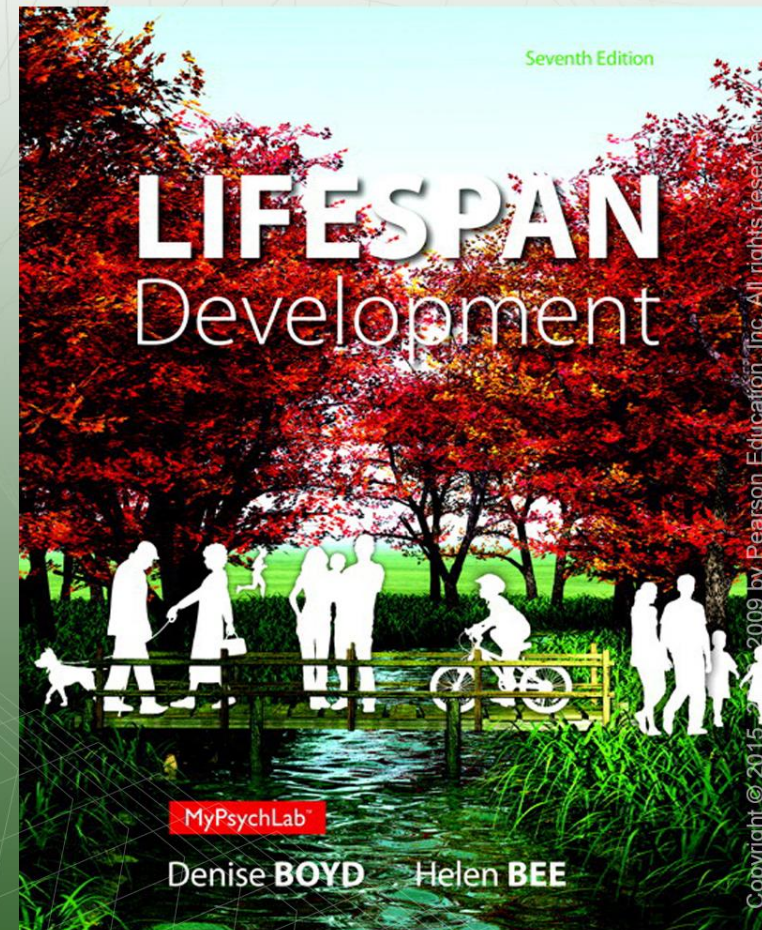


## Chapter 4:

# Physical, Sensory, and Perceptual Development in Infancy



# IN THIS CHAPTER



- Physical Changes



- Health and Wellness



- Infant Mortality



- Sensory Skills

# LEARNING OBJECTIVES

- 4.1 What important changes in the brain take place during infancy?
- 4.2 How do infants' reflexes and behavioral states change?
- 4.3 How do infants' bodies change, and what is the typical pattern of motor skill development in the first 2 years?
- 4.4 What are the nutritional needs of infants?
- 4.5 How does malnutrition affect infants' development?
- 4.6 What are infants' health-care and immunization needs?
- 4.7 What have researchers learned about sudden infant death syndrome?
- 4.8 How do infant mortality rates vary across groups?
- 4.9 How do infants' visual abilities change across the first months of life?

# LEARNING OBJECTIVES (con't)

- 4.10** How do infants' senses of hearing, smell, taste, touch, and motion compare to those of older children and adults?
- 4.11** How do researchers study perceptual development in infants?
- 4.12** How do depth perception and patterns of looking change over the first 2 years?
- 4.13** How do infants perceive human speech, recognize voices, and recognize sound patterns other than speech?
- 4.14** What is intermodal perception?
- 4.15** What arguments do nativists and empiricists offer in support of their theories of perceptual development?

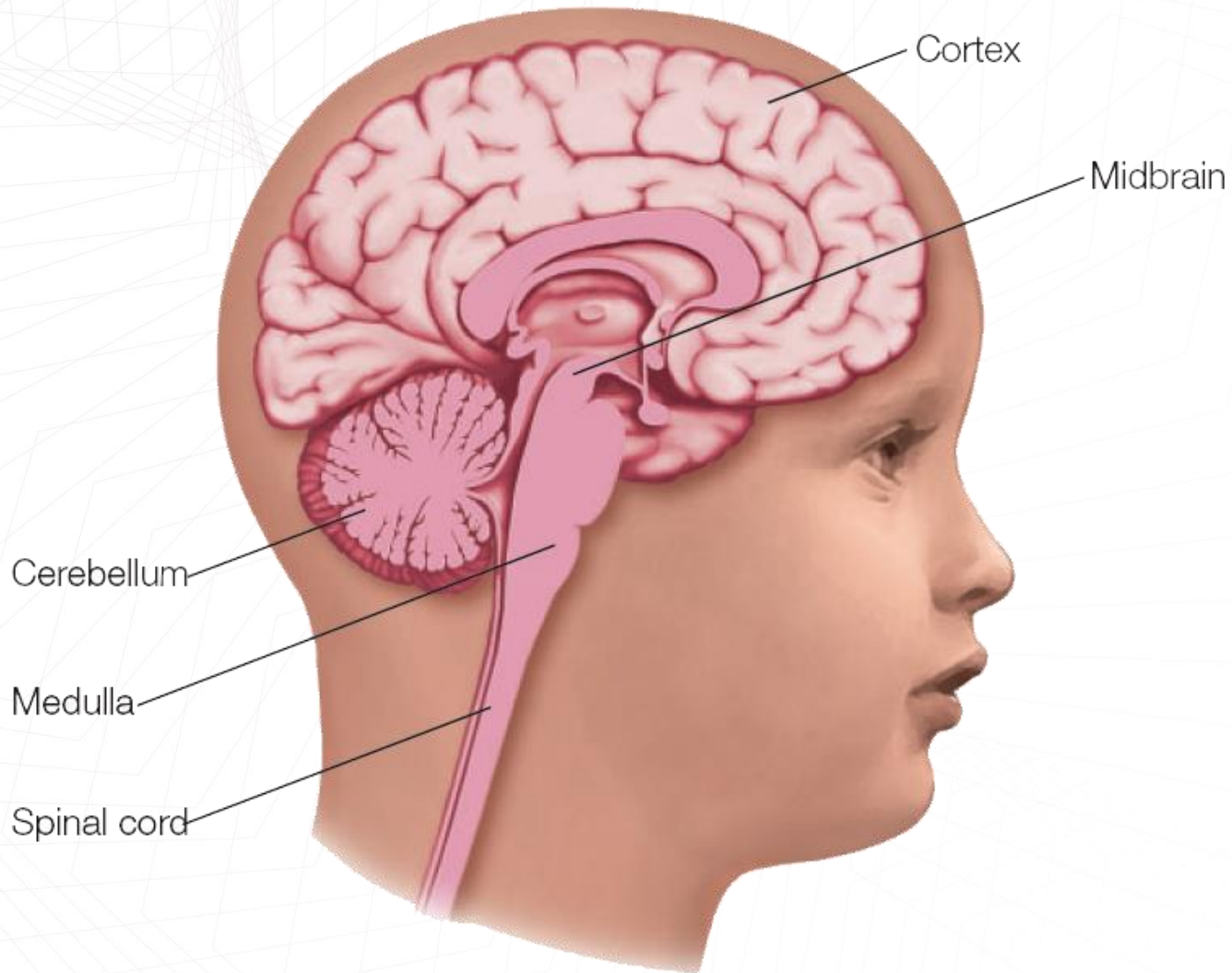
# PHYSICAL CHANGES

## The Brain and Nervous System

### Brain

- Rapid development during the first 2 years
- Midbrain and medulla most fully developed at birth
- Cortex is the least developed

# PARTS OF THE BRAIN



**Figure 4.1** Parts of the Brain

# THE BRAIN AND NERVOUS SYSTEM

## Physical Changes: Synaptic Development

### *Synaptogenesis*

- *Creation of synapses or connections between neurons*

### *Synaptic pruning*

- **Elimination of unused neural pathways and connections**

## TV FOR TOTS: HOW MUCH IS TOO MUCH?

### Statistics

- Ninety percent of U.S. babies watch television and other forms of video entertainment every day.
- Infants are exposed to an average of five hours daily of background television.

### Research

- Excessive television watching during the first three years of life is linked to reduced social interactions as well as AD/HD.

### Recommendations

- The American Academy of Pediatrics (AAP) calls for no television before age two.
- Parents should focus on quality when selecting resources.



## You Decide

1. I agree with the AAP's recommendation that children under age two shouldn't watch television at all.
2. I think that the AAP's recommendation goes too far. There is a place for television in the lives of toddlers.

# THE BRAIN AND NERVOUS SYSTEM

## Plasticity

**Neural plasticity:** the brain's ability to change in response to experience

- Use it or lose it
- Changes in psychological functioning

# THE BRAIN AND THE NERVOUS SYSTEM

## Myelinization

**Myelin:** insulating layer of proteins and fatty substances

- Description
- Timing

# REFLEXES AND BEHAVIORAL STATES

## Adaptive Reflexes

**Adaptive reflexes:** reflexes that aid survival

- Warn of possible neuronal development problems when weak or absent
- Some persist throughout life.

# REFLEXES AND BEHAVIORAL STATES

## Primitive Reflexes

**Primitive reflexes:** reflexes controlled by less sophisticated parts of brain

- Should appear at birth and disappear by six to eight months
- May indicate neurological problems if persistent

# REFLEXES AND BEHAVIORAL STATES

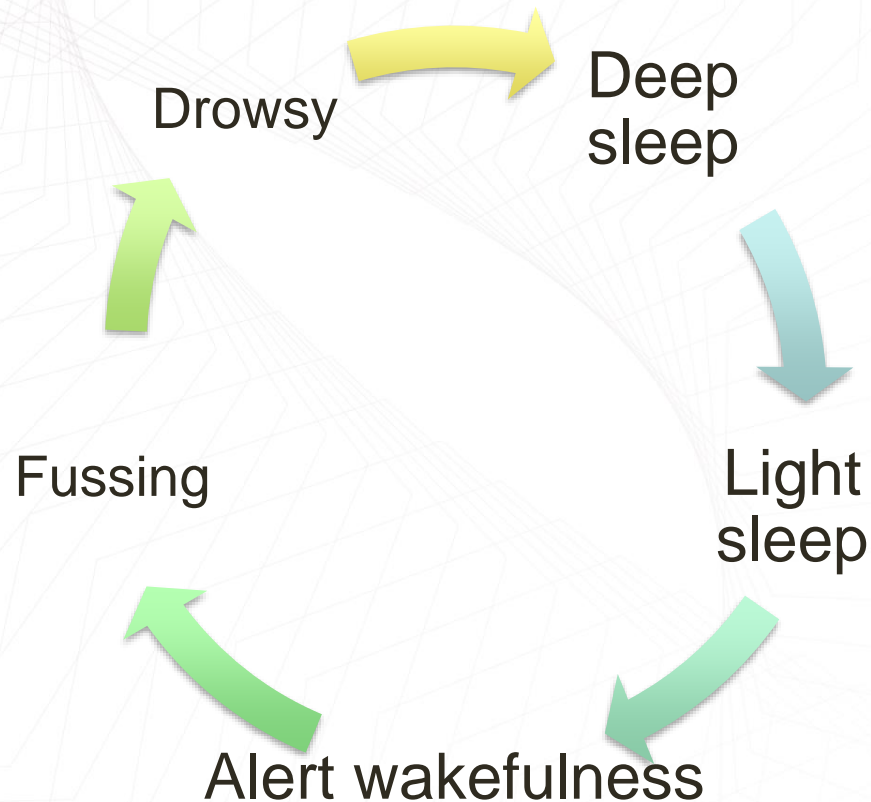
## States of Consciousness

### **Sleep, Baby, Sleep**

- Patterns of sleep and wakefulness stabilize with age.
- Neonates sleep 80 percent of the time.
- By eight weeks of age, babies begin to sleep through the night.
- By six months of age, babies average fourteen hours of sleep per day.

# REFLEXES AND BEHAVIORAL STATES

## Five States of Sleep and Wakefulness



- Most infants move through these states in the same sequence every two hours

# REFLEXES AND BEHAVIORAL STATES

## Crying Baby, Not Crybaby!

### **Cries differ by need.**

- Cross-cultural studies suggest crying increases until six weeks and then tapers off.
- Prompt attention to crying in the first three months leads to less crying later.



# GROWTH, MOTOR SKILLS, AND DEVELOPING BODY SYSTEMS

## Physical Changes: Growth

### **By Age One**

- 10 to 12 inches of growth
- Infants triple body weight

### **Around Age Two**

- Toddlers reach half their adult height.
- Proportionately much larger heads than adults

# GROWTH, MOTOR SKILLS, AND DEVELOPING BODY SYSTEMS

## Growth and Motor Skills: Overview

- A person's inborn timetable of motor skills development interacts with other aspects of physical development (Thelen).
- Muscles, bones, and weight all work together.
- Opportunities to practice motor skills are important.

# STOP AND THINK!

Researchers suggest there is a difference in the rate but similarity in the sequence of motor skill development.

*Using this information as a base, what advice would you give to parents of toddlers?*

# DEVELOPING BODY SYSTEMS AND MOTOR SKILLS

## Bones

**Ossification:** the process of hardening of the bones

- Begins during prenatal development
- Continues through puberty
- Motor development depends to a large extent on ossification.

**Changes in the number and density of bones are responsible for improved coordination.**

# DEVELOPING BODY SYSTEMS AND MOTOR SKILLS

## Muscles

**A full complement of muscle fibers is present at birth.**

- A decline in the muscle tissue to fat ratio occurs by age one.
- A change in muscle composition leads to an increase in strength.

# DEVELOPING BODY SYSTEMS AND MOTOR SKILLS

## Lungs and Heart

- Rapid growth during the first two years leads to stamina.
- Ability to sustain motor activity without rest by end of infancy

# DEVELOPING BODY SYSTEMS AND MOTOR SKILLS

## Cross-Cultural Research

- Experience influences motor development!
- African infant precocity
  - A pattern of traditional cultural practices intentionally and coincidentally promotes motor development.
- Precocity does not persist into early childhood.

# HEALTH AND WELLNESS

## Nutrition: Breastfeeding and Bottle Feeding

### **Breastfeeding**

Nutritionally superior: more rapid weight gain and size

Early health benefits

Only nutrition needed for first four to six months of life

May not be possible for all mothers

### **Bottle Feeding**

May be a needed supplement for preterm babies

Special-needs formulas available

Can be high quality

Allows more paternal participation



# HEALTH AND WELLNESS

## Nutrition: Solid Food

### **Solid Foods**

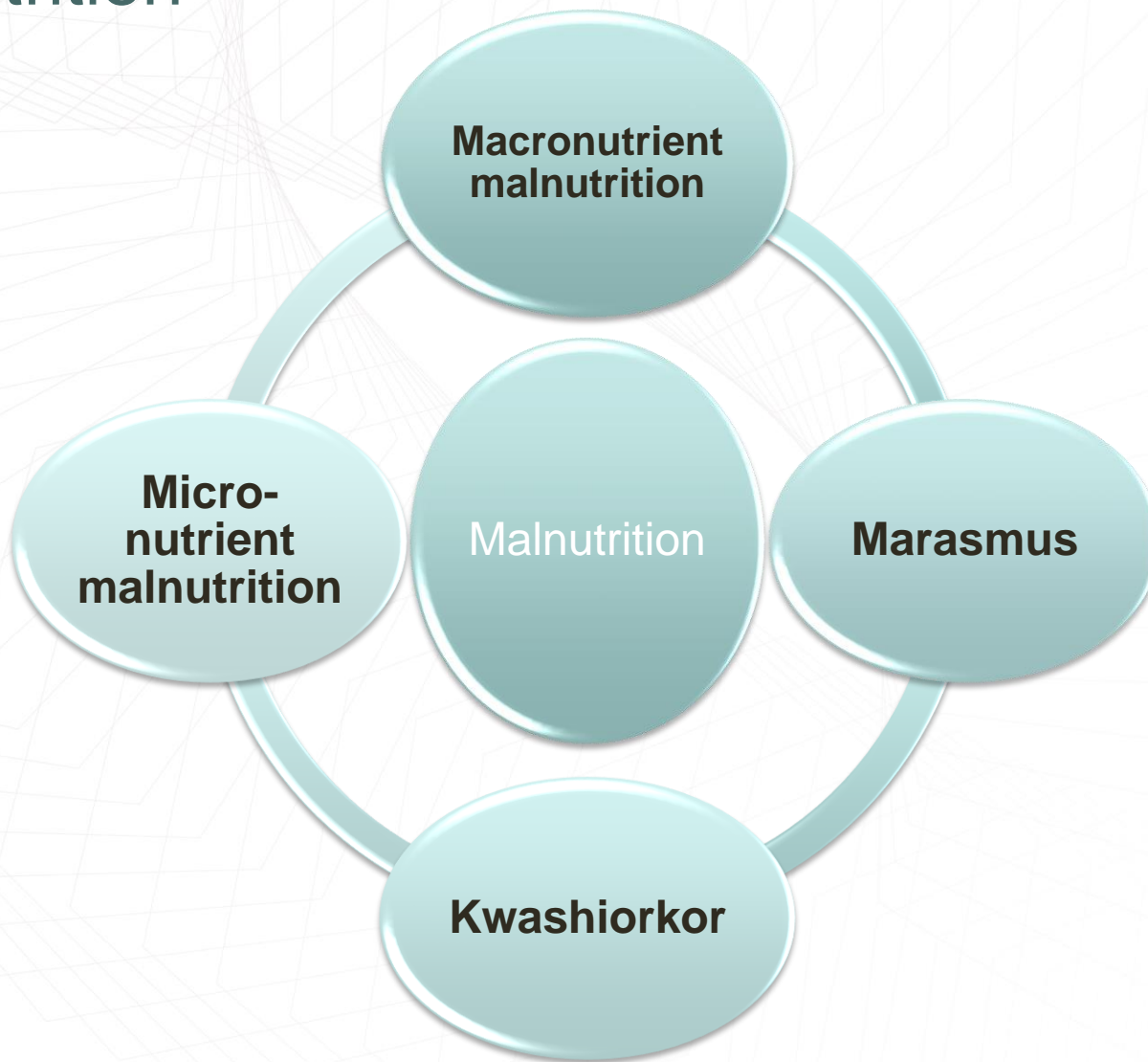
- Early introduction can interfere with nutrition.
- Do not help babies to sleep through the night
- Should start between four and six months of age

### **Baby is ready for solid foods when he or she can:**

- Hold head in steady, upright position
- Sit with support
- Show interest in what you are eating

# HEALTH AND WELLNESS

## Malnutrition



# HEALTH AND WELLNESS

## Health Care and Immunization

### **Health Care and Immunizations**

- Routine health professional visits are important.
- Overall health and motor skills are assessed during visits.
- Vaccinations are given to prevent diseases.

# HEALTH AND WELLNESS

## Health Care and Illness

### **Illnesses in the First Two Years**

- Respiratory illnesses common
- Higher in children participating in childcare programs
- Chronic ear infections

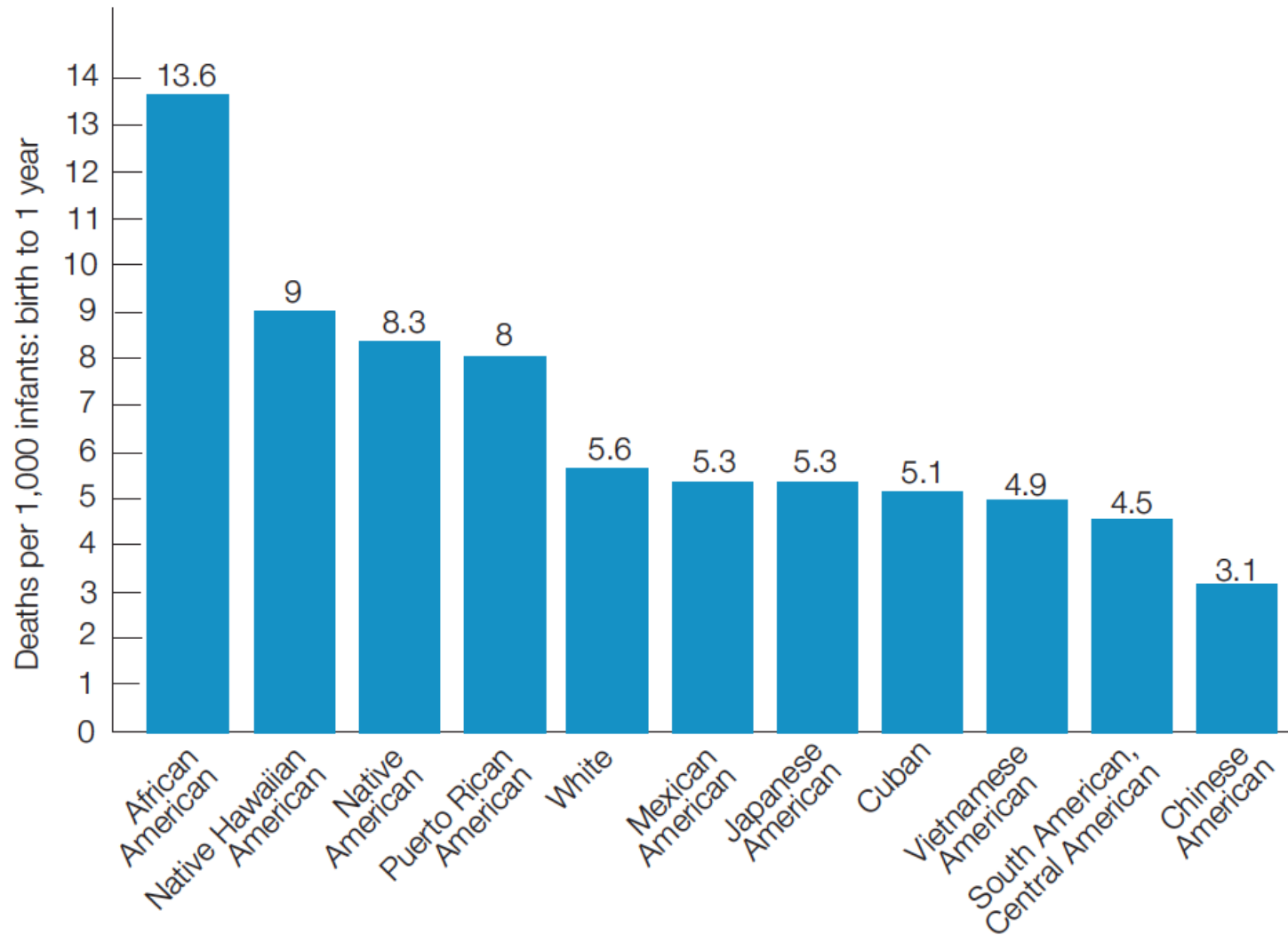
# HEALTH AND WELLNESS

## Infant Mortality

### **Death within the First Year of Life**

- 7 babies per 1000 in the U.S.
- Related to prenatal care
- Varies widely among U.S. ethnic groups

# GROUP DIFFERENCES IN INFANT MORTALITY



## WHEN AN INFANT DIES

### **Guidelines for use to support parents who have lost an infant**

- Don't attempt to force talking about grief.
- Refer to their deceased infant by his or her name.
- Express sincere feelings of loss.
- Follow the parents' lead in reminiscences about the baby.
- Assure the parents of the normalcy of their grief.
- Don't pressure parents to replace the lost child with another pregnancy.
- Don't offer rationalizations.
- Understand that grief is likely to affect all family members.

## Reflections

1. If you were one of Morgan's co-workers or relatives, how do you think you would behave toward her in everyday situations?
2. What sort of "mental script" could you develop from the recommendations above that would be helpful to friends and relatives of a person who has lost a child?

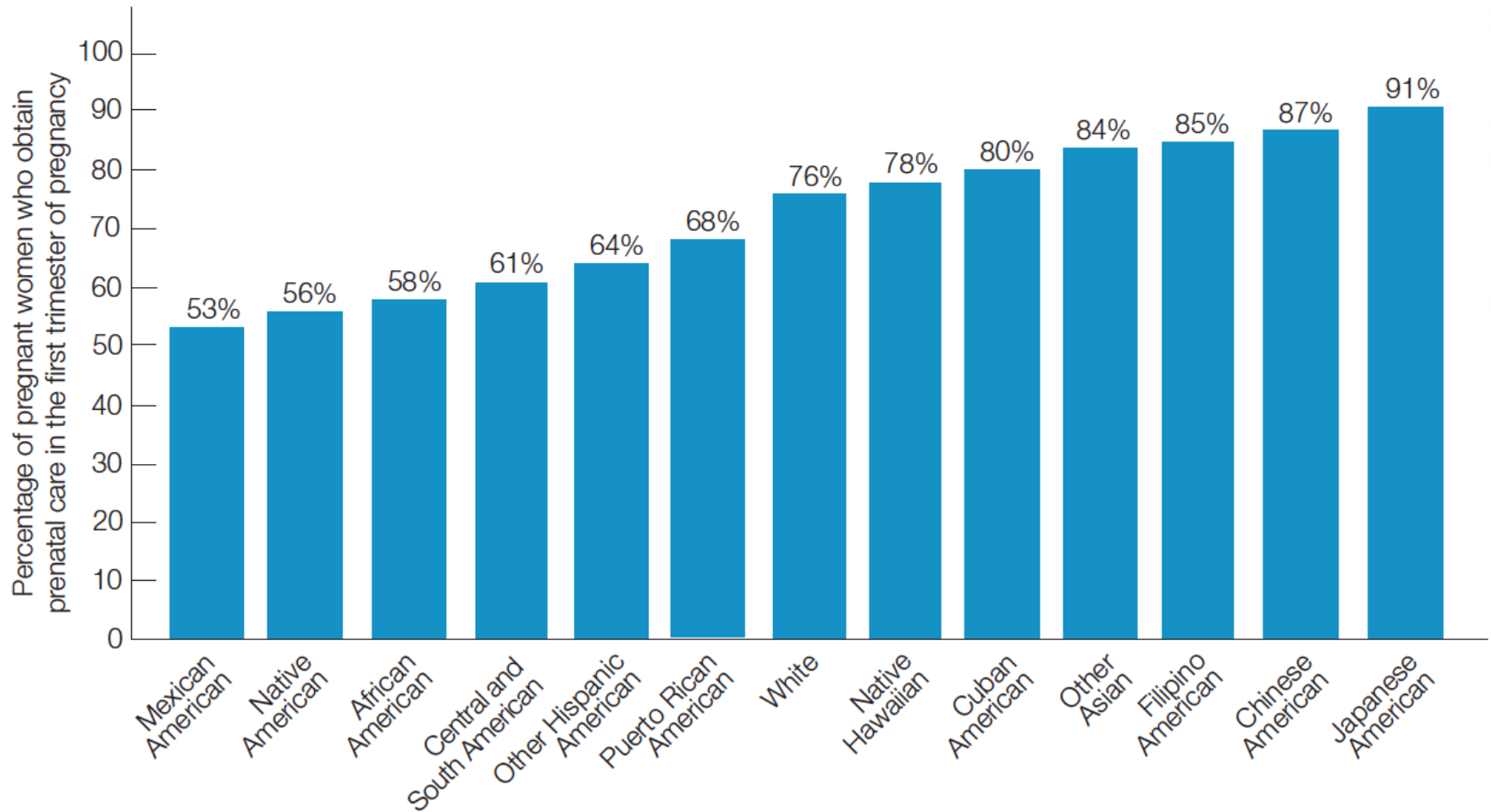


# NEXT, LET'S LOOK AT EARLY PRENATAL CARE AND ETHNICITY

**See if you can identify disparities across ethnic groups with regard to access to prenatal care.**

*Do you see any correspondence between these disparities and infant mortality?*

# EARLY PRENATAL CARE AND ETHNICITY



# HEALTH AND WELLNESS

## Sudden Infant Death Syndrome (SIDS)

**Incidence:** SIDS is the leading cause of death in the U.S. in infants one to twelve months old.

### **Links:**

- Apnea
- Sleeping on stomach
- Maternal smoking

# SENSORY SKILLS

## Vision

### **Rapid Development of Visual Acuity**

- 20/200 at birth; 20/20 at 2 years of age

### **Color Vision**

- Red, blue, and green at one month of age

### **Tracking**

- Tracking slow-moving object before two months of age; skilled tracking at six to ten weeks of age

# SENSORY SKILLS

## Hearing

- Adult voices heard well and some directional loud-sound location

## Smelling and Tasting

- Newborns react differently to each basic taste as early as birth.

## Touch and Motion

- Best developed of all the senses

# STOP AND THINK!

*In what ways do babies' sensory skills contribute to the development of the parent–infant relationship?*

# PERCEPTUAL SKILLS

## Studying Perceptual Development

### **Preference Technique**

- Study how long the baby attends to a particular stimulus.

### **Habituation/Dishabituation**

- Study loss of interest in a particular stimulus after repeated exposures.

### **Operant conditioning**

- Vary the stimulus and study the learned responses.

# LOOKING SKILLS

## Depth Perception

**Depth perception can be judged by:**

- Binocular cues
- Monocular cues
- Kinetic cues

*Do you know the differences among these cues?*



# DEPTH PERCEPTION

## A Walk on the Wild Side—Almost

### **Visual Cliff: Gibson and Walk (1960)**

**Initial findings:** six-month-old babies would not cross the visual cliff.

**Recent findings:** three-month-olds have some depth perception.

# PERCEPTUAL SKILLS

## What Babies Look at: Scanning

**Visual attention:**  
guided by the search  
for a  
meaningful  
pattern



# LISTENING

## What Babies Hear: Discriminating Speech Sounds

**At one month old:** discriminate between “pa” and “ba”

**At three months old:** respond to male, female, and children’s voices similarly

**At six months old:** discriminate between two-syllable words

**At six months old:** distinguish sound contrasts in any language; fades by one year

## LANGLOIS'S STUDIES OF BABIES' PREFERENCES FOR ATTRACTIVE FACES

**Langlois and her colleagues (1987) showed two- to three-month-olds and six- to eight-month-olds color slides of adult-judged attractive and unattractive women.**

- Babies consistently looked longer at attractive faces of individuals of different races.
- Similar findings resulted when slides of attractive infants and animals were used.

## Critical Analysis

1. If there is an inborn template against which faces are compared, how might such a template affect adults' interactions with others?
2. How would researchers determine the degree to which attractiveness affects adults' perceptions of infants' faces? Why would such research be unable to tell us whether the concept of attractiveness is inborn?

# PERCEPTUAL SYSTEMS

## Combining Information from Several Senses

**Intermodal perception:** formation of the single perception of stimulus that is based on information from two or more senses

- Possible by one month
- Common by six months
- Important in infant learning

# PERCEPTUAL SYSTEMS

## Explaining Perceptual Development

### **Nativists**

Most perceptual abilities  
inborn

Many of these abilities  
present at birth

### **Empiricists**

Most perceptual abilities  
learned

Experience needed to  
develop perceptual systems

**A compromise position:** perceptual skill  
development is the result of interaction between  
inborn and experiential factors.