

# Antenatal Development

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## Outline

- Stages in antenatal development
- Environmental influences on antenatal development
- Antenatal care

## Child Development before Conception

- Parental health can affect child development before conception
  - To improve the likelihood of conceiving a healthy child, both parents should reduce their intake of caffeine, alcohol, tobacco, and other drugs

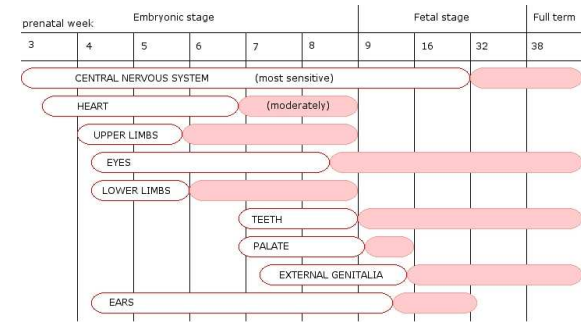
## Conception

- **Fertilization:** The process of fertilizing involving the fusion of male and female gametes to form a zygote
  - **Gamete:** Cell containing half the number of chromosomes that is able to unite with one from the opposite sex to form a new individual
  - **Zygote:** Fertilized ovum

### Periods in Antenatal Development

Period	Weeks	Size	Major Events
Ovum	0-2	Microscopic	Zygote (fertilized ovum) divides into multiple cells rapidly. Implants into uterine wall.
Embryo	2-8	Less than 1 inch long	Heart, muscles, backbone, brain, and spinal cord begin to form. Form arms, legs, toes, and fingers.
Fetus	9-38	2 inches to 20 inches	Rapid growth. Hear heartbeat. Sex of fetus can be identified. Mother feels movement. Lungs mature and brain develops.

### Antenatal Development



Adapted from Moore, K. L. and Persaud, T. V. N. *Before We Are Born: Essentials of Embryology and Birth Defects*. Phila: W. B. Saunders, 1998.

### First trimester (0-3 months)

- By the end of the first month, the baby:
  - Has a heartbeat
  - Eyes, ears, nose, and arms begin to form
- From 8-12 weeks, the genitalia begin to form

### Second trimester (4-6 months)

- In the 4<sup>th</sup> month, the baby averages at least one movement per minute
- By the 6<sup>th</sup> month, the baby follows a daily pattern with more movement at some times in the day than others
- By 24 weeks, the baby can be clearly identified as male or female

### Third Trimester

- A baby can survive birth at 28 weeks with good medical care
- The baby will triple its weight in the last trimester
- The baby practices behaviors like swallowing and breathing
- The baby's heart rate slows when it hears its mother's voice, suggesting that the baby pays attention to its mother.

### Antenatal Intellectual Development

- Fetuses can differentiate sounds by 33 weeks (about 8 months)
  - The brain shows a high level of activity when hearing different languages or unusual voices
  - Fetuses respond to music
- In a research study, mothers were asked to recite a short poem 3 times a day for the last 4 weeks of pregnancy
  - Babies' heart rates slowed when their mother recited that poem, but did not slow when their mother recited other poems.

### Environmental Influences on Antenatal Development

- **Maternal Nutrition:** The baby depends entirely on the mother for its nutrition
  - Mothers need to eat plenty of food with a variety of vitamins and minerals
  - Poor maternal nutrition influences:
    - Miscarriages
    - Infant mortality
    - Malformations in the baby
    - Low birth weight
    - Underdeveloped brains
    - Cognitive delays
    - Aggressive and criminal behavior

### Environmental Influences on Antenatal Development

- **Maternal Stress:**
  - Depression in pregnant women can lead to:
    - Premature birth
    - Smaller babies
    - Delayed development of infants
- **Maternal diseases** can affect the baby in different ways
- **Mothers taking prescription drugs** can lead to malformations amongst babies

### Environmental Influences on Antenatal Development

- **Smoking** both by mothers and second-hand smoke (e.g., fathers) can cause:
  - Poor baby growth and higher infant mortality
  - Babies who continually cry, have shorter attention spans, and other behavioral and intellectual difficulties
- Nicotine in cigarettes makes blood vessels constrict, which reduces blood flow to the baby, which reduces the nutrients available to the baby.

### Environmental Influences on Antenatal Development

- **Alcohol** kills the brain cells of babies
  - **Fetal Alcohol Syndrome:** Abnormal facial features, poor growth, poor coordination, learning disabilities, low IQ, poor judgment, hyperactive behavior.
    - This is the main cause of mental retardation in the West.

### Antenatal Care

- **Antenatal care** is very important
  - When the woman feels the baby move, she should go to a clinic for antenatal care.
  - The clinic will check blood pressure (BP), protein in the urine, and swelling of the legs, three signs of pre-eclampsia that can affect both the baby and the mother.
  - Clinics should also test for HIV because ARV drugs are important for both the mother and baby, if necessary

### Antenatal Care

- The clinic also checks the haemoglobin (iron) as a low level of iron can lead to maternal death in labor, when blood is lost
  - To increase iron intake, a pregnant mother should add plenty of green leafy to the soup, eat the meat in the soup, and eggs.
  - Iron supplements may also help.
- **Malaria** causes many miscarriages and premature deliveries
  - WHO recommends prophylaxis after 12 weeks of pregnancy.
  - Sleep under treated nets.
  - Prompt treatment of malaria is important.