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 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:

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

\[
\text{Number of live births}
\]
Measures of pregnancy-related mortality:

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

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

- **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 (and aren’t even complete in the US!)

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 of newborns’ survival and health."


The situation in the US
Unintended pregnancy in the US, 2001: determinants and consequences


Year
Maternal mortality rate (deaths/100,000 live births)
WHO
US Census Bureau


Live birth, 60.8%
Stillbirth, 5.2%
Ectopic pregnancy, 3.7%
Abortion, 2.8%
Undelivered, 12.6%
Unknown, 14.9%


Predictors of pregnancy-related mortality ratios: US, 1998-2005

Maternal age
Live birth order

Lessons from the US data

• Maternal mortality is low, but . . .
  – It could be lower
  – It hasn’t decreased in the last 30 years
• Maternal mortality rate varies by:
  – Age
  – Birth order
  – Marital status
  – Racial/ethnic group
  – Prenatal care

Change in maternal mortality, 1980-2008: 181 countries

Maternal deaths per 100,000 live births in 2010

Estimates of maternal death by UN MDG regions, 2010

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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.

Factors that contribute to maternal deaths in resource-poor countries:

- Low status of women and some families
- Poverty at the family and/or community level
- Lack of access to modern family planning
- Child (young adolescent) marriages
- Polygamous (multi-wife) marriages
- Low community-level awareness of danger signs of pregnancy/labor
- Violence (homicide, suicide) in pregnancy
- Rural location (time/distance to health facilities)
- Unwillingness/inability to attend antenatal care
- Weak health systems

Causes of maternal death

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Rates of unintended and intended pregnancy, worldwide and by region, 2008

“The world we want: an end to child marriage”

Types of birth

- Vaginal
  - Spontaneous
  - Assisted (e.g. forceps)
- Cesarean
  - Without labor
    - After a prior cesarean birth
    - Not after a prior cesarean birth
  - During labor
Risk of maternal mortality and morbidity by method of delivery: WHO, 9-country survey

Adjusted* odds ratio (95% CI)

0 10 20 30 40

Intrapartum CS with indication
Intrapartum CS without indication
Antepartum CS with indication
Antepartum CS without indication
Operative vaginal delivery
Death
Maternal mortality and morbidity index

*Adjusted for numerous possible confounding factors

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

Such cases indicate substandard care and may represent 1/3 of maternal deaths.


MDG 5: To improve maternal health

- 5A: To reduce maternal mortality rate by 75% between 1990 and 2015
  - ↓ maternal mortality ratio
  - ↑ proportion of births attended by a skilled attendant

- 5B: To achieve universal access to reproductive health
  - ↓ use of modern contraceptives
  - ↓ births to women <20 y old
  - ↑ improve antenatal coverage and ↑ number of visits

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.

—Nicholas Kristof, New York Times