Maternal Mortality
"THE BIG PICTURE"

Warwick D. Ngan Kee
The Chinese University of Hong Kong
“All… are equal. 
But some… are more equal than others.”

George Orwell, *Animal Farm*, 1945
OUTLINE

• Maternal Mortality
• Developed: U.K.
• Global: Developing
• Causes and Reasons
• Solutions?
U.K.
Confidential
Enquiries
U.K.

Mothers & Babies Reducing Risk through Audit and Confidential Enquiries across the U.K.

- Local audits 1920s
- CEMD 1952 (DoH)
- CEMACH 2003 (RCOG)
- CMACE 2009
- MBRRACE-UK 2011
Model:

Mandatory reporting

Confidential review

Hypothesis generation

Trend analysis

Recommendations

Review
U.K. Maternal Mortality Trends
UK DEATHS 2006-2008

• Maternal mortality rate: 11.4 / 100,000 maternities

• 107 direct deaths
• 154 indirect deaths
• Direct Deaths
Deaths resulting from conditions unique to pregnancy

• Indirect Deaths
Deaths resulting from pre-existing conditions aggravated by pregnancy
AUSTRALIA: Maternal Deaths 1982-2005

Australian Institute of Heath and Welfare
SUMMARY OF DEATHS

Deaths per 100,000 maternities

- Malignancies
- Other direct
- Anaesthesia
- Haemorrhage
- Early pregnancy
- Psychiatric
- Amniotic fluid embolism
- Thromboembolism
- Preeclampsia/Eclampsia
- Sepsis
- Neurological
- Other indirect
- Cardiac

CMACE 2006-2008
Direct Deaths Attributable to Anaesthesia
Direct Deaths Attributable to Anaesthesia

Deaths per 100,000 maternities

CEMACH/CMACE
Anaesthesia-Related Maternal Mortality

- Decreased
- Training and supervision
- Airway management
- Aspiration prophylaxis
- Regional anaesthesia
Aspiration during Anaesthesia
James Young Simpson
James Young Simpson

- Hannah Greener
- 15 years old
- Toenail extraction
- Chloroform anaesthesia
James Young Simpson

- “Cyanotic and spluttered”
- **Treatment:**
  - Water and brandy by mouth (!)
- **Died**

Simpson’s contention:  
*Cause of death was aspiration*
Curtis Mendelson

“The Aspiration of Stomach Contents into the Lungs During Obstetric Anesthesia”

*Am J Obstet Gynecol* 1946; 52:191
Curtis Mendelson
New York Lying-In Hospital

• Pathophysiology: Animal experiments
• Acid pneumonitis

“Mendelson’s Syndrome”
Mendelson’s Recommendations:

1. Withholding of food during labour.
2. Greater use of regional anaesthesia.
3. Administration of antacids.
4. Emptying of the stomach before GA.
5. Competent management of GA.

The basis for much of current practice
Maternal Mortality from Anaesthesia & Pulmonary Aspiration, 1952-1999

(From: Report on Confidential Enquiries into Maternal Deaths UK)
Anesthesia-related Deaths during Obstetric Delivery in the United States, 1970-1990


GA vs Regional Ratio: 16.7
Anesthesia-Related Maternal Mortality

JOY L. HAWKINS, MD
University of Colorado School of Medicine


Joy L. Hawkins, MD, Jeani Chang, MPH, Susan K. Palmer, MD, Charles P. Gibbs, MD, and William M. Callaghan, MD
Anaesthesia-Related Maternal Deaths per Million Anaesthetics

GA vs Regional Ratio: 1.7 (95% CI 0.6-4.6)

From Hawkins Obstet Gynecol 2011;117:69-74
Anaesthesia-Related Deaths in South Africa (2008-10)

- General Anaesthesia: 16%
- Spinal Anaesthesia: 79%
- Sedation/Epidural: 0%

From: Saving Mothers 2008-2010
OUTLINE

- Maternal Mortality
- Developed: U.K.
- Global: Developing
Maternal Mortality Ratio per 100,000 Live Births

Figure 1. Map with countries by category according to their maternal mortality ratio (MMR, death per 100 000 live births), 2010

Legend
- <20
- 20–99
- ≥1000
- 100–299
- Population <100 000 not included in assessment
- 300–549
- Not applicable
World Fertility Rates (2006)
Global Annual Maternal Mortality

- Asia: 48%
- Africa: 47%
- Latin America, Caribbean, Oceania: 22,530 (4.3%)
- Developed Countries: 2,500 (0.5%)

Source: WHO and United Nations
Maternal Mortality and the Developing World

Every year:
350,000 mothers die

Every day:
800 mothers die
1 in every 5-6 young women will die of a pregnancy-related complication.

Every year:
20,000,000 women left with serious ill health or disability after pregnancy
Causes of Global Maternal Mortality

Unsafe abortion: 13%
Obstructed labour: 8%
Eclampsia: 12%
Haemorrhage: 24%
Sepsis: 15%
Indirect causes: 20%
Other direct causes: 8%

Source: WHO 2002
Global Maternal Mortality

NON-TRADITIONAL CAUSES*

• Meningitis
• Tuberculosis
• Kaposi sarcoma & other malignancies
• Malaria
• Anaemia
• Sepsis

* >40% based on HIV/AIDS
OUTLINE

• Maternal Mortality
• Developed: U.K.
• Global/Developing
• Causes and Reasons
Global Distribution of Health Workers

Causes of Shortages of Health Workers

- Insufficient production of Health Workforce
- Poor planning of Health Workforce
- Health Workforce not a priority
- Political interference
- Death from HIV/AIDS
- Migration
Percentage of doctors trained in African countries but now working abroad

- Ethiopia
- Ghana
- South Africa
- Guinea Bissau
- Sao Tome and Principe

The chart shows the percentage of doctors trained in African countries who now work abroad. The values range from 0% to 60%. Sao Tome and Principe have the highest percentage, followed by South Africa, Ghana, Guinea Bissau, and Ethiopia.
Percentage of foreign-trained doctors in selected industrialized countries

- New Zealand: 2,832
- United Kingdom: 69,813
- United States: 213,331
- Canada: 13,620
- Australia: 11,122
- France: 11,269
- Germany: 17,318
- Finland: 1,003
- Portugal: 1,258
OUTLINE

• Maternal Mortality
• Developed: U.K.
• Global/Developing
• Causes and Reasons
• Solutions?
UNITED NATIONS
Millennium Development Goals

The 8 Millennium Development Goals

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Global partnership for development

[Logos of World Health Organization, UNDP, and UNICEF]
A. Reduce maternal mortality ratio by 75% between 1990 and 2015

B. Achieve universal access to reproductive health by 2015
Maternal Mortality Ratio 1990, 2000 & 2010
(Maternal deaths per 100,000 live births, women 15-49 yr)

Developing regions
- 1990: 440
- 2000: 350
- 2010: 240

World
- 1990: 400
- 2000: 320
- 2010: 210

Millennium Development Goals Report 2013
A. Reduce maternal mortality ratio by 75% between 1990 and 2015

B. Achieve universal access to reproductive health by 2015
% Women attended ≥4 times by a provider during pregnancy 1990, 2000 & 2010

Developing regions

- 1990: 37%
- 2000: 44%
- 2010: 51%

Millennium Development Goals Report 2013
% Women attended ≥4 times by a provider during pregnancy 1990, 2000 & 2010

Millennium Development Goals Report 2013
OUTLINE

• Maternal Mortality
• Developed: U.K.
• Global/Developing
• Causes and reasons
• Solutions?
Supporting the evolution of obstetric anaesthesia through outreach programs

P. R. Howell

St Bartholomew’s & Homerton Hospitals,
London, UK
About Kybele

Kybele, Inc. is a non-profit 501(c)(3) humanitarian organization dedicated to improving child health, safety, and care worldwide through educational partnerships. Our role is to bring professional medical teams into host countries, to work alongside doctors and nurses in their home hospitals, to improve healthcare standards, share knowledge and compassion in real life and death situations, and make miracles a matter of routine.

Save the Date

Kybele Annual Fundraising Dinner

Mamaroneck, California

Thursday, May 3

View Brochure
KEY POINTS

DEVELOPED WORLD

• Indirect deaths dominate
  - Cardiac especially, psychiatric

• Direct deaths
  - Embolic, Preeclampsia, Sepsis

• Anaesthesia:
  - Airway/aspiration less common
KEY POINTS

DEVELOPING WORLD

• Most deaths direct
• Haemorrhage, Sepsis, Eclampsia
• HIV/AIDS
• Global inequalities
  - Economic, Access, Migration
M A T E R N A L  M O R T A L I T Y

KEY POINTS

SOLUTIONS

• UN Millennium Goals
• Outreach

www.kybeleworldwide.com
www.mothersofafrica.org
KEY POINTS
HAVEN’T ADDRESSED
• Infant and child effects
• Maternal morbidity
Maternal Mortality
"THE BIG PICTURE"

Warwick D. Ngan Kee
The Chinese University of Hong Kong