

Maternal and child health

L-2



MATERNAL
HEALTH

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Objectives :

- **Define maternal morbidity**
- **Explain the meaning and the importance of severe maternal morbidity and concept of near miss**
 - Define maternal death , discuss its types**
- **Describe the fourth delays model for maternal death**
- Classify the causes of maternal death**

Uncomplicated pregnancy



Morbidity



Severe morbidity



Life-threatening morbidity

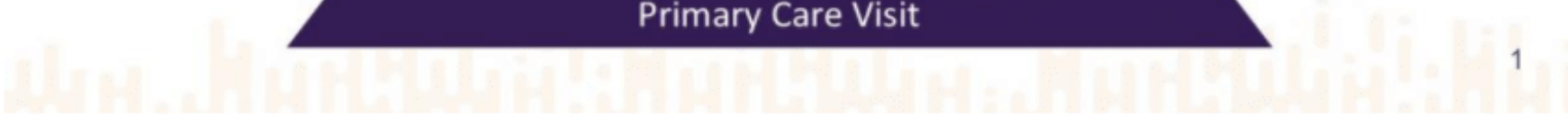
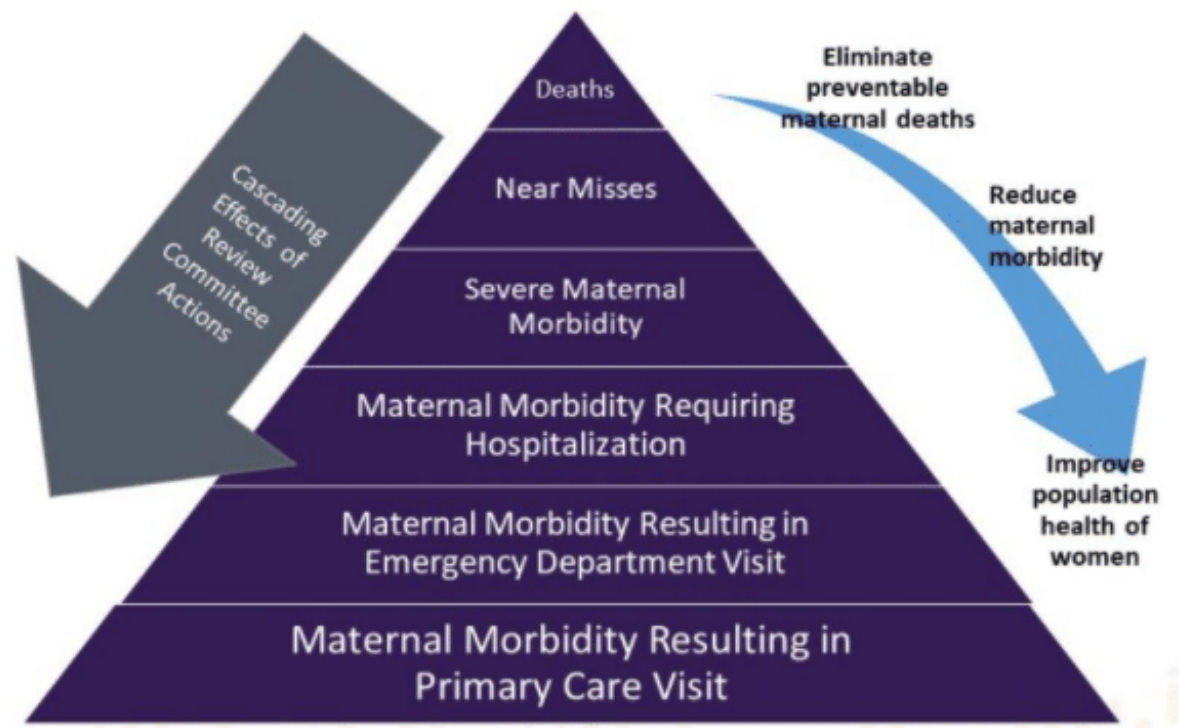
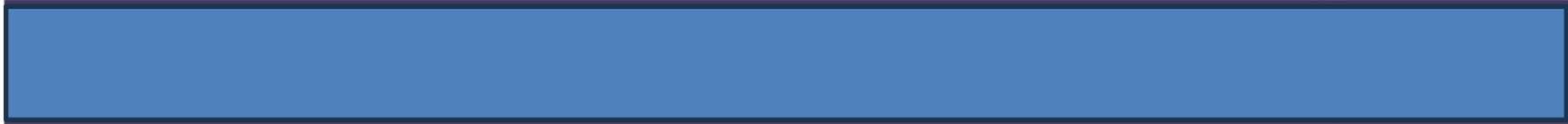


Maternal death

Maternal morbidity includes a range of different health conditions. Some of them start during pregnancy and last only a short time, while others do not develop until years after a pregnancy and continue throughout the woman's life.

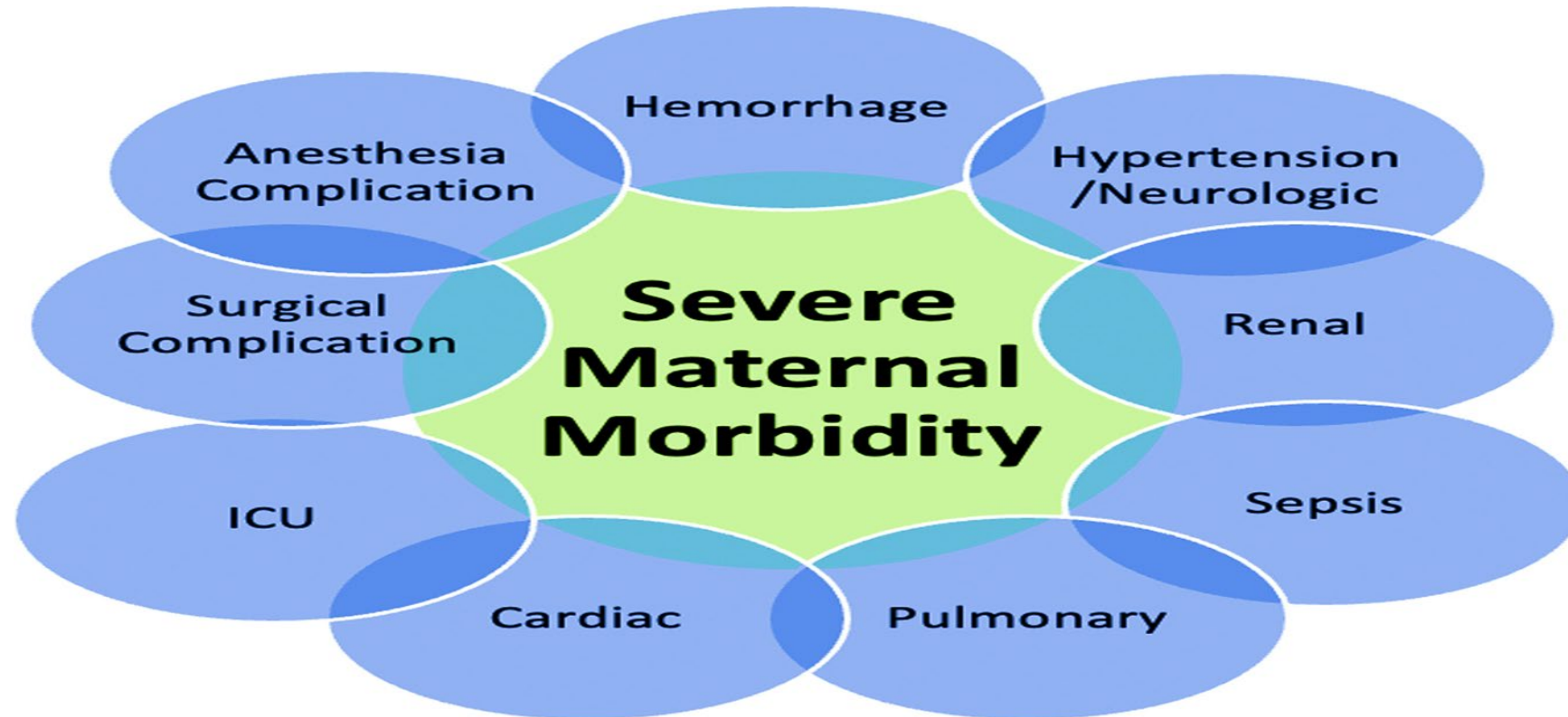
Some common examples of maternal morbidity include the following:

- **Cardiovascular problems, such as heart disease and blood vessel problems**
- **Diabetes**
- **High blood pressure**
- **Infections, especially from cesarean section**
- **Blood clots**
- **Hemorrhage**
- **Anemia**
- **Nausea and vomiting (morning sickness) and hyperemesis gravidarum (severe morning sickness)**
- **Depression and anxiety**



Severe maternal morbidity (SMM) is a life-threatening or severe health event during pregnancy, childbirth, or within 42 days of delivery that results in significant short- or long-term health consequences. While SMM may precede maternal death, it is a much more common indicator of overall maternal health.

SMM has been steadily increasing in recent years.



Common indicators and causes

A woman is identified as having SMM if she experiences one or more of a set of severe medical complications or requires critical medical interventions.

➤ Common complications include:

- **Hemorrhage:** Severe bleeding during or after childbirth, including conditions like disseminated intravascular coagulation (DIC).
- **Hypertensive disorders:** Conditions like preeclampsia, eclampsia, and HELLP syndrome.
- **Sepsis:** Severe systemic infection.
- **Embolism:** including amniotic fluid embolism and pulmonary embolism.
- **Heart conditions:** Such as cardiac arrest, heart failure, and myocardial infarction.
- **Renal failure:** Acute kidney failure.
- **Uterine rupture**

➤ **Critical medical interventions include:**

- **Receiving a blood transfusion of four or more units.**
- **Admission to an Intensive Care Unit (ICU).**
- **Needing assisted ventilation.**

Risk factors

Numerous factors can increase a woman's risk for SMM

- ❖ **Pre-existing medical conditions: Chronic conditions like cardiovascular disease, diabetes, obesity, and pre-existing hypertension significantly increase risk.**
- ❖ **Advanced maternal age: Women over 35 are at higher risk.**
- ❖ **Multiple gestation: Carrying twins or other multiples.**
- ❖ **Obstetric history: A history of previous cesarean deliveries is associated with higher SMM risk.**
- ❖ **Socioeconomic and racial disparities: Research consistently shows higher rates of SMM among certain racial and ethnic groups, particularly Black women in the United States.**

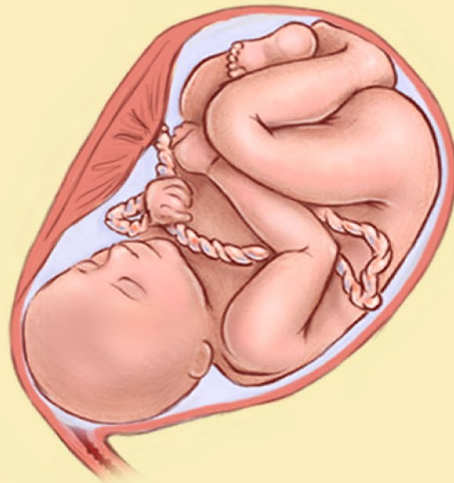
Severe Maternal Morbidity

Demographic Factors

- Maternal age >35 or <20
- Black race
- Social determinants of health
- Substance use

Pregnancy-Related Factors

- Nulliparity
- Prior cesarean delivery



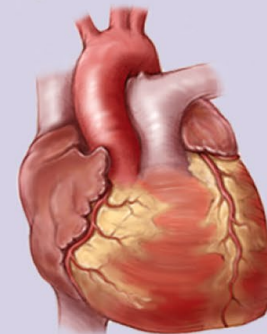
Pre-Existing Medical Diseases

- Obesity
- Diabetes mellitus
- Hypertension
- Renal insufficiency



Pre-Existing Cardiac Conditions

- Congenital heart disease
- LV dysfunction
- Hypertrophic cardiomyopathy
- Mechanical valve
- Severe mitral stenosis
- Symptomatic severe aortic stenosis
- Marfan syndrome
- Bicuspid aortic valve
- Arrhythmia



Trends and prevention

Monitoring SMM is a crucial public health strategy for understanding the quality of maternal care and preventing maternal mortality.

- ✓ **Increasing rates:** Despite medical advances, SMM rates have been steadily increasing in recent years in the United States and other high-income countries.
- ✓ **Surveillance:** tracks SMM using standardized indicators derived from hospital discharge data.
- ✓ **Quality improvement initiatives:** Monitoring SMM allows healthcare facilities and systems to identify areas for improvement in maternal care, and interventions like implementing safety "bundles" (**standardized care processes for specific conditions**) are used to address this issue.
- ✓ **Preventability:** A significant portion of SMM cases are considered preventable, often related to delays in diagnosis or treatment.

Consequences of SMM

Beyond the immediate risk of death, SMM can have lasting impacts on a woman's health and well-being.

- **Physical effects:** Long-term consequences can include serious physical disabilities and chronic health conditions.
- **Psychological effects:** The experience of a life-threatening complication can lead to anxiety, depression, and post-traumatic stress disorder.
- **Infant health:** SMM is also linked to a higher frequency of adverse outcomes for the newborn.

Maternal near-miss concept?

A Woman Who Survives Life Threatening Conditions during Pregnancy, Abortion, and Childbirth or within 42 Days of Pregnancy Termination, irrespective of Receiving Emergency Medical/Surgical Interventions, is called Maternal Near Miss.

It signifies a woman who "nearly died but survived a complication" and exhibits signs of organ dysfunction.

Investigating these near-miss cases, rather than only maternal deaths, provides critical insights into the quality of maternal healthcare and helps identify areas for improvement in preventing more serious outcomes.

The incidence of MNM varied widely from 3.9 to 379.5 per 1000 live births and 7.6-60.4 per 1000 deliveries.

Key Aspects of Maternal Near Miss

- **Near-death experience:** A woman experiences a severe, life-threatening complication.
- **Survival:** She survives the event, unlike a maternal death.
- **Organ dysfunction:** The complication often leads to signs of organ dysfunction or failure.
- **Timing:** The event occurs during pregnancy, labor, delivery, or up to 42 days after the end of pregnancy.



Why Maternal Near Miss is Important

➤ **Monitoring healthcare quality:**

Near-miss cases are valuable indicators of the effectiveness of maternal health programs and the quality of care.

➤ **Identifying weaknesses:**

Analyzing near misses helps healthcare facilities and systems find gaps in care that could lead to maternal deaths.

➤ **Preventing future deaths:**

By understanding the factors and conditions that lead to near misses, measures can be taken to prevent similar events and reduce overall maternal mortality.

How Near Misses Are Identified

The World Health Organization (WHO) has established standard, three-part criteria for identifying MNM cases:

- **Clinical/Disease-based criteria: Focus on specific life-threatening obstetric conditions:**
 - **Severe postpartum hemorrhage**
 - **Severe pre-eclampsia or eclampsia**
 - **Sepsis or severe systemic infection**
 - **Uterine rupture**
 - **Severe complications of abortion**

□ **Intervention-based criteria:** Identify women who received major interventions that are not routinely required in healthy pregnancies.

- **Admission to an Intensive Care Unit (ICU)**
- **Administration of blood products**
- **Laparotomy (excluding Cesarean section)**

□ **Organ dysfunction-based criteria:** Diagnose life-threatening conditions based on the failure of a specific organ system.

- **Cardiovascular dysfunction (e.g., shock)**
- **Respiratory dysfunction (e.g., severe hypoxemia)**
- **Renal dysfunction (e.g., acute kidney failure requiring dialysis)**
- **Coagulation/hematological dysfunction (e.g., massive blood transfusion)**
- **Neurological dysfunction (e.g., status epilepticus, prolonged coma)**
- **Hepatic dysfunction (e.g., severe jaundice with pre-eclampsia)**

Importance of the maternal near-miss approach

The WHO approach to studying maternal near-miss events has several benefits for improving maternal healthcare:

- **Larger dataset:** MNM cases are significantly more common than maternal deaths, providing a larger, more statistically robust dataset for analysis.
- **Direct feedback:** Unlike maternal death, the women survive and can provide first-hand information about their experience, including delays in care and systemic issues.
- **Less threatening review:** Healthcare providers may be more willing to openly discuss and review cases that ended in survival, which helps identify deficiencies in care without fear of blame.
- **Complements maternal mortality:** MNM analysis serves as a powerful complement to maternal mortality reviews by highlighting the pathways that lead to severe complications.

Main indicators for measurement of MNM

Several key indicators are used to monitor the quality of obstetric care using MNM data:

- ❖ **Maternal Near-Miss Ratio (MNMR):** The number of MNM cases per 1,000 live births. It is an indicator of the total burden of severe complications in a population.
- ❖ **Maternal Near-Miss to Mortality Ratio (MNM:1MD):** The number of near-miss cases for every maternal death. **A higher ratio generally indicates better quality of care because more women with life-threatening complications are surviving.**
- ❖ **Mortality Index (MI):** The number of maternal deaths as a percentage of all women with life-threatening conditions (MNM + maternal deaths).

A lower index suggests better quality of care as fewer critically ill women are dying.

While pregnancy should be a time of great hope and a positive experience for all women, it is tragically still a shockingly dangerous experience for millions around the world who lack access to high quality, respectful health care

When a woman dies in pregnancy, childbirth, or the postpartum period, it means there is an infant who will never know his or her mother. There is a tremendous sense of loss, grief, fear, and blame, as well as new, unexpected responsibility for the other parent and the family's extended community.

There were an estimated **287,000** maternal deaths in 2020



Most were in low- and middle-income countries

A woman dies of pregnancy-related causes every



minutes

Most of these deaths are preventable with the **right care** at the **right time**



WHY IS MATERNAL HEALTH IMPORTANT?

32%
REDUCED
INCOME
FOLLOWING
MATERNAL
DEATHS



Households in China usually see a major reduction in both income (**32%**) and expenditure (**25%**) over the year following the maternal death.



Economically, studies in both Africa and Asia have shown that the direct cost of a funeral and medical expenses can reach one third of a family's income.

A qualitative study on the impacts of maternal health in Tanzania, Ethiopia, Malawi, and South Africa showed that the impacts of maternal death can include having to take over the mother's tasks, such as cooking, cleaning/washing and fetching water.



COOKING



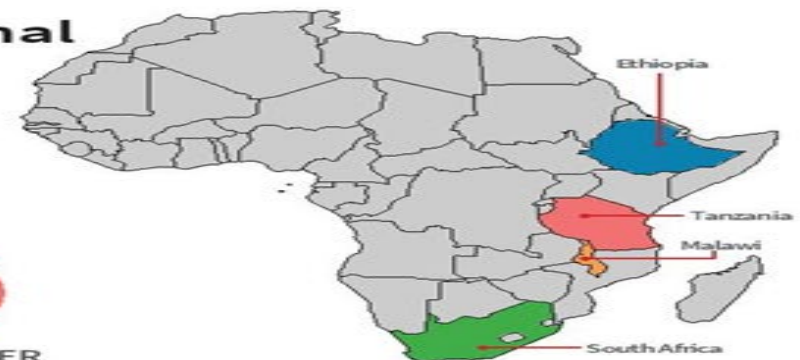
CLEANING



WASHING



FETCHING WATER

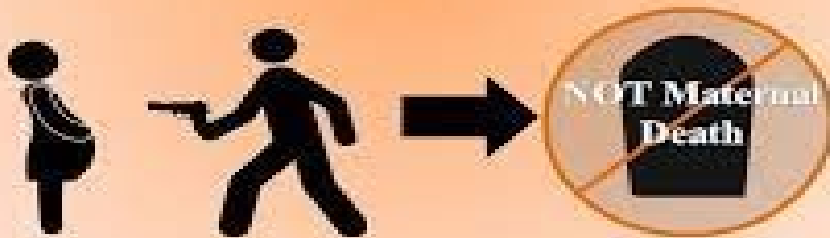


What is a Maternal Mortality?

It is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of duration and site of pregnancy from any cause related or aggravated by the pregnancy or its management and NOT due to any accidental or incidental cause.

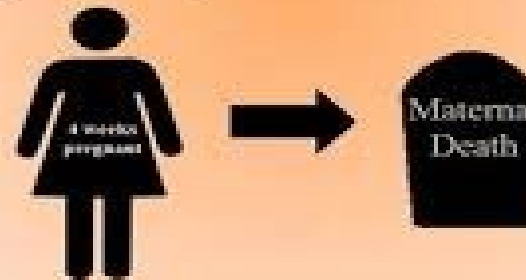
Maternal death: the death of a woman while pregnant, (or within 42 days of termination of pregnancy)

Accidental or incidental causes of death are not classified as maternal deaths.



Maternal death: the death of a woman while pregnant, (or within 42 days of termination of pregnancy).

- irrespective of the duration and the site of the pregnancy



Pregnancy-associated deaths
(1 year)

Pregnancy-associated deaths:

Deaths due to any cause during pregnancy and up to one year after pregnancy (includes deaths not related to pregnancy)

Pregnancy-related deaths
(1 year)

Pregnancy-related deaths (CDC):

Deaths during pregnancy and up to one year after pregnancy that are related to pregnancy

Maternal mortality
(42 days)

Maternal mortality (WHO / NCHS):

Deaths during pregnancy and up to 42 days after pregnancy that are related to pregnancy

A pregnancy-related death

is defined as a death during pregnancy or within 1 year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. The death may happen because:

- The pregnancy causes a new medical (including mental) health problem.**
- The pregnancy starts a chain of events that lead to death.**
- The pregnancy makes an unrelated condition worse.**

A late maternal death is “**the death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after termination of pregnancy**”.

- **Like maternal deaths, late maternal deaths also include both direct and indirect maternal/obstetric deaths.**
- **Complications of pregnancy or childbirth can lead to death beyond the six-week (42-day) postpartum period**

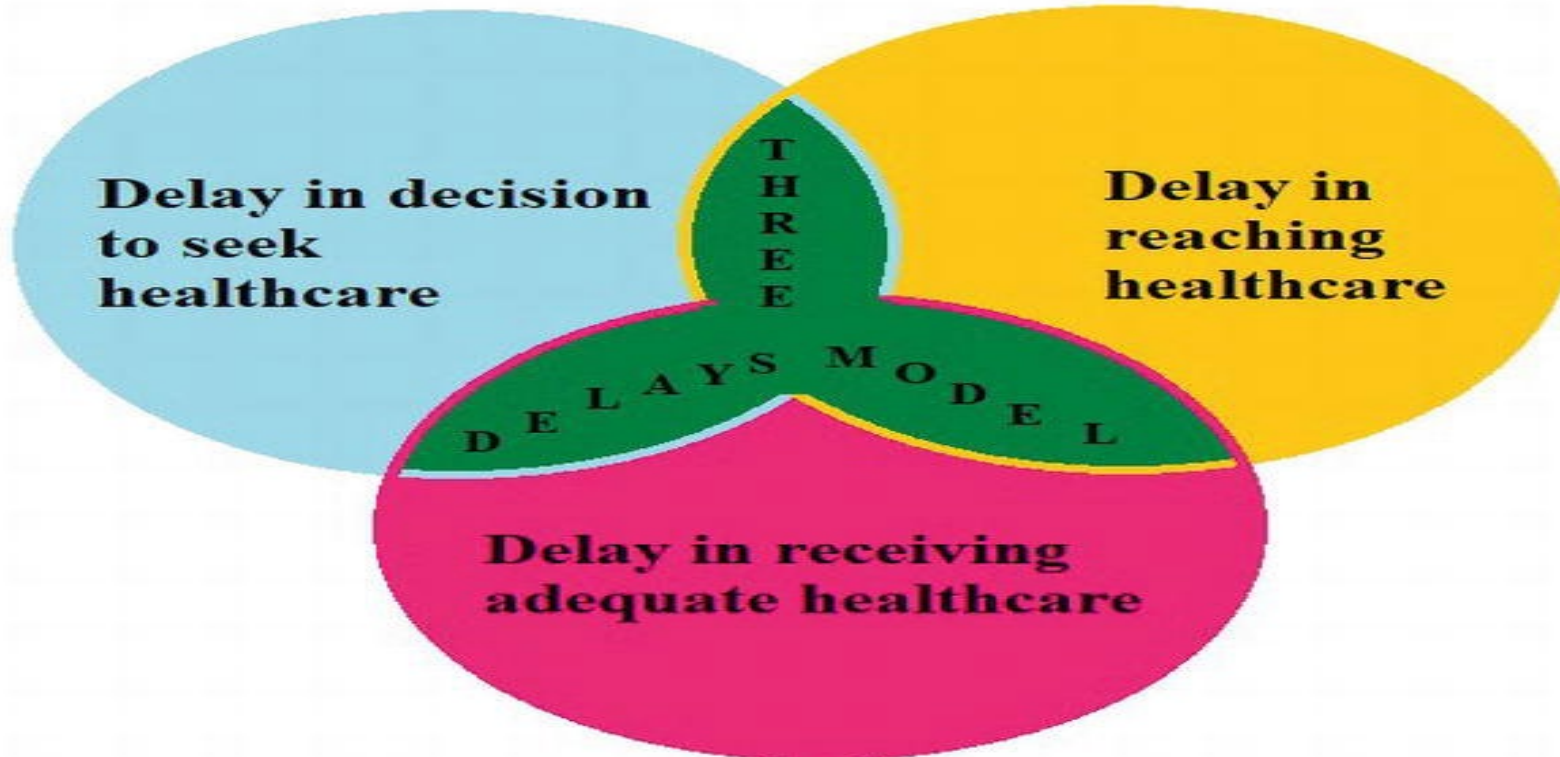
WHY DO WOMEN DIE?

Maternal deaths occur when women with life – threatening complications do not have timely access to emergency obstetric care. The delays may occur at one or more stages.



Three Delays Model

The Three Delays Model, developed by public health experts Thaddeus and Maine, identifies three critical types of delays that contribute to maternal mortality, particularly in low and middle-income countries. The model serves as a framework to understand and address barriers women face when experiencing obstetric emergencies



1. Delay in deciding to seek care

This is a household-level delay, where the pregnant woman, her family, or both hesitate or decide against seeking emergency medical care.

This delay is influenced by several socioeconomic and cultural factors, including:

- ❑ Poor knowledge of danger signs:** Families may not recognize the severity of an obstetric complication, leading them to delay seeking professional medical help.
- ❑ Low status of women:** A woman's lack of autonomy may mean that the decision to seek care is made by a male relative or mother-in-law, which can cause significant delays.
- ❑ Financial constraints:** The cost of transport and medical care can deter families from seeking help. They may need time to find money, sell property, or borrow funds.

- ❑ **Previous negative experiences:** Bad past experiences with the healthcare system, including mistreatment, can influence a woman's decision to avoid seeking care in the future.
- ❑ **Traditional beliefs:** Reliance on traditional healers or spiritual practices instead of modern medicine can delay a woman from receiving timely, appropriate treatment.

2. Delay in reaching a health facility

This is a logistical delay related to infrastructure, which occurs after the decision to seek care has been made but before arrival at the facility.

Barriers that cause this delay include:

- ❑ Long distances:** Many women in rural and remote areas live far from health centers and hospitals.

- ❑ Lack of transportation:** The absence of reliable transport options, such as ambulances or public transport, can result in significant delays.

- ❑ Poor road conditions:** Unsafe roads, especially during rainy seasons, can make travel difficult and slow.

- ❑ Community factors :** Lack of awareness about facility locations or inadequate community health infrastructure.

- ❑ Geography:** Natural barriers like rivers or mountainous terrain can pose major obstacles to reaching a facility.

3. Delay in receiving adequate care at a health facility

This delay happens once a woman has reached a health facility but does not receive timely or effective treatment.

This is often the most significant cause of institutional maternal deaths in developing countries. This delay involves issues within the healthcare system:

Reasons for this delay include:

- ☐ **Provider factors** : Shortages of trained medical personnel, such as doctors, nurses, and midwives, can lead to long waiting times and delayed care.**

- ❑ **Facility limitations :** A lack of essential medicines, equipment, and blood products, including in the blood bank, is a major problem in many low-resource settings.
- ❑ **Lack of competence:** Incompetence among staff can lead to incorrect diagnoses or improper treatment.
- ❑ **Poor referral systems:** Inadequate systems for referring patients to more equipped facilities, including problems with transport or poor communication, cause additional delays.
- ❑ **Overcrowded facilities:** High patient volume can overwhelm staff and resources, resulting in long waiting times before a woman is assessed and treated.

First
Delay

Delay in recognizing danger and deciding to seek care - It is often due to family inertia, lack of awareness, or financial constraints.

Second
Delay

Delay in reaching a health facility - It is caused by distance, poor transport, or lack of emergency services.

Third
Delay

Delay in receiving adequate care at the facility - Due to shortages of specialists, blood banks, or operational issues in hospitals.

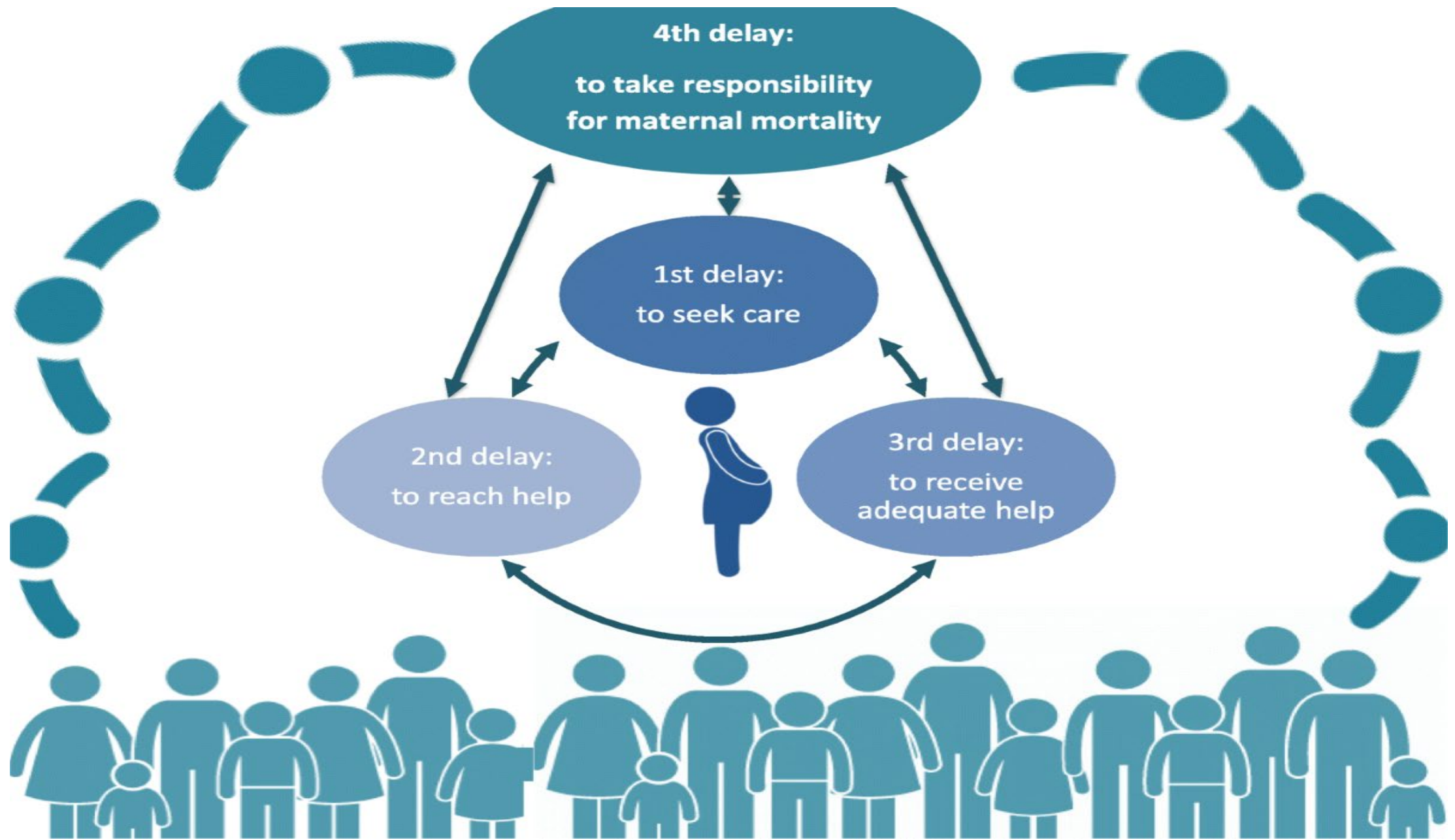
4. Delay in Taking Responsibility/Accountability (Fourth Delay)

This newer phase focuses on the systems response to a maternal death

fourth delay related to a community's collective responsibility for maternal mortality. This includes the failure to mobilize resources and provide social support during an obstetric emergency.

- ❑ Lack of mobilization:** The community may lack a coordinated system for responding to a maternal health crisis, such as organizing emergency transport.
- ❑ Social support:** Inadequate support from the extended family or community can delay the decision to seek help or provide other necessary aid.
- ❑ Community infrastructure:** A community that fails to address infrastructure problems, such as poorly maintained roads, can effect the second delay.

Addressing these four delays, especially through community involvement and integrated health system strengthening, is crucial for significantly reducing maternal mortality.



Factors affecting utilisation and outcome

Socioeconomic and cultural factors

Accessibility of facilities

Quality of care

Phases of delay

Delay 1: delay in decision to seek care

Delay 2: delay in reaching care

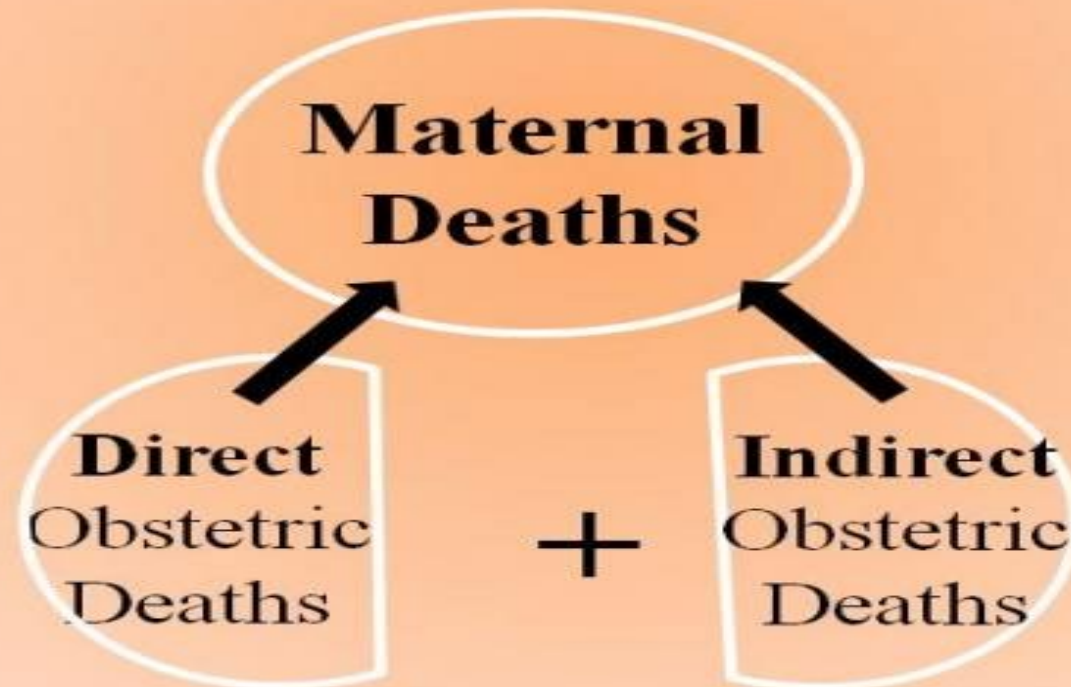
Delay 3: delay in receiving care



CAUSES OF MATERNAL DEATH

Maternal death: the death of a woman while pregnant, (or within 42 days of termination of pregnancy).

- All maternal deaths are either direct obstetric deaths or indirect obstetric deaths



Direct Causes of MM

Direct Obstetric Death: those deaths resulting from:

- obstetric complications of the pregnant state (pregnancy, labor and post-partum)
- interventions, omissions, or incorrect treatment
- or from a chain of events resulting from any of the above.



Deaths due to, for example, hemorrhage, pre-eclampsia/eclampsia or those due to complications of anaesthesia or Caesarean section are **classified as direct obstetric deaths, they are usually due to:**

one of five major causes- hemorrhage(usually occurring post partum), sepsis, eclampsia, obstructed labour, or complications of unsafe abortion.

These are all largely preventable and treatable with access to high-quality and respectful healthcare.

PPH is responsible for approximately 27 percent of all maternal deaths.

Hypertensive disorders are responsible for 14 percent of pregnancy-related deaths.

About 11 percent of maternal deaths are the result of an infection.

Termination of pregnancy accounts for 8 percent of the maternal deaths.

About 3 percent of maternal deaths are due to a pulmonary embolism.

Other Direct Complications

Approximately 10 percent of women die from other direct pregnancy-related issues. Conditions such as placenta previa, uterine rupture, and ectopic pregnancy can lead to complications and death without the proper care and treatment.

In developing countries [$\frac{3}{4}$] of maternal deaths are due to direct causes.

Indirect Causes of MM

Indirect Obstetric Death: those deaths resulting from previous existing disease (or from a disease that developed during pregnancy) and which was *not* due to **direct obstetric causes**, but which was *aggravated by* physiologic effects of pregnancy.



Deaths due to aggravation of an existing cardiac or renal disease, malaria and anemia are indirect obstetric deaths.

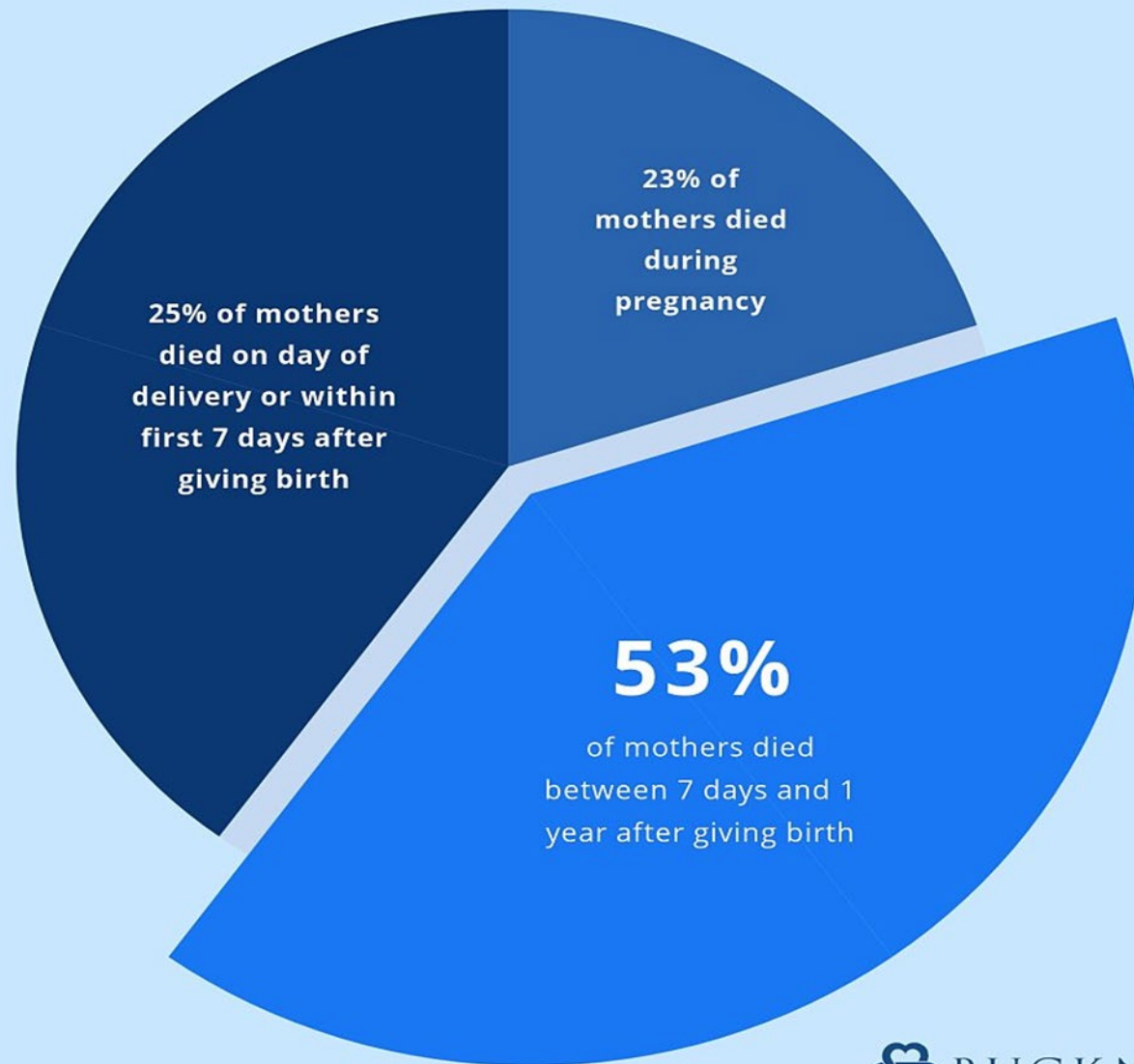
On average, [1/4] of maternal deaths in developing countries are classified as indirect causes.

Almost half of all postpartum deaths take place within one day of delivery and 70% within 1st week .

According to WHO, In Iraq the main reasons for maternal death are:

- Poor birth practices**
- Inadequate referral and emergency obstetric care**
- High level of anaemia among pregnant women**

Maternal Health Matters



Source: CDC, 2022

Factors contributing to high maternal mortality

Significant inequalities exist in maternal survival, with most maternal deaths occurring in low- and middle-income countries.

Main contributing factors include:

- ❑ Lack of access to quality healthcare:** This includes insufficient access to skilled birth attendants, emergency obstetric care, and antenatal and postnatal care.
- ❑ Socioeconomic factors:** Women in low-income settings face a much higher lifetime risk of maternal death.
- ❑ Systemic issues:** Delays in seeking, reaching, and receiving care at health facilities are major obstacles.
- ❑ Social and cultural factors:** These include the low status of women, early marriage, and gender-based violence.
- ❑ Conflict and fragility:** Maternal mortality is significantly higher in countries affected by conflict or social fragility

ANY QUESTION ?



References :

1-Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.

2-Levels and trends in child mortality report 2023

Estimates developed by the UN Inter-agency Group for Child Mortality Estimation

Authors:

UNICEF, WHO, World Bank, UN-DESA Population Division