Pregnancy and Childbirth

Chapter 8

Deciding to Become a Parent

- Issues to consider when deciding to become a parent
  - Health and age
  - Emotional preparedness
  - Relationships
  - Financial circumstances

Preconception Care

Preexisting conditions

Medications

Prior pregnancies

Age

Tobacco, alcohol, and caffeine use

Infections

HIV

Diet

Multiple births

Genetic disorders

Understanding Fertility

- Conception
  - Fertilization of a woman's egg by a man's sperm
  - Each month a woman's ovaries release an egg
  - Egg travels through the fallopian tubes to the uterus
  - Endometrium thickens in preparation for a fertilized egg (zygote)
  - If the egg is not fertilized, the woman's body expels the egg's remains and uterine lining during menstruation

Understanding Fertility (2)

- Fertilization

  Enzymes from hundreds of sperm soften the egg's outer layer, and one sperm cell is able to penetrate

  – Fuses with the nucleus of the egg, and fertilization occurs

  Zygote travels through the oviduct to the uterus and, now called a *blastocyst*, attaches to the uterine wall

  Ovum and sperm carry hereditary characteristics

  – Each contain 23 chromosomes

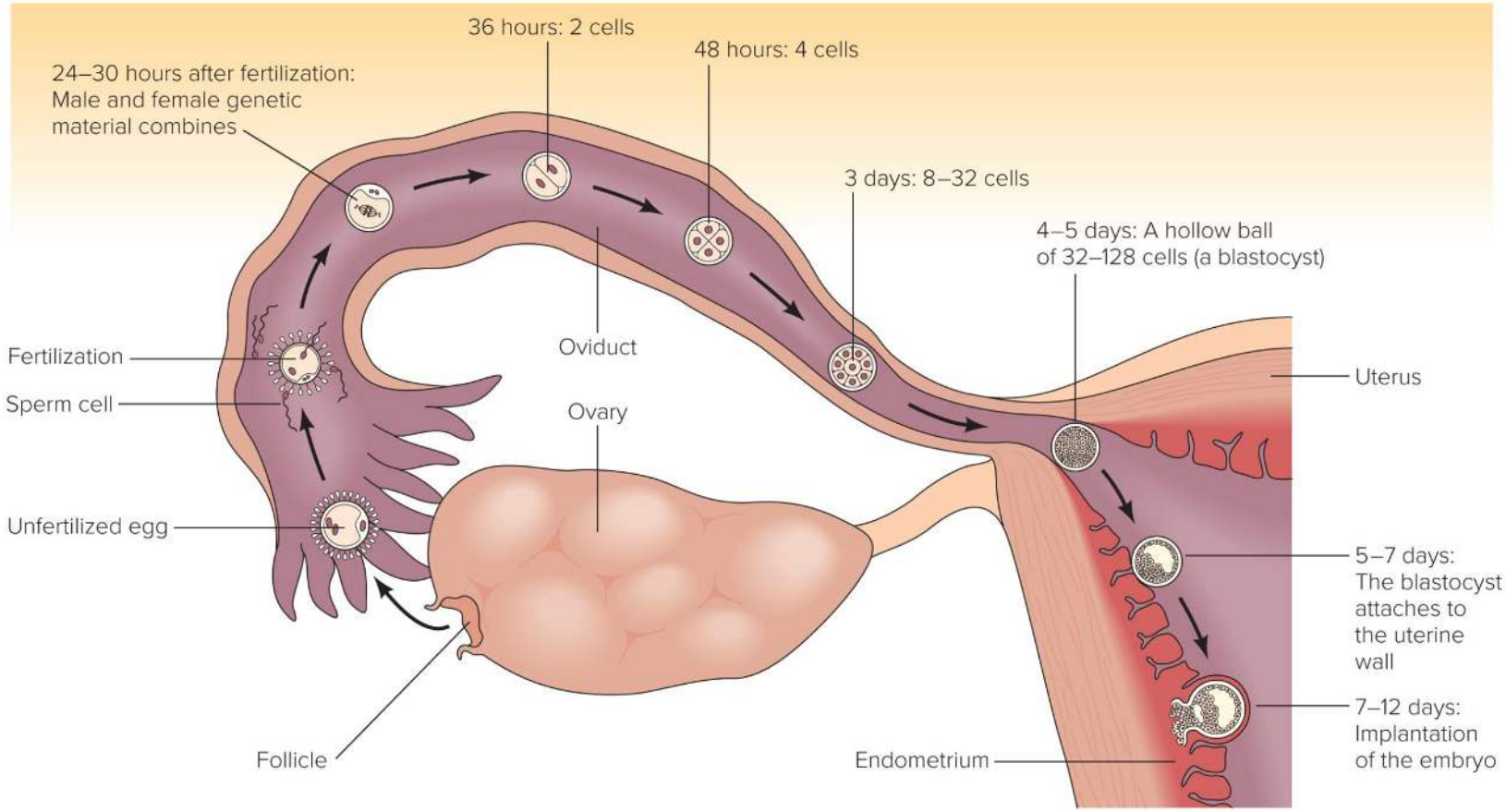

Figure 8.1 Fertilization and Early Development of the Embryo

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Understanding Fertility (3)

- Twins

  Fraternal (dizygotic) twins

  - Ovaries release more than one egg, and both are fertilized
  - 70% of twins

  Identical (monozygotic) twins

  - Division of a single fertilized egg into two cells that develop separately
  - Babies share all genetic material

Infertility

- Infertility is the inability to conceive after trying for a year or more
- Female infertility
  - Tubal blockage (14%)
    - Pelvic inflammatory disease (PID)
    - Endometriosis
  - Failure to ovulate (21%)
    - Age, behavior, exposure to toxic chemicals or radiation
  - Anatomical abnormalities, benign growths in uterus, thyroid disease, and other uncommon conditions (37%)
  - Unexplained (28%)

Infertility (2)

- Male infertility

  Accounts for about 26% of infertile couples

  - Hypothalamic pituitary disease (1–2%)
  - Testicular disease (30–40%)
  - Disorders of sperm transport or posttesticular disorders (10–20%)
  - Unexplained (40–50%)

Treating Infertility

- Cause of infertility can be determined for about 72–82% of infertile couples
- Options:
  - Assisted reproductive technology (ART)
  - Intrauterine insemination
  - In vitro fertilization (IVF)
  - Gestational carrier
    - Surrogacy
- Key consideration: emotional responses to infertility

Pregnancy

- Pregnancy is viewed in 13-week trimesters
- Early signs and symptoms
  - Missed menstrual period or slight bleeding
  - Nausea
  - Breast tenderness
  - Increased urination
  - Sleepiness, fatigue, and emotional upset
  - Hegar's sign; Chadwick's sign
- Four weeks after a woman misses her period, she is considered to be about eight weeks pregnant

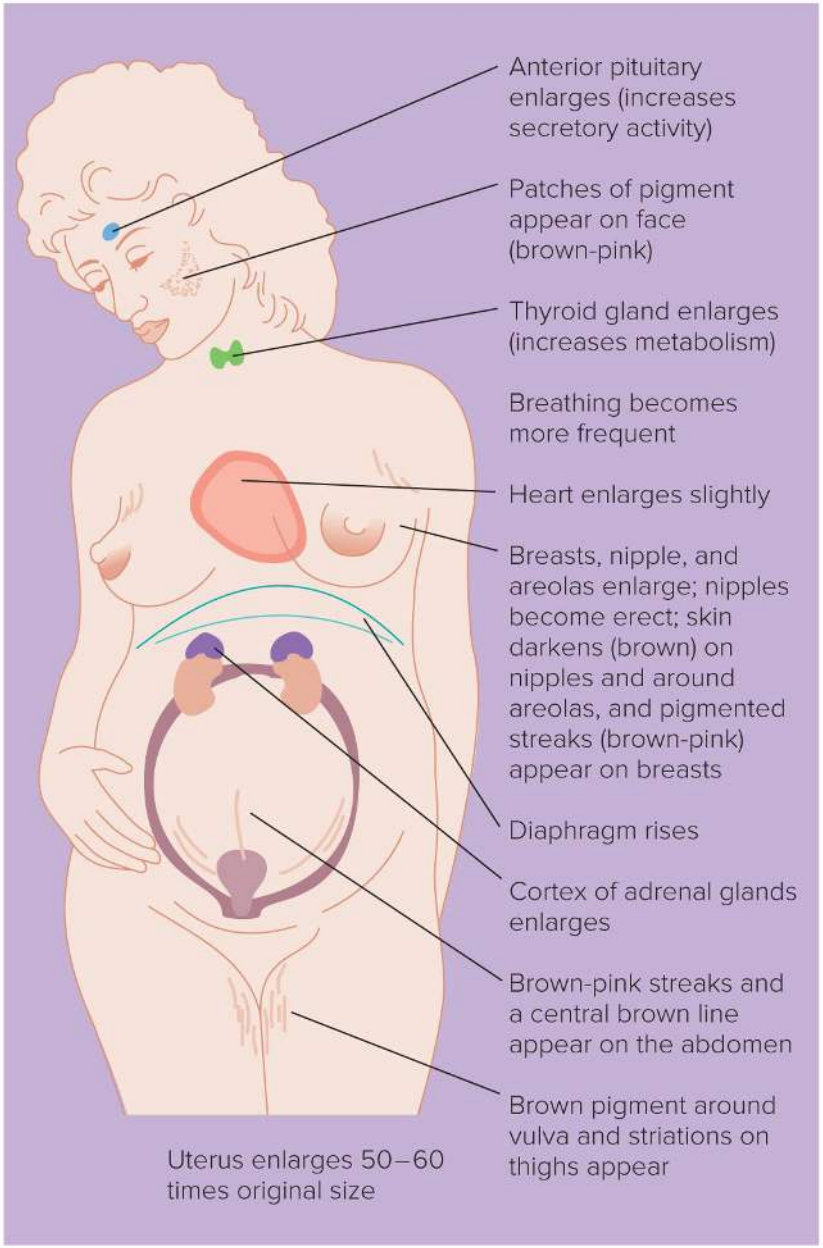

Figure 8.2 Physiological Changes During Pregnancy

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Continuing Changes in the Woman's Body

- Uterus enlarges
- Breasts enlarge and are sensitive
    - Hyperpigmentation
- Muscles and ligaments soften and stretch
- Blood volume doubles
- Lungs and kidneys become more efficient
- Weight gain: average 27.5 pounds
- Skin stretches
    - Stretch marks

Table 8.1 Recommended Weight Gain During Pregnancy

STATUS (BMI)*	WEIGHT GAIN (POUNDS)
Underweight (<18.5)	28–40
Normal (18.5–24.9)	25–35
Overweight (25–29.9)	15–25
Obese (>30)	11–20

*BMI, or body mass index, allows comparison of body weight across different heights. (See Chapter 14 to calculate BMI.)

Changes During the Later Stages of Pregnancy

- Fetus's increased needs place a burden on the mother's lungs, heart, and kidneys
- Body retains more water
- Braxton Hicks contractions
  - Preliminary contractions as the body prepares for childbirth
- Lightening
- Emotional responses to pregnancy
  - Hormonal changes
  - Responses vary throughout the trimesters

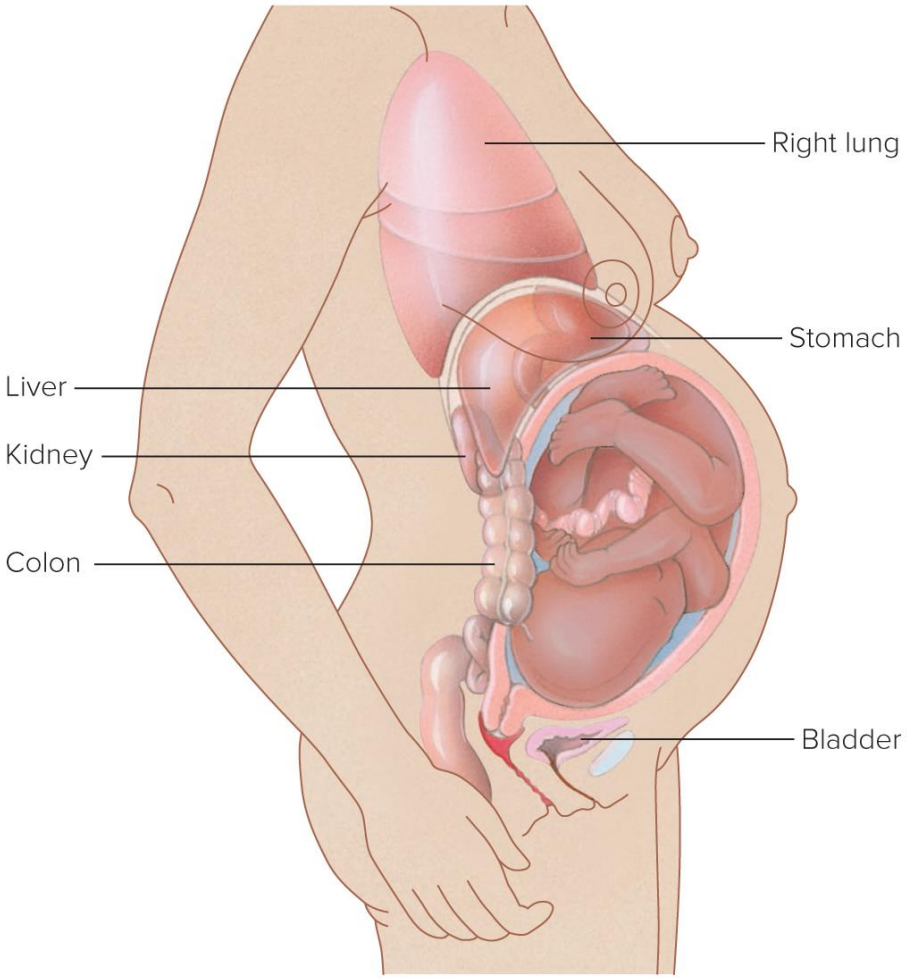

Figure 8.3 The Fetus during the Third Trimester of Pregnancy

Fetal Development

- First trimester

  Fertilized egg divides, then multiples to 32–128 cells and travels to the uterus, where it is called a blastocyst

  – On about the sixth or seventh day, it attaches to the uterine wall

  Blastocyst becomes an embryo by about the end of the second week, and cells differentiate into three layers

  Chorionic villi form the placenta, which brings oxygen and nutrients and removes waste products

  All major body structures are formed between the second and ninth weeks

  Fetus is about an inch long and weighs an ounce

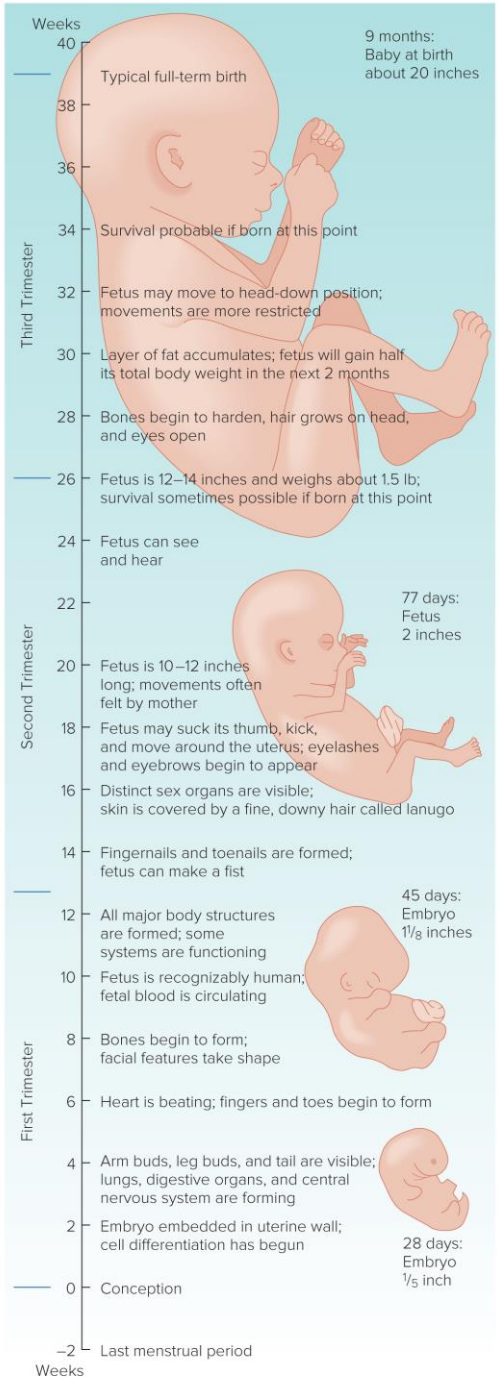

Figure 8.4 A Chronology of Milestones in Prenatal Development

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Fetal Development (2)

- Second trimester
  - Fetus grows to about 14 inches and 1.5 pounds
  - Fetus requires large amounts of food, oxygen, and water
  - Mother begins to feel fetal movement
- Third trimester
  - Fetus gains most of its birth weight
    - Brown fat develops to insulate and supply food
  - Respiratory and digestive organs develop more fully
  - Mother's blood brings immunity to the fetus

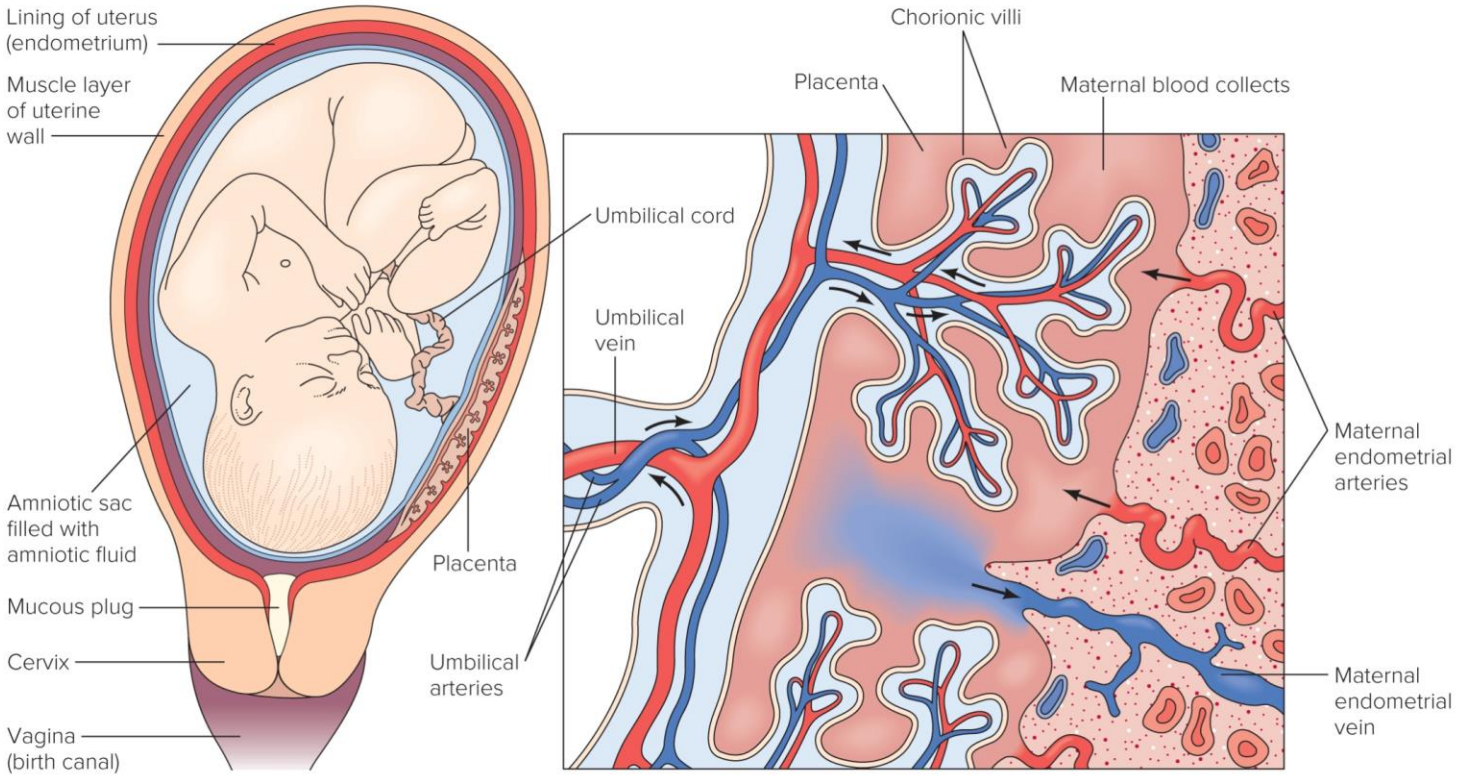

Figure 8.5 A Cross-Sectional View of the Fetus in the Uterus and an Enlargement of the Placenta

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Diagnosing Fetal Abnormalities

- About 3% of babies are born with a major birth defect
- Noninvasive screening tests
  - Quadruple marker screen (QMS)
    - Maternal blood test performed at 16 to 19 weeks
    - Estimates the probability of fetal abnormalities
  - Cell free DNA
    - Performed after 10 weeks
    - Used to identify chromosomal disorders

Diagnosing Fetal Abnormalities (2)

- Invasive diagnostic tests
  - Carry a slight risk of miscarriage (0.3–0.7%)
  - Chorionic villus sampling (CVS)
    - Performed at 10 to 12 weeks
    - Removal of a tiny section of chorionic villi
  - Amniocentesis
    - Fluid removal from around developing fetus
    - Usually takes place at 16 to 22 weeks
- Ultrasonography
  - High frequency sound waves used to create a sonogram
- Genetic counseling

Fetal Programming

- Focuses on how conditions in the womb may influence the risk of adult diseases

  Low birth weight linked to increased risk of heart disease, high blood pressure, obesity, diabetes, and schizophrenia

  High birth weight in female infants associated with increased risk of hypertension, diabetes, and some cancers in later life

  Adequate nutrition and stress management are vital for mother and fetus

The Importance of Prenatal Care

- Regular medical checkups
- Blood tests
  - Rh factor
- Prenatal nutrition
- Avoiding drugs and other environmental hazards
  - Teratogens—congenital malformations
  - Alcohol—fetal alcohol syndrome (FAS)
  - Tobacco, caffeine, drugs
- STIs and other infections

The Importance of Prenatal Care (2)

- Prenatal activity and exercise
  - Kegel exercises
  - Prenatal exercise classes
- Preparing for birth
  - Childbirth classes
  - Involvement of father or partner

Complications of Pregnancy and Pregnancy Loss

- Complications arise for many different reasons
  - Maternal diseases and exposures
  - Placental factors
  - Fetal conditions

Complications of Pregnancy and Pregnancy Loss (2)

- Complications:
  - Ectopic pregnancy
  - Spontaneous abortion, or miscarriage
  - Stillbirth
  - Preeclampsia/eclampsia
  - Placenta previa
  - Placental abruption
  - Gestational diabetes (GDM)
  - Preterm labor and birth
  - Labor Induction

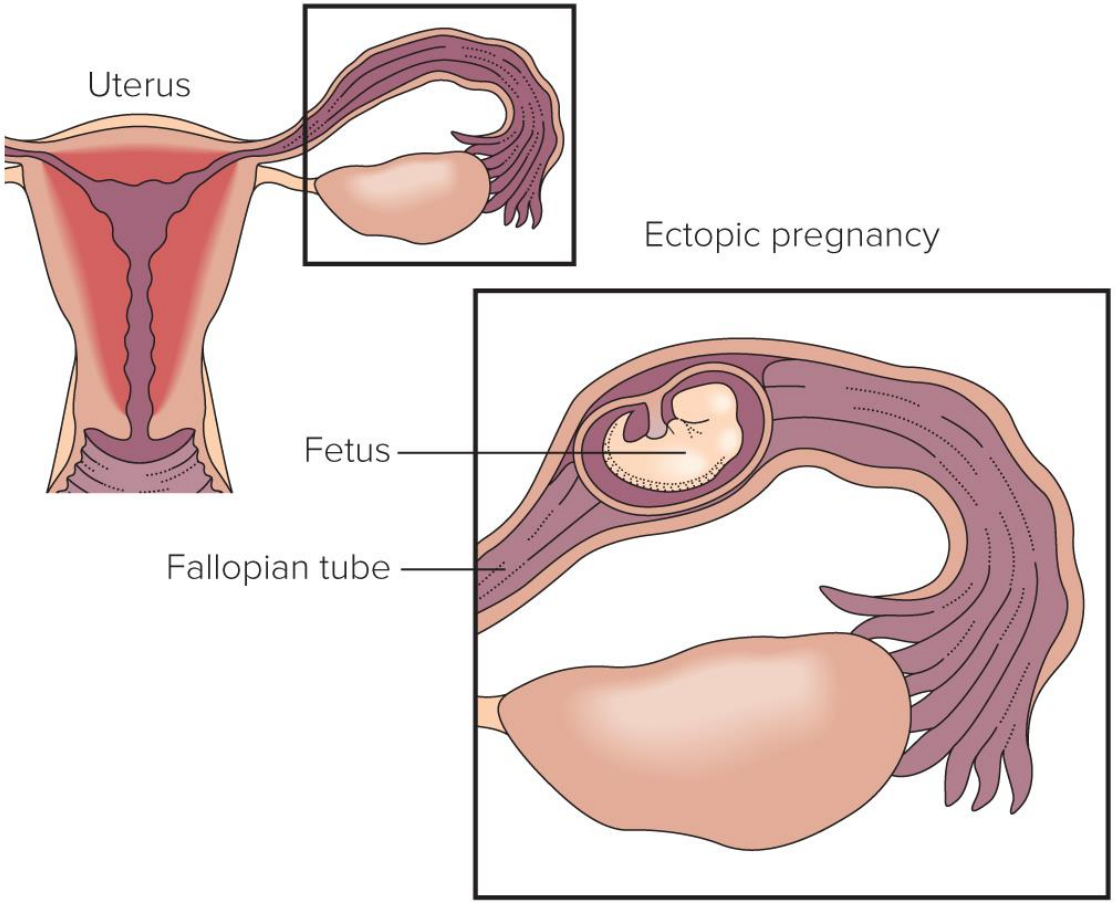

Figure 8.6 Ectopic Pregnancy in a Fallopian Tube

In an ectopic pregnancy, the fertilized egg implants and begins to develop outside the uterus, usually in an oviduct. As the limited space of the oviduct cannot accommodate the rapid growth of a fertilized egg, ectopic pregnancies pose high risk of emergent bleeding through tubal rupture.

Complications of Pregnancy and Pregnancy Loss (3)

- Low birth weight and premature birth
  - Low birth weight (LBW) babies weigh less than 5.5 pounds at birth
  - Many organs of a premature infant are not sufficiently developed
- Infant mortality
  - Poverty and inadequate care are key causes
  - Sudden infant death syndrome (SIDS)
- Coping with loss
  - Healing is a long-term process

Table 8.2 Environmental Factors Associated with Problems in a Fetus or Infant

AGENT OR CONDITION	POTENTIAL EFFECTS
Accutane (acne medication)	Small head, mental impairment, deformed or absent ears, heart defects, cleft lip and palate
Alcohol	Unusual facial characteristics, small head, heart defects, mental impairment, defective joints
Chlamydia	Eye infections, pneumonia
Cigarette smoking	Miscarriage, stillbirth, low birth weight, respiratory problems, sudden infant death
Cocaine	Miscarriage, stillbirth, low birth weight, small head, and other major birth defects
Cytomegalovirus (CMV)	Small head, mental impairment, blindness
Diabetes (insulin-dependent)	Malformations of the brain, spine, and heart
Gonorrhea	Eye infection leading to blindness if untreated
Herpes	Brain damage, stillbirth
HIV infection	Impaired immunity, stillbirth
Lead	Reduced IQ, learning disorders
Marijuana	Impaired fetal growth, stillbirth
Mercury	Brain damage
Propecia (hair loss medication)	Abnormalities of the male sex organs
Radiation (high dose)	Small head, growth and mental impairment, multiple birth defects
Rubella (German measles)	Malformation of eyes or ears causing deafness or blindness; small head; mental impairment
Syphilis	Fetal death and miscarriage, prematurity, physical deformities
Tetracycline	Pigmentation of teeth, underdevelopment of enamel
Vitamin A (excess)	Miscarriage; defects of the head, brain, spine, and urinary tract
Zika	Microcephaly

Childbirth

- Choices in childbirth
  - Who is going to assist with the delivery?
    - Physician
    - Certified nurse-midwife
    - Doula
  - Where is the baby going to be delivered?
    - Hospital
    - Home

Labor and Delivery

- First stage of labor
  - Cervical effacement
  - Contractions
    - Last 30 seconds and occur every 15–20 minutes
  - Small amount of bleeding
    - Mucus that blocked the cervical opening is expelled
  - Amniotic sac ruptures in some
  - Last part of first stage of labor: active labor
    - Strong and frequent contractions
    - Cervix completely dilates (10 centimeters)

Labor and Delivery (2)

- Second stage of labor
  - Baby is slowly pushed down
    - Mother must bear down to help push the baby out
  - Head is usually delivered first
    - Crowning
  - Baby's chest expands and the lungs fill with air
- Third stage of labor
  - Delivery of the placenta
  - Baby is assessed using the Apgar scale
  - Most newborns are tested for 29 specific disorders

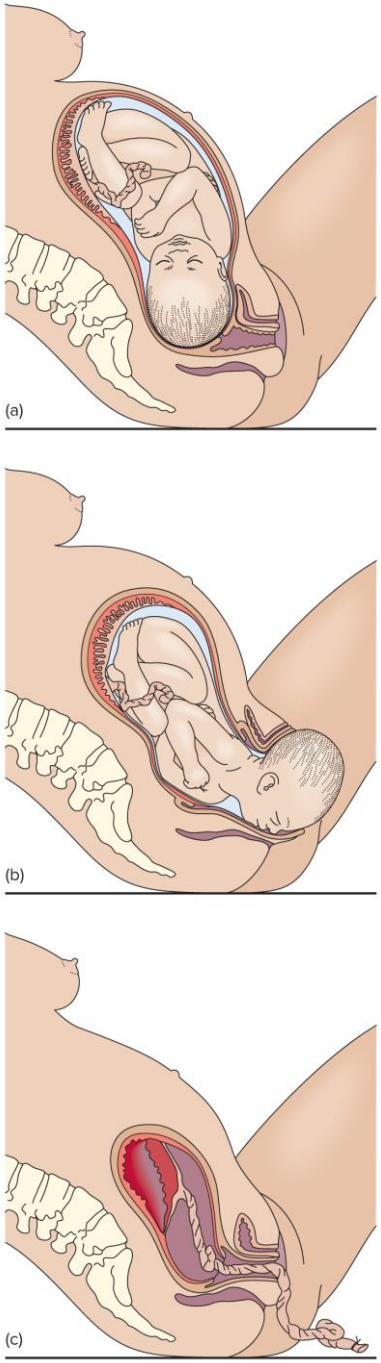

Figure 8.7 Birth: Labor and Delivery

(a) The first stage of labor; (b) the second stage of labor: delivery of the baby; (c) the third stage of labor: expulsion of the placenta.

Pain Relief during Labor and Delivery

- Childbirth preparation is a good place to start
- Pain can be modified by staying active in labor, laboring in water, and using breathing and relaxation techniques
- Medical intervention most often used is the epidural injection
    - Given through a catheter placed between the vertebrae in the lower back
- Local anesthesia is available

Cesarean Delivery

- In a cesarean delivery, the baby is removed through a surgical incision in the abdominal wall and uterus
  - Necessary when a baby can't be delivered vaginally
    - Baby's head is too large
    - Mother has a serious health condition
    - Mother is overweight or has diabetes
    - Difficult labor
    - Fetal distress
    - Dangerous infections
  - Repeat cesarean deliveries occur at a rate of 88.7%

The Postpartum Period

- Postpartum—3 months following childbirth

  Critical family adjustment

  Mother

  - With vaginal delivery, leaves the hospital in 1–3 days
  - 6–8 weeks for the mother's reproductive organs to return to prebirth condition
  - Lochia (blood discharge) for 3–6 weeks after birth

  Baby

  - Undergoes health screenings
  - Head becomes more rounded
  - Umbilical cord stump falls off

The Postpartum Period (2)

- Breastfeeding

  Lactation begins about 3 days post-childbirth

  – Colostrum prior to lactation

  American Academy of Pediatrics recommends breastfeeding exclusively for 6 months

  – Only 22.3% of U.S. mothers follow this recommendation

  Breastfeeding is beneficial to both baby and mother

  Bottlefeeding is sometimes the only alternative and can be part of a loving parent-child relationship

  – Also allows the father or partner to share in nurturing

Postpartum Depression and Attachment

- “Baby blues” are experienced by 50–80% of new mothers
- Postpartum depression is a prolonged period of anxiety, guilt, fear, and self-blame
  - Experienced by 9–16% of new mothers
- Attachment
  - Develops between baby and an adult caregiver
  - Helps in the child’s social, emotional, and mental development

Review

- List key issues to consider when preparing for parenthood
- Explain the principles of fertility and infertility
- Describe the physical and emotional changes related to pregnancy
- Identify the stages of fetal development
- Explain the importance of good prenatal care
- Understand potential complications of pregnancy
- Describe the choices and processes related to childbirth

Long image descriptions

APPENDIX A

Figure 8.1 Fertilization and Early Development of the Embryo Appendix

In the ovary, an egg matures and is released from its follicle and travels through an oviduct. The endometrium, which is the lining of the uterus, has already thickened for the implantation of a fertilized egg.

Sperm cells, much smaller than the egg, approach the egg in the oviduct. When a sperm cell enters, it fuses with the nucleus of the egg, and fertilization takes place.

In 24–30 hours after fertilization, male and female genetic material combines.

In 36 hours, as it continues to move toward the uterus, the zygote has divided into 2 cells; in 48 hours, 4 cells; by 3 days, 8–32 cells. By 4–5 days, it has become a hollow ball (a blastocyst) of 32–128 cells.

In 5–7 days after fertilization, the blastocyst attaches to the uterine wall.

By 7–12 days, implantation of the embryo has taken place.

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Figure 8.2 Physiological Changes During Pregnancy
Appendix

In the brain, the anterior pituitary enlarges, increasing secretory activity.

Patches of pigment appear on face (brown-pink).

Thyroid gland enlarges, increasing metabolism.

Breathing becomes more frequent.

Heart enlarges slightly.

Breasts, nipple, and areolas enlarge; nipples become erect; skin darkens (brown) on nipples and around areolas, and pigmented streaks (brown-pink) appear on breasts.

Diaphragm rises.

Cortex of adrenal glands enlarges.

Brown-pink streaks and a central brown line appear on the abdomen.

Brown pigment around vulva and striations on thighs appear.

Uterus enlarges 50–60 times original size.

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Figure 8.4 A Chronology of Milestones in Prenatal Development Appendix

Minus-2 weeks, last menstrual period

Week 0: conception; beginning of first trimester

Week 2: embryo embedded in uterine wall; cell differentiation has begun

28 days: embryo is about one-fifth of an inch

Week 4: arm buds, leg buds, and tail are visible; lungs, digestive organs, and central nervous system are forming

Week 6: heart is beating; fingers and toes begin to form

45 days: embryo is about one and one-eighth inches

Week 8: bones begin to form; facial features take shape

Week 10: fetus is recognizably human; fetal blood is circulating

77 days: fetus is 2 inches

Week 12: all major body structures are formed; some systems are functioning

Week 14, in second trimester: fingernails and toenails are formed; fetus can make a fist

Week 16: distinct sex organs are visible; skin is covered by a fine, downy hair called lanugo

Week 18: fetus may such its thumb, kick, and move around the uterus; eyelashes and eyebrows begin to appear

Week 20: fetus is 10–12 inches long; movements often felt by mother

Week 24: fetus can see and hear

Week 26: fetus is 12–14 inches and weighs about 1.5 lbs.; survival sometimes possible if born at this point

Week 28, in third trimester: bones begin to harden, hair grows on head, and eyes open

Week 30: layer of fat accumulates; fetus will gain half its total body weight in the next 2 months

Week 32: fetus may move to head-down position; movements are more restricted

Week 34: survival probable if born at this point

Week 40: typical full-term birth

9 months: baby at birth about 20 inches

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Figure 8.5 A Cross-Sectional View of the Fetus in the Uterus and an Enlargement of the Placenta Appendix

A mucus plug forms between the uterus and the cervix and vagina.

Inside the muscle layer of uterine wall is the lining of the uterus (endometrium) and the placenta. The fetus develops within the amniotic sac, which is filled with amniotic fluid.

Maternal blood collects in the endometrium via maternal endometrial arteries and maternal endometrial vein.

The network of blood vessels called chorionic villi form the placenta, which allows a two-way exchange of nutrients and waste materials between the mother and the fetus via the umbilical vein and umbilical arteries.

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