Maternal mortality: The epidemiological perspective
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Every minute of every day, somewhere in the world, a woman dies as a result of complications arising during pregnancy and childbirth. The majority of these deaths are avoidable.

For every woman who dies, 20 more are injured.

Maternal death is a tragedy for individual women, for families, and for their communities.


What is a maternal death?
If she had not been pregnant, would she have died?


- Pregnancy related deaths are caused by:
  - Complications of the pregnancy itself
  - A chain of events initiated by the pregnancy
  - The aggravation of an unrelated condition or event by the physiologic effects of pregnancy
- Cases must be considered individually and are usually (but not always!) straightforward

What is a maternal death?
If she had not been pregnant, would she have died?


- Three questions need to be answered:
  - Is the condition or procedure that caused death unique to pregnancy?
  - Is the condition that caused death more likely to occur during or to be exacerbated by pregnancy?
  - What is the temporal relationship between the pregnancy, the condition, and death?

What is a maternal or “pregnancy-associated” death?


- Death of a woman while pregnant or within 1 year (42 days for the WHO/NCHS definition) of termination of pregnancy, irrespective of cause
  - Pregnancy-related (cause related to or aggravated by pregnancy, but not from accidental or incidental causes)
  - Pregnancy-associated-but-not-pregnancy-related (cause unrelated to pregnancy)
  - Undetermined if pregnancy-related

Case Study #1

A 20-year-old female G2P1 with sickle cell anemia has an acute sickle crisis at 28 weeks gestation and dies on the second postpartum day.

Is this death related to pregnancy?

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A 20-year-old female G2P1 with sickle cell anemia has an acute sickle crisis at 28 weeks gestation and dies on the second postpartum day.

Is this death related to pregnancy?
Yes


Case Study #2
A 20-year-old female G2P1 with sickle cell anemia has an acute sickle crisis at 28 weeks gestation and suffers a cardio-respiratory arrest during delivery. She is resuscitated and placed on life support. She survives for 4 months but eventually becomes septic and dies.

Is this death related to pregnancy?
Yes


Case Study #3
A 20-year-old female G2P1 with sickle cell anemia gives birth to a healthy baby girl at 37 weeks gestation. Eight months later she develops an acute sickle crisis and dies.

Is this death related to pregnancy?
No


Measures of pregnancy-related mortality: Mortality ratio

- Chance of dying due to complications of an individual pregnancy over a specific time period:

\[
\text{Mortality ratio} = \frac{\text{Number of pregnancy-related deaths}}{\text{Number of live births}} \times 100,000
\]
Measures of pregnancy-related mortality: **Mortality rate**

- Chance of a reproductive-age woman dying of pregnancy complications during a specific time period:

\[
\text{Number of pregnancy-related deaths} \times 100,000 \quad \text{Number of women of reproductive age}
\]

Measures of pregnancy-related mortality: **Proportional mortality rate**

- The extent to which pregnancy-related deaths contribute to mortality among women of reproductive age (15–49 years old) over a specific time period:

\[
\frac{\text{Number of pregnancy-related deaths}}{\text{Number of deaths to women of reproductive age}} \times 100
\]

Measures of pregnancy-related mortality: **Lifetime risk of maternal death**

- Probability of maternal death during a woman’s reproductive life, usually expressed in terms of odds

Maternal deaths are difficult to count

- Deciding whose death is “pregnancy-related” often involves a review committee—and such committees are a luxury not usually available in poor countries
- As a result, accurate statistics on such deaths are quite limited in poor countries

The situation in the US

[Chart showing proportions of unexpected pregnancies and maternal deaths]
Lessons from the US data

- Maternal mortality is low, but . . .
  - It could be lower
  - It hasn’t decreased in the last 30 years
- Maternal morality rate varies by:
  - Age
  - Education
  - Marital status
  - Racial/ethnic group

The situation elsewhere

Some statistics

- Maternal deaths
  - 11-17% during childbirth itself
  - 50-71% during the postpartum period
- Stillbirths and newborn deaths
  - 98% occur in low- and middle-income countries
  - 58% result from obstetric complications

"The care that can reduce maternal deaths and improve women’s health is also crucial to newborns’ survival and health."


Maternal mortality ratios (global estimates), 1995

<table>
<thead>
<tr>
<th>Region</th>
<th>Maternal mortality rate (deaths per 100,000 live births)</th>
<th>Number of maternal deaths</th>
<th>Global risk of maternal death, in</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORLD TOTAL</td>
<td>400</td>
<td>5,794,000</td>
<td>74</td>
</tr>
<tr>
<td>DEVELOPED REGIONS*</td>
<td>20</td>
<td>2,300</td>
<td>2,800</td>
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<tr>
<td>Europe</td>
<td>24</td>
<td>1,700</td>
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<tr>
<td>DEVELOPING REGIONS**</td>
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<tr>
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<td>247,000</td>
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<tr>
<td>South-West Asia</td>
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<td>Western Asia</td>
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<td>9,800</td>
<td>130</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>190</td>
<td>22,000</td>
<td>160</td>
</tr>
<tr>
<td>Oceania</td>
<td>280</td>
<td>330</td>
<td>85</td>
</tr>
</tbody>
</table>

* Includes, in addition to Europe, Canada, the United States of America, Japan, Australia and New Zealand, which are not included in the Developed Regions.
** Excludes nations which are included in the Developing Regions.

Regional variation in maternal mortality ratio and number of maternal deaths

This difference between developed and developing countries has long been cited as the "largest discrepancy of all public-health statistics", and is substantially greater than that for child or neonatal mortality.

Rich-poor inequalities in maternal care

Maternal mortality ratio varies by income

Causes of maternal deaths


Trends in maternal mortality over time in 4 countries in South and Southeast Asia

Where pregnancy-related deaths occur

- Often in the hospital (receives the sickest women and has more accurate statistics)
- Types of cases:
  - Women who arrive too sick and late to benefit from emergency care
  - Women who could have been saved if they had received timely and effective interventions
  - Women admitted for normal delivery who subsequently developed serious complications and died with or without receiving emergency care

Lessons from the global data

- Maternal mortality is not low, and it hasn’t decreased in the last 30 years
- Maternal mortality rate varies by:
  - Place of residence (region, country, rural or urban)
  - Place of delivery
  - Income
  - And probably the other factors seen in the US

Poor countries don’t care and neither do we, so the rate [of maternal mortality] isn’t going to go down.

If this condition [maternal mortality] affected men, governments would take action. Women are considered as machines, machines to produce babies.

From: Kristof N. http://www.nytimes.com