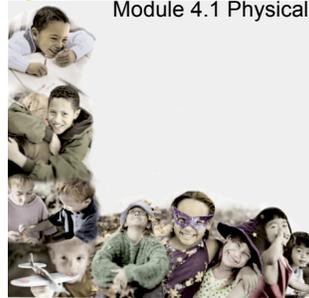


### Growth

IIE 366: Developmental Psychology  
Greg Francis  
Lecture 09

### Chapter 4: Growth and Health

#### Module 4.1 Physical Growth

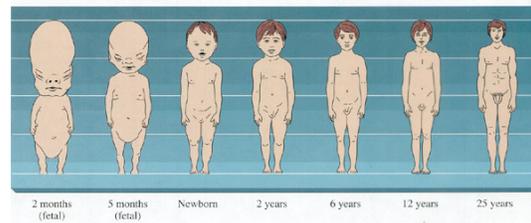


Children and Their Development, 4/e by Robert Kail

### 4.1 Physical Growth

Features of Human Growth  
Mechanisms of Physical Growth  
The Adolescent Growth Spurt and Puberty

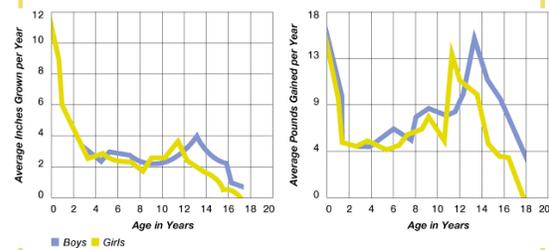
### Proportions



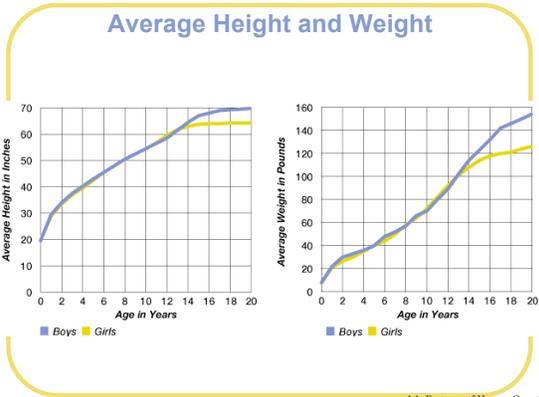
### 4.1 Features of Human Growth

- During the first year, growth is very rapid, it levels off during the preschool and elementary-school years, and is rapid again in early adolescence

### Rate of Growth



4.1: Features of Human Growth



- ### 4.1 Features of Human Growth
- Muscles become longer and thicker
  - During the first year, a layer of fat is added
  - Cartilage is replaced by bone
  - *Secular Growth Trends*: generational changes in physical development
  - Average and normal are not the same

- ### 4.1 Features of Human Growth
- Bones continue to grow and fuse after birth
- 

- ### 4.1 Mechanisms of Physical Growth
- Proper nutrition is particularly important during infancy when growth is rapid
    - 3 month old: 50 calories per pound ~ 600 calories
    - Preschoolers: 40 calories per pound ~ 1,500 to 1700 calories
    - Adults: 15-20 calories per pound ~ 2250 to 3500 calories
  - At 2 years, growth slows and children often become "picky" eaters
    - Usually not a long-term problem
- 

### 4.1 Mechanisms of Physical Growth

- Many benefits to breast-feeding, even in adulthood
  - Lower BMI
  - Higher average HDL (high-density lipoprotein) - protects against cardiovascular disease
- Benefits for the mother too!

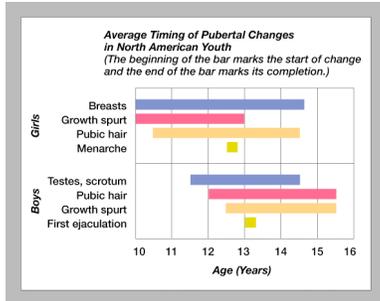
**You can't get fitter than a breastfed nipper.**

Breastfeeding is good for mum too. It cuts her risk of breast and ovarian cancer, and helps get her figure back more quickly.

**breast fed is best fed** NHS  
www.iamokshirebreastfeedingnhs.uk Lancashire

- ### 4.1 Adolescent Growth Spurt and Puberty
- During adolescent growth spurt children may gain 20-25 pounds in 1 year
  - Events and timing of sexual maturation differ for boys and girls

### Average Timing of Pubertal Changes



4.1: Adolescent Growth Spurt and Puberty

### 4.1 Adolescent Growth Spurt and Puberty

- During adolescent growth spurt children may gain 20-25 pounds in 1 year
- Events and timing of sexual maturation differ for boys and girls
- Pituitary gland signals other glands to release hormones
- Timing of puberty regulated by genes, nutrition, and health

### 4.1 Adolescent Growth Spurt and Puberty

- Early maturation good for boys, not girls
- Girls:
  - Lack self-confidence
  - Less popular
  - More likely to be depressed
  - More likely to smoke or drink
  - Associate with older adolescents and age-inappropriate activities
- Warm, supportive parents can mitigate these effects

### 4.1 Adolescent Growth Spurt and Puberty

- Early maturation good for boys, not girls
- Boys:
  - Date more often
  - Have more positive feelings about physical development
  - More positive about athletic abilities
- Puberty is almost always stressful
  - Few long-lasting effects for boys

### 4.2 Challenges to Healthy Growth

- Malnutrition
- Eating Disorders: Anorexia and Bulimia
- Obesity
- Disease
- Accidents

### 4.2 Malnutrition

- Malnutrition is especially damaging in infancy because growth is rapid
- Malnourished children are listless and inactive
- Malnutrition needs to be treated with adequate diet and parent training
- Children who don't eat breakfast often have a hard time concentrating

### 4.2 Eating Disorders: Anorexia and Bulimia

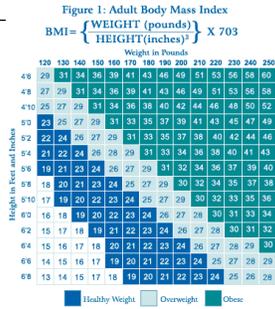
- *Anorexia*: persistent refusal to eat and irrational fear of being overweight
- *Bulimia*: uncontrolled eating and purging
- Both primarily affect adolescent girls and are influenced by cultural standards for thinness and family dynamics

### 4.2 Obesity

- Refers to individuals who have a body mass index (BMI) in the upper 5%
- Reflects heredity (activity level, basal metabolic rate) and environment (TV ads, external eating signals)
- Effective weight-loss programs incorporate parents, exercise, and changed eating habits

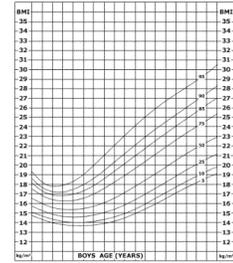
### 4.1 Features of Human Growth

- Body Mass Index (BMI)
  - BMI =  $\text{Kg}/\text{M}^2$
  - (weight in kilograms) divided by (squared height in meters)



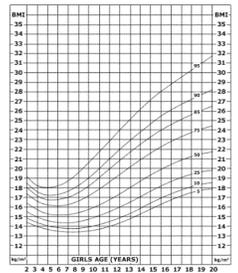
### 4.1 Features of Human Growth

- An appropriate BMI changes with age/development
- Differs slightly for boys and girls
  - Boys
- Growth chart from the US Centers for Disease Control and Prevention
- Obesity is defined as above the 95th percentile



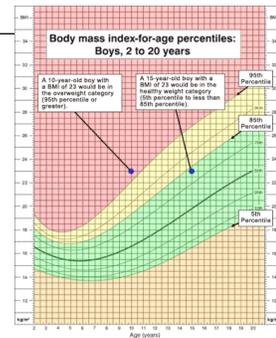
### 4.1 Features of Human Growth

- An appropriate BMI changes with age/development
- Differs slightly for boys and girls
  - Girls
- Growth chart from the US Centers for Disease Control and Prevention
- Obesity is defined as above the 95th percentile



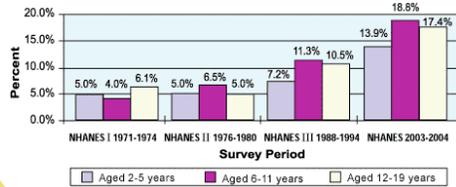
### 4.1 Features of Human Growth

- An appropriate BMI changes with age



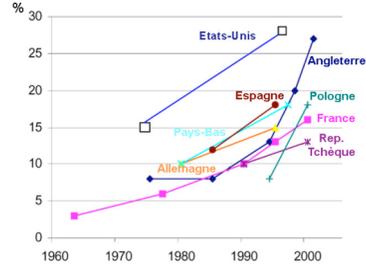
### 4.1 Features of Human Growth

- The reality is quite different from the desired growth patterns
- Childhood obesity is growing rapidly in the US
- Prevalence of Overweight Among U.S. Children and Adolescents (Aged 2-19 Years) National Health and Nutrition Examination Surveys



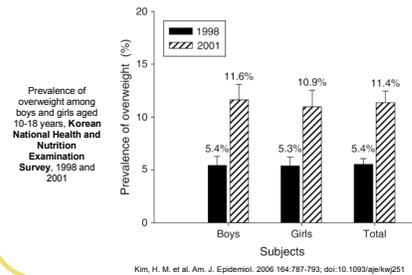
### 4.1 Features of Human Growth

- Similar problems are faced in other "first-world" nations



### 4.1 Features of Human Growth

- Similar problems are faced in other "first-world" nations



### 4.2 Disease

- Many diseases that kill young children are preventable with vaccines, improved health care, and changing habits (e.g., mosquito netting)
- Top 5 killers of children worldwide: pneumonia, diarrhea, measles, malaria, and malnutrition

### 4.2 Accidents

- In the US, car accidents are the most common causes of death in children over age 1 year
- Parents can help by enforcing use of seat belts, car seats, and bike helmets and by being realistic about child's abilities
- Firearms are a leading cause of death among teenage boys

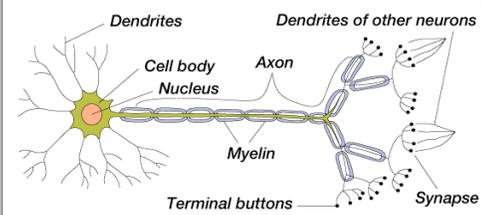
### 4.3 The Developing Nervous System

- Organization of the Mature Brain
- The Developing Brain

### 4.3 Organization of the Mature Brain

- *Neuron*: basic unit of nervous system

### The Neuron

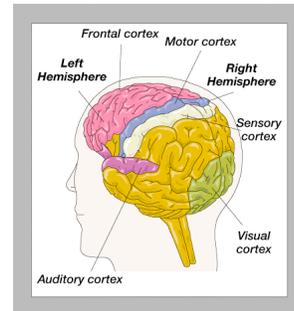


4.3: Organization of the Mature Brain

### 4.3 Organization of the Mature Brain

- *Neuron*: basic unit of nervous system
- *Cerebral hemispheres*: right and left halves of the cortex
- *Frontal cortex*: area of the cortex that controls personality and the ability to carry out plans

### Organization of the Brain



4.3: Organization of the Mature Brain

### 4.3 The Developing Brain

- Brain originates in prenatal neural plate
- *Myelination* and *synaptic pruning* occur
- Brain regions specialize early (e.g., left hemisphere for verbal functioning; frontal cortex for emotion and decision-making)
- *Plasticity* shown by children who recover from brain damage

### Next time

- Health
- Factors that inhibit growth
- The developing nervous system