Perinatal Mortality in New Zealand: Personal reflections from the UK perspective

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Programmes of Work

UKOSS
UK Obstetric Surveillance System

UKNeS
The National Maternal Near-miss Surveillance Programme

British Association of Paediatric Surgeons Congenital Anomalies Surveillance System (BAPS-CASS)

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

npeu
National Perinatal Epidemiology Unit
Summary

• Maternal and perinatal mortality surveillance in the UK
• Our maternity populations
• Perinatal mortality – similarities and differences
• Maternal mortality
What has been happening to maternal and perinatal mortality surveillance in the UK?

• April 2010 the UK-wide Maternal, Newborn and Infant Clinical Outcome Review Programme (previously run by CMACE)
  – Put out for open competitive tender
  – MBRRACE-UK were the successful bidders
  – Procurement halted March 2011 - to enable a review
  – CMACE closed 31st March 2011

• Re-tendering process re-started in January 2012:
  – MBRRACE-UK collaboration successful for a second time
  – Contract started 1st June 2012
NPEU (University of Oxford) Data collection hub and lead on the maternal work
TIMMS (University of Leicester) Lead on the stillbirth and infant work
Implications of the interrupted processes:

• No detailed perinatal deaths data for 2010-12 (routine data only)
• Large backlog of maternal deaths data to collect, review and analyse
• Secure electronic web-based data entry system – for the stillbirth and infant mortality data
  – Developed secure web-based data entry system via the internet
  – Identified the information to be collected (reducing the number of items)
  – Selected a new mortality classification system
    • CODAC
  – Tested and launching the system
New activities:

- Surveillance of infant deaths up to age one year
- Secure electronic web-based data entry system for the stillbirth and infant mortality data
- Confidential case reviews of selected stillborn and infant mortality or morbidity cases (topic-based)
  - Congenital Diaphragmatic Hernia (2013)
  - Term unexplained antepartum stillbirth (2014)
- Confidential case reviews of selected maternal morbidity cases as well as all deaths up to one year after delivery
  - Sepsis (2013)
  - Postpartum psychosis (2014)
- Annual reports for both maternal and stillborn/infant programmes
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Changing maternity populations

Live births

England and Wales
New Zealand
Maternal age

Proportion of live births to women aged 40 or over

Percentage of live births

UK

NZ

National Perinatal Epidemiology Unit
Changing maternity populations

Percentage of births to mothers born outside the UK
Changing maternity populations

- Increasing numbers of women with co-existing medical conditions
- Increasing rates of maternal obesity
- Decreasing smoking prevalence
Perinatal mortality in New Zealand and the UK – Similarities and differences
Rates

Note figures use comparable definitions
Change over time - UK

- Infant mortality
- Neonatal mortality
- Postneonatal mortality

Rate per 1000 live births

Change over time - NZ
Change over time - NZ

Intrapartum stillbirths

UK Rate in 2009: 0.34/1000 (excluding major congenital anomalies)
Stillbirths

• Are stillbirths decreasing in NZ but not in the UK?
• What has made the impact on intrapartum stillbirths?
• 13% of unexplained antepartum stillbirths in NZ still have no investigations
Maternal ethnicity - NZ

- Maori
- Pacific peoples
- Indian
- Other Asian
- Other/Not stated
- NZ European
Maternal ethnicity - UK

Rate per 1000 total/live births

- Stillbirth
- Neonatal Death

- White
- Black
- Asian
- Chinese
- Mixed
- Other
Deprivation - NZ

The graph shows the death rate per 1000 births across different quintiles of deprivation in New Zealand. The quintiles are color-coded as follows:
- Quintile 1 (least deprived) - Dark blue
- Quintile 2 - Grey
- Quintile 3 - Red
- Quintile 4 - Orange
- Quintile 5 (most deprived) - Light blue

The categories of death rates are:
- Termination of pregnancy
- Stillbirths
- Neonatal deaths
- Total perinatal related mortality

The bars indicate the death rates for each category across the quintiles, with error bars showing the variability in the data.
Deprivation - UK

Rate per 1000 total/live births

Quintile 1  Quintile 2  Quintile 3  Quintile 4  Quintile 5

Stillbirth

Neonatal Death

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Maternal age - UK

Rate per 1000 total/live births

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Stillbirth</th>
<th>Neonatal Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>20-24</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>25-29</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>30-34</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>35-39</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>40+</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Other associated factors

- Maternal BMI
- Maternal parity
- Maternal smoking
  - 33% of deaths vs 16% overall

- Importance of denominator data to allow for presentation of independently adjusted risks
Contributory factors

Perinatal death classification (PSANZ-PDC)
Why is there an increasing rate of death due to APH?

- Rising caesarean section rates?
- Uterine rupture?
- Placenta praevia?
- Placenta accreta?
Mode of delivery

Percentage of caesarean births

New Zealand
England

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Ministry of Health Maternity Factsheet 2001-2010
NHS Information Centre
Outcomes following Uterine Rupture

UK National study over one year
• 159 cases of uterine rupture
• 87% in women previously delivered by caesarean section

Infant outcomes
• 8 stillbirths & 10 early neonatal deaths associated with uterine rupture among 145 infants: perinatal mortality rate 124 per 1000 total births (95% 75 to 189)
• 56 (41%) infants admitted to a neonatal unit
• 9 infants diagnosed with neonatal encephalopathy

Risk Summary – Uterine rupture

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk of Uterine Rupture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman with previous CS in spontaneous labour</td>
<td>1 in 770</td>
</tr>
<tr>
<td>Woman with previous CS in spontaneous labour + oxytocin</td>
<td>1 in 280</td>
</tr>
<tr>
<td>Woman with previous CS induced with prostaglandin</td>
<td>1 in 360</td>
</tr>
<tr>
<td>Woman with previous CS induced + oxytocin</td>
<td>1 in 280</td>
</tr>
</tbody>
</table>

## Risk factors for placenta accreta

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>%* of Cases (n=134)</th>
<th>%* of controls (n=256)</th>
<th>Adjusted* Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 35 years or older</td>
<td>77</td>
<td>61</td>
<td>3.5 (1.5-8.0)</td>
</tr>
<tr>
<td>Previous caesarean delivery</td>
<td>84</td>
<td>15</td>
<td>14.4 (5.6-36.9)</td>
</tr>
<tr>
<td>Other previous uterine surgery</td>
<td>39</td>
<td>31</td>
<td>3.4 (1.3-8.9)</td>
</tr>
<tr>
<td>Placenta praevia diagnosed prior to delivery</td>
<td>86</td>
<td>3</td>
<td>65.0 (16.6-255.0)</td>
</tr>
<tr>
<td>IVF pregnancy</td>
<td>5</td>
<td>1</td>
<td>32.13 (2.0-509.2)</td>
</tr>
</tbody>
</table>

*Percentage of individuals with complete data

*Adjusted for all variables in the table in addition to ethnicity, BMI, smoking status, parity, multiple pregnancy, female infant(s) and pregnancy induced hypertension or pre-eclampsia

<table>
<thead>
<tr>
<th>Number of CS deliveries</th>
<th>Cases (n,%)</th>
<th>Controls (n,%)</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>151 (48)</td>
<td>513 (85)</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>1</td>
<td>80 (25)</td>
<td>76 (13)</td>
<td>2.1 (1.4-3.3)</td>
</tr>
<tr>
<td>2+</td>
<td>84 (27)</td>
<td>14 (2)</td>
<td>18.6 (7.7-45.4)</td>
</tr>
</tbody>
</table>

Adjusted OR (any previous CS) = 3.5 (95% CI 2.4-5.3)

Incidence of maternal morbidities

Sources:

AMOSS
UKOSS
NPEU
Maternal mortality in New Zealand and the UK – Are the patterns the same?
Maternal mortality rates
Leading causes of death and rates - UK

Source: Saving Mothers’ Lives reports
Causes of death - NZ

Percentage of maternal deaths

Direct
Indirect

AFE
Haemorrhage
Thromboembolism
Hypertensive disorders
Genital tract sepsis
Medical conditions
Other sepsis
Intracranial haemorrhage
Suicide
Causes of death

New Zealand
- Suicide: 23%
- AFE: 15%
- Haemorrhage: 5%
- Thromboembolism: 5%
- Hypertensive disorders: 6%
- Genital tract sepsis: 5%
- Other indirect: 41%
- Other direct: 0%

UK
- Suicide: 5%
- AFE: 5%
- Haemorrhage: 4%
- Thromboembolism: 7%
- Hypertensive disorders: 7%
- Genital tract sepsis: 10%
- Other indirect: 54%
- Other direct: 8%

2006-8: 18.3/100,000 maternities
11.4/100,000 maternities
Ethnicity - NZ

[Graph showing maternal mortality ratio per 100,000 maternities for different ethnic groups: Māori, Pacific peoples, Indian, Other Asian, Other (including unknown), and NZ European.]
Ethnicity - UK

Maternal mortality ratio (/100,000 maternities)

Maternal ethnicity

White  Mixed  Black  Asian  Chinese  Other
Numbers and estimated rates and relative risks of severe maternal morbidity in different ethnic groups

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Risk ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>Indian</td>
<td>1.11 (0.69 to 1.73)</td>
</tr>
<tr>
<td>Pakistani</td>
<td>1.49 (1.06 to 2.09)</td>
</tr>
<tr>
<td>Bangladeshi</td>
<td>1.57 (0.92 to 2.67)</td>
</tr>
<tr>
<td>Black African</td>
<td>2.35 (1.45 to 3.81)</td>
</tr>
<tr>
<td>Black Caribbean</td>
<td>2.45 (1.81 to 3.31)</td>
</tr>
<tr>
<td>Other</td>
<td>1.27 (0.95 to 1.70)</td>
</tr>
<tr>
<td>Any non-white</td>
<td>1.58 (1.33 to 1.87)</td>
</tr>
</tbody>
</table>

Summary

• Many of the new developments for surveillance in the UK are already in place in New Zealand
• We face similar challenges in terms of changing populations and inequalities among different population groups
• We can learn from your stillbirth information
• Maternal morbidity information may help to explain/investigate the perinatal deaths in association with haemorrhage