Comparing Perinatal Mortality Rates

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**EURO-PERISTAT Project**

- **Aim:** to develop a system for monitoring perinatal health in the EU
- Financed by the EU Public Health programme
- Developed a list of indicators, using a consensus process
  - 10 core indicators
  - 20 recommended indicators
- Data from 2000, 2004 and 2010

**EUROPEAN PERINATAL HEALTH REPORT**

by the EURO-PERISTAT project
in collaboration with SCPE, EUROCAT & EURONESTAT
More information: www.europeristat.com

ABOUT EURO-PERISTAT

The EURO-PERISTAT project's goal is to monitor and evaluate maternal and child health in the perinatal period - pregnancy, childbirth and the postpartum - in Europe using valid and reliable indicators.

This project stems from the EU's Health Insurance Programme.

NEWS

SHARING AND REPORTING:
NATIONAL PERINATAL HEALTH REPORTS

Cyprus, Ireland
Priority for surveillance

- In Europe, ≈23,000 stillbirths and ≈22,000 infant deaths yearly
- 40,000 (≈8 per 1,000 survivors) with severe impairments, many of perinatal origin
- Large health inequalities between and within countries
- Burden falls on young people
- Adult health affected by pregnancy and infancy
- Medical advances carry risks and raise ethical questions
  - Increased survival of extremely preterm infants, sub-fertility treatments, prenatal screening
- A key challenge is to benefit from new technology without over-medicalizing pregnancy and childbirth
The first EPHR showed wide variability in perinatal mortality rates.

The highest mortality rates were approximately 3.5 times higher than the lowest.
Comparable indicators of fetal, neonatal and infant mortality

- Differences between countries in recording of births and deaths at borderline viability

- These births are a small proportion of total births

- The majority of these births are either fetal deaths or live births followed by a neonatal death

- They have a significant impact on mortality statistics

- Valid comparisons of fetal and neonatal mortality rates across countries thus require common inclusion limits
Stillbirths – WHO recommendations for data collection

WHO definition

- A stillbirth is defined as death of a fetus that has reached a birth weight of 500 grams
- if the birth weight is unavailable
- a gestational age of 22 completed weeks or a crown-to-heel length of 25 cm is used
Euro-Peristat countries in 2004

Substantial Variation in Registration of Stillbirths

- BW criteria of ≥ 500 grams:
  Austria, Flanders, Germany, Poland, Slovenia

- GA criteria:
  ≥ 12 wks in Norway
  ≥ 16 wks in the Netherlands (Perinatal Registry)
  ≥ 22 wks Czech Republic, Denmark, Latvia, Lithuania
  ≥ 24 wks in Portugal and United Kingdom
  ≥ 180 days in Italy and Luxembourg
  ≥ 28 wks in Greece and Sweden

Gissler et al. Inform Health Soc Care. 2010
Euro-Peristat countries in 2004

- GA and BW criteria: ≥ 22 wks or ≥ 500 grams
  Brussels, Estonia, Finland, France, Malta, Slovak Republic

- GA and BW criteria: ≥ 24 wks or ≥ 500 grams
  Hungary and Ireland

- Voluntary vs. obligatory registration:
  United Kingdom:
  Legal limits of ≥ 24 wks, but voluntary notification at 22-23 wks
  The Netherlands:
  Civil registration ≥ 24 wks, perinatal registration ≥ 16 wks

USA = fetal deaths with a gestational age at birth of 20 weeks or greater
Euro-Peristat countries

No Limits for Registration of Live Births

 Exceptions

- Czech Republic: 
  ≥ 500 grams or any birth weight surviving the first 24 hours

- France and the Netherlands: 
  ≥ 22 weeks or ≥ 500 grams

- Norway: 
  ≥ 12 weeks

- Poland: 
  ≥ 500 grams
Recording of live births

- WHO definition of a live birth is based on signs of life irrespective of gestational age
- But practical difficulties in interpreting true signs of life
- Recording of live births affected by:
  - Criteria for recording of fetal deaths
  - Rules governing maternity and other pregnancy benefits
  - Rules governing burial
  - Medical practices related to intervention at the limits of survival
Total births, live births and survivors per 10,000 total births – MOSAIC cohort of very preterm births

<table>
<thead>
<tr>
<th>GA</th>
<th>Total births</th>
<th>live births</th>
<th>Survivors</th>
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<tbody>
<tr>
<td>22</td>
<td>9.8</td>
<td>1.3</td>
<td>0.0</td>
</tr>
<tr>
<td>23</td>
<td>10.6</td>
<td>2.9</td>
<td>0.2 (n=12)</td>
</tr>
<tr>
<td>24</td>
<td>9.6</td>
<td>4.9</td>
<td>1.6</td>
</tr>
<tr>
<td>25</td>
<td>10.5</td>
<td>6.7</td>
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<tr>
<td>26</td>
<td>11.7</td>
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<td>27</td>
<td>11.8</td>
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<tr>
<td>30</td>
<td>22.0</td>
<td>19.8</td>
<td>18.9</td>
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<tr>
<td>31</td>
<td>27.2</td>
<td>24.7</td>
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</tr>
</tbody>
</table>

10 European regions ≈ 500,000 total births in 2003
Median, IQR and 90% centile range for the percentage of preterm births registered as live born by gestational age for Primary Care Trusts (log scale).

Smith L et al. Arch Dis Child Fetal Neonatal Ed
doi:10.1136/fetalneonatal-2011-301359
Stillbirths

Definition, fetal death at or after 22 weeks of gestation

Using different inclusion criteria

Countries ranked by overall mortality rate

2004 data

Mohangoo et al, PloS One (2011)
Neonatal mortality

Definition neonatal death at or after 22 weeks of gestation

Using different inclusion criteria

Countries ranked by overall mortality rate

2004 data
Based on US, Canadian and Euro-Peristat data

conclude that variations in recording of births and deaths at very early gestational ages “compromise the validity of international rankings of perinatal and infant mortality.”

Euro-Peristat response:
http://www.bmj.com/content/344/bmj.e746/rr/572087
Fig 1 Association between reported proportion of live births under 500 g birth weight and crude neonatal mortality rates in 25 industrialised countries.

Joseph K S et al. BMJ 2012;344:bmj.e746
Fig 1 Association between reported proportion of live births under 500 g birth weight and crude neonatal mortality rates in 25 industrialised countries.

Without the US and Canada
Solutions

- Present data after eliminating births and deaths most likely to be affected by registration

- What cutoff?
  - Gestational age? – 22, 24 or 28 weeks (beginning of third trimester)
  - Birthweight? 500 grams, **1000 grams**
Cutoff of 1000 grams is not sufficient

- Approximation of 3rd trimester deaths, useful measure in high income countries (Flenady et al. Lancet 2011).

- Babies born before 28 weeks of gestation or with a birthweight less than 1000 grams are between 30% and 50% of all deaths

- Marked differences in the rates of preterm birth

- Survival to discharge after live birth at 24 to 27 weeks of gestation ranged from 43 to 81% in 10 European regions
  
  Zeitlin et al (2008), Field et al. (2009)
Figure 4. Infant mortality rates for the United States and Sweden, and the U.S. infant mortality rate standardized for Sweden’s gestational age distribution, 2004

- Sweden IMR: 3.0
- U.S. IMR: 5.8
- U.S. IMR if the United States had Sweden’s gestational age distribution: 3.9

NOTES: IMR is infant mortality rate. Excludes births at less than 22 weeks of gestation.
Birthweight or gestational age

- **Birthweight**
  - Measured in a similar way everywhere
  - Measured at birth and available in low and middle income countries
  - Physiological parameters can differ between countries
  - Low birthweight = premature birth + growth restriction

- **Gestational age**
  - Measurement differs (use of ultrasound)
  - Not reliable in absence of comprehensive antenatal care
  - Prognostic value is better
  - Stable distribution across populations
Example - Comparison Japan and Finland

- Japan
  - Low birthweight (< 2500 grams) = 9.6%
  - Infant mortality rate = 2.3 per 1000

- Finland
  - Low birthweight (< 2500 grams) = 4.3%
  - Infant mortality rate = 2.3 per 1000
Euro-Peristat analysis

- To compare the effects of using a 1000-gram birth weight or a 28-week gestational age threshold on registered rates of fetal and neonatal mortality in Europe

- Should exclusion thresholds be based on birth weight or gestational age?
Comparing 28 weeks with 1000 grams for neonatal mortality

Rates calculated with a gestational age cut-off were not significantly higher or lower than those with a birth weight cut-off.

Differences were minimal, with 15 out of 21 countries/regions having differences between -0.1‰ and +0.1‰.
Except for Czech Republic (0.16‰) and Estonia (0.21‰), countries had higher rates of fetal deaths using a gestational age cut-off.
Feasability and practical solutions

- Most high-income countries collect data on births and deaths by gestational age and birthweight.

- Euro-Peristat: Provide gestational age and birthweight specific mortality rates using a number of thresholds.

- Too complex for an international database covering a wide range of health topics.

- Time for a common initiative to develop updated guidelines for the international comparison of perinatal mortality statistics.
Future collaboration

- Data from Euro-Peristat data collection in 2010 could be useful for such an initiative (data will be available early 2013)

- Collect similar data on birthweight and gestational age from other OECD countries
Thank you