



## Chapter 2 Biological beginnings

### Class Objectives:

- What Factors Influence Prenatal Development?
- Process of Physical Development

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Is the prenatal environment that important??

- ❖ YES it is extremely important! There are many factors that can negatively impact the developing person.

- ❖ Teratogens are substances that can lead to

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### Teratogens

- ❖ Drugs (street or over the counter)
- ❖ Alcohol
- ❖ Cigarettes
- ❖ Disease
- ❖ Poor nutrition
- ❖ Stressors
- ❖ Chemicals
- ❖ Almost anything can impact a developing fetus

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## It's all about timing...

- ❑ The effect of a *teratogen* is very personal because the impact depends on the timing of exposure.

- ❑ Critical period is the time when a particular

- ❑ Different *teratogens* can cause damage at different times during development and each body structure has its own critical period

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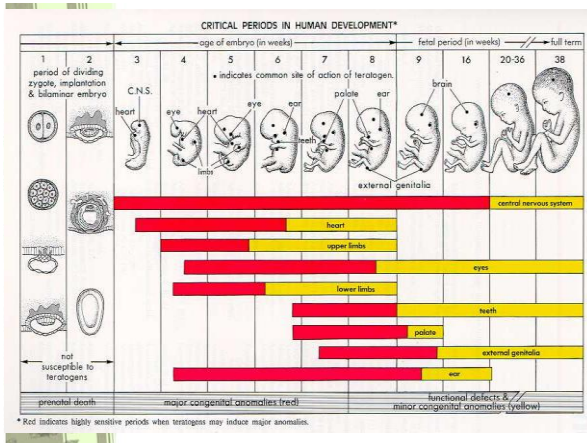
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## Some Environmental Hazards (to a Fetus or Newborn)

### ❑ Drugs:

- Alcohol
- Birth Control Pills
- Caffeine
- Cocaine
- Heroin
- Marijuana
- Methadone
- Nicotine

### ❑ Maternal Diseases

- AIDS
- Chicken Pox
- Chlamydia
- Cytomegalovirus (CMV)
- Gonorrhea
- Genital Herpes
- Influenza
- Mumps
- Rubella (German Measles)
- Syphilis
- Toxoplasmosis

### ❑ Environmental Pollutants

- Lead
- Mercury
- PCBs

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## Fetal Alcohol Syndrome (FAS)

- ❖ This syndrome is caused by a mother drinking
- ❖ Heavy drinking during the second trimester (particularly from the \_\_\_\_\_ week after conception) seems to cause more clinical features of FAS than at other times during pregnancy
- Approximately 10,000 infants are born each year with physical or cognitive disabilities associated with maternal drinking

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## What does FAS look like?



A child with Fetal Alcohol Syndrome (O'Rahilly 1996).

- ❖ Facial Characteristics
- Flattened features
- Low-set ears
- Down syndrome-like appearance

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## Facial abnormalities are an obvious indicator of FAS



- ❖ Small head circumference
- ❖ Small, widely-spaced eyes
- ❖ Prolongation of the fold of the upper eyelid
- ❖ A short, upturned nose
- ❖ Flat mid-face, lowered nasal bridge
- ❖ Thin upper lip

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The presence of alcohol in the fetus's bloodstream triggers widespread cell death in the fetal brain.

Normal brain of  
6-week-old baby

Brain of 6-week-old  
baby with FAS



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## Other Factors

- ❏ Nutrition
  - Especially folic acid
- ❏ Maternal age
  - Negatively affect development if mom is an adolescent or over the age of 35
- ❏ Emotional states and stress
  - When a pregnant woman experience intense fears, anxieties, and other emotions
    - physiological changes occur that may affect her fetus

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## How do we Develop Physically?

### Chapter 3

Physical Development and Biological Aging



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One of the most obvious signs of development is how we grow and change physically.

One of our goals in this chapter is to examine the physical changes that occur from infancy through late adulthood

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Did you know that humans take the longer to become physically mature than any other animal?

We spend about 20% of our lives growing physically!

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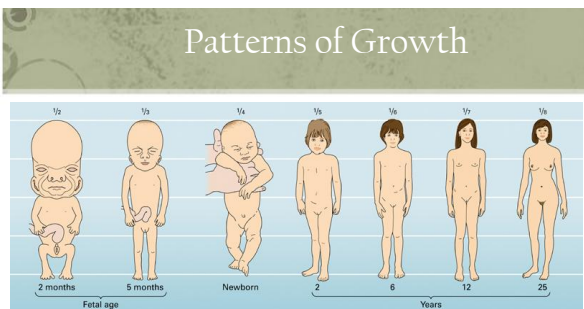
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What is the pattern of physical development illustrated in this picture?

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During these growth spurts body parts of children develop at different rates, which means that infants and young children are not simply scaled down versions of adults.

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### Progression of Physical Development



- The upper portion of the body develops quicker than the lower part of the body



Describes the progression of body

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- For example, an infant will achieve head, upper trunk, and arm control before lower trunk and leg control.

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### Proximodistal Principle of Development

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In this developmental progression,

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### Physical Changes Infancy and Childhood

Infancy	Average 20 inches, 7 ½ lbs at birth ½ adult height, 20% adult weight by age 2
Early Childhood	Growth slows, patterns vary individually Girls slightly smaller and lighter
Middle and Late Childhood	~ Muscle mass and strength increase Boys stronger, body proportions change

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Interesting rule of thumb:  
Boys achieve half their adult height by 2 years of age  
Girls achieve half their adult height by 18 months of age

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Adolescence begins officially with puberty, which refers to the adolescent growth spurt and sexual maturation.




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## Physical Changes in Adolescence

### ❖ Puberty

- A period of rapid physical maturation \_\_\_\_\_  
\_\_\_\_\_
- The timing of puberty is programmed into the genes of every human, which is why puberty occurs between 9-16 years of age.
  - But in addition to heredity, environmental factors can influence the onset and duration of puberty

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## Hello Puberty!

❖ Sexual maturation includes a change in \_\_\_\_\_, which refers to the organs directly involved in reproduction.

- Girls: Ovaries, uterus and vagina
- Boys: scrotum, testes and penis

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*Puberty* comes from the Latin word *pubescere*, which means “to grow hairy”

❖ The development of *secondary sex characteristics*, which are physical signs of maturity \_\_\_\_\_  
\_\_\_\_\_

❖ These are the changes that distinguish a man from a woman

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Which is a Boy or a Girl?  
How do you know?



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Try it again...  
Which is the Boy or the Girl?



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This one should have been  
EASY for you to answer.  
But why?

Puberty produces changes in physical appearance that make it easy to distinguish a boy from a girl- secondary sex characteristics!

We've all experienced them...what are they?

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## Secondary Sex Characteristics

- Girls- Breast development, widening of the pelvis, Menarche (menstruation), voice changes.

- Boys- Spermathe, voice deepens, shoulders broaden, facial hair

❖ The development of facial and body/pubes hair occur for both genders.

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## Why do these changes occur?

❖ Changes in the production of *hormones* (secreted by the *endocrine glands*) are responsible for physical changes experienced in puberty.

- \_\_\_\_\_ – the main class of male sex hormones  
- *Testosterone*

- \_\_\_\_\_ – the main class of female sex hormones  
- *Estradiol*

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## Two Phases of Puberty

### ❖ Adrenarche

- Hormonal changes in the adrenal glands
- Changes occur from 6 to 9 years of age

### ❖ Gonadarche

- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- ❖ In non-latino girls – begins around 9-10 years
- ❖ In African-American girls – begins around 8-9 years
- ❖ In boys, begins around 10-11 years of age

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## Gonadarche Gender Differences?

### ■ Menarche

- A girl's first menstrual period
- Occurs in mid to late gonadarche

### ■ Spermarche

- A boy's first ejaculation of semen
- Occurs in early to mid gonadarche

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## What triggers menarche?

- Some researchers have proposed that a girl must weigh \_\_\_\_\_ in order to trigger menarche
- Some researchers have proposed that for menarche to start and continue a girl must \_\_\_\_\_

-This is why very athletic girls or those with anorexia often stop menstruating.

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## Most studies suggest that

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Early maturation in boys appears at more of an advantage in many aspects of emotional and social functioning. "

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## Body Image in Puberty

### ❏ *Early Maturation*

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- Early girls less positive, potential problems

### ❏ *Late Maturation*

- Late boys less positive but have more positive identity by 30s than early boys
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## Physical Changes

Early Adulthood

- ❏ Body structures reach maximum capacity and efficiency in the late teens and twenties

- Typically they are at the peak of health, strength, energy, and endurance
- Typically they are at a peak of sensory and motor functioning

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## Physical Changes in Early Adulthood

- Body structures reach maximum capacity and efficiency in the late teens and twenties
- Typically they are at the peak of health, strength, energy, and endurance
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## What are some physical signs of aging?



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## Physical Changes in Middle Adulthood

- Loss of height and weight
- \_\_\_\_\_
- \_\_\_\_\_
- Strength, bone density, flexibility decrease
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

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## Sexuality Changes in Middle Adulthood

### ❖ Climacteric

- The midlife transition in which fertility declines

### ❖ Menopause

- The time in middle age, usually in the late 40s or early 50s, when a woman's menstrual periods cease

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## Changes in Reproductive Systems During Middle Adulthood

	Female	Male
Hormonal change	Drop in estrogen and progesterone	Drop in testosterone
Symptom	Hot flashes, vaginal dryness, urinary dysfunction	Undetermined
Sexual changes	Less intense arousal, less frequent and quicker orgasms	Loss of psychological arousal, less frequent erections, slower orgasms, longer recovery between ejaculations, increased risk of erectile dysfunction
Reproductive capacity	Ends	Continues - some decrease in fertility may occur

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## Physical Changes Late Adulthood

- ❖ An increased risk of physical disability
- ❖ Changes in physical appearance become more pronounced
  - A more "sagging" look
- ❖ Increased blood pressure

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## Life Expectancy and Life Span

How Long Do Most People Live?

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## Life Span versus Life Expectancy

### ❏ Life Span

- The maximum number of years an individual can live – approximately 120 years

### ❏ Life Expectancy

- For those born in the US today – approximately 77 years

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## Sex Differences in the Life Span

- ❏ Women almost always have higher life expectancies than men

- For men – average 74 years
- For women – average 80 years

WHY?



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## Social and Biological Factors

- Women have a greater tendency to:

- \_\_\_\_\_
- Have a higher level of social support

- Have less biological vulnerability than males
  - Women have an additional X chromosome (extra antibodies to fight disease)

- \_\_\_\_\_

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- Men are more likely than women to die from the leading causes of death in the US

- \_\_\_\_\_
- Suicide
- Cirrhosis of the liver
- Emphysema, and coronary heart disease

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## What Can We Do To Live Longer?

Longevity Survey



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# Centenarians

- ✦ Individuals 100 years and older
- ✦ The most important factors in longevity are:
  - Heredity and family history
  - Health
  - Education
  - Personality and lifestyle

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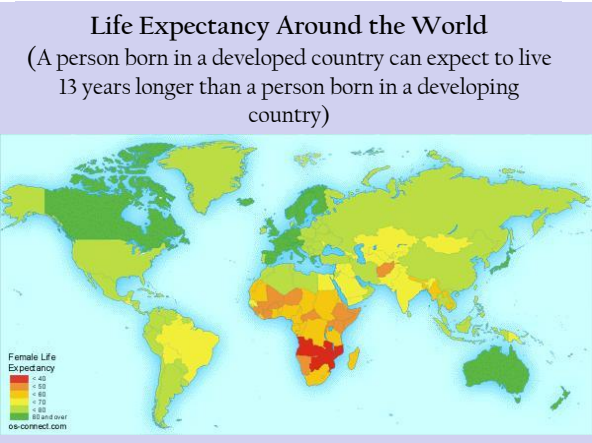
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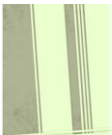
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# Poverty Rates and Health Problems Among Elderly Ethnic Minorities

	Poverty Rate (age 65 and over)	Health Problems Greater than in the General Population of Elderly
African-American	23%	Cardiovascular disease, a variety of cancers, diabetes
Hispanic	20%	Cardiovascular disease, diabetes
Native-American	Over 80%	Diabetes, kidney disease, liver disease, tuberculosis, hearing and vision impairments
Canadian Aboriginal	Over 63%	Cardiovascular disease, diabetes, liver disease, tuberculosis

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## So... Why Do We Age?

### ■ Primary aging

- Gradual, inevitable process of bodily deterioration throughout the life span

### ■ Secondary aging

- Aging processes that result from disease and bodily abuse and disuse and are often preventable

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Next...

Chapter 4 Health

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