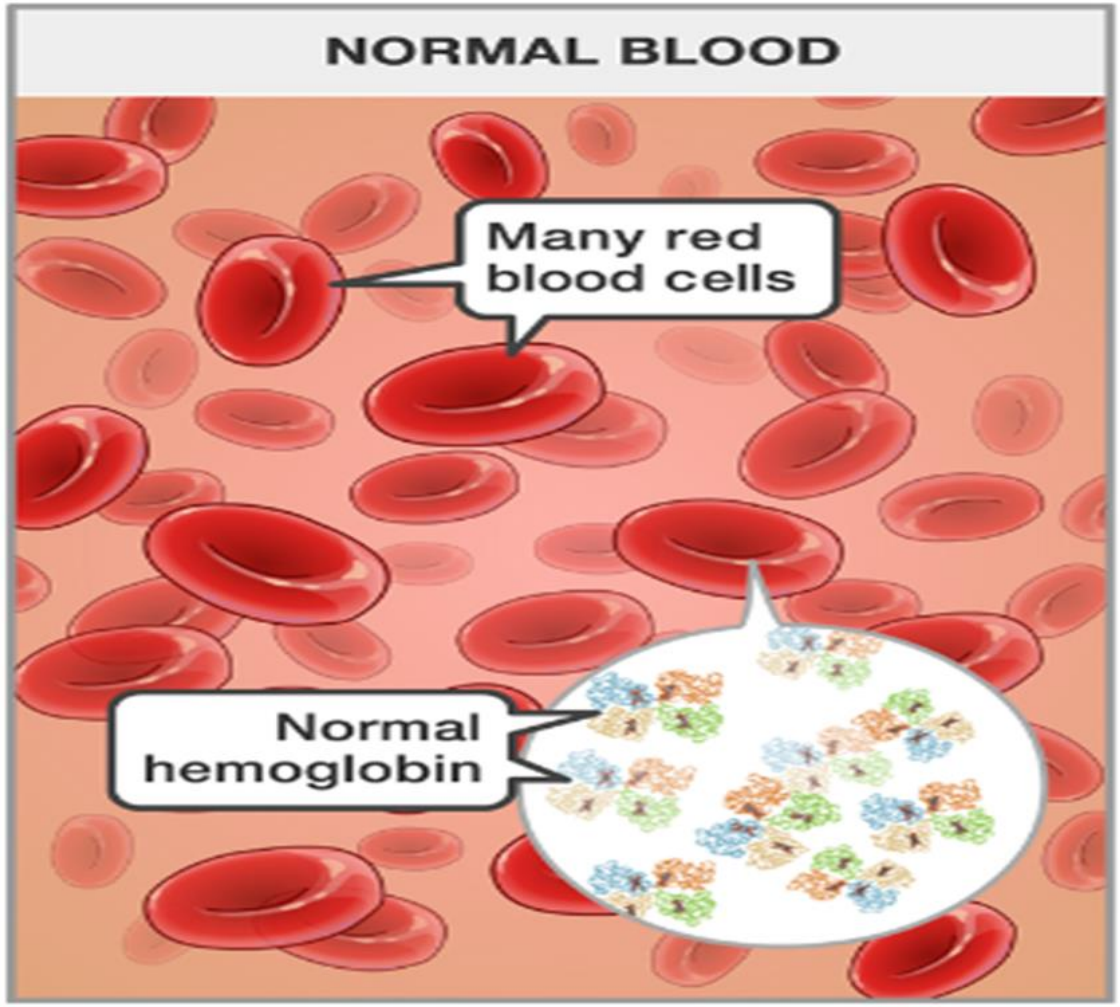
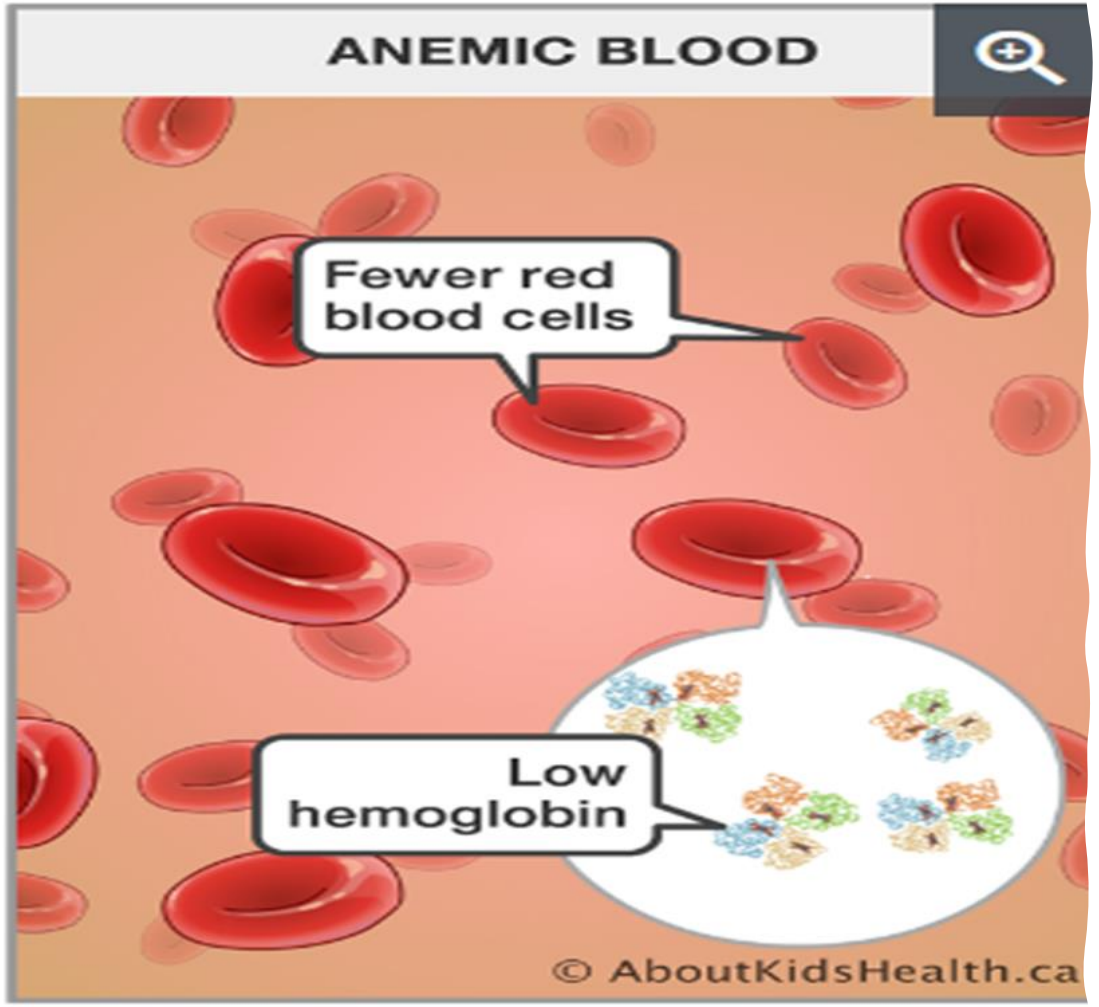
# Maternal Morbidity and Mortality

# I. Anemia during pregnancy

- Anemia is a reduction in one or more of the major red blood cell measurements (Hemoglobin concentration, hematocrit, or RBC count).
- Pregnant women are at a higher risk for developing anemia due to the excess amount of blood the body produces to help provide nutrients for the baby.
- Anemia during pregnancy can be a mild condition and easily treated if caught early. However, it can become dangerous, to both the mother and the baby, if goes untreated
- Anemia during pregnancy is associated with low birth weight, premature birth, and maternal mortality.




In normal blood, there are lots of red blood cells. These cells contain a normal type and amount of hemoglobin molecules which work to deliver oxygen to the body. In a person with anemia there are fewer red blood cells or there is less or abnormal hemoglobin in the red blood cells. This can result in less oxygen being delivered to various body tissues.

# Prevalence of anemia

- An estimated 30% of reproductive-age females are anemic[1].
- The World Health Organization (WHO) estimates that over 40% of pregnancies are complicated by anemia[2].
- Variations in regional and global prevalence of anemia during pregnancy reflect socioeconomic status and associated nutritional deficiencies

Anemia in pregnancy can be defined as follows, based mostly on data in nonpregnant individuals [1,2]:

- First trimester – Hemoglobin <11.0 g/dL
- Second trimester – Hemoglobin <10.5 g/dL
- Third trimester – Hemoglobin <11.0 g/dL
- Postpartum – Hemoglobin <10.0 g/dL

# Common causes of anemia in pregnancy

**1. Physiologic (dilutional):** Increased RBC production begins at approximately 16 weeks of gestation and progressively accelerates, reaching a 25% increase above the pre-pregnancy level by 34 weeks. Since plasma volume expansion is greater than the increase in total RBC volume, hematocrit/hemoglobin is modestly reduced, a dilutional anemia termed "physiologic anemia of pregnancy." Peak hemodilution occurs at 24 to 26 weeks

**2. Iron Deficiency:** The most common pathologic cause of anemia in pregnancy. Responsible for 95% of anemia of pregnancy. Iron deficiency is very common in reproductive-age females, even if never pregnant. Data from studies using iron studies suggest that approximately 50% of pregnant individuals have iron deficiency

# Factors that contribute to iron deficiency in pregnant women:

- Individuals in some parts of the world, especially in resource-limited settings, may have insufficient dietary iron.
- Blood loss from previous pregnancies and/or menstruation, as well as a short interpregnancy interval, may lead to iron deficiency or borderline iron stores.
- Iron requirements increase dramatically through pregnancy due to the expanding blood volume of the mother and the iron requirements for fetal RBC production.
- Certain underlying conditions that preclude adequate iron intake or impair iron absorption can increase the risk of iron deficiency during pregnancy, especially if the woman has not received adequate supplementation. Examples include nausea and vomiting of pregnancy, inflammatory bowel disease, bariatric surgery (eg, gastric bypass), and other conditions.

# Common causes of anemia in pregnancy

**3. Folate Deficiency:** Is the most common cause of megaloblastic anemia during pregnancy, often associated with diets low in animal proteins, fresh leafy vegetables, and legumes. Recommended daily folate intake is 400 to 800 mcg beginning at least one month prior to attempting conception and continuing throughout pregnancy for all individuals planning to or becoming pregnant to prevent neural tube defects.

# COMMON RISK FACTORS FOR ANEMIA in pregnancy

1. Twin or multiple pregnancy
2. Poor nutrition, especially multiple vitamin deficiencies
3. Smoking.
4. Excess alcohol consumption.

# Routine screening for anemia and/or iron deficiency is supported by the following observations of adverse outcomes associated with anemia

1. Placental abruption[1]
2. Preterm birth[1]
3. Severe postpartum hemorrhage[1]
4. Increased risk of maternal mortality (WHO)[2]

# II. Urinary Tract Infections (UTIs)

Urinary tract infections (UTIs) are common in pregnant women.

Asymptomatic bacteriuria (it is the presence of significant bacterial counts in the urine without symptoms) occurs in 2%-7% of pregnant women.

It typically occurs during early pregnancy.

Without treatment, as many as 20% to 35% will develop a symptomatic UTI.

This risk is reduced by 70 to 80% if bacteriuria is eradicated

# Etiology

**Hormonal changes**: causes the smooth muscles in the urinary tract to relax.

This relaxation can reduce bladder tone, slow down urine flow, and cause urine stasis, which helps bacteria grow and spread.

**Enlarging uterus**: As the uterus grows, it can press on the ureters, partially blocking urine flow.

This mechanical obstruction increases the risk of urinary stasis and infection.

**Changes in vaginal flora**: Hormonal shifts can alter the natural balance of bacteria in the vagina, potentially increasing the presence of bacteria that cause UTIs.

**Immune system adjustments**: Pregnancy leads to a decrease in immunity, which may weaken the body's defenses against infections, including UTIs.

# Screening & pregnancy outcome

- Screening for asymptomatic bacteriuria is performed at 12 to 16 weeks gestation.
- Untreated bacteriuria has been associated with an increased risk of preterm birth, low birth weight, and perinatal mortality

# III. Gestational Diabetes mellitus (GDM)

- GDM is hyperglycemia that develops during second or third trimester of pregnancy
- It occurs due to increasing insulin resistance during gestation.
- GDM usually resolves after pregnancy. However, women who had GMD, has a higher risk of developing type 2 diabetes in the future.

# PREVELANCE OF GDM

- The global prevalence of GDM has been estimated to be 17.0 %.[1]
- Worldwide prevalence varies because of differences in population characteristics (e.g., average maternal age and body mass index [BMI]) and choice of screening and diagnostic criteria.

# GDM RISK FACTORS

- GDM in a previous pregnancy (associated with a 40% risk of recurrence)
- Family history of diabetes, especially in a first-degree relative.
- Prepregnancy BMI ≥30
- Medical condition/setting associated with development of diabetes (e.g., polycystic ovary syndrome [PCOS]).
- Older maternal age (≥35 years of age).
- Previous birth of an infant ≥4000 g.

# GDM complications (Maternal)

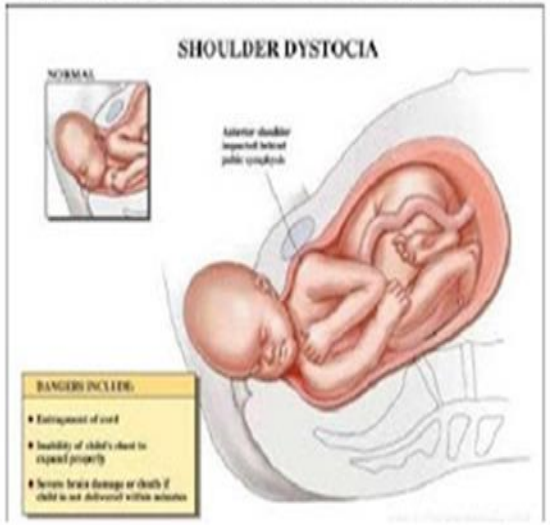
1. Cesarean section.
2. Polyhydramnios: the excessive accumulation of amniotic fluid — the fluid that surrounds the baby in the uterus during pregnancy.
3. Pre-eclampsia.
4. Type 2 diabetes: 50% mothers develop T2DM within 5-10 years of delivery.

# GDM Complications (Fetal)

1. An increased risk of macrosomia
2. Shoulder dystocia
3. Obesity
4. T2DM
5. Autism spectrum disorders
6. Cardiomyopathy
7. Neonatal respiratory problems and metabolic complications (e.g. hypoglycaemia)
8. Stillbirth
9. Medically-indicated preterm birth

**Shoulder Dystocia**

A shoulder dystocia is defined as the impaction of the anterior fetal shoulder against the maternal pubic bone after delivery of the fetal head.



# Maternal mortality

The death during pregnancy or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes[1]

# Maternal Mortality
# General Consideration

- Maternal mortality is the leading cause of death among women of reproductive age in most of the developing world.
- Almost 95% of all maternal deaths occurred in low and lower middle-income countries in 2020, and most could have been prevented
- Globally, about 287,000 women died during and following pregnancy and childbirth in 2020.
- Between 2000 and 2020, the maternal mortality ratio dropped by about 34% worldwide.

# Maternal Mortality risk factors

- Maternal mortality is much higher in developing countries compared to developed nations owing to lack of adequate medical care (health systems failure), socioeconomic factors, and higher total fertility rate.

# Maternal mortality causes WHO 2023

The major complications that account for nearly 75% of all maternal deaths are[1]:

1. severe bleeding
2. Infections.
3. high blood pressure during pregnancy.
4. complications from delivery.
5. unsafe abortion.

# WHO response

- Improving maternal health is one of WHO's key priorities; WHO is working with partners in supporting countries towards[1,2]:

1. Addressing inequalities in access to and quality of MCH services.
2. Ensuring universal health coverage for comprehensive MCH services.
3. Addressing all causes of maternal mortality and morbidities.
4. Strengthening health systems to collect high quality data to respond to the needs and priorities of women.
5. Ensuring accountability to improve quality of care and equity.

# Postnatal care

- Women and newborns require support and careful monitoring after birth. Most maternal and infant deaths occur in the first six weeks after delivery, yet this remains the most neglected phase in the provision of quality maternal and newborn care.
- The World Health Organization (WHO) recommends 4 routine postpartum evaluation: first day (24 hours) , Day 3 (48–72 hours) , Between days 7–14 and Six weeks.
- 83% of women aged 15-49 received a postnatal checkup within two days of delivery; 12% received no postnatal check.(JPFHS 2017)
- 86% of newborns received a postnatal checkup within two days of birth; 13% received no postnatal check.(JPFHS 2017)

# Postnatal care

- Observe physical status
- Advise, and support on breast-feeding
- Provide emotional and psychological support.
- Health education on weaning and food preparation.
- Advise on Family Planning

# THANK YOU