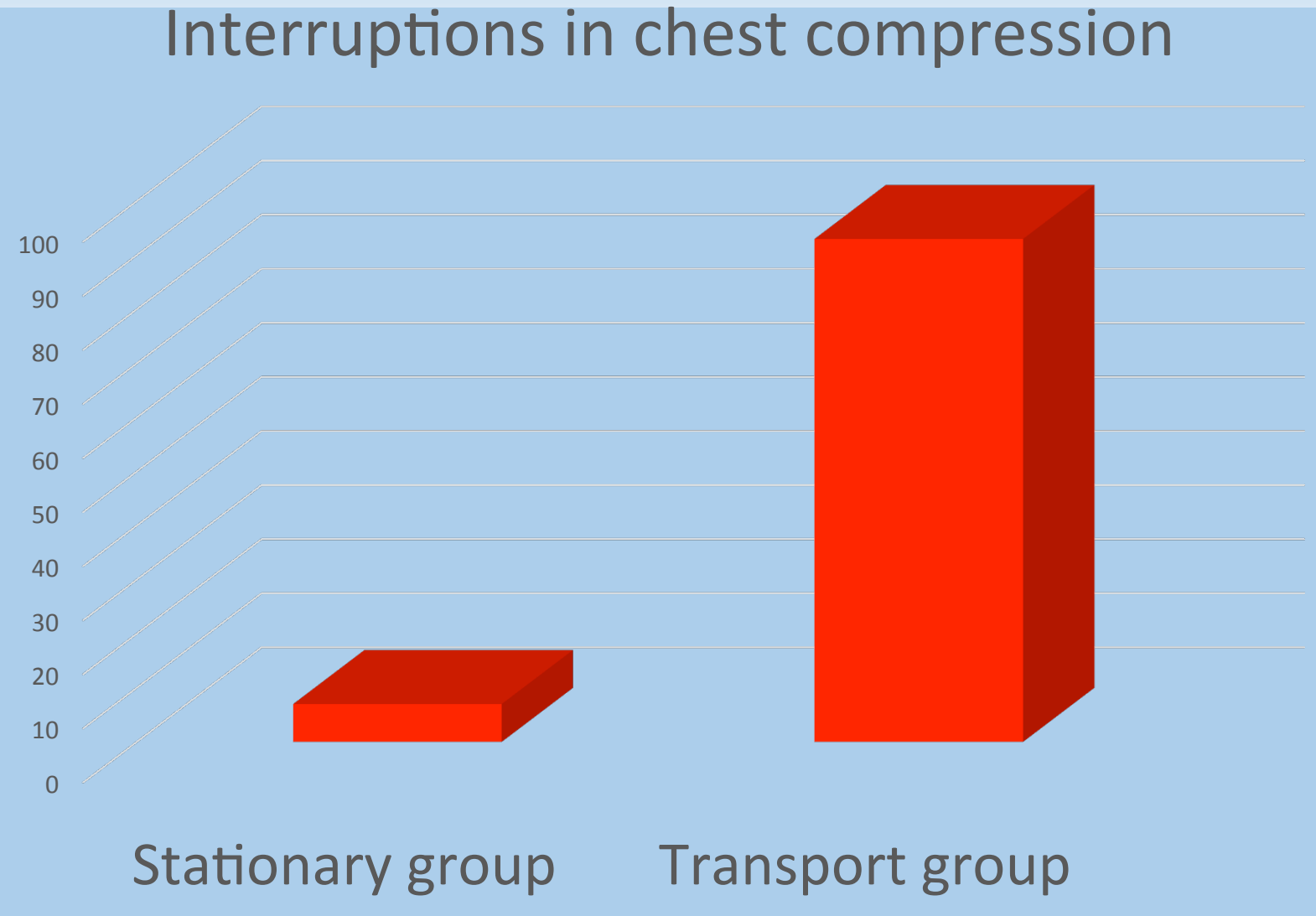

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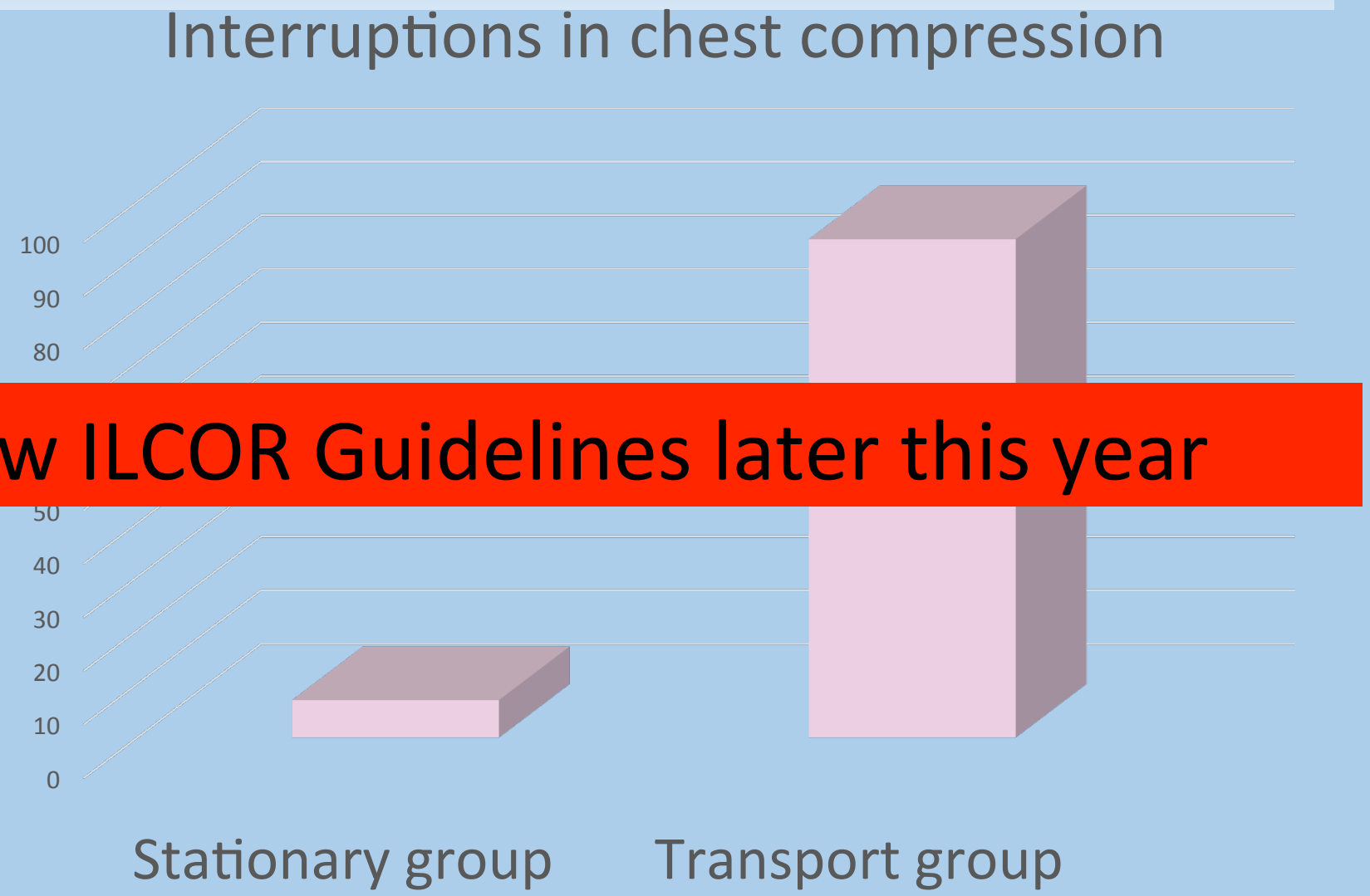
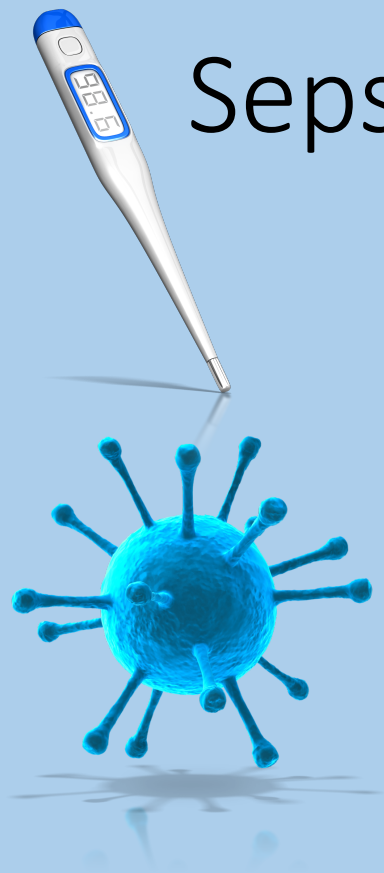


New ILCOR Guidelines later this year

Sepsis



Deaths from sepsis
83

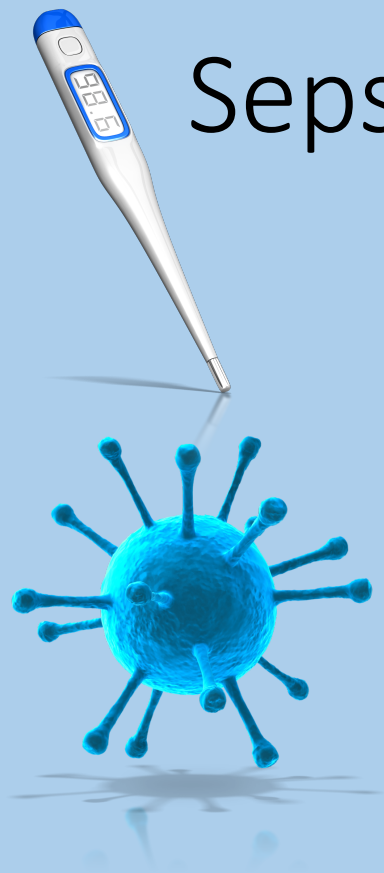
Genital tract sepsis
20

Other infections
63

Influenza
36

Other
27

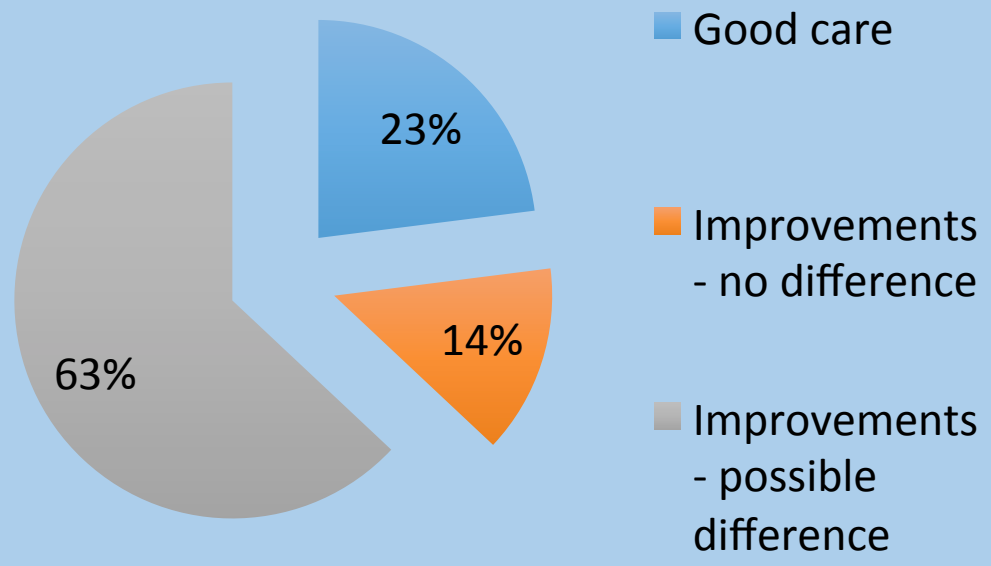
Sepsis



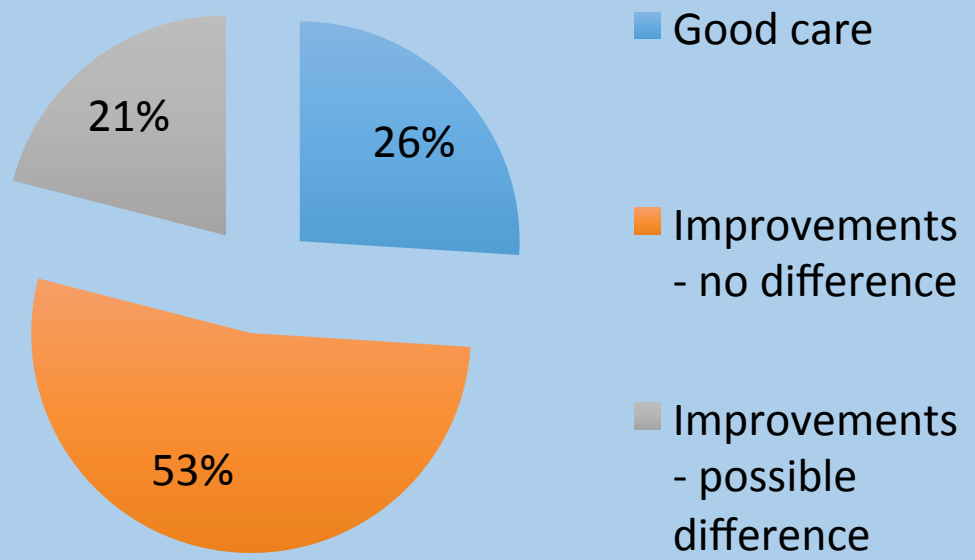
- Genital tract sepsis
  - 1st trimester 2
  - 2nd trimester 7
  - 3rd trimester 11
    - Antepartum 2
    - Postpartum 9

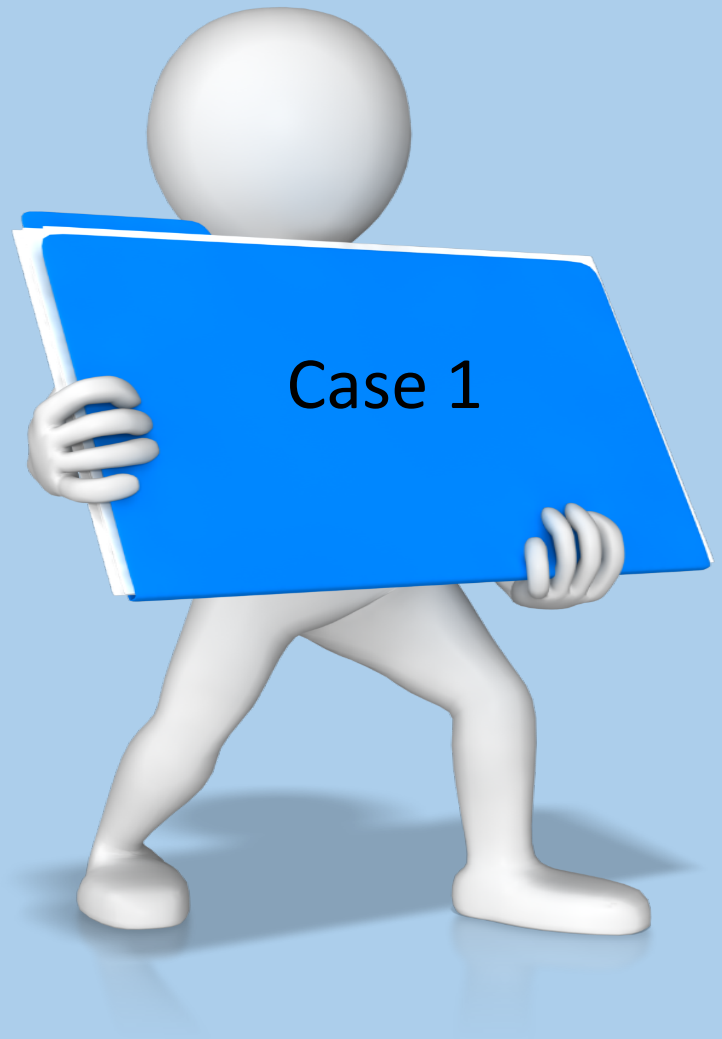
Quality of care

Women who died

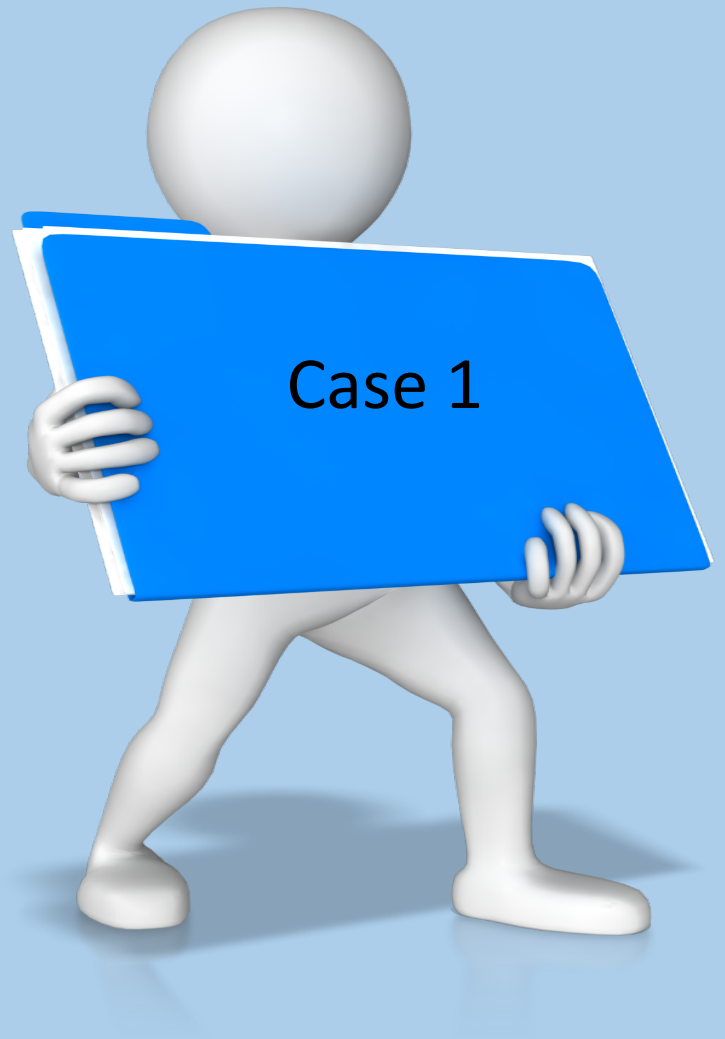


Women who survived





A woman was admitted in preterm labour & delivered rapidly. Three hours after delivery she was noted to be tachycardic and had a low BP. These observations were not plotted on a MEOWS or similar chart. She was not reviewed by an obstetrician & was discharged for low risk postnatal care. Her community midwife saw her 24 hours later. No observations were taken. On day 4 she was admitted to the A&E as an emergency but found to be dead on arrival. A post mortem revealed Group A Streptococcal sepsis. Further enquiries revealed that investigations taken in the hospital during her labour were abnormal. Blood results indicated sepsis and a high vaginal swab cultured Group A Streptococcus.



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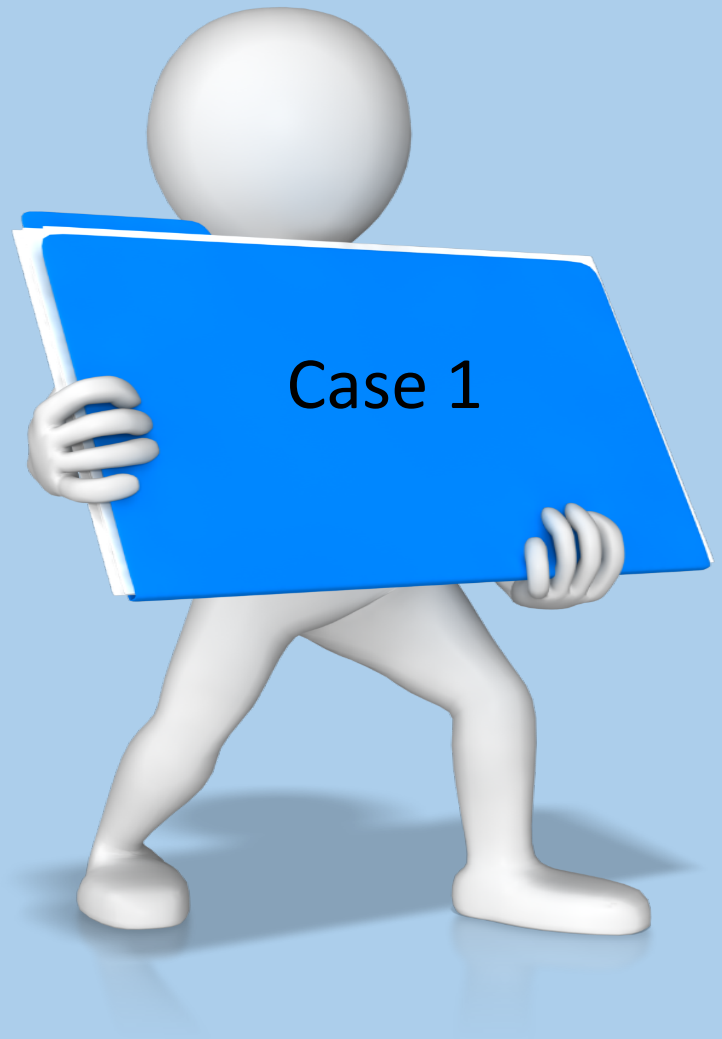
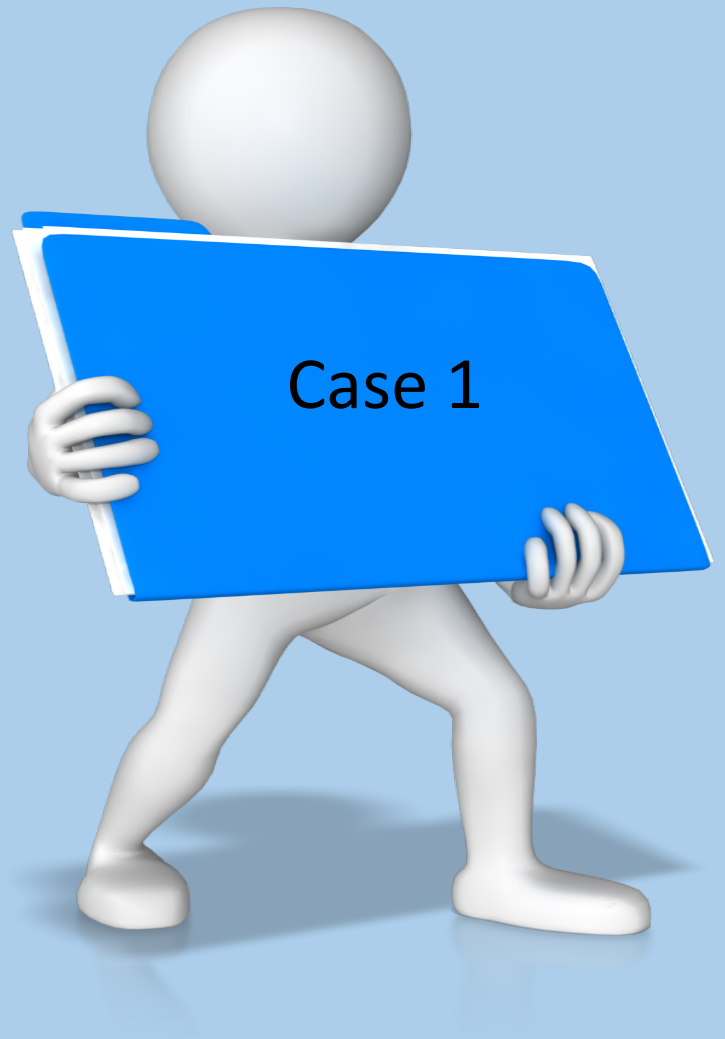
Delayed recognition
Incomplete assessment
No antibiotics
Communication
Care setting



A woman who was seven days post SVD became unwell at home with a fever. She was advised to attend the maternity unit immediately. On admission she was noted to be tachycardic, tachypnoeic and febrile. She was prioritised for urgent medical review. A diagnosis of acute sepsis from retained products was made and fluid resuscitation started immediately. IV antibiotics were started within 1 hour of diagnosis and she was transferred to the high dependency unit. The retained products of conception were removed promptly and she made a full recovery. Blood culture subsequently grew Klebsiella.



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Early recognition, clear advice & prompt treatment

Key messages for Sepsis

Missed opportunities

1. Failure to recognise/respond to the sick woman
2. Antibiotic failings
3. Fluid balance in the septic parturient
4. Removing the source of the sepsis

Sepsis ‘bundles’

- A bundle is a group of evidence-based care components for a given disease that, when executed together, may result in better outcomes than if implemented individually”

The sepsis six

1. Give high flow oxygen *via non-rebreathe bag*
2. Take blood cultures
3. Give IV antibiotics
4. Start IV fluid resuscitation *Hartmann's or equivalent*
5. Check haemoglobin and lactate
6. Monitor accurate hourly urine output *may require catheter*

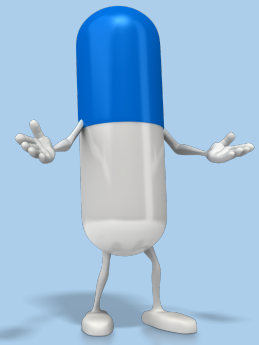
Daniels et al
Emergency Medicine Journal, 2010

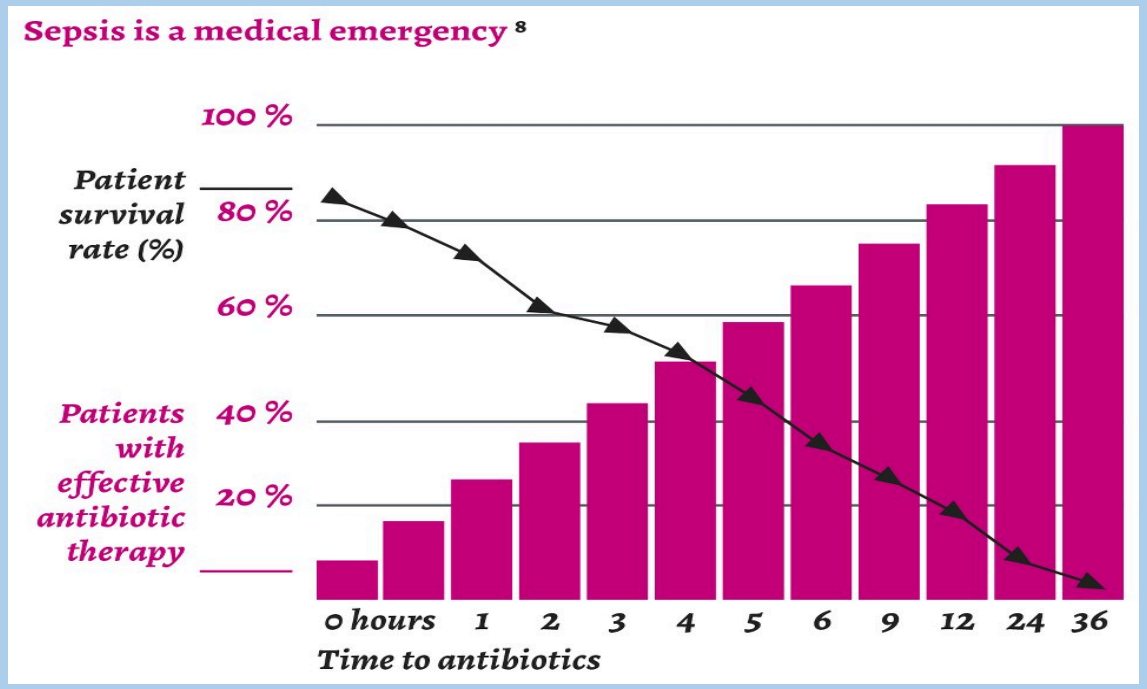
Antibiotic timing - *does it really matter?*

- Importance of rapid antibiotic administration in sepsis long been recognised
- ‘A recurring feature ….is a delay in starting intravenous antibiotics’

CEMACH 2003-5

Antibiotic timing - *does it really matter?*





'Every additional hour without effective antibiotic therapy can increase risk of death in patients with hypotensive sepsis by 7.6% during the first 6 hours'

Kumar et al

Crit Care Med, 2006

Fluid balance in obstetrics

Additional challenges in the parturient

- Physiology
- Pathology – co-existing disease
- Pharmacology- syntocinon, prostaglandins
- Monitoring - ‘or lack of’

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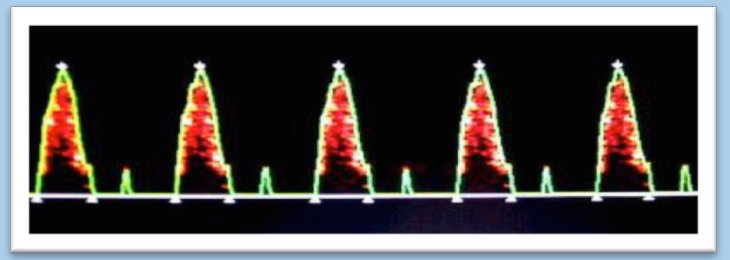
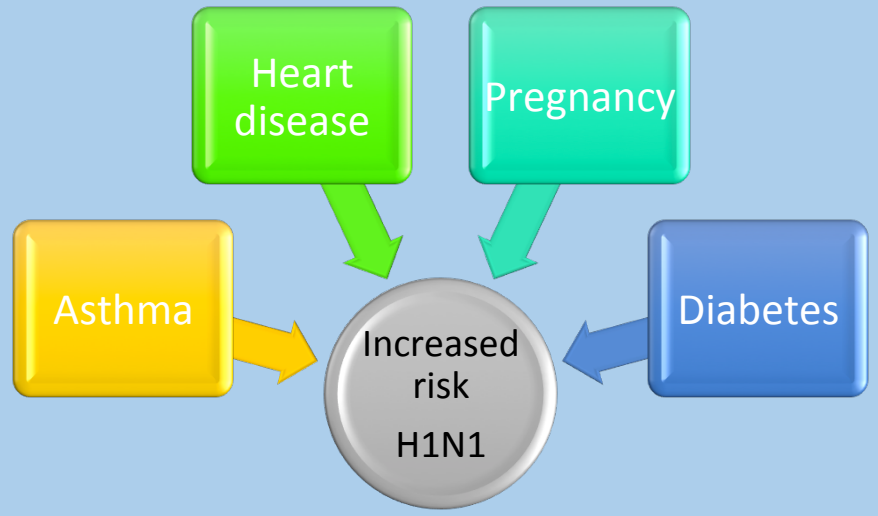


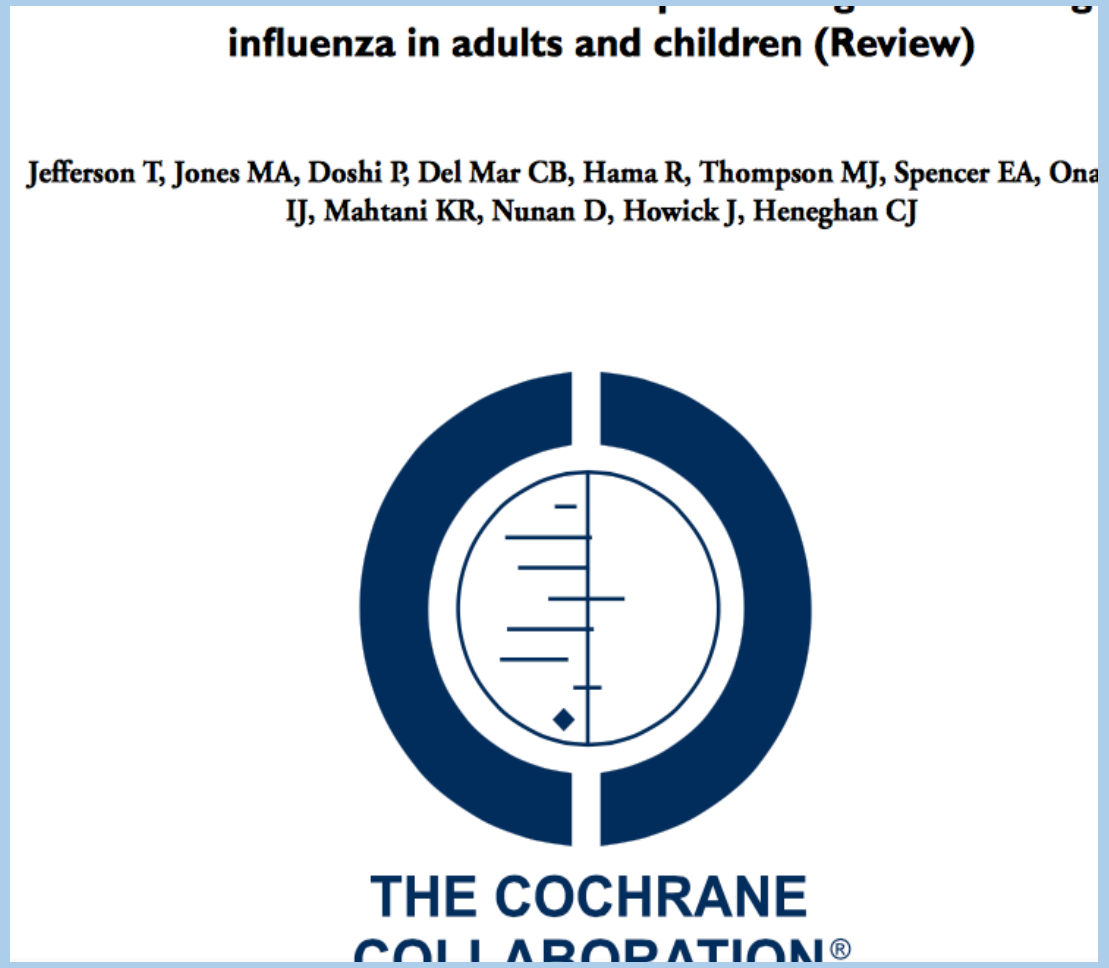
H1N1

- Surveillance period of the Report coincided with a pandemic from influenza virus subtype H1N1



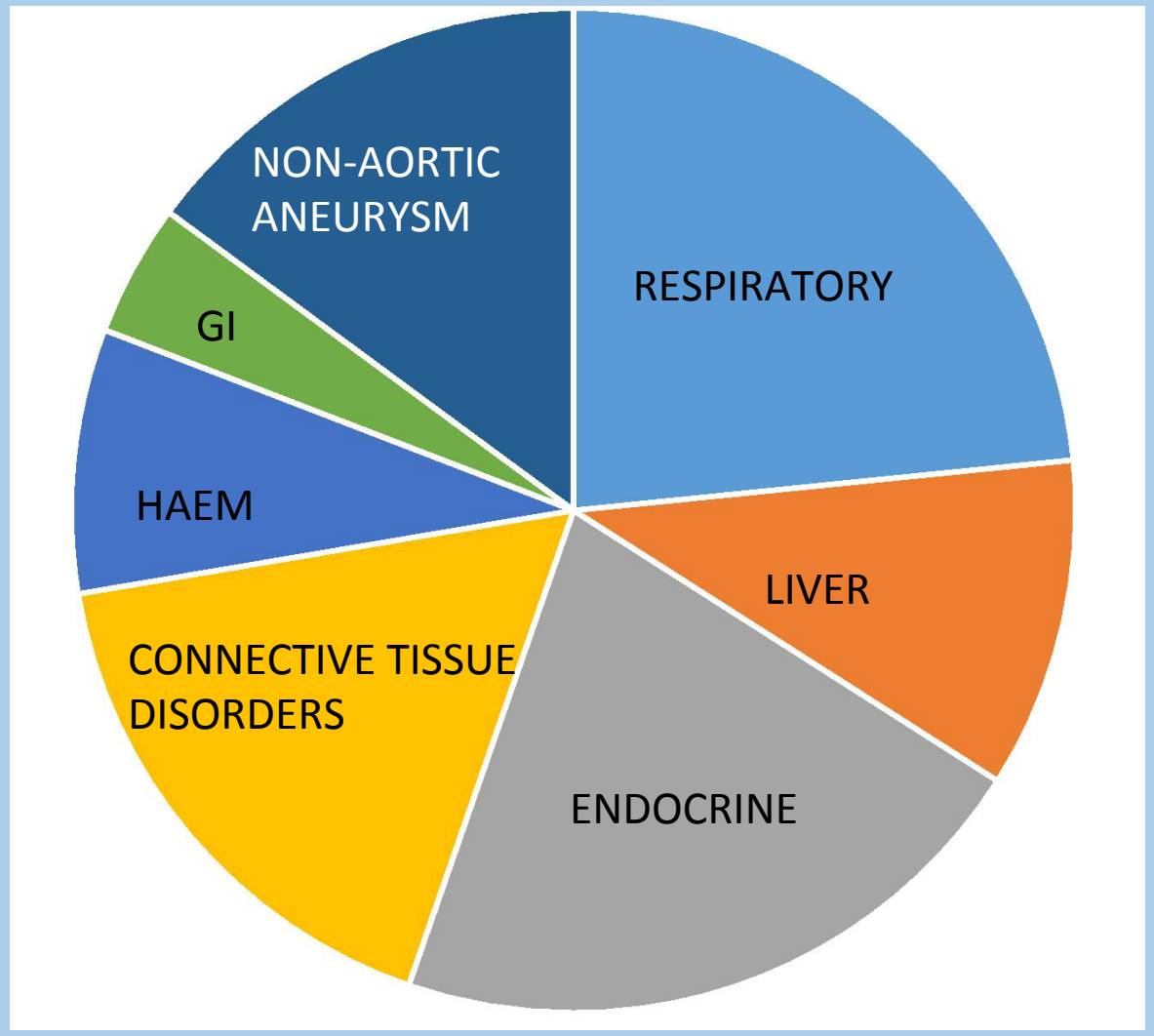
- 2 messages

1) Vaccination
2) Use of neuramidase inhibitors



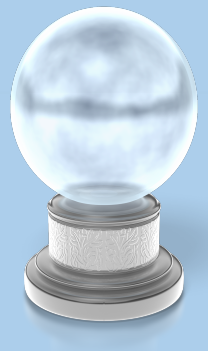
- Little benefit in *general* population
- Studies *excluded* pregnant women
- Observational data continues to show evidence of benefit in pregnant women

Siston, Rasmussen, 2010
Pierce, Kurinczuk, 2011


NON-AORTIC ANEURYSM
RESPIRATORY
GI
HAEM
LIVER
CONNECTIVE TISSUE DISORDERS
ENDOCRINE

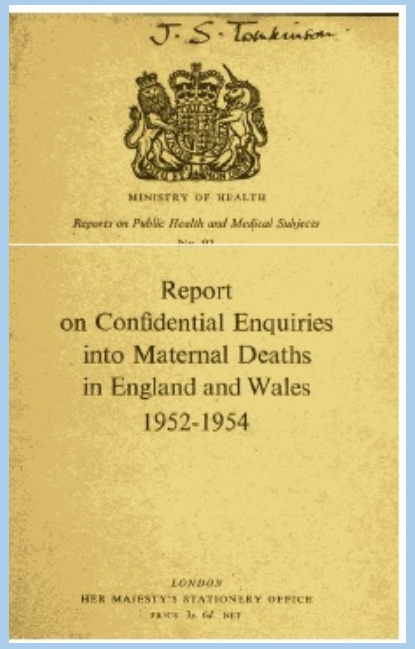
Key messages

- Standards for women with epilepsy must be improved
- Women with asthma should be advised of the importance of good control
- Women with long standing diabetes are at risk of hypoglycaemia and ketoacidosis
- Connective tissue disorders can flare postpartum



The future….

1952-54



2009 -12

2013-15

?

What is the role the enquiry?

‘Criticisms’

- Very small numbers
- Very low rates overall
- Topical annual reviews may *delay* messages

What is the role the enquiry?

'…to recognise and respect every maternal death is a young woman who died before her time….goes beyond counting numbers to listen and tell stories…..so as to learn lessons that may save other mothers and babies…'

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'…to recognise and respect every maternal death is a young woman who died before her time….goes beyond counting numbers to listen and tell stories…..so as to learn lessons that may save other mothers and babies…'

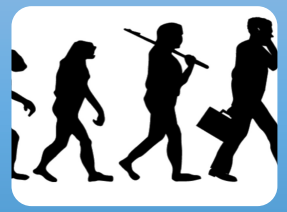
Annual review

Lessons we can learn

Human factors

'Old' themes recurring

Summary

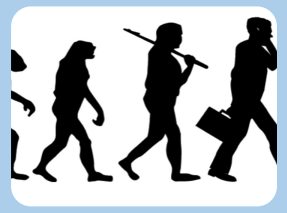


Evolution of the enquiry

Findings

The future of the enquiry

Summary



Evolution of the enquiry

- Annual reports
- Topic review on rolling cycle
- Inclusion of *morbidity* as well as mortality data
- Greater emphasis on ‘learning’

Summary

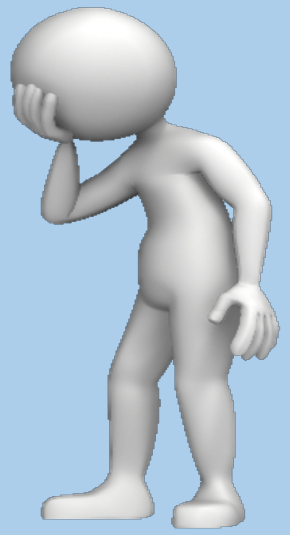
Findings

- Indirect deaths now leading cause of maternal mortality
- Human factors strong emerging theme
- Room for improvement (PPH/sepsis)

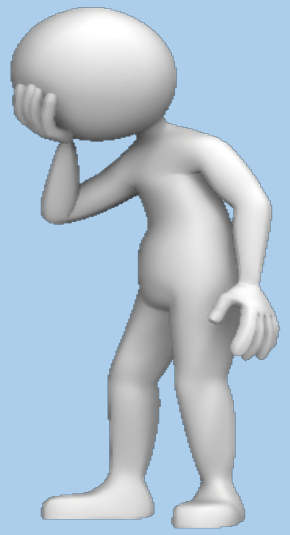
Summary

The future…

- Why these enquiries remain important?



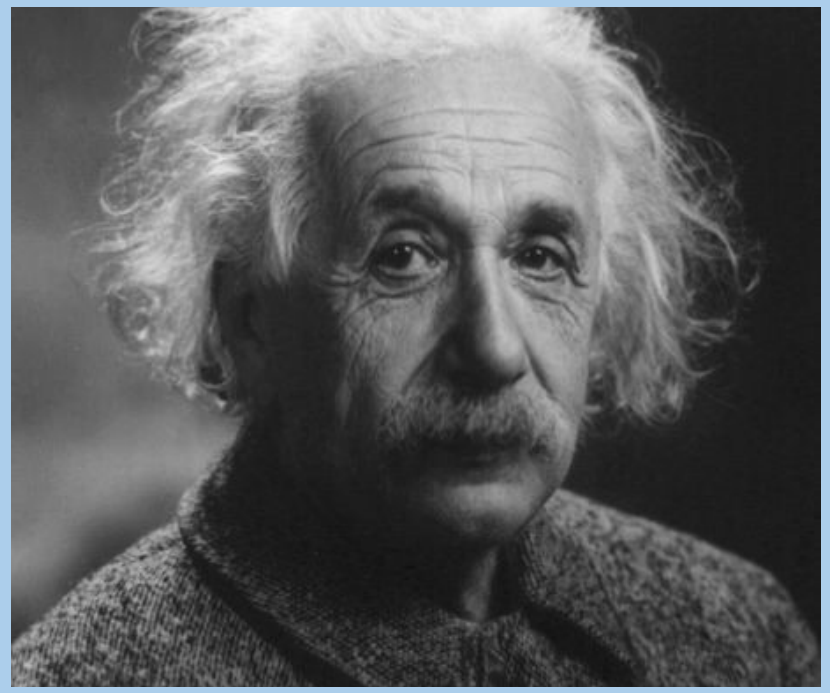
Summary



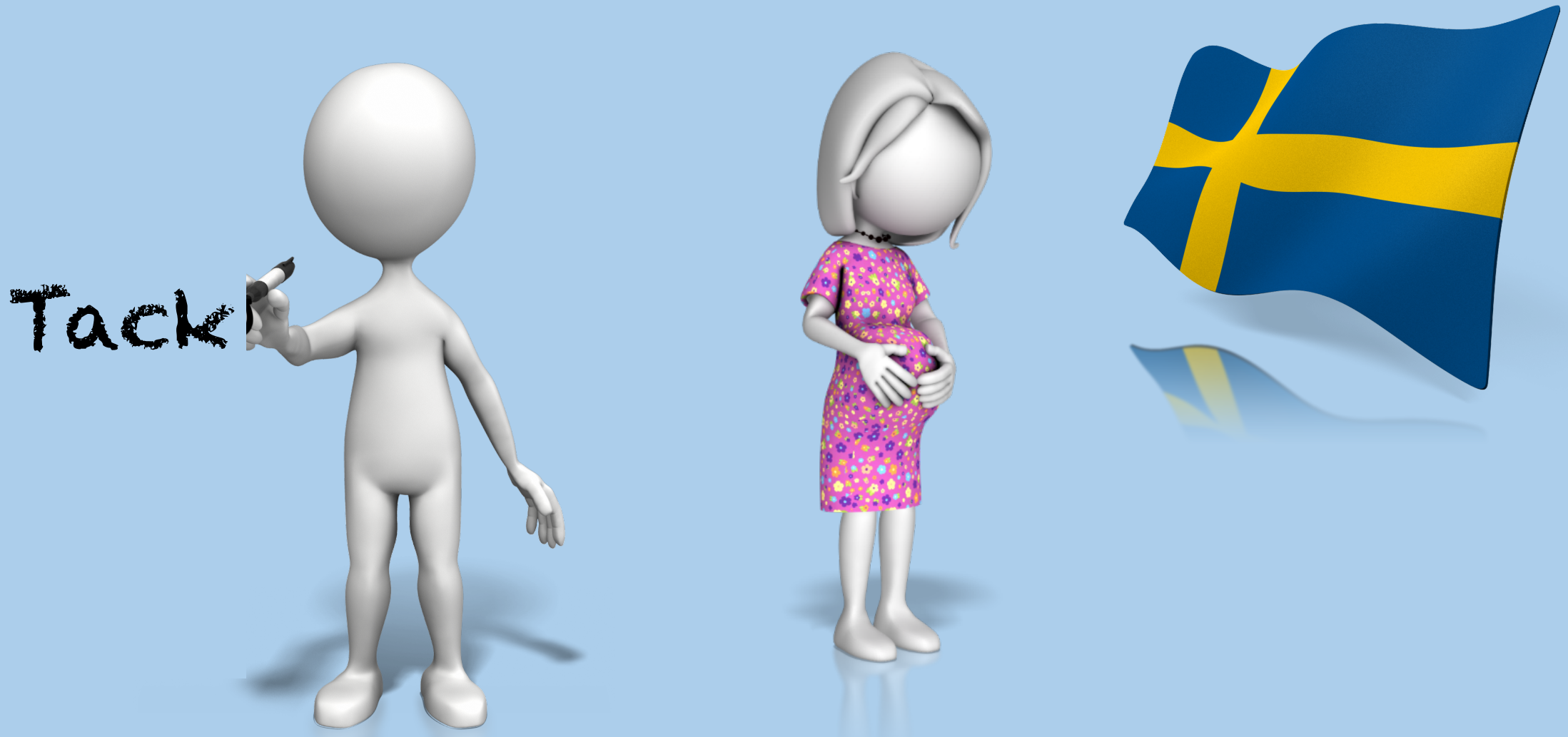
The future…

- Why these enquiries remain important?

- 321 women died
- The women who died gave birth to 235 infants, 173 survived
- 408 siblings



‘Any fool can know. The point is to understand’


Tack