

CHAPTER 4

Pregnancy and Birth



Learning Outcomes

After studying this chapter, you will be able to

- 4-1 analyze how good health before pregnancy can impact the health of the future developing baby.
- 4-2 analyze how care during pregnancy including good nutrition, medical care, and a healthy lifestyle can lead to more positive outcomes for the mother and developing baby.
- 4-3 describe how various prenatal complications including genetic disorders, the mother's age, health status, and environmental factors including drugs can affect the developing baby.
- 4-4 describe the three stages of pregnancy and the developmental milestones that occur in each stage.
- 4-5 identify and describe the three stages of childbirth.
- 4-6 discuss how preterm labor, induced labor, breech presentation, oxygen deprivation, and the Rh factor can complicate childbirth.

Reading Prep

Before reading this chapter, preview the illustrations. As you read, cite specific textual evidence to support the information in the illustrations.

Key Terms

obstetricians	AIDS	fetus
certified nurse-midwives	fetal alcohol syndrome (FAS)	Braxton-Hicks contractions
low birthweight	sudden infant death syndrome (SIDS)	natural childbirth
stillbirth	germinal period	Lamaze method
gestational diabetes	zygote	doula
caesarean section	blastocyst	episiotomy
sexually transmitted infections (STIs)	embryonic period	very low birthweight
bacterial STIs	embryo	induced labor
viral STIs	fetal period	breech birth
HIV		oxygen deprivation
		Rh factor

CTSO Event Prep

Select a topic from this chapter and create a lesson plan to teach the information to a grade level of your choice. In your lesson plan, include objectives, activities, and desired outcomes of the lesson. Arrange to present the lesson to an actual class of students. Ask the

teacher of the class you taught to complete an evaluation of your performance. You may wish to expand your project by participating in an Educators Rising *Lesson Planning and Delivery Competition*. See your adviser for further information.

Introduction

This story of human development begins even before a baby is conceived, long before developing in the womb. In this chapter, care before and during pregnancy, challenges during pregnancy, and the stages of prenatal development will be discussed. Birth, the baby's grand entrance into the world, will be described. Issues after birth will also be discussed as this first important life stage is explored. Although you may often think that development begins at birth, you will learn that the information presented in this chapter covers the foundation of human development.

4-1 Care Before Pregnancy Occurs

Care *before* pregnancy? Absolutely! Health and lifestyle behaviors can play a large part in both becoming pregnant and the success of a pregnancy. Most importantly, these factors can play a large part in the health of a fetus. They may even have lifetime effects on both parent and child.

An important first consideration for a person who is planning to become pregnant or suspects a pregnancy has occurred is to find good medical care. If possible, a thorough checkup before becoming pregnant is important to make sure the pregnant person is healthy. Genetic testing (for possible risks of birth defects) can be done at this time. Any known health problems should be observed and managed, including family health issues or infections. When a person suspects a pregnancy has occurred, the person should confirm the pregnancy with a doctor and begin early medical care.

Eating a well-balanced diet of healthful foods is important during every stage of life, **4-1**. A person's well-balanced diet, healthy body weight, and physical fitness before pregnancy can provide the right setting for optimal development of a baby. Before pregnancy, taking extra *folic acid* (a type of vitamin) is recommended.

Folic acid promotes healthy brain and spinal cord development, some of the earliest organ developments during pregnancy.

People should avoid alcohol consumption, drugs (including over-the-counter and prescription drugs), and smoking during pregnancy. Even secondhand smoke should be avoided. All of these can cause great harm to the developing baby. Chemical exposure can have negative lasting effects. Avoiding these things prior to pregnancy can have a positive impact on the future pregnancy as well. Pregnancies are most successful when people begin at a healthy body weight, are active, and have social and emotional support from family members and friends. When pregnancy does occur, a person is ready to devote cognitive, physical, social, and emotional resources toward supporting the developing baby.



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4-1 Fresh fruits and vegetables are a rich source of vitamins and minerals. *Why is healthful eating especially important during pregnancy?*



Checkpoint

1. *True or false?* A person who wants to become pregnant does not need to find good medical care or to take special vitamins.
2. *True or false?* Chemical exposure can negatively impact the health of a person who wants to become pregnant and prevent good health outcomes for both parent and child.
3. *True or false?* Pregnancies are most successful when the parent begins at a healthy body weight, is active, and has social and emotional support from family and friends.

4-2 Care During Pregnancy

Prenatal care is essential to give the best possible outcome for both the pregnant person and fetus. Good medical care, nutrition, and health practices are all important for optimal results. The healthier the pregnant person is, the more positive the outcome of the pregnancy will be.

Medical Care

An early task for a pregnant person is to find good health care. There are many options. The most common is being under the care of a medical doctor. **Obstetricians** are doctors who specialize in pregnancy and childbirth. Pregnant people may choose to use their family doctor who provides general care. They may also choose **certified nurse-midwives**, or nurses who specialize in pregnancy and birth. Any of these medical professionals can provide good care for healthy people. If a pregnant person is at risk from complications, the pregnant person may need to see a doctor who specializes in the condition.



Safety Connections

Medical Checkups

Regular medical care is vital in monitoring the health of pregnant people prior to and during pregnancy. The health status of the pregnant person directly impacts the growth and development of the fetus. During pregnancy, a person attends regular checkups to ensure the pregnancy is progressing in a safe and healthy manner. The frequency of medical checkups increases throughout the pregnancy.

At checkups, both the health of the pregnant person and fetus are monitored. At the first exam during pregnancy, the physician will speak with the pregnant person to understand lifestyle, family history, and non-pregnant partner's family history. The physician will also conduct

tests for potential health threats to the fetus and determine a due date for it. In sequential medical visits, the physician will check blood pressure, heart rate, and weight of the pregnant person. The physician may also conduct prenatal testing to screen for genetic-related diseases, potential birth defects, or threatening conditions. Maintaining scheduled medical visits is a critical part of pregnancy.

Career Activity

What education and training is needed to become an obstetrician? Research the education requirements, job responsibilities, and salary of an obstetrician. Does this career interest you? Why or why not?

During the first medical exam, usually at around the eighth week of pregnancy, expectant parents are screened for potential health problems. An expected due date is calculated based on the last menstrual period. A full physical exam is done and blood and urine samples are taken.

After the first visit, health care exams are usually scheduled every month until the last few months when visits are increased to every two weeks. During the last month, weekly visits are the norm. During these visits, weight is taken, blood pressure measured, and measurements are taken to determine the size of the fetus.

In the United States, a woman's age and race influence the availability or lack of prenatal medical care. On average, teenagers and Native Americans are less likely to receive prenatal care than their counterparts. Pregnant people who do not receive early prenatal care are three times more likely to have low-weight babies and adverse outcomes. Hopefully through awareness and better accessibility, these trends will change.

Nutrition

Even before a person suspects pregnancy, a person should eat in a healthy manner. Grains; plenty of fruits and vegetables; protein from meats, beans, or eggs; and dairy products are all important. During pregnancy, each meal becomes a meal for the pregnant person and fetus. Because so much growth and development is occurring for the fetus, good nutrition is vital.

To meet nutritional needs, pregnant people often need to eat an additional 300 calories daily beginning in the fourth month. People who are at a healthy weight before pregnancy should gain between 25 and 35 pounds while pregnant, **4-2**. People who are overweight or underweight before pregnancy may be advised differently.

Weight Gained During Pregnancy	
Portion of Added Weight	Weight Gain in Pounds*
Baby	7–8
Uterus	2
Placenta	1.5
Amniotic fluid	2
Increased maternal blood volume	3–4
Increased maternal breast mass	2
Increased maternal stored fat and other nutrients	6–8
Increased maternal fluid retention	4
Total weight gain	25–35

*Numbers vary for women who are underweight or overweight at the start of pregnancy and for women pregnant with multiples. Consult a doctor for a specialized weight gain plan.

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4-2 During pregnancy, doctors carefully monitor women's weight gain to ensure optimal health of both the mother and the developing baby. *What are the two largest sources of pregnancy-related weight gain?*



Health Connections

Dietary Guidelines for Americans

The U.S. Department of Agriculture has created the *Dietary Guidelines for Americans*, a customized booklet of recommendations specific to American eating habits. These guidelines outline foods and nutrients that are lacking or consumed in excess in the American diet and offers recommendations for how to increase or reduce certain foods. According to the *Guidelines*, pregnant people typically lack iron, folate, and sufficient calcium in their diets. All three items are crucial to the development of the fetus and are also beneficial to the health of the pregnant person. The *Dietary Guidelines for Americans* recommends the following advice for a pregnant person prior to and during pregnancy:

Folate

- *Prior to pregnancy:* Consume 400 micrograms per week.
- *During pregnancy:* Consume 600 micrograms per week.

Iron

- *Prior to pregnancy:* Consume more foods with *heme iron*, a form of iron that is more easily absorbed by the body.
- *During pregnancy:* To help meet iron needs, an iron supplement may be recommended by a physician.

Calcium

- *Prior to pregnancy:* Consume natural foods, such as low-fat or fat-free milk, yogurt, and cheese along with fortified foods, such as cereals, juices, other beverages.
- *During pregnancy:* Consume 1300+ micrograms daily for teen mothers; 1000+ micrograms daily for adult mothers recommended, often through supplements.

Research Activity

Research food sources of folate and iron. How can folate, iron, and seafood be incorporated into the diet? Does your nutritional advice differ for women prior to pregnancy and during pregnancy?

Pregnant people should strive to eat healthful foods. Even so, most doctors recommend additional vitamin and mineral supplements. *Prenatal vitamins*, made just for pregnancy, contain extra folic acid, calcium, and iron. The additional supplements have several benefits. Folic acid helps reduce brain and spinal cord birth defects. *Calcium* helps build strong bones and teeth. *Iron* helps to reduce the chance of babies being born at a low birthweight. Babies are considered **low birthweight** when they weigh less than 5.8 pounds.

Food insecurity is the limited or uncertain availability of nutritionally adequate safe food. As is true throughout the world, many Americans face food insecurity, including pregnant people. In some neighborhoods, food markets or grocery stores simply do not exist. Dense urban or rural areas that have faced economic hardship may lack stores that stock fresh produce, healthy protein choices, or fresh dairy products. Sometimes, the only source of food products is a fast-food or convenience store that sells mostly snack food and nutritionally unsound beverages. At any stage of life, food insecurity leads to adverse health outcomes for parents and child, including stunted growth prenatally and in childhood, obesity throughout childhood to adulthood, and other health concerns.

Some foods should be avoided during pregnancy. These include some fish and shellfish that contain high levels of mercury. Undercooked meats, poultry (such as chicken), and eggs should be avoided. Milk products that are unpasteurized, such as cheese, should also not be eaten. All of these foods can cause food-related illnesses that may affect the developing fetus.



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4-3 Pregnant people who are not normally physically active should consult their doctor before starting a physical activity program.

Lifestyle

A healthy lifestyle is vital to positive health outcomes for the pregnant person and the developing fetus. Good outcomes include an uncomplicated pregnancy and delivery and a healthy baby at birth. Choices associated with healthy outcomes include consuming nutritionally dense food, maintaining a healthy pregnancy weight and adequate weight gain, avoiding drugs and alcohol, healthy blood pressure, and having paid family employment.

A major factor in health and wellness during pregnancy is the impact of stress. Stress can have negative effects in all stages of life, which may include emotional and physical disorders. During pregnancy, stress has been associated with early births and low birthweights for newborns. How can stress be reduced during this time?

One of the best ways to reduce stress during pregnancy is for the pregnant person to be surrounded with a support group. Friends, medical professionals, and family can all help to relieve stress by providing social and emotional support. Having an employer who is willing to accommodate any necessary job changes is important, too. For families in financial need, some government assistance programs, such as WIC (Supplemental Nutrition Program for Women, Infant, and Children) can offer support. WIC offers nutritional foods, classes, and health screenings. Finally, getting physical activity, both aerobic and stretching exercises, can aid in wellness, **4-3**. Together, these factors can reduce the chance of problems during pregnancy.



Checkpoint

1. *True or false?* Obstetricians are nurses who specialize in pregnancy and birth.
2. *True or false?* Babies are considered low birthweight when they weigh less than 8.5 pounds.
3. *True or false?* During pregnancy, stress has been associated with early births and low birthweights for newborns.

4-3 Problems in Prenatal Development

People have been giving birth since the beginning of time and in the vast majority of cases, pregnancy and birth goes well. Even so, some people have a greater chance of experiencing problems during pregnancy. Complications can make the pregnancy difficult and may affect the health of the parent. Often, these problems can have an effect on the fetus. These problems range from family genetic disorders to environmental concerns such as drug use or radiation exposure.

Genetic Disorders

Some problems associated with pregnancy are *genetic* (passed down through family genes). Prenatal testing can determine the possibility of some genetic disorders before pregnancy occurs, 4-4. Others can be tested for during pregnancy, and some of these disorders can be treated. Other genetic disorders cannot be treated prior to birth.

Genetic disorders fall into several categories. The first are disorders associated with faulty genes or chromosomes. These are inherited or passed down from parent to baby. Sickle-cell anemia and cystic fibrosis are examples of inherited diseases.

Sometimes genetic disorders are caused by absent, damaged, or extra chromosomes. A genetic disorder caused by a chromosomal defect is Down syndrome. The risk of having a baby born with Down syndrome increases with the pregnant parent's age.

Many genetic disorders can be treated before or after birth. Heart or kidney problems may be detected prior to birth. Treatment can then be implemented immediately following birth or sometimes even before birth. When a parent's family history of preterm labor or **stillbirth** (delivery of a deceased baby) are known, special medical care during pregnancy may reduce the chances of occurrence.

The Pregnant Person's Age

A pregnant person's age during pregnancy can impact the most important outcome of the pregnancy, the health of the fetus. Age can also affect the pregnancy experience and the pregnant person's own health. Age at both ends of the spectrum can complicate pregnancies and births.

Case Study

Genetic Screening and "Designer Babies"

Casey and Jared are planning to have another baby. They already have a 2-year-old son, Micah, who was born with a congenital kidney disorder. Micah has undergone numerous surgeries since birth, including a kidney transplant. He is doing well now, but still requires a significant amount of medical care. Due to financial reasons, Casey and Jared only plan to have two children. They would both love to have a healthy daughter. They would like to have a red-haired, brown-eyed girl who is smart, athletic, and tall. All of these traits are in their family. If Casey and Jared could, they would arrange for their future daughter to have all of these family traits.

- Should people be able to create their idea of a "perfect" baby? Why or why not?
- Should there be limitations to genetic screening? If so, what should these limitations be?
- If people are allowed to create a designer baby, what regulations would be needed to avoid creating a completely changed society with generally "perfect people"? Is there a danger in people all becoming alike?
- Since there is a clear correlation between certain diseases and their link to sex chromosomes, do you think genetic engineering to control diseases is a good idea? What are some alternative methods other than genetic engineering to help prevent sex-linked diseases?



Genetic Disorders			
Name	Description	Effects	Treatment
Cystic fibrosis	Caused by two faulty genes that interfere with the respiratory, digestive, and reproductive systems. The body cannot easily process mucus, which creates blockage within the body.	Digestive, reproductive, and respiratory issues. Effects range from mild to severe.	No cure exists, but treatments are available and vary depending on symptoms. Treatments may include medications, exercise, and dietary supplements.
Down syndrome	Caused by an extra chromosome.	Severe cognitive disability and delayed language development. Effects are not uniform.	Possible surgery, education specialists, and specialized learning programs.
Fragile X syndrome	Caused by a faulty gene. The X chromosome is unstable (fragile) and usually breaks.	Effects range from short attention span to a learning disability to severe cognitive disability.	Treatments vary, but may include specialized education and therapy.
Huntington's disease	Caused by an abnormal gene that provides instructions for producing a protein called <i>huntingtin</i> , which is suspected to play an important role in nerve cells in the brain.	Loss of some physical control, memory, and ability to rationalize. Often leads to depression and death from complications.	There is no cure, but medication is available to treat symptoms. Physical activity is also recommended.
Phenylketonuria (PKU)	Caused by two mutated genes that prevent the body from processing phenylalanine, an amino acid.	If undetected, can cause permanent internal damage and cognitive disability.	When detected early, a modified diet can prevent physical and cognitive damage.
Sickle-cell anemia	Caused by a recessive gene that alters the shape of the red blood cell. Affected cells are bowed instead of circular and do not properly carry oxygen throughout the body.	Effects range from no effect unless in high altitude areas to chronic illness to early death.	Blood transfusions, penicillin, and proper medication.
Spina bifida	Caused by incomplete development and formation of the spine.	Partial to complete paralysis, fluid buildup in the skull.	Corrective surgery, physical therapy, and a modified diet.
Tay-Sachs disease	Caused by a recessive gene. The body is unable to break down certain types of fats, which build up in the system and can block neural transmissions.	Cognitive and physical deterioration that usually leads to early death.	No cure exists, but a modified diet and medication can ease symptoms.

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4-4 Genetic disorders vary in effects and treatment.

Teen Pregnancy

Early pregnancy may be hard on a teenager and may cause lifelong negative health consequences, such as decreased physical and mental health. Physical health is not always impacted immediately but later in life. Teen pregnancy has consequences on both the pregnant person and fetus. Pregnant teens are more likely to develop high blood pressure than older pregnant people. They are more likely to experience preterm labor and delivery resulting in low birthweight babies. Low birthweight babies face their own challenges including developmental delays that can last for many years. If the pregnant teen consumes alcohol or uses drugs, the impact is great during the early weeks of development when the brain and spinal cord are developing.

If pregnant teens are just past puberty, their bodies are still in a growing stage. Their brains are still undergoing tremendous growth and change. When a pregnant teen is supporting the growth and development of a fetus, fewer nutrients are available for the teen's own growth and development. Many pregnant teens do not receive early prenatal care, which can impact the health of both the teen and fetus.

Another concern for pregnant teens is finding adequate emotional and social support. Having a baby in the teen years increases the likelihood of the parent and child being socially and economically disadvantaged throughout their lives. Stress often increases, especially if social support systems are not in place. For this reason, many high schools offer alternative school programs that allow teens to finish their schooling while learning parenting and life skills.

Pregnancy During Advanced Age

Many people choose to become pregnant after turning age 35. Most have healthy babies. The odds of having a healthy baby decrease, however, when compared to younger pregnant people. Conception often takes longer and the risk of having multiple babies (twins, triplets) is increased.



Cultural Connections Teen Parenting

Becoming pregnant during the teen years has consequences on both the teen and child. The physical, emotional, and financial costs of raising and supporting a baby are extremely high. Babies have many physical needs, such as diapers, food, clothing, cribs, car seats, strollers, blankets, child care, and toys. These physical needs are costly.

Babies also need constant care and attention, both physically and emotionally. Babies need to be fed, clothed, cleaned, and changed. They need to know that when they cry, they will receive comfort. Babies need to feel safe and secure. Meeting a baby's needs can be emotionally and physically taxing on any parents, but especially on teens who are still growing and maturing themselves.

Teen parents must often put their own needs aside to first provide for and attend to the baby, which often leaves teen parents fatigued. With the new responsibilities of parenting, having a child during the teen years can prevent high school graduation and interfere with plans for higher education. If the parents have multiples or a baby with special needs, additional resources and support are necessary to provide proper care and optimal development for the baby or babies.

Financial Activity

Estimate the financial cost for raising a baby in the first year by conducting an online search. How would becoming a parent impact a teen's life?

Pregnant people of advanced ages are more likely to give birth to babies with birth defects and abnormalities. There are two main reasons. One is exposure to environmental toxins over a longer life. Two is the age of the fertilized egg.

Over a lifetime, people are exposed to more and more environmental toxins. Secondhand smoke, cleaning chemicals, food pollutants, and medications are just some of the pollutants that can affect a fetus.

People begin their monthly menstrual cycle as older children or young teens. They can continue this cycle at least 40 years, but all of their eggs exist from the start. By the time an older person conceives, the older egg may be susceptible to genetic chromosomal abnormalities. This can result in birth defects such as Down syndrome. Because of these risks, prenatal testing is often done to prepare the pregnant person and medical team in providing proper care for the baby.

When a pregnant person is older, the pregnancy can be harder as well. **Gestational diabetes**, a type of diabetes that occurs only during pregnancy, is more common. Older pregnant people are at a higher risk for *miscarriage*, the early loss of a pregnancy. They are also more likely to have problems with labor and deliver their babies via **caesarean section** (surgical removal of the baby) than through normal vaginal delivery.

There is some evidence that older male parents of advanced age may also present health risks, such as increased risk of premature birth, low birth weight, and genetic abnormalities. Because of these risks, additional prenatal testing is often done to prepare the pregnant person and medical team and to provide proper care for the newborn.

Illness and Poor Health

A pregnant person's health has implications for the fetus. When pregnant people are ill or in poor health, their bodies may struggle to support both the health of the pregnant person and that of the fetus. Infections and viruses can have an impact depending on when they occur during development. For example, contracting rubella (German measles) during the first three months of pregnancy can cause infant blindness. A pregnant person can pass some sexually transmitted infections to the baby during birth.

Sexually Transmitted Infections

Sexually transmitted diseases include both **sexually transmitted infections (STIs)** such as chlamydia infections, and *sexually transmitted viruses (STVs)*, such as genital herpes simplex and human papillomavirus (HPV). Globally, STIs and STVs are particularly prevalent in the teen population.

STIs are often categorized as bacterial and viral infections, **4-5. Bacterial STIs** are caused by bacteria and can be cured with antibiotics if detected and treated early. Unfortunately some, such as chlamydia, often go undetected leading to *pelvic inflammatory disease (PID)*, which can cause infertility in women. Others, such as gonorrhea, have become more resistant to antibiotic treatments. Syphilis can lead to serious mental disorders and death. Although syphilis is more controlled than previously, outbreaks still occur.

Viral STIs are caused by viruses and cannot be cured. They cannot be treated with antibiotics. Some treatments can alleviate symptoms, but because there is no cure, the symptoms return. Genital herpes, genital warts, and human papillomavirus (HPV) are common viral STIs. *Human papillomavirus (HPV)* is prevalent

Bacterial Sexually Transmitted Infections				
Name	Description	Symptoms	Health Risks to Fetus and Newborn	Treatment
Chlamydia	Caused by the bacteria, <i>Chlamydia trachomatis</i> ; is transmittable through any type of sexual activity	<ul style="list-style-type: none"> • No noticeable symptoms • Vaginal or penial discharge • Painful urination • Fever • If left untreated, may damage reproductive organs and cause sterility 	<ul style="list-style-type: none"> • Can be passed to baby during delivery • Eye infection during birth • Pneumonia 	Prescribed antibiotics
Gonorrhea	Caused by the bacteria, <i>Neisseria gonorrhoeae</i> ; is transmittable through any type of sexual activity	<ul style="list-style-type: none"> • No noticeable symptoms • Vaginal or penial discharge • Painful and/or frequent urination • Fever • Abdominal pain • If left untreated, may damage reproductive organs and cause sterility 	<ul style="list-style-type: none"> • Can be passed to baby during delivery • Blindness • Blood infection 	Prescribed antibiotics
PID	A severe infection caused by bacteria that moves into female reproductive organs (chlamydia and gonorrhea can lead to PID)	<ul style="list-style-type: none"> • No noticeable symptoms • Discharge • Abdominal pain • Fever • Painful urination • If left untreated, may cause sterility 	<ul style="list-style-type: none"> • Eye infection • Blindness 	Prescribed antibiotics; in severe cases, surgery may be necessary
Syphilis	Caused by the bacteria, <i>Treponema pallidum</i>	<ul style="list-style-type: none"> • No noticeable symptoms <p>Early Stage</p> <ul style="list-style-type: none"> • Small, painless sore on affected area <p>Later Stages</p> <ul style="list-style-type: none"> • Body rash • Fever • Hair and weight loss • Headache • Sore muscles • If left untreated, may cause permanent internal damage and death 	<ul style="list-style-type: none"> • Can be transmitted to the fetus • Stillborn birth • Delays in development • Postpartum death 	Penicillin injection or prescribed antibiotics

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4-5 STIs can affect the fetus or newborn in cases of pregnancy. *Which type of STI may require surgical intervention to treat severe cases?*

(Continued on next page)

Viral Sexually Transmitted Infections				
Name	Description	Symptoms	Health Risks to Fetus and Newborn	Treatment
AIDS/HIV	Virus that destroys white blood cells and interferes with the body's ability to fight illnesses and diseases (HIV can lead to AIDS)	<p>Early Stage</p> <ul style="list-style-type: none"> • Fever • Fatigue • Sore or swollen muscles <p>Later Stages</p> <ul style="list-style-type: none"> • Weight loss • Body sores • If untreated, may lead to heart, kidney, liver, and lung diseases 	<ul style="list-style-type: none"> • Can be transmitted during pregnancy, birth, or breastfeeding • Developmental delays • If untreated, will lead to death 	No cure, but prescription medications can ease symptoms; medication may be prescribed during pregnancy to help manage risks to the unborn baby
Genital herpes	Caused by herpes simplex virus	<ul style="list-style-type: none"> • No noticeable symptoms • Sores around the affected area with pain and itching 	<ul style="list-style-type: none"> • Can be passed to baby during birth • Respiratory issues, such as trouble breathing • Bleeding • Seizures 	No cure, but prescribed medication can ease symptoms and control breakouts
HPV	A virus that exists in different forms; is the most common STI	<ul style="list-style-type: none"> • No noticeable symptoms • Warts on genitals • Painful urination • Cervical and other types of cancer 	<ul style="list-style-type: none"> • Premature delivery • Low birthweight 	No cure, but medications are available to ease symptoms

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4-5 (Continued.)

in young adulthood and has been linked to cervical cancer. For this reason, many teens are given the HPV vaccination.

The **HIV** or human immunodeficiency virus causes the disease **AIDS** (acquired immune deficiency syndrome). HIV is spread through bodily fluids. Blood transferred during an infusion, shared needles, and unprotected sex are all possible sources of exchange. Once a person has HIV, the virus attacks the body's immune system. AIDS develops when the person's immune system is no longer able to fight illness.

Rates and types of diseases vary greatly based on geographical areas of the United States. These differences are often attributed to differences in health care, the availability of health education, or the prevalence of risky sexual behaviors, such as unprotected sex or sex with multiple partners. All STIs can cause serious health problems. A person could be infected and not know it because there are no outward signs of infection. This can have dire effects on fetuses. An STI can enter a pregnant person's bloodstream and reach the fetus.

Likewise, pregnant people with HIV/AIDS are more likely to infect their babies if proper medical care is not used. The virus has the most impact on the fetus during the first three months of development. After birth, babies are more likely to be sick from infections. Facial abnormalities are common in babies infected with HIV/AIDS.

Environmental Factors

Some pregnancy problems and birth defects are the result of the fetus being exposed to harmful substances, 4-6. These include such things as chemicals, illness and infections, and medications. Alcohol, drugs, and cigarettes also create an adverse environment for both a pregnant person and fetus. Knowing exactly which agents in the environment are causing the problems can be difficult. A combination of several agents could be the problem. The level and length of exposure can also make a difference. Pregnant people should check with their health provider on what items to avoid.

Radiation and Lead Exposure

Radiation exposure can occur from X-rays and some other medical tests or treatments. People should try to avoid getting any medical or dental X-rays while pregnant. Radiation occurs in higher doses in cancer treatments. People should inform technicians of their pregnancy before receiving treatments of any kind. Both men and women exposed to too much radiation in hospital settings have shown higher risks of miscarriage for the pregnant person.

Lead can also be found in older home renovations or repairs, auto refinishing, and plumbing. Sometimes foods, cosmetics, or other consumer products contain lead. Public water supplies are another potential source of lead exposure. Lead exposure can cause miscarriage, preterm birth, low birthweight, childhood cognitive deficiencies, and behavior problems; lead may even damage the developing nervous system or other fetal organs.

Drug Use

Drugs are a major environmental risk for both pregnant people and their fetuses. Drug exposure can cause severe and long-term birth defects. These effects can be so long-term they affect the physical, cognitive, and socio-emotional development of a baby for his or her entire lifetime. Drugs include illegal drugs, prescription and over-the-counter drugs, alcohol, and nicotine. Drugs do not just include those that are swallowed or smoked. They can also have negative effects when in the environment. For example, secondhand smoke (smoke exhaled by someone else) can have negative effects.

Drug use by male parents can also have an adverse effect on fetuses. The male parent's exposure to chemicals may even alter sperm. The major drugs known to cause congenital disabilities are tobacco, marijuana, alcohol, heroin, methadone, cocaine, and a myriad of other drugs found and sold on the streets or online. Prescription and over-the-counter drugs are also of concern, although many of their possible effects are not known.

Nicotine is a drug found in cigarettes and other tobacco products. Nicotine is a stimulant that is easily absorbed in a pregnant person's bloodstream. Once absorbed, nicotine travels from the pregnant person to the fetus. Because nicotine is a stimulant, the fetus increases in activity just like the pregnant person.

The Impact of Environmental Factors on Fetal Development	
Factor	Possible Effects
Prenatal vitamins	<ul style="list-style-type: none"> • Folic acid reduces brain/spinal cord defects • Calcium builds strong bones and teeth • Iron reduces chance of low birthweight
Caffeine	<ul style="list-style-type: none"> • Miscarriage
Radiation, lead, or mercury	<ul style="list-style-type: none"> • Miscarriage • Congenital disorders
Nicotine	<ul style="list-style-type: none"> • Premature births • Low birthweight • Congenital disorders • Cardiovascular disorders
Marijuana	<ul style="list-style-type: none"> • Premature births • Low birthweight • Neurological disorders • Respiratory problems • Slow weight gain • SIDS
Alcohol	<ul style="list-style-type: none"> • Facial deformities • Defective limbs • Defective heart • Below average intelligence • Cognitive disabilities
Cocaine	<ul style="list-style-type: none"> • Low birthweight • Shorter birth length • Smaller head circumference • Slower motor development through infancy • Slower growth through age 10 • Excitability/irritability • Neurological deficits • Cognitive deficits • Medical deficits • Behavioral and attention issues
Heroin	<ul style="list-style-type: none"> • Behavioral and attention issues • Withdrawal issues • Excitability/irritability • Excessive crying • Disturbed sleep • Slower motor development
Methamphetamine	<ul style="list-style-type: none"> • Low birthweight • Higher infant mortality • Neurological deficits • Cognitive deficits • Behavioral and attention issues

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4-6 Pregnant women should try to avoid as many risks as possible.

Pregnant people who smoke are more likely to have premature, low birthweight babies who are at a higher risk of death than babies who are born full-term. Their babies are also more likely to have congenital abnormalities than babies born to people who do not smoke.

Alcohol is the drug that infants are most often exposed to prior to birth. Prenatal alcohol consumption is the leading cause of cognitive disabilities. Head and facial abnormalities along with heart, brain, and skeletal damage are common symptoms of **fetal alcohol syndrome (FAS)** or prenatal exposure to alcohol. Neither good nutrition before birth nor good health care after birth can change the effects of prenatal exposure to alcohol on the baby. Because alcohol consumption is often combined with other risky behaviors such as smoking or drug use, the total impact of alcohol may be more significant than when considered alone.

Marijuana or cannabis is the most frequently used addictive drug in the United States. Because it is legal in many places, it is sometimes considered a harmless substance for pregnant people.

Babies exposed to marijuana prenatally are often born early and are of low birthweight. They may also have neurological disorders, respiratory problems, and are slower to gain weight than their healthy counterparts. After birth, they are more likely to die from **sudden infant death syndrome (SIDS)**, which is an unexpected death for unknown reasons during the first year of life.

Other illegal drugs have the same devastating effects on infants—preterm births and low birthweights. Because they, too, are exposed to the drug, babies must go through drug withdrawals after birth when the exposure is stopped. This painful process involves excessive sweating, sneezing, yawning, tremors, and shaking. Babies exposed to illegal drugs have breathing and sucking or eating difficulties. They often cry incessantly, have trouble keeping food in their stomachs, have rigid bodies, and are hyperactive. In other words, their withdrawal experience is not different from adults. Those who survive the painful withdrawal process are more likely to die from SIDS or suffer lifelong consequences.



Health Connections

Fetal Alcohol Syndrome

When any amount of alcohol is consumed during pregnancy, the environment of the fetus negatively changes. The fetus becomes at risk for suffering fetal alcohol syndrome (FAS). The effects of FAS range from permanent physical and cognitive defects to death of the fetus. The following are possible effects of FAS:

Physical

- low birthweight
- smaller head, eyes, and lips
- diminished muscle coordination
- poor vision and hearing
- problems with the heart, liver, bones, and central nervous system

Cognitive

- learning disabilities
- delays with speech development
- difficulties interacting in social situations
- hyperactive behavior

People with FAS require extra medical, educational, and therapeutic help. FAS, however, can be avoided altogether when no alcohol is consumed during pregnancy.

Research Activity

Research children born with FAS. What obstacles do they encounter in school and social situations?

Although nicotine, alcohol, and illegal drugs are often the focus of prenatal development problems, legal drugs are a great concern, too. Prescription and over-the-counter drugs such as cold or cough medicines, aspirin, or other pain relievers should not be taken unless approved by a doctor who is aware of the pregnancy.

Paternal Factors

The lifestyle of and environment surrounding people who can become pregnant, both before and during pregnancy, is traditionally the focus of concern in prenatal development. Of course, this is because people who can get pregnant carry a fetus within their bodies. The male parent may also affect conception and prenatal development, however.

Since sperm is joined with the egg at conception, quality of the sperm may have an impact on the results of the pregnancy. Lifestyle, health, and age all affect the quality of the sperm. Parental alcohol use before conception is an example of a lifestyle choice that may have an effect on a fetus. The effect is difficult to measure precisely, but early studies suggest that such use may result in birth defects. Likewise, a male parent's drug use may also affect a developing baby in ways similar to a mother's use of drugs. When alcohol and drugs are used together, the effect of one over the other is difficult to determine.

After conception, if the non-pregnant partner smokes, the secondhand smoke in the environment is inhaled by the pregnant person and can have an effect similar to when a pregnant person smokes. Parents should try to never smoke around their pregnant partner or after birth in the child's presence.



Checkpoint

1. *True or false?* Genetic disorders are sometimes caused by absent, damaged, or extra chromosomes.
2. *True or false?* Viral STIs are caused by bacteria and can be cured with antibiotics if detected and treated early.
3. *True or false?* Head and facial abnormalities along with heart, brain, and skeletal damage are common symptoms of sudden infant death syndrome (SIDS).

4-4 Stages of Prenatal Development

A pregnant person deals with many changes during the nine months of pregnancy. Learning about the pregnancy is the first. This news may cause stress. Even pregnancies that are planned can cause stress. The pregnant person wonders about how life will change. Can the pregnant person handle the additional responsibility? Are there adequate resources to care for the baby? What physical changes will occur?

First Trimester

The *first trimester* begins at conception and continues until about the twelfth week of pregnancy. People may not even realize they are pregnant during much



Health Connections

Physical Changes During Pregnancy

When a person becomes pregnant, the body will go through many changes throughout the next nine months. For the first few weeks, a person may be unaware that pregnancy has occurred. As the body is preparing for the fetus, the pregnant person will begin to notice and display signs of pregnancy.

The first few bodily changes pregnant people experience are changes in menstruation, breast size, and stomach discomfort. People do not continue to menstruate during pregnancy and a missed period is usually the first indicator of pregnancy. Pregnant people will also notice a slight increase in breast size and breast soreness. Since the body is producing breast milk for the baby, the breasts enlarge and become sore. Nausea, or “morning sickness,” is another change some pregnant people experience. Not all pregnant

people experience nausea, but most do because of an increase in hormone levels.

As the uterus grows during pregnancy, many other physical changes also take place. The uterus expands to make room for the fetus and pushes against the bladder, causing frequent urination. From all the bodily changes, pregnant people often feel fatigued. Weight gain, sore muscles, and changes to the skin are also common and normal changes pregnant people experience.

Speaking Activity

Interview a person who has recently given birth or who is expecting a child. Ask about the changes that are currently being or were experienced. How did these changes affect the person physically and socio-emotionally?

of the first trimester. Especially if a person’s periods are irregular (a missed period is often the first indicator of pregnancy). There are other signs besides a missed period, however, including tiredness and mood changes. Although changes may not be as apparent from the outside, a tremendous amount of change is going on inside the body.

The first trimester includes both the germinal and the embryonic periods of prenatal development. The **germinal period** extends from conception until about two weeks later when implantation in the uterus occurs. Here are the highlights. *Conception* occurs when a sperm penetrates the egg or ovum. The fertilized egg is now considered to be a **zygote**. Within hours, the zygote begins dividing first into two cells, then four. By the time five days have passed, the zygote is up to 64 to 128 cells and is now called a **blastocyst**. Within two weeks’ span, the blastocyst will attach itself to the lining wall of the pregnant person’s uterus.

The next stage of the first trimester is called the **embryonic period**. From the second to the ninth week of pregnancy, astounding development occurs. At this stage, the developing baby is called an **embryo**. The embryo has three parts: the outermost layer (ectoderm), the middle layer (mesoderm), and the innermost layer (endoderm). These three layers are responsible for the formation of distinct parts, **4-7**.

Early in this stage, an umbilical cord, or life support line, develops between the embryo and the pregnant person’s uterine lining. The umbilical cord is attached to the *placenta*, a mass attached to the uterus that provides nutrients from the pregnant person. The *umbilical cord* is the tube of veins that connects the placenta with the fetus (at the site later called the belly button). This lifeline will provide oxygen, nutrients, and water through the pregnant person’s blood to the developing embryo. The embryo then floats free from the wall. Amniotic fluid will develop. This prevents the embryo from shocks and movements and keeps the temperature constant as the pregnant person carries on with life.

Parts of the Embryo	
Part of Embryo	Parts of Body That Develop
Ectoderm	Nervous system, ears, nose, eyes
Mesoderm	Bones, muscles, circulatory system, reproductive system
Endoderm	Digestive and respiratory systems

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- 4-7** Each part of the embryo is responsible for the development of different body parts and systems. *Which part of the embryo is responsible for the development of the circulatory system?*

The development that occurs during the embryonic period is astonishing, **4-8**. The nervous system develops. The heart develops and begins to beat. Most body parts become identifiable. During this stage, the head is dominant.

The final stage of the first trimester begins the **fetal period**, which lasts until birth at the end of the third trimester. During this stage, the developing baby is called a **fetus**. All parts of the fetus's body mature and overall size increases quickly.

Second Trimester

By the beginning of the second trimester (13 to 24 weeks), one of the most important milestones for a pregnant person is achieved. This is when the person emotionally shifts from viewing pregnancy as a "state the body is in" to viewing the fetus as a separate person. During the second trimester, the pregnant person's body is beginning to show the effects of pregnancy with an enlarged "belly," larger breasts, and expanding hips.




During the second trimester, body parts become more distinct including arms and legs, fingers and toes, and eyes and ears. Facial features become clear. When using ultrasound imaging, the bones of the fetus can be seen. Movements of arms and legs become more coordinated and the fetus's movements can be felt by the pregnant person and others. Even the sex of the fetus can often be determined.

By the time the second trimester comes to an end, the developing fetus weighs 1 to 1½ pounds and may be 12 to 14 inches long. As the fetus increases in size, so does the pregnant person. Many people report that the best part of their pregnancy is during the second trimester as "morning sickness" is often over and the uncomfortable expanding body of the third trimester is yet to come.

Third Trimester

If the baby is born as early as the beginning of the third trimester (24 to 40 weeks), there is a good chance of survival with proper medical care. In other words, all organs are developed and functioning. The last trimester is important for increased organ function, especially the lungs. Fatty tissue develops and the baby becomes both longer and heavier. By the end of the seventh month, the fetus weighs about 3 pounds and is about 16 inches long. By birth at the end of the third trimester, an average baby weighs seven to eight pounds and is about 20 inches long.

An Overview of the Highlights in Prenatal Development*

First Trimester	
<p>First month</p> 	<ul style="list-style-type: none"> • Conception: sperm and egg (ovum) unite • Fertilized egg is considered to be a <i>zygote</i> • Zygote divides up to 64–128 cells to create a <i>blastocyst</i> • Blastocyst implants into uterus lining • Nervous system (brain and spinal cord) begins to develop, continues throughout pregnancy • Digestive system begins forming • Heart begins to beat • First signs of heart, face, arms, legs, and lungs show • Tissue that will later form the backbone, skull, ribs, and muscles can be seen on ultrasound • By end of the month, it is called an <i>embryo</i> and is about ¼ inch long
<p>Second month</p> 	<ul style="list-style-type: none"> • Head continues rapid growth appearing larger than rest of body • Brain grows quickly and starts to direct fetus's movements • Liver and stomach begin working • Legs and arms become longer and take shape • Fingers and toes develop • Ears, nose, and mouth take shape • Eyes take on color and eyelids form • By end of month, embryo is about 2 inches long and weighs about 1/3 ounce
<p>Third month</p> 	<ul style="list-style-type: none"> • Now called a <i>fetus</i> • Bones are growing • Kidneys are working • Fetus moves often, but cannot be felt by pregnant person • Toes are visible and elbows are identifiable • Facial features are well-formed • Fingerprints appear • Fetus can open and close mouth and swallow • May be possible to determine sex from genitals • Head growth slows • By end of month, fetus is about 4 inches long and weighs about 1 ounce

*Images are not necessarily true-to-size.

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4-8 Many important changes occur during each of the stages in prenatal development.
(Continued on next page)

An Overview of the Highlights in Prenatal Development*

Second Trimester

Fourth month



- Umbilical cord grows and thickens to carry enough blood and nourishment to baby
- Placenta is now formed
- Airways develop, but are not yet in use
- Heartbeat is strong
- More muscles and bones develop
- Bones can be identified
- Fingernails appear
- Fetus sleeps and wakes
- Limb movement becomes more coordinated
- Fetus moves and kicks
- By end of month, fetus is about 6 to 7 inches long and weighs about ½ pound

Fifth month



- Fetus's internal organs continue to grow
- Fetus's movements increase and can be felt by pregnant person
- Blood supply to lungs increases
- Heartbeat heard by stethoscope
- Eyebrows and eyelashes appear
- Scalp hair appears
- Sleeps and wakes in a pattern
- Silky body hair and a waxy coating protect fetus's skin from watery surroundings
- By end of month, fetus is about 9 inches long and weighs about 1 pound

Sixth month



- Fetus's growth speeds up
- Skin is red, wrinkled, and oily
- Fingernails identified
- Fetus stretches, kicks, and sucks thumb
- Fetus can open and close eyes and hear sounds
- By end of month, fetus is about 12 inches long and weighs about 1½ pounds

*Images are not necessarily true-to-size.

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4-8 (Continued.)

(Continued on next page)

An Overview of the Highlights in Prenatal Development*

Third Trimester

Seventh month



- Lungs are more mature and can support fetus outside the uterus
- Brain and nervous system are much more mature
- Bones are more developed, but are still soft and flexible
- Skin is wrinkly and covered with a thick, white protective coating called *vernix*
- Fatty tissue begins developing under skin surface
- Fetus kicks and stretches
- Outline of fetus's fist, foot, or head may be seen outside pregnant person's body when fetus moves
- By end of month, fetus is about 16 inches long and weighs about 3 pounds

Eighth month



- Fetus's growth continues
- Brain growth is rapid
- Skin is not wrinkled, and color is pink
- Fetus kicks strongly, but has less room to move
- Fetus may move into a head-down position in the uterus
- By end of month, fetus is about 18 inches long and weighs about 5 pounds

Ninth month



- Fetus gains about ½ pound weekly
- Lungs are mature
- Downy hair (lanugo) that covers the skin disappears
- Fetus positions itself into a head-down position to prepare for birth
- By birth, an average baby is about 20 inches long and weighs about 7 to 8 pounds

*Images are not necessarily true-to-size.

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4-8 (Continued.)



Health Connections

Music to the Womb

Have you ever heard that playing music for a fetus will stimulate and encourage intellectual development? Some pregnant people place headphones over the womb and play music to foster a stimulating environment for the fetus. The research on the effects of playing music in relation to intellectual development is inconclusive. Evidence does suggest, however, that the fetus will physically respond to music and sounds. The fetus begins to develop hearing during the 16th week. Studies have shown that when music is played over the womb after the 16th week, the fetus responds with increased or decreased heart rate depending on the music tempo. Fetuses in the third trimester

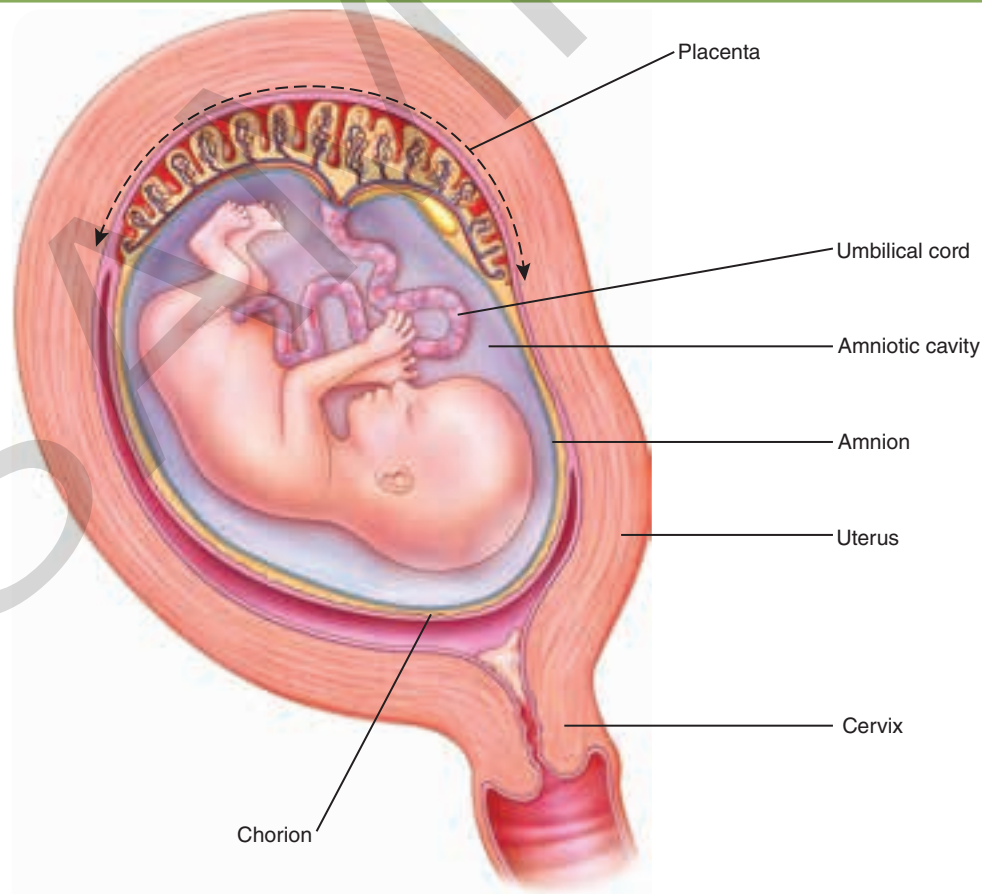
respond with physical movement. The amniotic fluid can amplify some pitch frequencies in the womb. Therefore, to protect the hearing development of the fetus, music should not be played too loudly.

Research Activity

Most studies about the effects of music on the fetus use classical music as the sample. Do you think playing other types of music would have a different effect on the fetus? From journals, magazines, or other reliable sources, locate a reporting of one of the studies on music exposure to the fetus. Summarize your findings in a two-page report.

As the fetus grows in size and weight, the pregnant person's body prepares for birth. After nine months of preparation, the pregnant person's body prepares for labor and delivery. The fetus positions itself in a head-down position, **4-9**. As

Fetus in the Uterus



©Body Scientific International

4-9 During the fetal stage, the fetus turns to a head-down position to prepare for birth.

the fetus's head moves into the pelvis, pregnant people often feel less pressure on their breathing and stomach. Sometimes pregnant people experience psychological changes. The most commonly mentioned is "nesting" or the desire to ready things for the upcoming new baby.



Checkpoint

1. *True or false?* A pregnant person may not realize pregnancy has begun for much of the first trimester.
2. *True or false?* During the second trimester, morning sickness is often worse than in the first trimester.
3. *True or false?* To prepare for birth, the fetus positions itself in a head-down position.

4-5 Birth

When a fetus is full term (any time after 37 weeks), the pregnant person is more than ready to meet the child. By now, the fetus should be in position and the pregnant person begins to feel slight health changes. Mild cramps begin, which are **Braxton-Hicks contractions**. The pregnant person may be slightly nauseous and may feel that something is about to change.

Stages of Labor

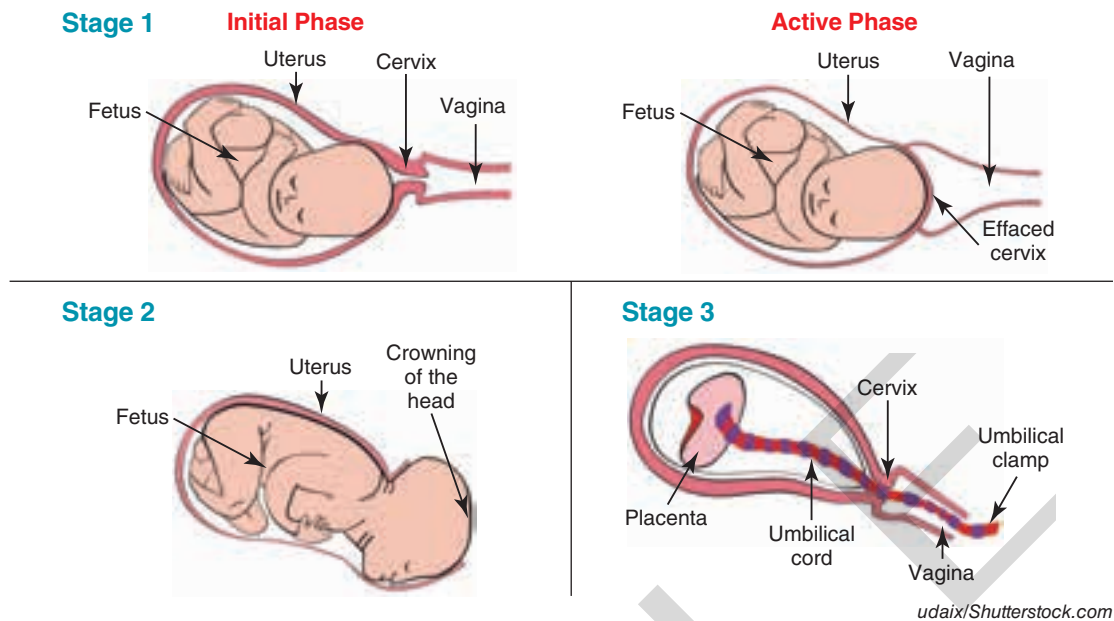
The first signs of real labor starting are felt and seen. Most pregnant people experience one or all of the following: blood or mucus when the mucous plug falls out of the cervix, "water breaking" (passing of amniotic fluid), and the beginning of uncomfortable uterine contractions. These are called *contractions*. As labor progresses, these contractions become more intense and closer together. During birth, there are three stages that prepare the pregnant person for delivery of the baby, **4-10**.

Stage One—Dilation

The first stage is called the *dilation stage*. During this stage, the pregnant person's cervix increases in diameter to allow for the baby to eventually pass through. The goal is 10 centimeters, or about four inches in diameter. This stage can last hours.

Fetal monitoring is often used during the labor or dilation stage. *Fetal monitors* are devices that track a baby's heart rate, the pregnant person's contractions, and alert the medical staff to any signs of distress. Fetal monitoring is a good way to track the fetus's stress through the labor and delivery process. Typically, one monitor is strapped around the top of the pregnant person's stomach. The second monitor is inserted internally through the cervix and rests on top of the fetus's head.

Some people choose natural childbirth. In **natural childbirth**, breathing and relaxation exercises are used to help the pregnant person deal with pain. Often, a partner or coach is chosen to help the pregnant person focus. One of the most well-known natural childbirth methods is called the **Lamaze method**. In this method, the partner helps the pregnant person keep track of and time the contractions while providing emotional support. Natural childbirth can be used in



4-10 The three stages of labor are the dilation stage, the expulsion or delivery stage, and the afterbirth stage. *During which stage of labor does the baby's head become visible outside the parent's body?*

hospitals, in birthing centers with a certified-nurse midwife, or at home with a **doula** (someone who is trained to provide emotional support during the birth process). Midwives and doulas usually work in close contact with medical professionals in case a complication arises.

Most people choose to deliver their babies in hospitals, **4-11**. Again, natural childbirth can be used. Others choose to use medication to control pain. Local anesthetics, medications that numb the pain in a specific region of the body, are often used the most. Once the pregnant person reaches full dilation, pain medications for contractions are usually not administered in a regular delivery.



Cultural Connections Birthing Practices Around the World

The cultural practices of birthing differ from country to country. Some countries and cultures encourage natural childbirths at home with a midwife present, some prefer hospital births, and some favor cesarean section births. In the Netherlands, natural childbirths at home are encouraged and more common than hospital births. A midwife is present to coach the pregnant person during childbirth and to ensure the health and wellness of the pregnant person and baby. A midwife will also return after childbirth to check on them, teach parenting skills, prepare meals, and help with housekeeping. In other countries, such as China and Paraguay, there is a

growing preference toward C-sections. In China, nearly half of all childbirths are C-sections. Other than medical reasons, C-sections may be favored because of the choice of the baby's birth date, less time in labor, and the possibility for less pain.

Discussion Activity

Discuss the possible advantages and disadvantages to natural, hospital, and cesarean-section births. Find current articles about changing trends in birthing practices around the globe to discuss with the class.

Stage Two—Delivery

The second stage of labor is called the *expulsion stage* or delivery. Once the pregnant person is fully dilated, the baby is ready to begin moving through the birth canal. Usually the baby's head appears first, quickly followed by the rest of the body. This stage is much shorter than the labor or dilation stage and only lasts about one and a half hours for first time births and much shorter for those who have given birth before.

Sometimes the birth canal does not adequately stretch to allow the baby through without hurting both the person in labor and baby. When this is the case, an episiotomy procedure is done. An **episiotomy** is a surgical cut that allows the baby to pass through more easily. The surgical cut is quickly repaired with a few stitches. This procedure is done less routinely than in years past as there is concern about possible infection and healing afterward.

Stage Three—Afterbirth

The final stage of birth is called the *afterbirth stage*. During this final stage, the umbilical cord and the placenta are delivered. The stage does not last very long, only a few minutes to as long as an hour. The umbilical cord is cut and the new baby is now a separate, independent human being.



laflori/Stock/Getty Images Plus

4-11 Many parents choose a hospital as the birthing place of their baby. *What other birthing locations are available?*

Checkpoint

1. *True or false?* The first stage of labor is called the expulsion stage.
2. *True or false?* An episiotomy is a surgical cut that allows the baby to pass through more easily and is quickly repaired with a few stitches.
3. *True or false?* During the final stage of birth, the umbilical cord and the placenta are delivered.

4-6 Birth Complications

The vast majority of births are “good” births. They go according to plan and result in a positive experience for both parents and baby. Once in awhile, however, complications occur. Some of these complications include unexpected preterm birth, the need for induced labor, and breech births. Some babies suffer from oxygen deprivation during birth. Others have Rh factor challenges. As mentioned earlier in the chapter, some babies are born using a surgical procedure rather than the usual method of labor and vaginal delivery. This procedure is called a *caesarian section* or *C-section*.

Preterm Birth

Babies come earlier than expected (before full-term) for many reasons. Several of these reasons were previously discussed including the pregnant person's



Santibhavank P/Shutterstock.com

4-12 Babies who are born prematurely require special attention and medical care.

age, health, and exposure to environmental toxins including smoking, alcohol, drugs, and other substances. Premature births may occur despite a pregnant person's best efforts to provide the safest prenatal environment possible. Sometimes premature births are a result of too much crowding when twins or other multiple births struggle to share space inside the womb.

What happens if a baby comes earlier than expected? Babies who are born earlier are usually small in size, having a low birthweight (less than 5.8 pounds). A **very low birthweight** baby weighs less than 3.5 pounds. These babies are at greater risks for many problems. The risk varies, however, depending on how early the baby arrives.

Babies born after 28 weeks have the best chance of survival among premature babies, **4-12**. By then, all organs are developed and

functioning. Each day after week 28 adds to the baby's chances of good health and lessens the chance of developmental delays associated with early birth. For example, although the lungs are developed and functioning, each week after week 28 prepares the lungs for better functioning outside the womb.

Babies who are born early often face developmental challenges and require special care. They may grow slower, crawl later, and be delayed in other early milestones. Today, improvements in health care have greatly improved the chances of premature babies living a normal life. By the time most premature babies reach toddlerhood, they have often caught up with their full-term counterparts.

Induced Labor

Sometimes, labor needs to start before the pregnant person's body begins the birth process itself. **Induced labor** occurs when doctors use medication to initiate the birth process. Doctors may also break the amniotic sac, giving the pregnant person's body a signal that labor is about to begin. Induced labor is not to be considered just out of convenience to the pregnant person, but when there is risk to the pregnant person or baby to prolong the waiting. For example, when a baby is well past the due date, he or she continues to grow and gain weight. Sometimes, the extra weight and size will be detrimental to the pregnant person and baby if labor is not begun. Induced labor has some drawbacks. One is more intense labor contractions. These harder contractions are uncomfortable and painful for the person in labor, but may also create more stress for the baby. Two is the higher possibility that a C-section may be required from the more intense labor and stress on the baby. For example, when a baby's oxygen supply is compromised a quick decision must be made.

Breech Birth

Typically, fetuses turn head down in a pregnant person's pelvis during the last few weeks of pregnancy in preparation for their upcoming birth. Sometimes, however, they do not. A **breech birth** occurs when a fetus does not "turn." Breech babies do not come through the birth canal in the typical head first fashion so careful guidance is needed by the birth attendant. Sometimes the baby comes feet first, sometimes crosswise, and sometimes buttocks first. Because this can be difficult, attempts are often made to get the baby to turn through massage and outside prodding. Sometimes this works, but more often, the breech baby is delivered by C-section.

Oxygen Deprivation

Sometimes fetal monitoring determines that a fetus is suffering from oxygen deprivation. **Oxygen deprivation** means that the baby's flow of oxygen is somehow interrupted. This can have grave consequences including damage to the brain or death. Sometimes, too much pressure on the baby's blood vessels during the birth process causes oxygen deprivation. Other times, an inadequate blood supply between the pregnant person and fetus causes oxygen deprivation. This insufficiency may be caused from problems with the placenta or umbilical cord. Whatever the reason, medical professionals must move quickly to deliver the baby safely.

The Rh Factor

The **Rh factor** refers to the type of protein in red blood cells that does not match between the pregnant person's and fetus's blood type. A mismatch between the pregnant person and fetus is of concern as incompatibility can cause miscarriage or infant death. In some cases, the fetus may become anemic, or lacking in iron. In other cases, the fetus experiences no harm. Results depend on the type and severity of the incompatibility.

Through routine blood tests during pregnancy, mismatches are detected. If the results are positive for the Rh factor, pregnant people can be treated and special care taken both during pregnancy and after delivery.



1. *True or false?* Premature births only occur when the pregnant person does things to negatively affect the health of the fetus, including smoking and drinking alcohol.
2. *True or false?* Induced labor usually occurs when the baby is almost past its due date and is completely safe in all circumstances.
3. *True or false?* A mismatch of the Rh factor between the pregnant person and fetus can cause miscarriage or infant death.

Summary

- 4-1** Health and lifestyle behaviors can play a large part in becoming pregnant and the success of the pregnancy. Good health care and a balanced diet are some healthful behaviors that a person trying to become pregnant should have.
- 4-2** Wellness, including nutrition, abstinence from drugs and other harmful substances, and a healthy lifestyle, is important during pregnancy.
- 4-3** Complications can make the pregnancy difficult and may affect the health of the pregnant person. These problems range from family genetic disorders to environmental concerns such as drug use or lead exposure.
- 4-4** From conception to post-delivery, so much happens during these few months of development. These last few weeks of pregnancy are important to the fetus's health and wellness. After 37 weeks, the fetus is considered full-term.
- 4-5** The birth process begins with contractions and sometimes expulsion of the mucous plug and breakage of the amniotic sac. During labor, the cervix dilates to 10 centimeters. The head appears first, and intense pushing begins during the delivery stage. Once the baby is delivered, the placenta and umbilical cord follow during the afterbirth stage.
- 4-6** Pregnancy and birth can be complicated by many factors. These include the pregnant person's age and health status, the baby's reaction to the birth, exposure to alcohol and drugs, and blood incompatibility among other factors.

Vocabulary Activity

Read the text passages that contain each of the key terms. Then write the definitions of each term in your own words. Double-check your definitions by re-reading the text and using the text glossary.

Review and Assessment

- Before pregnancy, taking extra _____ is recommended to promote healthy brain and spinal cord development.
 - folic acid
 - calcium
 - iron
 - potassium
- _____ are doctors who specialize in pregnancy and childbirth.
 - Certified nurse-midwives
 - Family doctors
 - Obstetricians
 - Doulas
- _____ is caused by a recessive gene that alters the shape of the red blood cell and can cause chronic illness or early death.
 - Cystic fibrosis
 - Sickle-cell anemia
 - Tay-Sachs disease
 - Phenylketonuria
- The _____ period occurs from the second to the ninth week of pregnancy.
 - germinal
 - embryonic
 - fetal
 - postnatal
- _____ occurs when doctors use medication to initiate the birth process.
 - Preterm birth
 - Breech birth
 - Oxygen deprivation
 - Induced labor

Core Skills

1. **Reading.** Read a popular book or magazine about pregnancy or birth. What are the main topics covered?
2. **Writing.** Write a one-page letter that offers advice to a friend or family member who might be pregnant in the future.
3. **Speaking.** Form groups of three classmates. Have each person describe one of the trimesters of pregnancy.
4. **Listening.** Interview a person who gave birth to a child in the past few years. Ask that person to describe the experience.
5. **Math.** Make a shopping list of clothing items you might need if caring for a newborn baby. Total the price of these items. If possible, do comparison shopping.
6. **Writing.** In a short essay, describe environmental factors that can affect the development of a fetus.
7. **CTE Career Readiness Practice.** Use reliable online sources to investigate the changes that occur in a person's body during pregnancy. Compare the changes of a 25-year-old pregnant person with that of a 40-year-old pregnant person.

Research

1. Research the birth options available in your local community including hospitals, birthing centers, midwives, and doulas. Prepare a pamphlet of your findings.
2. Conduct online research to learn more about one of the birth complications discussed in this chapter. Write a one-page paper of your findings to present to the class.



Event Prep

Practice for the HOSA Human Growth and Development final by answering the following questions.

1. To promote healthy infant brain and spinal cord development, doctors recommend increasing one's intake of ____ during pregnancy.
 - A. mercury
 - B. vitamin A
 - C. folic acid
 - D. vitamin C

Topic: *Prenatal*

2. Starting at the end of the first trimester, or around three months, a developing baby is referred to as a(n) _____.
 - A. zygote
 - B. embryo
 - C. fetus
 - D. infant

Topic: *Prenatal*

3. In the case of a breech birth, the fetus _____.
 - A. is not in a head-down position
 - B. weighs less than 3.5 pounds
 - C. experiences oxygen deprivation
 - D. does not have the same red blood cell proteins as the birth parent

Topic: *Prenatal*

4. During teen pregnancies, the risks of which complications increase?
 - A. Gestational diabetes and high blood pressure
 - B. High blood pressure and pre-term labor
 - C. Pre-term labor and birth defects
 - D. Birth defects and gestational diabetes

Topic: *Prenatal*