

# FUNDAMENTALS OF HUMAN SEXUALITY:

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MAKING HEALTHY DECISIONS

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# CONCEPTION, PREGNANCY, AND CHILDBIRTH

A story from a new mother:

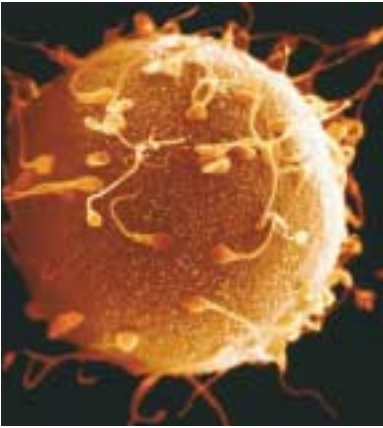
I was in the grocery store with my 5-month-old baby, and a kind woman came up to admire him. We began to chat, and I learned that she had *six* children of her own. As she leaned over the cart and cooed at my baby, I became filled with emotion. I looked at her with tears in my eyes and said, “I don’t think I can have another baby.” “Ah,” she said, “that’s because you don’t think you could love another baby like you love this one.” “That’s right! How did you know that?” I replied. “Because I felt the same way,” the woman said, “but, as hard as it may seem for you to believe right now, you will love all your babies just as you love this one.”

## CONCEPTION AND FETAL DEVELOPMENT

No text on human sexuality would be complete without a discussion of some of the most remarkable aspects of sexuality—the processes of conception, pregnancy, and childbirth. Whether you have been a participant or an observer, you probably agree that the birth of a child is truly miraculous. But the miracle does not begin at birth; it begins much earlier—40 weeks earlier, to be exact—at conception, when an egg and a sperm unite, and the new life begins to grow. Perhaps most miraculous of all is the fact that this life begins as a single cell, and despite a very complex developmental process with many opportunities for error, the outcome is almost always a perfectly formed, healthy baby. For the miracle of conception to occur, the timing of the release of an egg from the ovary and the movement of sperm into the woman’s body must be perfect.

Once an egg has been released from a follicle, it is swept from the surface of the ovary by contractions of the fimbriae at the end of the fallopian tube. It takes the egg approximately 4 days to reach the uterus (Vander, Sherman, & Luciano, 1994), but fertilization generally occurs earlier than that, in the outer third of the fallopian tube closest to the ovary.

During intercourse, seminal fluid containing hundreds of millions of mature sperm is deposited in the vagina. The many millions of sperm are produced and ejaculated because many of them are improperly formed, many die in the acidic vaginal environment, many do not survive the long-distance swim to the fallopian tube, and still others make a wrong turn into the other tube that contains no egg. Thus, only a few hundred sperm reach the tube containing the egg (Vander, Sherman, & Luciano, 1994).



Only one sperm fertilizes the egg.

When the sperm reach the egg, several of them attach themselves to sperm receptor sites on the **zona pellucida**, which is the outer layer of the egg. With the thrusting motions of their tails, the sperm begin moving through this layer until one penetrates it and reaches a space between it and the egg's plasma membrane. This sperm fuses with the plasma membrane and is pulled into the egg by contractions within the egg. As soon as one sperm reaches this point, vesicles around the egg secrete enzymes into the space between the zona pellucida and the plasma membrane. These enzymes deactivate the sperm receptor sites and cause the zona pellucida to harden. From that point on, no other sperm can penetrate the egg's plasma membrane.

## THE ZYGOTE

Once it is fertilized, the egg is called a *zygote*. For 3 or 4 days after it is formed, the zygote travels down the fallopian tube to the uterus while dividing rapidly. The cells do not grow as they divide; thus, the resulting mass of cells is no larger than the fertilized egg when it reaches the uterus. With each division, the chromosomes—the structures within each cell that contain genetic material in the form of DNA—replicate themselves so that each cell has the same genetic material. Occasionally, the mass of dividing cells splits into two separate masses, resulting in **monozygotic**, or **identical**, **twins**. Identical twins, therefore, have exactly the same genetic makeup. **Dizygotic**, or **fraternal**, **twins**, in contrast, are no more similar genetically than any other pair of siblings, because they result from two eggs that have been fertilized by two different sperm.

As the zygote divides, it becomes a **blastocyst** (see Figure 4.1). The blastocyst floats around in the uterus for about 3 days before implanting itself in the uterine wall (about 7 days after conception). Once implantation has occurred, the rest of prenatal development is divided into two phases: the *period of the embryo* and the *period of the fetus*. During the period of the embryo, all internal and external structures begin to

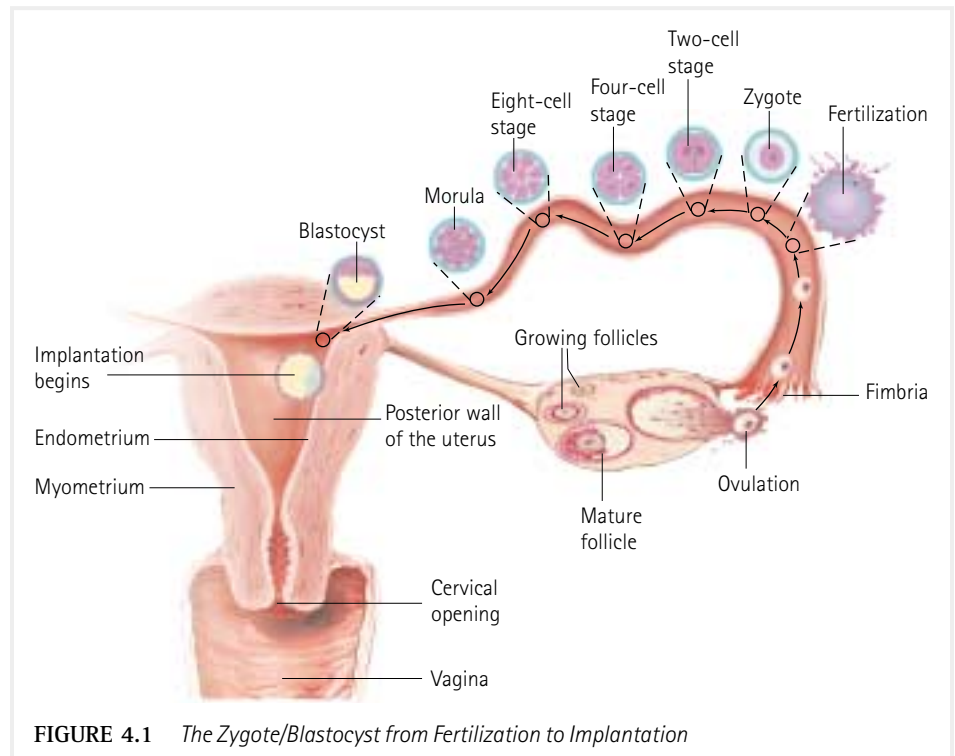


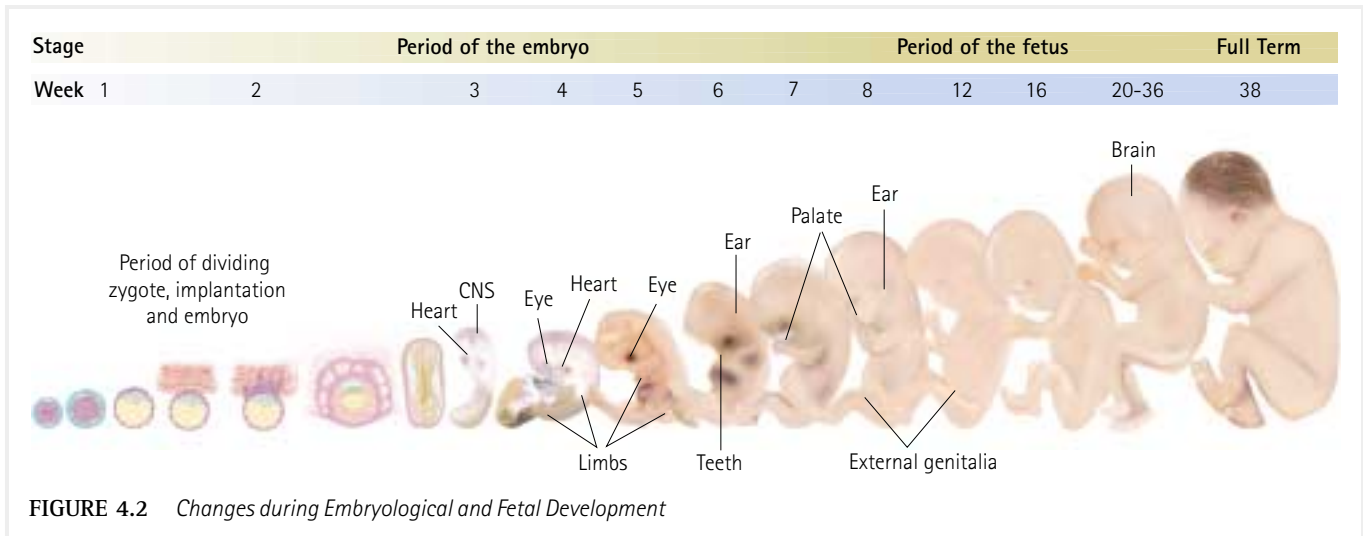
FIGURE 4.1 The Zygote/Blastocyst from Fertilization to Implantation

**zona pellucida** gelatinous outer layer of the ovum.

**monozygotic (identical) twins** two offspring deriving from a single fertilized ovum; these twins, therefore, have an identical genetic makeup.

**dizygotic (fraternal) twins** offspring that develop from separate ova fertilized at the same time.

**blastocyst** a stage of a zygote in which it is a mass of developing cells surrounding a cavity.



form; during the period of the fetus, these structures grow and mature. (During the discussion of pregnancy, you will also note references to three trimesters [first, second, and third], or three periods of roughly 3 months each, which is another common way of breaking pregnancy into stages.) Figure 4.2 summarizes the major changes that occur during embryological and fetal development.

## THE EMBRYO

The developing organism is referred to as an **embryo** from implantation until the 8th week of pregnancy. This 8-week embryonic period is especially critical, because the cells of the organism are differentiating into the various organs of the body at an astounding rate. In fact, the embryo’s weight increases 10,000 times during the first month of pregnancy and an additional 74 times within the second month (Cherry, 1973). As we will discuss in more detail later, because of these rapid and dramatic developmental changes, the embryo is particularly vulnerable to the effects of poor nutrition and toxins.

Early embryonic growth is aided by nutrients from the endometrium of the uterus. However, the **placenta** soon takes over nutritional support. The placenta is a disk-shaped structure that is made up of tissues from both the prenatal organism and the mother and that allows exchange between their circulatory systems. Waste products are removed from the fetus and nutrients are transported from the mother through the placenta by way of the **umbilical cord**. The umbilical cord is a flexible structure that contains two arteries and one vein. These vessels transport blood between the fetus and the placenta.

Another support system, the **amniotic sac**, develops simultaneously with the placenta. This sac forms a protective membrane around the fetus. The **amniotic fluid** within the sac serves as a buffer against temperature changes as well as bumps and bouncing.

## THE FETUS

From the 8th week of gestation to delivery, at about 40 weeks, the developing human is called a **fetus**. The organ systems that first formed during the period of the embryo continue to mature during the period of the fetus. By the end of the first trimester, the fetus has many human physical characteristics, including fingernails, eyelids, and genitals; thus, the sex of the child can be determined even though the fetus is less than 2 inches long.

**embryo** the prenatal organism from implantation on the uterine wall to the 8th week of pregnancy.

**placenta** a disk-shaped structure made up of tissues from both the prenatal organism and the mother that allows for exchange between their circulatory systems. The fetus is attached to the placenta by the umbilical cord, through which it receives nourishment and oxygen, and through which waste products pass.

**umbilical cord** a flexible cord that contains two arteries and one vein. These vessels transport blood between the fetus and the placenta. Waste products move from the fetus and nutrients move to the fetus by way of the umbilical cord.

**amniotic sac** fluid-filled membrane surrounding the fetus.

**amniotic fluid** liquid inside the amniotic sac in which the fetus floats; it provides protection against jarring and bouncing and changes in temperature.

**fetus** the prenatal organism from the 8th week of pregnancy until delivery.



(Upper left) An Embryo at about 5–6 Weeks Gestation; (Upper right) A Fetus at about 11 Weeks Gestation; (Lower left) A Fetus at about 5 Months Gestation; (Lower right) A Fetus at Full Term

In the second trimester, usually around 18 to 20 weeks, the pregnant woman begins to feel the fetus moving. (The fetus has been moving all along, but until this point it was too small for her to feel its movements.) The mother may notice that the fetus is more active at some times than others, which reflects its periods of waking and sleeping. The fetus also responds to sounds and is sensitive to light. The brain has developed considerably by this point, but if the fetus were to be born during the second trimester, it would be highly unlikely to survive. For one thing, the lungs are not yet prepared to extract oxygen from the air. By the third trimester, however, a fetus has a better chance of surviving if born early. By then, the lungs and heart are developed enough for life outside the womb, and the fetus has a layer of fat tissue under the skin to help regulate body temperature. In the third trimester, the fetus is much more responsive to stimulation from the environment, for example, becoming startled at the sound of loud noises such as an alarm clock. The mother may feel less movement from the fetus as the pregnancy nears term because the fetus is getting so large that there is not as much room to move around in the womb.

The fetus usually moves into a head-down position in the 7th month. If the fetus does not turn, it may reach the end of pregnancy in the **breech position**, which is when the buttocks are delivered first. If this position is detected in advance, a doctor

**breech position** fetal position in which the buttocks position themselves in the pelvis first.

can sometimes turn the fetus into the head-down position with external manipulation. Some breech babies are born vaginally, but many require a cesarean section.

**CRITICAL THINKING CHECKPOINT 4.1** *Conception and fetal development are incredibly complex processes. What part of this miracle of life do you find most fascinating? Why?*

## THE EXPERIENCE OF PREGNANCY

Because early prenatal care is so critical to the health of the developing embryo and fetus, it is important that a woman confirm a pregnancy as early as possible. A woman's first clue that she is pregnant is usually a missed menstrual period. Of course, some women miss their periods for other reasons, and pregnant women sometimes bleed when their periods would normally occur. Swelling, tingling, or tenderness in the breasts may occur just days after conception. During the next few weeks, the woman may notice other indications of pregnancy, including fatigue, frequent urination, food aversions, and nausea or vomiting. Nausea or vomiting experienced during pregnancy is generally referred to as **morning sickness**; however, these symptoms can occur at any time during the day or night and sometimes last all day. Other physical evidence later in the first trimester are food cravings, darkening of the areola, the appearance of blue lines on the breasts (a sign of increased blood supply), and changes in the color of cervical and vaginal tissue, detected during a medical exam.

The preceding signs are all considered *possible signs* of pregnancy. *Probable signs* of pregnancy include Hegar's sign. **Hegar's sign** is the softening of the uterus and cervix, which is detected by a physician during a bimanual exam (one hand on the abdomen and two fingers in the vagina). Enlargement of the uterus, another probable sign, is also detected in this way.

A positive pregnancy test is another probable sign of pregnancy. A woman can determine if she is pregnant in the privacy of her own home in only about 5 minutes. Women can choose from among several home pregnancy tests, which are quite accurate (manufacturers report over 99% accuracy in laboratory tests) and easy to use. Home pregnancy tests can detect pregnancy as early as 14 days after conception. The tests work by detecting **human chorionic gonadotropin (hCG)**, a hormone secreted by the placenta and present in a pregnant woman's urine. These tests produce quick results and thus can allow for early prenatal care. However, if a woman gets a false negative result (that is, if the test wrongly indicates that she is *not* pregnant), she may dismiss her symptoms and not seek appropriate care.

Urine tests conducted in a laboratory or physician's office also detect hCG and with nearly 100% accuracy. These tests can be conducted as early as 7 to 10 days after conception. The physician may prefer to use a blood test, which not only detects the fact of pregnancy but also aids in determining how far the pregnancy has progressed by the amount of hCG detected (Eisenberg, Murkoff, & Hathaway, 1991). Signs that confirm pregnancy, or *positive signs*, include a fetal heartbeat, which can be detected anywhere between 10 and 20 weeks; visualization of the embryo via ultrasound, which can be done as early as 4 to 6 weeks; and feeling the fetus move, which occurs not earlier than 16 weeks.

The due date for a pregnancy is calculated by subtracting 3 months from the date of the first day of the last menstrual period, then adding 7 days and 1 year. For example, if a woman is pregnant, and the first day of her last menstrual period was June 28, 2002, she subtracts 3 months to get to March 28, then adds 7 days and 1 year. Her due date is April 4, 2003.



### INTERNET ACTIVITY

Go to <http://www.2bparent.com/prenatal-stimulation.htm>. Would you recommend that a pregnant woman perform prenatal stimulation exercises, such as exposing the fetus to certain sounds or music or making an effort to eat a variety of foods to expand the food preferences of the child? Why or why not?

**morning sickness** nausea or vomiting usually occurring in the morning, especially early in pregnancy.

**Hegar's sign** softening of the uterus and cervix, which is detected by a physician during a bimanual exam and is a probable sign of pregnancy.

**human chorionic gonadotropin (hCG)** a hormone secreted by the placenta. Pregnancy tests detect this hormone in urine as a way of indicating probable pregnancy.

## PHYSICAL CHANGES

When it comes to the experience of pregnancy, no two women are alike. Some women have more symptoms than others. In addition, many women tolerate the changes and symptoms well because the sheer excitement of being pregnant overrides any inconvenience or discomfort. Regardless of the severity of the symptoms or an individual's experience of them, every woman's body changes dramatically during pregnancy. The placenta is producing high levels of estrogen and progesterone, which may account for many of the early signs of pregnancy described above. As the first trimester progresses, these early symptoms may even heighten. The woman's breasts will become fuller and may be tender. She may experience faintness and dizziness as well as heartburn, bloating, indigestion, and flatulence. Later in the pregnancy, she might have to urinate more frequently because of hormonal changes and because the growing uterus puts pressure on the bladder. Many women develop food aversions as well as food cravings.

Virtually all of a pregnant woman's organ systems are undergoing changes and increased activity, but the cardiovascular system is probably affected the most. In fact, cardiac output, which is the amount of blood pumped out of the heart per minute, will increase by as much as 50% during pregnancy. Veins may become more prominent in the abdomen and legs as the blood flow increases to support the developing fetus. A pregnant woman may notice that the veins and capillaries on all surfaces of her skin are more prominent. This occurs because the fetus is generating about as much heat as a 15-watt lightbulb; thus, the body must increase its ability to cool the blood in order to regulate its core temperature and protect the fetus from overheating. By the end of the first trimester, the woman may notice that her clothes are getting snug, not just because the uterus and its contents are growing but because she has started to store a little fat as well. During the second trimester, the body breaks all the "rules" of the metabolic process: No matter how little the woman eats, her body begins to store fat to support the fetus.

By the second trimester, the woman may be feeling less nausea (although some women are nauseous throughout pregnancy). She may also need to urinate less frequently, since there is less pressure on the bladder in the second trimester than in the first and third trimesters; during the second trimester, the fetus is floating in the amniotic fluid and is not yet heavy enough to press on the bladder. The breasts are still enlarged, but they may be less tender. Many women report feeling less fatigued, and still others report having more energy and feeling better than before pregnancy. This may be because their bodies are simply adjusting to the pregnancy; in addition, many women take better care of themselves during pregnancy, which contributes to feelings of well-being. Some women still experience unpleasant physical symptoms, however. For instance, gastrointestinal symptoms such as heartburn may continue, especially as the growing uterus puts pressure on the stomach. The woman may also develop swollen ankles and feet, varicose veins, hemorrhoids, and nasal congestion or occasional nosebleeds; increased body fluids create most of these symptoms. She may also have a little difficulty taking a full breath as the fetus grows and pushes up on the diaphragm.

From about the middle to the end of the second trimester, the woman's breasts may occasionally secrete a yellowish substance called **colostrum**. This is an antibody- and nutrient-rich substance that the nursing baby will consume during the first 24 to 48 hours of life. Also, around the 20th week of pregnancy, the woman may begin to experience uterine contractions. These contractions, called **Braxton-Hicks contractions**, are not labor contractions; they are contractions that are thought to "prepare" the uterus for labor by strengthening the muscles in the uterine wall. They are generally experienced as uncomfortable but not painful, and they begin at the top of the uterus and work their way down, lasting about 30 to 120 seconds. Many women are excited to feel the Braxton-Hicks contractions, and since the abdomen becomes very hard, they can share this event with others.

**colostrum** a thin, clear or yellowish fluid secreted from the breasts in late pregnancy and for about 48 hours after birth. Colostrum contains many nutrients and antibodies that are valuable for the newborn.

**Braxton-Hicks contractions** uncomfortable but not painful contractions that occur around the 20th week of pregnancy that are thought to strengthen uterine muscles to prepare the uterus for labor. They are not part of labor.

All of the other physical symptoms we've described continue throughout the third trimester, and as the woman continues to gain weight, she may find herself quite exhausted at times. As the abdomen stretches to accommodate the growing fetus, the woman's skin also stretches, causing itching. Moisturizers can help relieve any discomfort this causes. In the third trimester, the woman may find it difficult to find a comfortable sleeping position that supports the weight of the fetus. Sleeping on her left side with a large body pillow wedged between her knees and/or under her abdomen is often the solution. Other factors can make sleep difficult as well. Increasing pressure on the bladder may force the woman to get up several times during the night to urinate (which can prepare her for the nights to come when the baby has to be fed throughout the night!). Also, the fetus often becomes more active at night and awakens her by kicking and squirming around. (Pregnant women and those who observe their experiences note that the fetus appears to sleep during the day because the woman's movements lull it to sleep; when the woman becomes still, the fetus wakes up!) Of course, the excitement of feeling the fetus move might just supersede the annoyance of being awakened by these movements. On the positive side is the fact that toward the end of pregnancy, the baby drops into the pelvis in preparation for childbirth; thus, the woman may notice less pressure on her diaphragm, so she can breathe more easily.

## PSYCHOLOGICAL CHANGES

Like the physical changes, the psychological adjustments during pregnancy vary tremendously from one woman to another. The majority of pregnant women (and those who are close to them) experience many emotional ups and downs. These feelings can range from near-ecstasy to tremendous fear, sometimes all within the same day. The physical and hormonal changes a woman experiences during pregnancy can give rise to mood swings. Some women report general edginess and tearfulness, especially early in the pregnancy. Also, in the beginning, a pregnant woman and her partner may experience fears about the health of the baby, which is understandable.

As the pregnancy progresses, many parents start to feel close to the unborn baby. Many people claim that a mother has an advantage over the father or partner because she can feel the baby moving inside her, which creates a special bond. For this reason, it is important that the father or partner be involved during the course of the pregnancy, perhaps by touching the mother's abdomen when the baby kicks, talking to the baby, attending parenting classes, attending a co-ed baby shower, and preparing the nursery. Such involvement minimizes feelings of being left out.

As the end of pregnancy draws near, the excitement mounts and expectations build, sometimes to the point of impatience. After 40 long weeks, the parents are usually eagerly anticipating the birth. One mother likened pregnancy to having a pen pal. She said she felt she had been getting to know this unseen little person throughout the pregnancy via a special form of communication, but she anxiously awaited getting to see and touch her or him for the first time. Despite the pressures of pregnancy and the ensuing life changes, most prepared parents will tell you that their overwhelming feelings at the birth of their baby are joy and elation.



*Sharing pregnancy with the father or partner encourages bonding with the baby.*



## THE EXPERIENCE OF CHILDBIRTH ACROSS CULTURES

The physiological processes of pregnancy and childbirth are very similar for all women, but varying social standards produce experiences that differ tremendously across cultures. Anthropologists have observed that the differences appear on several dimensions and are largely determined by the extent to which the medical establishment is involved in pregnancy and childbirth. Cultures differ with regard to the amount and type of birth preparation women receive, who is present to assist and support women

during labor and delivery, where deliveries typically take place, and who controls the decision-making process during delivery.

Prepared childbirth and prenatal care are formal approaches to educating and preparing a woman (and her partner or support person) for birth. Such birth preparation is common in some cultures, whereas a more informal approach predominates in others. In the United States, the number of women who get prenatal care has increased tremendously over the last two decades. The incidence of prenatal care in the first trimester increased from 75.8% in 1990 to 82.5% in 1997 (although among ethnic minority groups the rate was closer to 70%) (U.S. Department of Health and Human Services, 1999). In other developed countries such as Sweden and Holland, where prenatal care and education are readily obtainable and free, *all* women receive them. In these countries, prenatal preparation is largely guided by well-trained midwives, and only high-risk pregnancies call for the involvement of medical

professionals. Physicians, nurses, and other medical professionals provide most of the prenatal care in the United States.

In the Mayan culture of the Yucatan region of southeastern Mexico and northern Central America, preparation does not occur until the woman is actually in labor and is provided by any of a number of individuals who are there to support and assist during the birth. However, because most women give birth at home, it is unlikely that a woman and her partner will not have observed many births throughout their lives. Thus, they are likely to be fairly well informed before the birth of their first child.

The individuals present at a birth may be either specialists or nonspecialists. The United States is unusual compared to other cultures in that, up until the 1970s, only medical specialists assisted women giving birth. Today, it is increasingly common for one or more family members or friends to be present and even to assist. However, the view of the medical professional as the “expert” who is

Some women and men ease right into parenthood, but parents who do not should not feel guilty. Parenthood usually requires significant life-style adjustments. Increased financial burdens, restrictions on activities, and changes in work habits all require a shift of perspective. It is not unusual or wrong for one or both parents to feel some apprehension and even resentment over the demands of parenthood. One truly loving mother even confessed to feelings of wanting to give her baby up—a fantasy that has crossed many a parent’s mind. Parenthood can be particularly stressful for the professional woman who is expected to shift her focus from career to baby. An equally involved father or partner, however, can reduce her burden.

Like so many aspects of human sexuality, the experience of pregnancy varies not only from person to person but also from one culture to another. *Close Up on Culture: The Experience of Pregnancy Across Cultures* describes the variety.

## SEX DURING PREGNANCY

Sexual intercourse during normal pregnancies is perfectly safe. Some women even report heightened sexual desire during pregnancy, especially during the second trimester, when the nausea is gone but they are not yet big enough to be uncomfortable during intercourse. Sometimes deep penetration may cause some bleeding of the cervix, which is engorged with blood during pregnancy. A pregnant woman who experiences bleeding should consult her doctor to rule out any threat of a miscarriage. With the doctor’s okay, intercourse may resume, albeit less deeply. Most couples try different positions during the course of pregnancy in order to find those most comfortable for both partners. Some

present to “deliver a patient” has not disappeared entirely. This is a highly medicalized approach, which gives most of the control to the physician rather than to the woman and those who support her. In Holland and Sweden, the mother is attended by a midwife (a specialist) and a partner, husband, mother, or anyone else she chooses (a nonspecialist). The general attitude in Holland and Sweden is that the woman is capable of delivering the baby by herself, and the midwife is there simply to assist, encourage, and watch for complications. An even stronger contrast to the U.S. culture is found in the Yucatan, where more nonspecialists than specialists attend and assist in childbirth.

The location of the birth also gives some indication of who is in control of the birth process. In the Yucatan, the woman remains in the familiar surroundings of her home. Only a blanket hung between the hammock in which she delivers and the rest of the living area separates her from everyday life. In Sweden and the United States, nearly all births take

place in a hospital; in Holland, most births used to take place at home, but most now occur in hospitals. Birthing rooms within hospitals or birthing centers, which have cropped up in the United States over the years, are intended to create the feel of a home birth while offering ready access to high-tech interventions in an emergency. Although these are still unfamiliar environments with unfamiliar attendants, for the most part, women seem to feel more comfortable in them than in standard hospital rooms. Nonetheless, the medical personnel maintain ultimate authority over the birth process in these settings.

As we have indicated, cross-cultural differences in birth processes are heavily influenced by who is assigned the role of decision maker. In the Yucatan, everyone present participates in the decision-making process via “negotiated consensus.” In Holland, even hospital deliveries are attended by midwives, as long as there are no major complications; however, the midwives leave most of the decision making to the mother-to-be.

Women are not instructed when to push, for example. Instead, they are asked if they feel ready to push. The view in the Dutch culture is that childbirth is a natural process, which should be allowed to take its own course. Drugs are not given for pain or to speed labor, even if the woman would like them. Swedes, too, assign control to the woman within the hospital system. The woman, for instance, is totally in control of the decision about using pain medication. As in Holland, midwives attend normal hospital deliveries. In the United States, decision making is largely assigned to the medical staff as soon as the woman enters the hospital. Although a woman may choose not to accept the recommendations of medical personnel, it is generally assumed that they are in charge of the birth process.

SOURCE: Unless otherwise indicated, the information above is from B. Jordan & R. Davis-Floyd, *Birth in Four Cultures*, 4th edition (Prospect Heights, IL: Waveland Press, Inc., 1993).

doctors recommend no intercourse during the last month to avoid the possibility of bursting the amniotic sac, which could lead to intrauterine infection.

## RENATAL CARE

Monitor your diet, exercise pattern, and use of medications and other drugs for a week or so after reading this section, and you will realize all the changes a pregnant woman needs to make to ensure the optimal health of her newborn. Of course, not all factors that might affect a developing fetus are under the mother’s control, but many are. Good prenatal care can protect the mother’s health and enhance the probability of having a healthy baby. Many substances known to have an adverse effect on unborn children, called **teratogens**, can be avoided if the mother alters her behavior; however, some, such as environmental toxins, may be difficult to avoid. The impact of the mother’s behavior and of teratogens can be mild to life-threatening; thus, eliminating or at least reducing those factors that can have a negative impact during pregnancy is very important.

## MATERNAL HEALTH PRACTICES

The importance of early checkups, good nutrition, and exercise cannot be overemphasized. Nonetheless, many women do not adhere to these recommendations during pregnancy.

**teratogens** substances that can be dangerous to the health of a fetus.

The backbone of good prenatal care is regular visits to an obstetrician or midwife. Unfortunately, many expectant mothers fail to obtain prenatal care—for a multitude of reasons ranging from socioeconomic and cultural to highly personal. Some women are simply not aware of the importance of prenatal care or are told by important role models in their lives that it is unnecessary. Alternatively, they might be ambivalent about their pregnancy and might postpone getting care because they do not want anyone to know that they are pregnant. Some women believe they cannot afford checkups, but because prenatal care is so important, mothers-to-be who have no health insurance or other means of paying for checkups can get assistance from various public services.

Overall, a pregnant woman should have two dietary goals: getting adequate nutrition and gaining an appropriate amount of weight. A woman who is of average weight before pregnancy should aim to gain 25–35 pounds during pregnancy. Babies who do not receive adequate nutrition during fetal development are more likely to have a low birth weight, which is associated with increased postnatal problems and death (Luke, 1994). Women trying to become pregnant should start taking vitamins, especially folic acid, one of the B vitamins. Folic acid reduces the occurrence of two major spinal cord and brain defects, spina bifida and anencephaly, by 50–70% (American Academy of Pediatrics, Committee on Genetics, 1999; March of Dimes, 1999). Even if a woman does not take vitamins before becoming pregnant, she should definitely take them during pregnancy, in addition to eating a balanced diet. This can be particularly difficult for the woman who is nauseous or who has strong food aversions; finding a balanced diet of foods she can eat may take some finesse.

Because caffeinated beverages are so popular, many women are concerned about caffeine consumption during pregnancy. Moderate consumption of caffeine is generally not associated with preterm delivery or fetal malformations (Golding, 1995; Pastore & Savitz, 1995). However, consumption of large amounts of caffeine (over 30 mg, which is equal to over 2 cups of coffee or 7 cans of soda per day) may be associated with difficulty in conceiving a child, miscarriage, and **intrauterine growth retardation**, or failure of the fetus to grow at a proper rate (Golding, 1995; Stanton & Gray, 1995). Another nonnutritive substance that Americans tend to consume in excess is sugar. There is some evidence that babies born to women who eat a lot of sugar during pregnancy have low birth weights (Lenders et al., 1994). Thus, it is not enough to eat nutritious food; it is also important to avoid eating too much nonnutritious food.

In addition to receiving regular checkups and maintaining a healthy diet, women with normal pregnancies can and should exercise regularly. Safe, moderate aerobic exercise increases the movement of nutrients and oxygen to the fetus. Women who were regular exercisers be-



## INTERNET ACTIVITY

A pregnant woman not only has to take care of herself during her pregnancy, but she also has to take care of the fetus. This means that she must watch her nutrition, exercise, and daily habits. Visit the Web site at: [http://www.storknet.com/ip/staying\\_well/active/pregnancy\\_exercise\\_intro.html](http://www.storknet.com/ip/staying_well/active/pregnancy_exercise_intro.html). What can mothers do to help the fetus remain healthy? What types of activities should women not participate in while pregnant?



*With a doctor's clearance, pregnant women can exercise as strenuously as they did before pregnancy. Exercise is a very vital self-care practice during pregnancy. Walking, cycling, and swimming are generally considered safe; however, pregnant women should avoid activities that may expose them to hard falls, such as downhill or water skiing, diving, rollerblading, and horseback riding.*

**intrauterine growth retardation**  
failure of the fetus to grow at the proper rate.

fore pregnancy can safely continue that level of exercise (American College of Obstetricians and Gynecologists [ACOG], 1994). Even strenuous exercise by women who exercised at high levels before pregnancy is not harmful to the fetus (March of Dimes, 1997). In addition, these “exercised” babies have less body fat and continue to be leaner than other children through at least age 5 (Clapp, 1996). The pregnant woman also benefits from exercise, which reduces fluid retention, hemorrhoids, and varicose veins (Eisenberg et al., 1991). Toning strengthens the back and other parts of the body that are placed under strain during pregnancy and also may be good preparation for childbirth. Squats may increase the size of the pelvic cavity, making delivery easier. In fact, the more women exercise throughout pregnancy, the fewer perceived discomforts they report in late weeks (Sternfeld, Quisenberry, Eskenazi, & Newman, 1995). Exercise can also help to reduce the effects of stress, which can cause complications in the developing fetus.

## RISKS TO PRENATAL DEVELOPMENT

In addition to following good health practices, pregnant women can eliminate those behaviors that are health risks for the developing fetus, primarily consumption of harmful substances. Another risk to fetal development is maternal illness, which is not so easily controlled by the mother.

### Smoking, Alcohol, and Drugs

Smoking may lower both a woman’s ability to conceive and the quality of a man’s sperm. Smoking may decrease a woman’s fertility by as much as 50%, even among women who smoke fewer than 9 cigarettes per day (Aldrete, Eskenazi, & Sholtz, 1995). Men who smoke have sperm that are less dense and motile, less viable, have a shorter life-span, and may be less able to fertilize an egg (Makler, Reiss, Stoller, Blumenfeld, & Brandes, 1993; Zavos, Correa, Antypas, Zarmakoupis-Zavos, & Zarmakoupis, 1998). In addition, smoking is hazardous to the health of a fetus whose mother smokes or is even exposed to others’ smoke. Smoking is the number-one risk factor for low birth weight in babies (Chomitz, Cheung, & Lieberman, 1995). In fact, a woman who smokes is almost twice as likely as a nonsmoker to have a low-birth-weight baby, and this risk increases the more a woman smokes. Nonsmoking women who are exposed to smoke also have lower-birth-weight babies (Eskenazi, Prehn, & Christianson, 1995; Shu, Hatch, Mills, Clemens, & Susser, 1995; Walsh, 1994). Cigarette smoking is associated with devastating events before, during, and after birth, including spontaneous abortion, stillbirth, preterm birth, and up to 25% of cases of sudden infant death syndrome (SIDS) (Action on Smoking and Health, 1999). Children born to smoking mothers also tend to have persistent respiratory problems, ranging from chronic coughing and excess phlegm to bronchitis, pneumonia, and bronchiolitis, and they are twice as likely to develop asthma (Action on Smoking and Health, 1999; Harding, 1995). Compared to children born to nonsmoking women, these children also suffer long-term problems with physical and intellectual development, including mental retardation in some cases (Drews, Murphy, Yeargen-Allsopp, & Decouflé, 1996; Fogelman & Manor, 1988). Pregnant women should not smoke or be around smokers.

Another risk factor for a developing fetus is alcohol consumption. While it is difficult to know how much alcohol is safe, scientists do know that alcohol reaches the fetus through the placenta in about the same concentration found in maternal blood. There have been cases in which maternal consumption of a very small amount of alcohol has had detrimental effects on a baby. In addition, alcohol has been shown to have more significant negative effects on babies born to older mothers (Jacobson, Jacobson, & Sokol, 1996). Since no one can predict the effect that even light drinking will have on a fetus, the American Academy of Pediatrics urges



*When a pregnant woman smokes, all the harmful effects of smoking are transferred to the fetus.*



*Alcohol consumption during pregnancy can have detrimental effects. Children born with FAS often have distinct facial characteristics.*

women to avoid alcohol altogether during pregnancy (American Academy of Pediatrics, 2000). One of the major effects of “excessive” alcohol consumption in pregnancy is **fetal alcohol syndrome (FAS)**. Exactly how much alcohol must be consumed to produce FAS is unclear. FAS produces a specific pattern of physical abnormalities in children, marked by widely spaced eyes, small eye openings, small and upturned noses, and small upper lips. Physical defects of other organs such as the heart and genitals may be present as well. These children commonly experience intrauterine and postnatal growth retardation, failure to thrive, and a higher risk of perinatal death. In addition, they are generally mentally retarded and uncoordinated and may display symptoms of hyperactivity (Applebaum, 1995).



## INTERNET ACTIVITY

The effects of drug and alcohol exposure on the fetus are far-reaching. Go to <http://www.choptop.com/archfs49.htm>, where you can review a description of these effects. In addition, you can learn about strategies for managing a child who has lasting problems from drug or alcohol exposure. Discuss these strategies and the difficulties that caretakers must endure.

In addition to cigarettes and alcohol, some prescription medications have been shown to have particularly detrimental effects, immediate or delayed. Thalidomide is a prime example of a drug that has an immediate and devastating effect on the fetus, although it was originally regarded as a miracle drug. Thalidomide, prescribed in the early 1960s as a sedative and a treatment for influenza, was found to cause severe malformations of fetal arms and legs when taken between the 4th and 6th week of pregnancy. Diethylstilbestrol (DES), another supposed “miracle drug” that was given to prevent miscarriages, was found to have delayed effects on female offspring whose mothers took it while pregnant.

Women exposed *in utero* (while in the womb) to DES were found to have a greater risk of cervical cancer than nonexposed women. More recently, a drug used for acne, Accutane, has been shown to cause birth defects in one out of five pregnancies. It can also increase the risk of miscarriage; of defects of the nervous system, skull, and face; and of cleft palate. In addition, nonsteroidal antiinflammatory medications such as ibuprofen may cause high blood pressure in the neonate’s lungs if a woman takes them during her second or third trimester (Schneider, 1997). Certain antibiotics also present a risk to the developing fetus. Tetracycline is known to combine with calcium in the bones and teeth of the fetus if the mother ingests it from the middle to the end of pregnancy. It results in brown teeth, increased risk of cavities, and possibly retarded bone growth. Another antibiotic, streptomycin, may cause deafness.

Like some legal drugs, illicit drugs also pose specific risks to the developing fetus. Drug use during pregnancy has been associated with premature separation of the placenta, premature birth, intrauterine growth retardation, brain hemorrhage, perinatal death, and withdrawal symptoms in the newborn. Addicted babies tend to be hyperactive and developmentally delayed and to have attention deficits and other behavioral problems. In addition, the health and safety of a baby whose mother, father, or other household member is abusing or addicted to drugs, whether illegal or legal, may be at risk. Thus, both the specific physical effects of being exposed to drugs in the womb and the psychosocial implications of having a drug-abusing caregiver are grave concerns.

**CRITICAL THINKING CHECKPOINT 4.2** *Many maternal behaviors can have an effect on the developing fetus. Do you think women who take drugs that are known to have major negative effects on unborn fetuses should be punished? Why or why not? If so, how should they be punished? How might they be helped? Should pregnant women who smoke, drink alcohol, or eat a poor diet suffer consequences? If you answered yes to the first question but no to the last, where do you think the line should be drawn?*

**fetal alcohol syndrome (FAS)** moderate to severe physical abnormalities in children produced by the mother’s regular bouts of heavy alcohol consumption during pregnancy.

## MATERNAL ILLNESS

There are several maternal illnesses that can affect the developing fetus. *Rubella*, or German measles, is a virus that was a much greater threat before the majority of children were immunized against it. However, it is still a primary cause of congenital anomalies. If a pregnant woman becomes ill with rubella, the virus is capable of causing malforma-

tions, hearing problems, cataracts, mental retardation, and other complications in her baby, especially if her illness occurs in the first trimester during early cell differentiation (Ornoy & Arnon, 1993). A woman who knows she was never immunized against rubella may wish to be vaccinated at least 3 months before becoming pregnant; vaccination during pregnancy can transmit rubella to the fetus (Eisenberg et al., 1991; Oster, 1999).

Sexually transmissible infections can affect the fetus as well. *Human immunodeficiency virus (HIV)* can be transmitted to the baby from an HIV-infected mother. Transmission may occur through the placenta during pregnancy as well as during childbirth. A neonate who contracts HIV usually develops AIDS quickly and typically dies before age 2 (Berkow, 1992). Fortunately, researchers have made progress in decreasing the likelihood of transmission of HIV to newborns. *Herpes simplex virus (HSV)* can be passed to the newborn during childbirth if the mother has an active herpes lesion. Because the newborn's immune system is immature, HSV can have a much more severe impact on neonates than on adults. Although HSV-infected adults usually suffer only the annoying lesions, the virus can cause blindness and can even be fatal to newborns. However, the chances of a newborn's being infected are very low if no lesion is present. A *cesarean section*—removal of the baby through an incision made through the abdominal wall and uterus—may be necessary if a lesion is detected. *Chlamydia*, a sexually transmissible bacteria, has a high risk of fetal transmission, in part because it often persists in women as a low-grade, undetected infection (Morell, 1995). If untreated, it may cause preterm labor and premature rupture of the amniotic sac. It can also cause pneumonia and eye infections in newborns.

## **P**RENATAL MEDICAL COMPLICATIONS

Most women have relatively uncomplicated pregnancies. However, there are several medical complications that may threaten the health of the mother or the fetus, or both. A pregnant woman should know her risk for developing any of these conditions and should be alert for the signs and symptoms. A quick response can often reduce or eliminate their harmful impact.

### ECTOPIC PREGNANCY

An **ectopic pregnancy** occurs when the zygote becomes implanted somewhere other than in the uterus, usually in the fallopian tube (which is why such a pregnancy is often referred to as a *tubal pregnancy*) but sometimes on the surface of an ovary, on the cervix, or even in the abdominal or pelvic cavity. The misplaced implantation commonly occurs because the fallopian tube is blocked by scar tissue from a prior infection (such as pelvic inflammatory disease) or is twisted so that the zygote cannot pass into the uterus. An ectopic pregnancy that is undetected can be very dangerous because the fallopian tube will eventually rupture at the site of the zygote, causing severe abdominal pain and bleeding. A woman should see her doctor or midwife if she experiences any of these symptoms early in pregnancy: painful cramps on one side of the lower abdomen that radiate out into the abdomen, brown spotting or bleeding from the vagina, shoulder pain, or rectal pressure. Other symptoms include nausea, vomiting, dizziness, and weakness, although these are common to most pregnancies.

### SPONTANEOUS ABORTION AND LATE MISCARRIAGE

Occasionally, an embryo or fetus is expelled from the uterus before it can survive outside the womb. The general term for this event is **miscarriage**. A miscarriage that occurs early in pregnancy (within the first trimester, usually between 6 and 10 weeks) is called **spontaneous abortion**. Spontaneous abortion is very common, occurring in

**ectopic pregnancy** implantation of a fertilized egg somewhere other than in the uterus.

**miscarriage** expulsion of the embryo before it can survive outside the womb.

**spontaneous abortion** a miscarriage that occurs early in pregnancy, within the first trimester but usually between 6 and 10 weeks.

about 15–20% of all known pregnancies (Morales & Inlander, 1991) and in up to 40% of all pregnancies (Eisenberg et al., 1991). In other words, many women miscarry before they know they are pregnant. A spontaneous abortion may seem to the woman like an especially heavy and symptomatic menstrual period, since the most common signs are bleeding, cramping, and pain in the lower abdomen. The cause of a spontaneous abortion is often unknown but is typically a fetal abnormality, inadequate levels of hormones needed to support the pregnancy, or an immune reaction to the embryo (Eisenberg, Murkoff, & Hathaway, 1991).

A miscarriage that occurs after the first trimester and no later than the 20th week of gestation is called a **late miscarriage**. Poor maternal health, use of drugs or alcohol, poor uterine or cervical conditions, and environmental toxins are generally responsible for late miscarriages. A woman who has symptoms of a miscarriage should contact her physician immediately. Continuous pink or brown vaginal discharge sometimes signals an impending miscarriage. If heavy cramping and bleeding occur, a miscarriage is most likely. Unlike an early miscarriage, a late miscarriage may feel more like labor. A large gray and red clot is expelled. However distressing it may be for the woman, giving the mass of tissue to her physician may allow the cause of the miscarriage to be determined.

## PREMATURITY AND POSTMATURITY

Labor that begins between the 20th and 37th weeks of pregnancy is called **preterm labor**. If preterm labor is not stopped and delivery occurs, the neonate is referred to as a **premature infant**, and its birth is considered a **preterm birth**. (The birth is a **stillbirth** if the fetus is dead at birth.) The longer a baby remains in the womb, the better its chance of survival. Therefore, if preterm labor occurs, every effort is made to postpone delivery as long as neither the mother nor the fetus is in danger. The physician might prescribe bed rest and instruct the mother to limit her physical activity. Occasionally, medication may be given to relax the uterine muscles (Epps & Stewart, 1995). Factors commonly related to premature births are heavy smoking, poor nutrition, and poor maternal health; however, the cause of many premature deliveries is not known.

Thanks to modern medicine, many premature infants survive. They are usually kept in an incubator in a neonatal intensive care unit (NICU). Depending on whether the neonate's lungs are developed sufficiently, he or she may be placed on a respirator and other life supports. Human contact is believed to be helpful to the survival of premature infants, and parents and hospital staff are generally encouraged to touch and handle these babies to the greatest extent possible. Breast-feeding is encouraged if at all possible. A premature infant who lives through the first week has a good chance of surviving.

**late miscarriage** death of a fetus after the first trimester and no later than the 20th week of gestation.

**preterm labor** labor beginning between the 20th and 37th week of gestation.

**premature infant** a baby delivered between the 20th and 37th week of gestation.

**preterm birth** delivery of a fetus any time after the 20th week of gestation.

**stillbirth** birth of a dead fetus.



*Scientific advances help medical professionals protect infants who are not quite ready for the world.*

A baby is considered a **postmature infant** if the mother has not delivered by the 42nd week of gestation. After this time, the support system for the fetus, the placenta in particular, may begin to break down and not provide adequate nutrients and oxygen. In most cases, if a baby has not been delivered by 2 weeks past the woman's due date, labor is induced using a drug that causes contractions.

## PREGNANCY-INDUCED HYPERTENSION

A woman with **pregnancy-induced hypertension**, also known as **preeclampsia**, experiences high blood pressure induced by pregnancy. Related symptoms include poor liver and kidney function, reduced urine output, protein in the urine, swelling of the hands and face and sudden weight gain (both caused by water retention), headaches, dizziness, blurred vision, itching, irritability, and stomach pain. Preeclampsia develops in from 7% to 12% of pregnant women (Chesley & Lindheimer, 1979; Sibai & Anderson, 1991). It is more common among African American women (Chesley & Lindheimer, 1979). Its exact cause is unknown, but poor nutrition is thought to be one factor. Drastic reduction of salt in the diet is generally recommended, and nutritional supplements, diuretics, and other hypertensive medications may be prescribed. Doctors commonly prescribe bed rest, and hospitalization may become necessary. In addition, relaxation therapy, hypnosis, and biofeedback have been used to help control high blood pressure in pregnancy (Little et al., 1984; Smith, 1989; Somers, Gervitz, Jasin, & Chin, 1989). The condition of the fetus is monitored daily, and if there are signs of fetal distress, a preterm delivery is initiated by induction of labor or cesarean section. In the most severe cases, preeclampsia may develop into **eclampsia**, which involves the onset of one or more convulsions and can result in a coma. This condition is very rare (Cunningham, McDonald, & Gant, 1989) and usually does not develop until late in pregnancy. Once the immediate crisis is over, the woman will generally be kept in a darkened room to minimize stimulation from the environment. If the mother remains stable, the baby is usually delivered either by induction of labor or by cesarean section.

## Rh INCOMPATIBILITY

Rh is an antigen, or protein, on the surface of blood cells that is responsible for producing an immune response. **Rh incompatibility** can occur when the father of a baby is Rh positive (his blood contains the Rh antigen) and the mother is Rh negative (her blood does not have the Rh antigen). If the fetus is Rh positive like the father, and blood from the fetus makes contact with the mother's blood, her body begins to produce antibodies to the Rh antigen. Usually this is no problem for the first pregnancy, because the baby's blood generally only mixes with the mother's blood during delivery. During a subsequent pregnancy, however, the mother's body may produce antibodies in reaction to an Rh-positive fetus. These antibodies cross the placenta and attack the fetus's red blood cells, producing anemia in the fetus. If the mother has a high level of antibodies, the condition can be particularly threatening. Good prenatal care can prevent the dangerous effects of Rh incompatibility. With careful monitoring, several interventions can be used as needed to prevent complications. In the most severe cases, blood transfusion to the fetus or to the newborn immediately after birth may be necessary. Only about 15% of women are Rh negative, making the likelihood of Rh incompatibility very low (Eisenberg, Murkoff, & Hathaway, 1991).

**postmature infant** a baby delivered after the 42nd week of gestation.

**pregnancy-induced hypertension, or preeclampsia** high blood pressure during pregnancy; can result in poor liver and kidney function, reduced urine output, protein in the urine, swelling of the hands and face and sudden weight gain (both caused by water retention), headaches, dizziness, blurred vision, itching, irritability, and stomach pain.

**eclampsia** severely high blood pressure during pregnancy that can cause convulsions and coma.

**Rh incompatibility** a complication of pregnancy that can occur when the father is Rh positive (his blood contains the Rh antigen) and the mother is Rh negative (her blood does not have the Rh antigen). If the fetus inherits Rh-positive blood from the father, and blood from the fetus makes contact with the mother's blood, her body begins to produce antibodies to the Rh factor. Her body, therefore, will attempt to reject the fetus containing the Rh factor.

**CRITICAL THINKING CHECKPOINT 4.3** *So many things can go wrong during pregnancy that it seems like a miracle that most pregnancies remain free of complications. Nonetheless, bad things do happen to good people during pregnancy. Imagine that you are an administrator at the National Institutes of Health, a major funding source for medical research. To which of the prenatal complications discussed in this section would you devote research funds? Explain your choice(s).*

## INFERTILITY AND TECHNOLOGICAL ADVANCES IN CONCEPTION

Some people who would like to become parents cannot do so without special assistance. These people are experiencing problems of **infertility**. Infertility is the inability to conceive after 1 year of unprotected sexual intercourse. In the United States, 18% of married couples who have no children are infertile, and approximately 8% of all couples in which the woman is of childbearing age are infertile. For women, the age of peak fertility is 22; female fertility decreases with age, dropping by 50% by age 43 (Mosher & Pratt, 1990).

Approximately 40% of infertility problems in couples are caused by male factors, and another 40% are explained by female factors. Approximately 10% of infertility problems result from a combination of male and female factors, and the remaining 10% are of unknown origin (Meyers et al., 1995).

### MALE FACTOR INFERTILITY

Male factor infertility is generally caused by low sperm count, inability of the sperm to move properly or to survive, or structural abnormalities in the sperm (Meyers et al., 1995). The first step in evaluating sperm for such problems is to obtain a sample of ejaculate and count the sperm. Any number under 20 million points to low sperm count as a possible cause of the infertility. In addition to sperm count, semen quantity and quality (including pH) are examined to determine if the semen is sustaining the life of the spermatozoa and supporting their movement. Finally, the sperm are assessed for adequate motility and for structural defects. The number of well-functioning sperm is perhaps more important than the actual sperm count (Corson, 1990). Occasionally, a **sperm penetration analysis**, also known as the **hamster egg test**, is conducted to determine if the sperm can penetrate an egg. A sample of sperm is incubated with numerous hamster eggs from which the zona pellucida has been removed. The number of sperm successfully penetrating the eggs is then analyzed. This test is somewhat controversial, particularly because scientists disagree as to whether hamster egg penetration is comparable to human egg penetration (Harkness, 1992).

Because poor sperm production may result from hormonal imbalances, a man's levels of testosterone, FSH, and LH may be analyzed. Structural abnormalities or damage from previous infection may also account for male infertility problems. Ultrasound is sometimes conducted to rule out blockage of or damage to the vas deferens or spermatic ducts due to such causes. The man is also checked for a *varicocele*, a mass of varicose veins in the scrotum known to affect sperm count and quality (Harkness, 1992).

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### FEMALE FACTOR INFERTILITY

Infertility in the female primarily arises from blocked fallopian tubes, ovulation disorders, or, to a lesser extent, endometriosis (Healy, Trounson, & Andersen, 1994). Depending on the condition suspected, any of a number of tests may be conducted to assess female factor infertility. Levels of hormones, including estrogen, progesterone, LH, and FSH, are analyzed. The woman may also be tested for an abnormally high level of naturally occurring sperm antibodies that kill the sperm before they can reach the egg cell. A postcoital test may also be conducted by extracting a small amount of cervical mucus and analyzing it for surviving sperm. An infertile woman is typically asked to record her basal body temperature to check for signs of ovulation. More invasive laparoscopic methods may be used, to allow the physician to view the physical condition of the uterus, fallopian tubes, and ovaries. Tubal and uterine damage or defects may be



#### INTERNET ACTIVITY

For the couple with fertility problems, any emotional upset can be compounded by the lack of understanding exhibited by friends and family. Go to RESOLVE's Infertility Myths and Facts page at <http://www.resolve.org/mythfact.htm>. Have you heard (or even repeated) any of these myths before?

**infertility** the inability to conceive a child after 1 year of trying to become pregnant.

**sperm penetration analysis** a test of infertility that assesses the ability of sperm to penetrate an ovum. A sample of sperm is incubated with numerous hamster eggs from which the zona pellucida has been removed. The number of sperm successfully penetrating the eggs is then analyzed. Thus the test is also called the *hamster egg test*.

assessed using a technique called *hysterosalpingography*, which involves injecting a dye through the cervix into the uterus, then viewing it with X-rays. If the uterus is unobstructed, the dye will move from the uterus to the fallopian tubes and spill out of the tubes and into the abdominal cavity (Corson, 1990).

## INTERVENTIONS FOR INFERTILITY

Reproductive technology has advanced in recent decades, but the techniques are still being refined, vary widely in terms of success rates, and can be very expensive. Nevertheless, every year many thousands of couples seek out medical interventions for their infertility problems.

### Artificial Insemination

**Artificial insemination (AI)** is commonly used in cases of male factor infertility. This procedure involves obtaining a sample of ejaculate, selecting only the most motile sperm through a method called “washing,” and inserting the ejaculate into the woman. Two methods of insertion are common. One involves putting the sperm sample into a cap that fits tightly over the cervix. This procedure protects the sperm against the hostile vaginal environment and gives them a better chance of survival. Intrauterine insemination (IUI), involving injection of “washed” sperm into the uterus, is also used. Recent evidence suggests that IUI is more effective than the cervical cap method in achieving pregnancy (Williams et al., 1995). Artificial insemination may be conducted with the husband’s or partner’s sperm (AIH) or with donor sperm (AID).

### Drug Therapy

When infertility is the result of the woman’s inability to produce an egg, clomiphene citrate (trade name Clomid or Serophene) or preparations of human LH and FSH (trade name Pergonal or Menotropin) can be given to induce ovulation. Both of these drugs, however, have numerous negative side effects. First, because they induce the maturation of several egg cells at once, multiple gestations are common. Clomiphene also can cause enlargement of the ovaries, and Pergonal can produce large ovarian cysts (Corson, 1990). Finally, clomiphene has been associated with increased risk of ovarian cancer in several studies (Harris, Whittemore, Itnyre, & Collaborative Ovarian Cancer Group, 1992; Horn-Ross, Whittemore, Harris, Itnyre, & Collaborative Ovarian Cancer Group, 1992; Whittemore, Harris, Itnyre, & Collaborative Ovarian Cancer Group, 1992).

### Assisted Reproductive Technologies (ART)

More complicated techniques are available to couples who fail to conceive using AI or drug therapy. **In vitro fertilization (IVF)** involves the harvesting of eggs from the woman’s or a donor’s ovary using ultrasound and aspiration (suctioning out) of the eggs. Fertility drugs such as clomiphene are often used prior to harvesting to promote egg development. The eggs are combined with the partner’s or donor’s sperm in a petri dish so that fertilization can take place. One or more fertilized eggs are removed from the dish 2 to 3 days later and inserted into the uterus through the cervix. The woman is given a pregnancy test about 10 days after the procedure to determine if implantation occurred (Harkness, 1992).

Several refinements of IVF are increasingly used. **Gamete intrafallopian transfer (GIFT)** is one such procedure. GIFT involves the harvesting of eggs from the ovary just as in IVF. But in this case, the eggs are combined with sperm, and both are injected into the fallopian tubes to foster natural fertilization and subsequent implantation. **Zygote intrafallopian transfer (ZIFT)** is like IVF except that the ovum is fertilized outside of the woman’s body and then inserted into the fallopian tube instead of the uterus. Yet another technique is called **frozen embryo transfer (FET)**. As the name implies, frozen embryos developed from eggs previously harvested and fertilized are inserted into a woman’s uterus. Finally, a technique known as **intracytoplasmic sperm injection**

**artificial insemination (AI)** process whereby sperm are collected from a donor and deposited in a woman’s uterus.

**in vitro fertilization (IVF)** a procedure involving the harvesting of eggs from a woman’s ovary using ultrasound and aspiration of the eggs, combining them with sperm in a petri dish to foster fertilization, and then inserting one or more fertilized eggs into the uterus through the cervix 2 to 3 days later.

**gamete intrafallopian transfer (GIFT)** a procedure involving harvesting eggs from an ovary, combining them with sperm, and injecting them into the fallopian tubes to foster natural fertilization and subsequent implantation.

**zygote intrafallopian transfer (ZIFT)** a procedure involving harvesting eggs from a woman’s ovary, combining them with sperm in a petri dish to foster fertilization, and inserting them into the fallopian tube 2 to 3 days later.

**frozen embryo transfer (FET)** a procedure in which frozen embryos are injected into the the uterus of a woman in an attempt to impregnate her.

**intracytoplasmic sperm injection** a procedure involving injection of sperm directly into the cytoplasm of an ovum to foster conception. This procedure is particularly useful in cases where few sperm are available or the sperm have functional abnormalities.

seems to be particularly useful in cases where few sperm are available or the sperm have functional abnormalities. This process involves injection of the sperm directly into the cytoplasm of the ovum (Palermo, Cohen, Alikani, Adler, & Rosenwaks, 1995).

## Surrogate Motherhood

Surrogate motherhood is an option available to a woman whose uterus is incapable of carrying a fetus. The Ethics Committee of the American Fertility Society (1986) defines a **surrogate mother** as “a woman who is artificially inseminated with the sperm of a man who is not her husband; she carries the pregnancy to term and then turns the resulting child over to the man to rear” (p. 62). In most cases of surrogate motherhood, a couple contracts with another woman to produce a child for them using the man’s sperm. In such cases, the woman who does not bear the child is not genetically related to the baby and so must adopt the child after the birth. However, if she is capable of producing an egg but cannot carry the baby herself, IVF can be performed with her egg and her partner’s sperm. The resulting zygote is inserted into the uterus of another woman who has agreed to carry the fetus for the biological parents. Alternatively, IVF may be used with a donor’s egg and the man’s sperm. In both of these cases, the surrogate mother is not genetically related to the fetus she carries.

In U.S. culture, we tend to hold sacred the bond between mother and infant and find it difficult to understand how a woman could deliberately become impregnated, nurture the baby through the pregnancy, and then part with the baby immediately after delivery. The media attention given to cases in which surrogate mothers changed their minds about giving the baby away seems to indicate that a surrogate mother is traumatized by the loss of the infant and cannot easily relinquish the child. Such cases have been highly publicized, but, in fact, there have been about 4,000 surrogate pregnancies, and few of them have ended in legal hassles (Bromham, 1992; Hanafin, 1996). In addition, when a surrogate has been properly screened, no controversy has ever arisen (Litz, 1996).

**CRITICAL THINKING CHECKPOINT 4.4** *Drugs and technological interventions for infertility are becoming more common but are often expensive and sometimes unsuccessful. Assume you are ready to have a child but have tried for a full year without success. How far would you go in the infertility treatment process? What factors would influence how far you would go—religious, moral, financial, life-style and family, or others?*

## ADVANCES IN TESTING FOR AND TREATING FETAL PROBLEMS

Just as medical advances have improved fertility options for potential parents, so too have they affected the health of the developing fetus. In this section we will discuss some medical techniques used to detect genetic or physical defects in the fetus.

### MATERNAL SERUM ALPHA-FETOPROTEIN TESTING

Levels of **maternal serum alpha-fetoprotein (MSAFP)** are routinely tested during pregnancy to identify potential problems. A relatively simple blood test on a pregnant woman at around 16–18 weeks can indicate if further testing is necessary. High levels of AFP, a substance produced by the fetus, are indicative of neural tube defects (Canick & Saller, 1993). Such defects include spina bifida, a spinal cord deformity, and anencephaly, a condition in which most or all of the fetus’s brain is absent. Very low levels of AFP point to an increased risk of Down syndrome. The test is not a precise indicator of any disorder, however; thus, if a woman tests abnormally high or low, a retest followed by ultrasound, amniocentesis, and genetic counseling is advised to determine if any abnormal condition exists.

**surrogate mother** a woman who is artificially inseminated with the sperm of a man who is not her husband; she carries the pregnancy to term and then turns the child over to the sperm donor.

**maternal serum alpha-fetoprotein (MSAFP)** a substance produced by the fetus and found in the mother’s blood. High levels of AFP in the mother’s blood indicate the possibility of fetal neurological abnormalities, and very low levels of AFP are indicative of an increased risk of fetal Down syndrome.

## ULTRASONOGRAPHY

**Ultrasound technology** has had a tremendous impact on obstetrics as well as on other areas of medicine. *Ultrasound* is sound that is inaudible to human ears. The diagnostic use of ultrasound waves is technically called *ultrasonography*. This technique allows a visualization of the developing fetus. A *transducer* (a device that emits sound waves and detects the echoes of the sound waves bouncing off objects) is either placed on the abdomen or inserted into the vagina. As the transducer is moved around, different areas are visualized on a videolike screen and recorded. The transducer is moved until an image of the fetus can be seen. The resulting picture is called an *ultrasonogram*, or simply a *sonogram*.

An ultrasound screening may be conducted as early as 5 weeks into a pregnancy. It is used for several purposes: (1) to determine fetal age (by size) and therefore verify a due date; (2) to check for ectopic pregnancy or other causes of spotting or bleeding; (3) to look for multiple fetuses; (4) to determine the sex of the fetus; (5) to identify physical abnormalities; (6) to detect signs of genetic abnormalities; and (7) to guide amniocentesis and CVS procedures (described below) (Eisenberg et al., 1991; Sanders, 1993).

The use of ultrasound has no known risks to the mother or fetus; thus, some obstetricians routinely order sonograms. However, some physicians are reluctant to use them unnecessarily because risks might be discovered in the future.

## AMNIOCENTESIS

In **amniocentesis**, amniotic fluid, which contains fetal cells, microorganisms, and chemicals, is extracted by inserting a needle through the abdomen and into the amniotic cavity (see Figure 4.3). This process is guided by the use of ultrasound. The test is performed



An ultrasound exam allows parents to see their growing fetus at different stages of development. It also allows medical professionals to assess for proper development and complications.

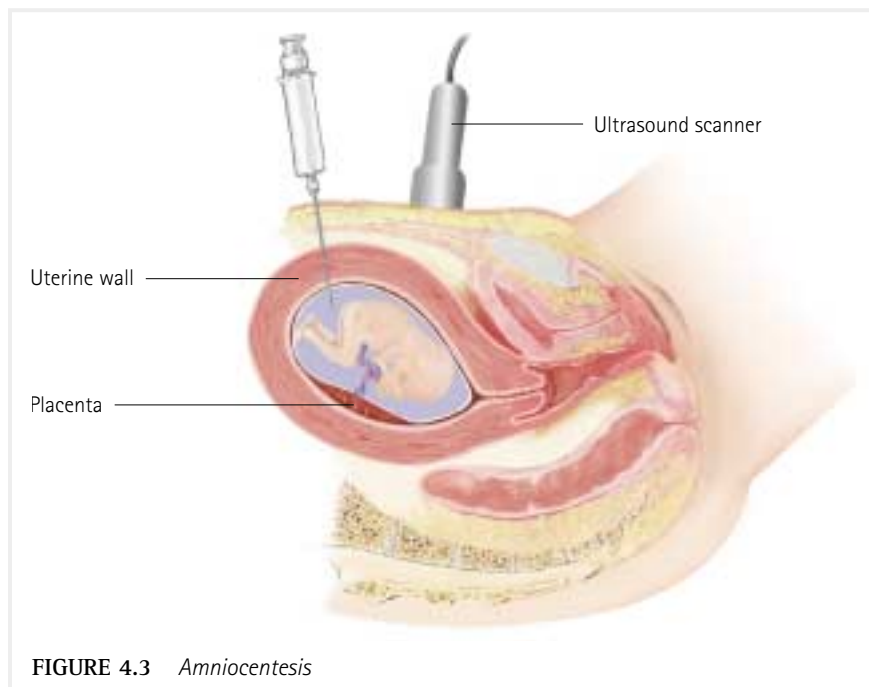


FIGURE 4.3 Amniocentesis

**ultrasound technology** a technique that uses sound waves to produce a two-dimensional image of internal body structures, including fetuses; the resulting image is called a *sonogram*.  
**amniocentesis** a diagnostic procedure in which amniotic fluid is removed from the amniotic sac to test for some fetal defects.

between 14 and 20 weeks of gestation and is used to determine the genetic makeup as well as the age of the fetus. Neural tube defects can be detected by this method as well. Fetal death from amniocentesis may be as high as 0.5%; thus, it should only be performed when the benefits are believed to outweigh the risks (Shulman & Elias, 1993).

Amniocentesis is generally recommended for pregnant women over the age of 35 because of the significant increase in genetic abnormalities in babies born to women above this age. Couples who have already had one child with a chromosomal abnormality or have a child or close relative with a neural tube defect are advised to have amniocentesis, possibly coupled with genetic counseling. Couples known to be at risk for other genetic disorders or detectable diseases such as Huntington's chorea or Tay-Sachs disease are also advised to be tested. Amniocentesis is often used as a follow-up to confirm the findings of other less invasive tests such as MSAFP or a sonogram. Amniocentesis tends to be highly accurate; however, because errors are possible, a second amniocentesis or other diagnostic tests may be recommended to confirm findings (Shulman & Elias, 1993).

## CHORIONIC VILLI SAMPLING

Because many parents want results of genetic testing as early in the pregnancy as possible and because some conditions can only be treated if detected early in the pregnancy (Shulman & Elias, 1993), researchers are exploring the use of amniocentesis

before the 14th week of gestation. However, there is often not enough amniotic fluid available that early to do that procedure. Another procedure, known as **chorionic villi sampling (CVS)**, can be performed early in pregnancy and is becoming more popular as it becomes more refined and more readily available. CVS can be conducted in the first trimester, when the pregnancy is not apparent to others and when a first-term abortion is still an option. CVS involves sampling the chorionic villi, which are fingerlike projections of the *chorion*, or the membrane on the fetal side of the placenta. A long tube is inserted either through the cervix (a transcervical procedure) or into the abdomen (a transabdominal procedure), and chorionic tissue is either suctioned or cut off and retrieved through the tube.

CVS is performed between 9 and 12 weeks of gestation and is no more risky than amniocentesis (Shulman & Elias, 1993). Early reports on relatively small numbers of CVS recipients indicated that CVS might have a higher fetal death rate than amniocentesis and might cause malformations in the fetus's arms and legs (Froster & Jackson, 1996). However, more recent research has shown that limb defects are no more likely in fetuses tested by CVS than in those not tested (Froster & Jackson, 1996; Kuliev et al., 1996). CVS is less useful than amniocentesis, in

that it cannot be used to detect neural tube defects and anterior abdominal wall defects (Shulman & Elias, 1993).



### INTERNET ACTIVITY

The possibilities for correcting fetal abnormalities are astounding. Go to <http://www.fetal-surgery.com> and read the information there. Then click on "Pictures," which takes you to two photos taken during fetal surgery. Click on each of these and read the stories behind them. What is your position on fetal surgery for conditions like spina bifida? Should parents risk the life of the fetus to reduce or eliminate the crippling effects of spina bifida?

## LABOR AND DELIVERY

As the end of pregnancy approaches, a pregnant woman is often simultaneously excited in anticipation of the big event and more than a bit weary, owing largely to the extra weight she is carrying. Along with feelings of excitement, anticipation, and even irritability, physical changes begin to signal that she is ready to go into labor. Labor involves a series of changes that occur over varying lengths of time and that ultimately prepare the body for the delivery of the newborn. The experience of labor is different for each woman, and not all women go through each of the changes of the typical labor and delivery, as described in the following sections.

**chorionic villi sampling** a diagnostic procedure in which tissue from the chorion of the placenta is removed and tested for certain fetal abnormalities.

## PREPARING FOR LABOR

Several changes take place before labor actually commences. First, many women report feeling a burst of energy and an increase in activity level just before they go into labor. One of the first physical signs that the body is preparing for labor and delivery is **lightening and engagement**, or the descent of the fetus into the pelvic region. First-time mothers usually experience this event between 2 and 4 weeks prior to onset of labor; in subsequent pregnancies, lightening and engagement may not occur until labor has begun. A good sign that lightening and engagement has occurred is that the woman finds she can breathe better, because the pressure on her diaphragm has decreased. The fetus's movement downward may increase pressure on the bladder, however, causing the woman to have to urinate more frequently. Many women also report pressure in the rectum and pelvis and lower back pain after lightening and engagement has occurred.

Another change that occurs late in pregnancy is cessation of weight gain; some pregnant women even lose a couple of pounds in the final weeks. Vaginal secretions increase and become thicker, and as the cervix thins out (a process called **effacement**) and begins to dilate in preparation for delivery, a woman may notice a pinkish discharge, called a "bloody show." The blood comes from capillaries, which burst as the cervix effaces and dilates. Not every woman experiences or notices this change, but a woman who does should be prepared to go into labor within the next 24 hours. Also, as the cervix dilates, a **mucus plug** that sealed its opening may be discharged. If the amniotic sac ruptures, clear liquid gushes from the vagina; this event is commonly referred to as "the water breaking." Because amniotic fluid continues to be produced, a woman whose water has broken continues to experience leakage until delivery. Labor generally begins within 12 hours after a woman's water breaks. The longer the time between the rupturing of the protective membrane and delivery, the greater the risk of infection; thus, most physicians induce labor within 24 hours of the water breaking if it does not begin spontaneously during that period. Also, if the amniotic sac fails to rupture naturally, the physician breaks it once labor has started.

## STAGES OF LABOR AND DELIVERY

As soon as a woman starts to feel contractions, she should time them to determine their frequency. When contractions come every 5 to 20 minutes, last 30 to 60 seconds, and become stronger, longer, and increasingly close together, the woman most likely is in labor.

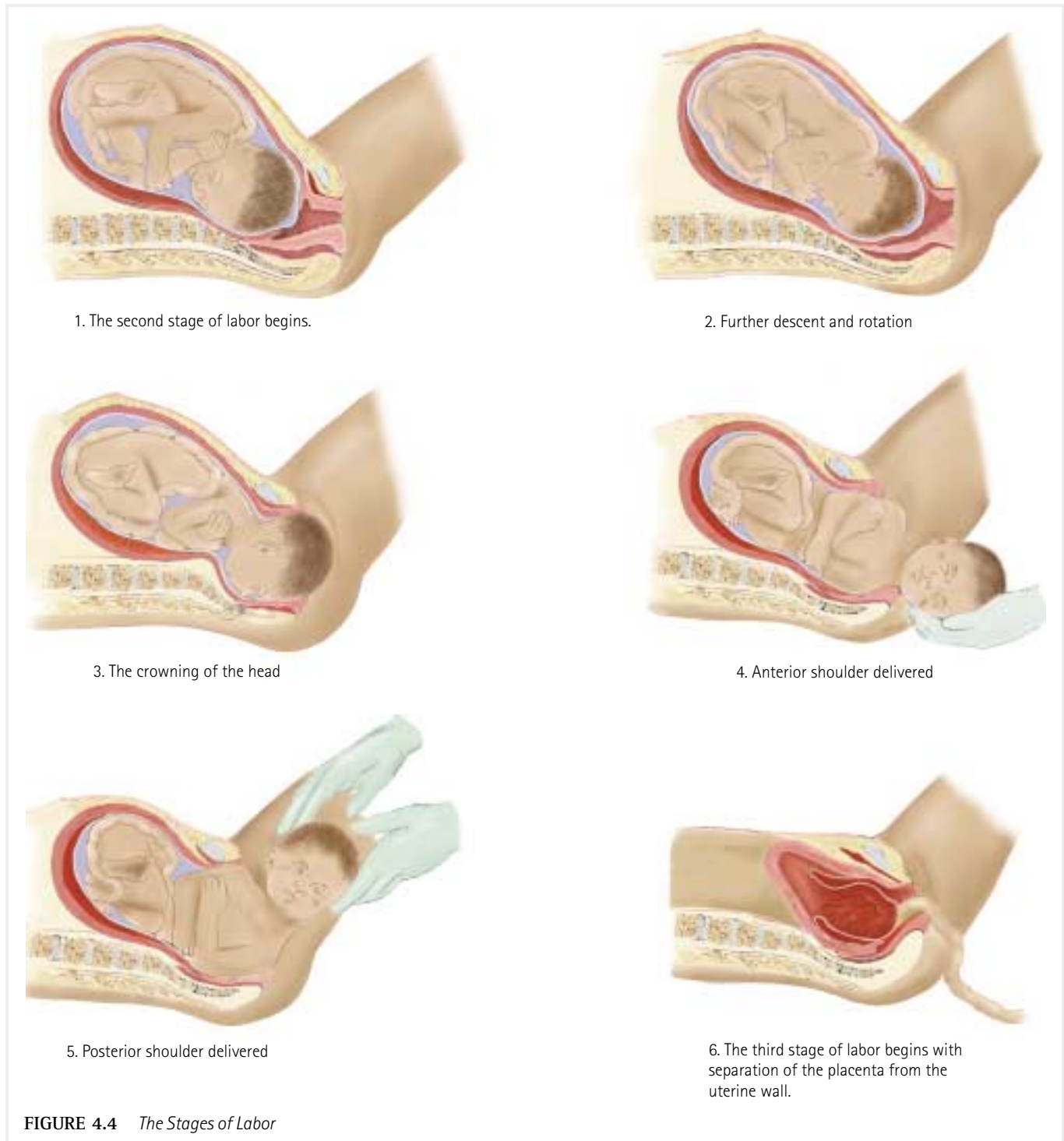
Labor is divided somewhat arbitrarily into the stages described below (see Figure 4.4).

*Stage I:* With a first baby, the first stage of labor lasts, on average, about 12 hours and is divided into three phases. During the *early phase*, the cervix dilates from 0 to 3 centimeters, which takes about 7 or 8 hours, on average. Contractions last anywhere from 30 to 60 seconds, are of mild to moderate intensity, and occur every 5 to 30 minutes. Some women experience nausea and vomiting and either constipation or diarrhea during this phase. Even a woman who plans to deliver in a hospital or birthing center will spend much of this early phase at home. Most doctors tell women not to come to the office or hospital until their contractions are about 5 minutes apart. The *active phase* of Stage I lasts about 5–7 hours, during which the cervix dilates from 3 to 7 centimeters. Moderately intense contractions occur about 2–4 minutes apart and last from 45 to 90 seconds. The woman is likely to experience increased discomfort in her back as the baby's head moves downward in the pelvis. The next phase of Stage I is called *transition*; this phase typically lasts from 30 to 90 minutes. The cervix dilates from 8 to 10 centimeters; intense contractions occur every 1–3 minutes and last up to 2 minutes. The woman may experience nausea, vomiting, hiccups, and belching; she may alternate between feeling hot and cold, and she may have the urge to push. At this point, her entire body is likely to shake, and she is very fatigued. Labor is far from over, however.

**lightening and engagement** the descent of the fetus into the pelvic region, usually occurring between 2 and 4 weeks prior to onset of labor in first pregnancies. Lightening may not occur until onset of labor in subsequent pregnancies.

**effacement** thinning of the cervix that occurs just before labor.

**mucus plug** a viscous substance that blocks the cervix during pregnancy and that is expelled as the cervix dilates in preparation for delivery.



*Stage II:* Once the cervix is dilated 10 centimeters, it is time to start pushing. Stage II can last anywhere from 20 minutes to 3 hours in a first delivery. It is also divided into three phases. Some women have an *early*, or *rest*, *phase* that is marked by a brief lull when they no longer feel an urge to push. During the *active*, or *descent*, *phase*, the woman pushes during contractions, which moves the baby down the birth canal.



Truly a miraculous event

During *transition*, or the *crowning and birth phase*, the baby's head is delivered, followed by the baby's body.

*Stage III*: Stage III is also known as the *placental phase*, because this is when the placenta is delivered. The placenta may be delivered within 5 minutes after the baby or up to 30 minutes later. At this point, the woman is exhausted. Contractions continue at a rate of 4–8 minutes apart until the placenta is expelled; the woman also experiences vaginal bleeding as the contents of her uterus are expelled.

*Stage IV*: Stage IV is the *recovery phase*. The woman and baby are watched closely for the first hour after birth and checked for complications. The woman may experience chills, shakes, hunger and thirst, and exhaustion. She may also feel her uterus contracting.

Once delivered, the baby is generally placed on the mother's abdomen and chest to comfort both of them. After a few minutes (the timing depends on the practices followed in the facility where the baby is born), the delivery staff clean off the baby and check the vital signs. Often the father or partner assists in this process. Then the baby is wrapped and returned to the parents. Breast-feeding mothers should nurse their babies as soon after delivery as possible.

The labor and delivery process can be very uncomfortable and even painful and can place quite a strain on the woman. Fortunately, there are some strategies a pregnant woman and her husband or partner can use to make the process less stressful.

## PREPARED CHILDBIRTH METHODS

With all the developments of modern science surrounding conception, pregnancy, and childbirth, it is easy to lose sight of the fact that having a child is not just a medical procedure; it is a highly personal event. **Prepared childbirth** is any method designed to allow the woman and her husband or partner to maintain control of the birth process, rather than relying solely on instructions from medical personnel. Perhaps you have heard of the two most popular of these methods, the Lamaze and Bradley methods, which are named for the individuals who developed them. Prepared childbirth methods are based on the philosophy that knowledge and social support can help eliminate fear, tension, and pain during childbirth. Relaxation exercises and breathing techniques are the primary tools of these methods.

Prepared childbirth was once more commonly referred to as *natural childbirth*, implying childbirth without use of modern medical technologies (especially pain medication). Today, many hospitals offer prepared childbirth classes and have birthing

**prepared childbirth** birth guided by skills learned to ease and control the labor process, using techniques such as breathing exercises, focusing on an object, and support by a labor coach.



Prepared childbirth can teach a woman and her partner how to proceed through delivery using nondrug pain-management strategies.

suites (rooms that look like standard bedrooms) within the hospital setting, where high-tech interventions are available if needed. Birthing centers (often located near a hospital) that promote an all-natural option are available as well. Many couples train for and use prepared childbirth procedures to help the woman (and her husband or partner) cope with labor but opt for use of a regional painkiller (called an *epidural*) at a particular stage of labor. Thus, couples can now choose the extent to which they want to “go natural” in their birthing experience. In more urban communities, at least, the options are nearly limitless, and options are the key to giving women, and their husbands or partners, control over the childbirth experience. Anesthesia is certainly one of those options.

## DRUGS DURING LABOR

Both analgesics and anesthetics are commonly used during labor. Analgesics, or tranquilizers and narcotics, help the woman to relax and give some pain relief. A woman receiving an analgesic is not allowed to walk around, in case she becomes dizzy or faints. In addition, analgesics cause the woman to feel drowsy and, thus, less in control of the labor process. Nausea is also a side effect of these drugs. All side effects subside as the medication wears off.

While the use of anesthesia in childbirth is almost standard in obstetrics, it is a hotly debated topic among medical professionals. Although general anesthesia (which puts the woman to sleep) is no longer used, local and regional anesthetics are. Local anesthetics may be used to numb the vulval area before a woman is given an **episiotomy**, the cutting of the perineum that allows more room for the baby to be delivered. The most common regional anesthetic is a lumbar epidural, which eliminates sensation from the belly down. A catheter is placed into the woman’s back so that anesthesia can be continuously administered. The woman can no longer feel her contractions; thus, they must be monitored so that she can be told when to push. A major problem with epidurals is that the loss of sensation is sometimes so severe that labor is prolonged or even stops. As a result, medications to induce labor may be necessary. These medications produce more pain and the potential need for more pain medications (Morales & Inlander, 1991). In addition, cesarean sections and forceps deliveries are thought to be more common among women given epidurals (Bradley, 1996; Cohen & Estner, 1983); however, this issue remains unresolved.

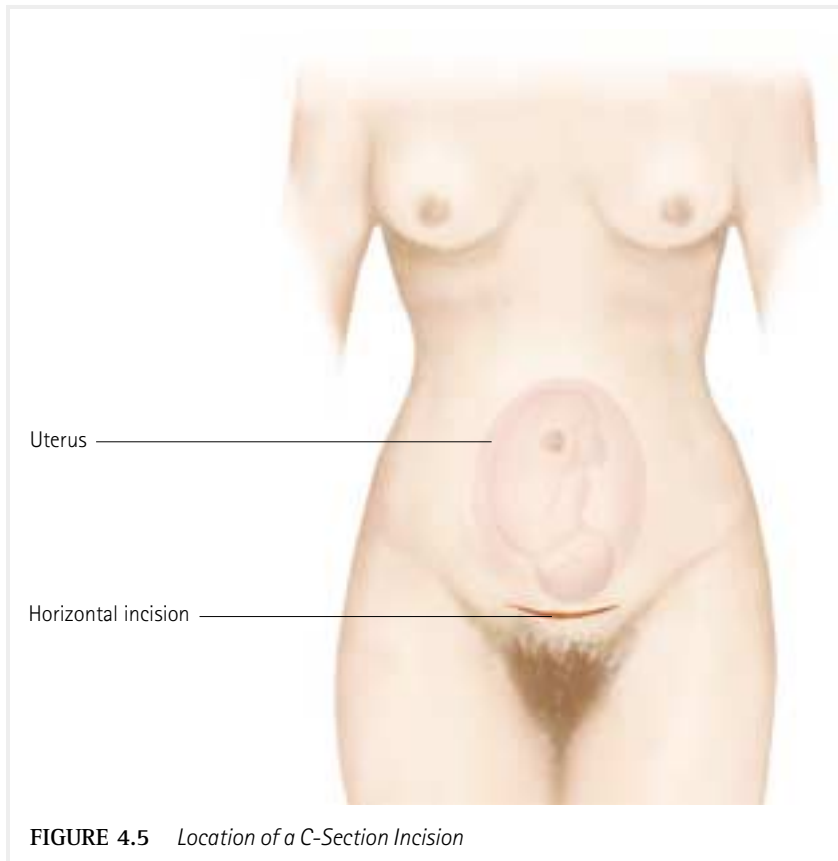
The greatest risk of giving drugs to a pregnant woman arises from the fact that they cross the placental barrier to the baby (Boston Women’s Health Book Collective, 1992). Babies whose mothers receive medications during labor have shown usually temporary side effects, such as irregular or slowed heartbeat, higher rates of jaundice, breathing and temperature regulation problems, and reduced muscle strength (Bradley, 1996). Because of the potential adverse effects of medications on the mother and the baby, a pregnant woman and her husband or partner should discuss the risks and benefits of using drugs with her doctor well in advance so that they can make informed choices.

The woman and her husband or partner should also be prepared for the possibility that her physician will recommend a cesarean section. They should be well informed in advance, so that they can make the best choice for her and the baby.

## CESAREAN SECTION

Cesarean sections are most commonly performed when one of the following occurs: (1) The baby is a breech (buttocks first) presentation; (2) labor is difficult or abnormal, a condition called **dystocia**; (3) the fetus is distressed (e.g., has an abnormal heartbeat); or (4) the woman has had a previous cesarean section. The doctor performs a cesarean section, or c-section, by cutting through the abdominal and uterine walls to remove the baby. The woman is generally given a regional anesthetic and may also be given an analgesic. A catheter is placed into her urethra to empty the bladder. After the pubic hair is shaved and an antiseptic solution is applied to the abdomen, an incision

**episiotomy** an incision in the perineum sometimes made during delivery.  
**dystocia** abnormal or difficult labor.



**FIGURE 4.5** *Location of a C-Section Incision*

is made horizontally at the “bikini line” (Figure 4.5), and the baby is removed. Once the baby’s nose and mouth are cleared and vital signs have been checked, the parents can usually hold the baby, just as they would following a vaginal delivery.

The United States has one of the highest cesarean birth rates in the world (Centers for Disease Control and Prevention [CDC], 1993a; Stolberg, 1994). This rate has increased significantly over the past 30 years, from 5.5% in 1970 to 21.2% in 1998, and it has remained over 20% for more than a decade (CDC, 2000a; Ventura, Martin, Curtin, Mathews, & Park, 2000). The current rate of c-sections in the United States is in sharp contrast to the rate recommended by the World Health Organization (WHO) of between 5% and 15% (World Health Organization, 1999b). According to WHO, if a country’s c-section rate falls below 5%, it indicates that some women die in childbirth because they do not have access to a surgical intervention. If the rate exceeds 15%, this indicates that c-sections are being performed unnecessarily. Thus, an optimal c-section rate might be around 10–12%—half the rate currently reported in the United States.

So controversial is the overutilization of c-sections that organizations (e.g., the Cesarean Prevention Movement, or CPM) have been formed to educate women and prevent unnecessary use of this procedure (Boston Women’s Health Book Collective, 1992). Many opponents of c-sections claim that physicians are motivated to perform them for reasons other than the safety of the mother or fetus. These reasons include the convenience for the doctor of scheduling a c-section and the erroneous belief that c-sections reduce risk of complications and subsequent malpractice lawsuits. Despite the controversy, there are times when a c-section is a medical necessity. It is most likely to be called for with multiple births, with a baby that is very large relative to the mother’s pelvis, with complications such as the positioning of the placenta over the cervical opening (a condition known as **placenta previa**) or a collapsed umbilical cord, and with some breech presentations (Morales & Inlander, 1991).

**placenta previa** a complication in childbirth in which the placenta blocks the cervical opening, preventing passage of the infant through the birth canal.

## ALTERNATIVES TO HOSPITAL DELIVERY

A woman once told us that she had had great difficulty making it to the hospital to deliver her first two children—she either had a very short labor or did not identify full labor until it was almost too late. She decided that trying to make it to the hospital was not the best strategy. The night she delivered her third child, she had just finished preparing dinner for her parents (her father was a doctor) and a friend who was a pediatrician.

She finished her dinner preparations just in time to go to her bed and deliver her son with the help of her father, her friend, and her husband. Afterwards, they all enjoyed the dinner she had prepared.

Certainly, labor and delivery are rarely that easy, but home birth is still a viable option for many women. Even home birth advocates will tell you, however, that a woman should deliver wherever she feels most comfortable, and that it should be a well-planned process. Western cultural beliefs hold that hospital delivery is safest, but this is not necessarily true. With an uncomplicated pregnancy, home birth under the care of a well-trained midwife or a physician is at least as safe as hospital birth and may, in fact, be better than hospital births for women who are not having their first child. In addition, it reduces medical interventions (Olsen, 1997; Wiegers, Keirse, van der Zee, & Berghs, 1996).

Underwater birth is an interesting twist on delivery options. During an underwater birth, the woman is immersed in a birthing pool filled with warm water. The room is usually dimly lit and quiet. The water helps to relax the woman during labor and reduce the pain of contractions. The woman can be accompanied in the water by whomever she wishes. During delivery, the mother or helper reaches into the water and gently pulls the baby to the mother's chest. As the baby makes contact with the air, it begins to breathe. Babies born in water have been known to remain under-

water for several minutes before floating to the surface to take their first breaths of air. Proponents of this method call it a *gentle birth* because it is soothing to the mother and allows the infant to have a gradual and calm introduction to the world. Moving through the birth canal into a familiar fluid environment is thought to be comforting to the newborn.

**CRITICAL THINKING CHECKPOINT 4.5** *Many options—ranging from no medical intervention to a highly “medicalized” approach—are available to women and their partners during labor and delivery. Outline the various options available, and discuss the relative merits and problems of each.*

## THE POSTPARTUM PERIOD

After the birth of the child, the mother and her partner enter into the postpartum period, a time of tremendous change. Even the most well-prepared mother or couple will find that while the postpartum period is an exciting time, it requires many adjustments.

### PHYSICAL ADJUSTMENTS

Having gone through the tremendously exhausting experience of childbirth, the mother's body must begin to return to its prepregnant state. The mother still has a considerable amount of extra weight, in the form of fat and excess fluid. Blood volume decreases by about 30% within the first 2 weeks after delivery (Boston Women's Health Book Collective, 1992). In addition, the mother expels a bloody discharge from her vagina for up to 6 weeks. This discharge, called **lochia**, is the contents of the uterus. The uterus also begins to contract and return to its prepregnancy size. Breast-feeding facilitates uterine contractions because it causes the release of the hormone responsible for producing those contractions; thus, the mother usually feels some cramping as her baby nurses.



### INTERNET ACTIVITY

Support is very important during pregnancy, birth, and after birth. Go to the Web page of Doulas of North America at <http://www.dona.org/faq.html> to learn about trained professionals who provide supportive services to couples during and after pregnancy. Next, read the position paper at <http://www.dona.org/positionpapers.html>, which tells you more about the physical and emotional benefits of employing a doula. Describe some of these benefits. Would you consider employing a doula's services? Why or why not?

**lochia** discharge of the uterine contents that occurs for up to 6 weeks after delivery of a baby.

Breast-feeding can also produce discomforts of its own, at least at the outset. During the first 48 hours, the mother's breasts produce colostrum but no milk. Once the milk "comes in," she is likely to experience painful engorgement of her breasts. Frequent nursing helps reduce engorgement, and over time, milk production will decrease and become more consistent with the demands of the newborn. In addition, the mother's nipples might become sore from the infant's suckling; support and instruction in proper nursing technique can prevent soreness. Hospitals, local lactation consultants, or the La Leche League can offer such support. The pros and cons of breast-feeding are examined in *Close Up: Is Breast Milk Best?*

The mother is likely to experience some physical discomfort after a delivery. If she has had a vaginal delivery, application of an ice pack to the external genitalia during the first day may reduce swelling, and warm sitz baths on subsequent days relieve the pain. Women who have had c-sections sometimes find it necessary to use pain medication; however, it is important to get up and move around as soon as possible to reduce stiffness and to help the digestive system to function normally again. Exercise restrictions are necessary for the first few weeks, especially after a c-section, which usually requires 6 weeks of limited activity.

Most new mothers find that they are very fatigued. As if all the postpartum demands on the body are not enough, newborns eat about every 2 hours for the first few months; therefore, at least one caregiver must get up for night feedings. Breast-feeding mothers find it helpful if someone else gets up and brings the baby to them to nurse at night so that they can continue to rest while feeding. Caregivers are well advised to take naps while the baby is sleeping during the day.

## PSYCHOLOGICAL ADJUSTMENTS

New parents often describe their postnatal experience as a smorgasbord of emotions. Most parents are thrilled and at the same time overwhelmed—they are fearful that they may not be competent caregivers for this helpless little baby. New parents also face having less time for intimacy and privacy. They can no longer run out for dinner or to a movie on a whim. These and other changes may be difficult for some people and may even cause feelings of resentment.

### The Mother's Experience

Many women experience some disruption of mood in the weeks that follow delivery. Most commonly, they report feeling the **postpartum blues** (also called the "baby blues" or the postnatal blues), a state of short-term dysphoria (increased emotionality, tearfulness, mood swings, even anxiousness) that may accompany the feelings of happiness and excitement that follow the baby's birth (Kumar, 1994). Up to 42% of women in the United States report postpartum blues (O'Hara, Zekoski, Philipps, & Wright, 1990). These feelings generally disappear in a few days. They appear to be associated with drops in estrogen and progesterone, but they may also be related to the psychosocial adjustments the mother is going through. For instance, she may have left a demanding and exciting job to stay home with the baby for awhile. The isolation from other adults may be a difficult adjustment for her. She may miss the interaction with other adults and may also feel that she has lost her old identity and that her friends and coworkers view her differently now that she is a mother. In addition to struggling with her identity, the new mother who takes time away from work may also face the stress of losing her income while off work.

A more severe form of mood disturbance, **postpartum depression**, is reported in about 9–10% of new mothers in the United States (Kumar, 1994); it affects 26% of adolescent mothers (Troutman & Cutrona, 1990). Postpartum depression is more severe than the blues. The mother experiences extreme sadness and feelings of worthlessness and inadequacy as a mother and may become suicidal. She may also experience insomnia, digestive problems, and unusual weight loss (Epps & Stewart, 1995). Postpartum depression may require psychological intervention; however, most women tend to improve on their own within 3–6 months (Kumar, 1994).

**postpartum blues** mild depressive symptoms occurring for only a short period just after the birth of a baby.

**postpartum depression** feelings of extreme sadness, worthlessness, and inadequacy as a mother, possibly combined with suicidal thoughts, insomnia, digestive problems, and unusual weight loss occurring after the birth of a baby. Postpartum depression may require psychological intervention; however, it tends to resolve itself within 3 to 6 months.



## IS BREAST MILK BEST?

Most babies around the world are nourished with breast milk. In the United States, however, breast-feeding has a rocky history. At the start of the 20th century, more than 90% of U.S. mothers breast-fed their babies. However, technological advances, including refrigeration, pasteurization, and the ability to alter cow's milk to be easily digested by newborns, brought about a tremendous decrease in breast-feeding. By the 1960s, only about 25% of U.S. mothers breast-fed, and by the early 1970s, the rate fell to 22%. Public health efforts targeted at health care providers and women of child-bearing age brought about a reverse in this downward trend. By 1984, 62% of U.S. mothers were breast-feeding. Unfortunately, the rate dropped again throughout the 1990s (Losch, Dungy, Russell, & Dusdieker, 1995).

Breast-feeding provides great health advantages over the use of formula.

The American Academy of Pediatrics Work Group on Breastfeeding (1997) recommends exclusive breast-feeding for the first 6 months of life, with no supplementation because breast milk is the only source of nutrition a newborn needs. Unlike formula, which is always the same, the nutritional composition of breast milk changes over time to meet the changing needs of the growing infant.



*In addition to being good for the baby, breast-feeding can be a wonderful bonding experience.*

In addition, there are hundreds of substances in breast milk whose functions scientists have yet to discover. Given these two facts, it is impossible to duplicate breast milk. Even when for-

mula contains certain substances that are found in breast milk, such as iron, it is difficult to make these substances as "bioavailable" (readily absorbed and used by the infant's body) as they are in breast milk (Lawrence, 1994).

Following are some of the major advantages of breast-feeding.

1. Breast milk is highly digestible, and does not cause stomach upset (Dewey, Heinig, & Nommsen-Rivers, 1995; Popkin et al., 1990).
2. Breast-fed babies are less likely than formula-fed babies to be fat as children or as adults.
3. In general, breast-fed babies score higher on mental development tests (Taylor & Wadsworth, 1984; Uauy & DeAndraca, 1995).
4. Breast-fed babies have enhanced visual development (Lawrence, 1994).
5. Breast-fed babies might have fewer problems with high cholesterol as they grow older (Lawrence, 1994).
6. Babies who breast-feed may have better jaw formation and straighter teeth than babies who don't (Dermer, 1995; Eiger & Olds, 1987). Suckling, contrasted with nursing on a bottle, requires more exercise and different movements of the jaw.
7. Breast-feeding is associated with a lower incidence of chronic diseases and acute infections in childhood

It appears that psychosocial factors play an important role in the development of postpartum depression (Murray, Cox, Chapman, & Jones, 1995). In addition, women are more likely to experience postpartum depression if they are also experiencing marital dissatisfaction and if the couple has traditional beliefs about marital and gender roles (Hock, Schirtzinger, Lutz, & Widaman, 1995). In addition, women who take only a short maternity leave (defined as 6 weeks or less) and who have other risk factors (e.g., marital concerns) are more likely to get depressed (Hyde, Klein, Essex, & Clark, 1995).

Even more rare is postpartum psychosis, which is marked by extreme highs and lows. The mother may become extremely agitated and paranoid and may experience delusions and hallucinations. Postpartum psychosis is a serious disorder that probably has underlying physiological causes (Kumar, 1994); it definitely requires psychological evaluation and treatment.

## The Father's or Partner's Experience

Mothers tend to get all of the attention at the birth of a new baby, and too often the father's or partner's experiences are ignored. Obviously, the biological factors direct people's attention to the mother, since she has carried the baby for 9 months and can breast-feed it. Beyond those functions, however, fathers or partners can provide as much caregiving as mothers do. But societal and cultural pressures usually dictate that mothers

and adulthood (American Academy of Pediatrics Work Group on Breast-feeding, 1997). In general, breast-fed babies are sick less often and make fewer visits to the doctor (Eiger & Olds, 1987).

8. Breast-fed babies have fewer allergies (Saarinen & Kajosaari, 1995).
9. Breast-fed babies are three times less likely to die of sudden infant death syndrome, or SIDS (Ford et al., 1993; Sears, 1995).

Breast-feeding also provides advantages for parents. Breast milk is about \$855 cheaper per year than formula (American Academy of Pediatrics Work Group on Breastfeeding, 1997). In addition, breast-feeding does not require the hassle of bottle preparation and cleaning. When traveling, breast milk is available and already heated to the right temperature. And breast-fed babies' bowel movements and spit-up do not smell as bad as those of babies fed with formula!

Many women express great joy at the closeness that breast-feeding produces. Breast-feeding mothers may also benefit from a health standpoint. They experience less postpartum bleeding, and their uteruses return to normal more quickly; they return to prepregnant weight more rapidly; their bones, which lose minerals during pregnancy, remineralize better,

leading to fewer postmenopausal hip fractures; and they have a reduced risk of ovarian cancer and premenopausal breast cancer (American Academy of Pediatrics Work Group on Breastfeeding, 1997).

Despite all the advantages of breast-feeding, it is important to understand that it is not for everyone. Breast-feeding is not recommended for infants with a genetic condition called *galactosemia* (which prevents an infant from digesting the mother's milk), nor is it recommended if the mother uses illegal drugs, has untreated and active tuberculosis, and in most cases if the mother is HIV-positive (American Academy of Pediatrics Work Group on Breastfeeding, 1997). Women have personal reasons not to breast-feed as well. The most common reasons women give for not breast-feeding are that they are embarrassed, they fear the discomfort of breast-feeding, they think it will limit their freedom and social life, and they want the father to be involved in feeding the baby. They also see formula feeding as more convenient (Losch, Dungy, Russell, & Dusdieker, 1995).

Many mothers return to work within a few weeks of delivery, and breast-feeding can present a challenge for them. They may find it difficult to find time or privacy to express milk for the caregiver to feed the baby. High-

tech pumps and storage systems are available that allow a woman to pump and store milk quickly and relatively easily (see White River Concepts, at [www.whiteriver.com](http://www.whiteriver.com), for an example).

Social support—from the baby's father, the woman's mother, or another relative or friend—is a key determinant in maintaining breast-feeding (Losch, Dungy, Russell, & Dusdieker, 1995). Unfortunately, many women do not receive such support. Even physicians fall short in educating and supporting women who might otherwise breast-feed. The health care industry is making efforts to enhance support for breast-feeding because it is so good for the baby (Dermer, 1995), and employers are being charged with the responsibility of making the workplace "breast-feeding-friendly" (American Academy of Pediatrics Work Group on Breastfeeding, 1997).

In the end, breast-feeding is a very personal decision, and a woman who decides not to breast-feed should not feel guilty or be judged. Indeed, the development of formula has given women the freedom to choose whether to make the commitment to breast-feeding. A woman's choice should be respected either way. While breast milk has enhanced health effects, formula is an acceptable and nutritious alternative, and scientists are hard at work to make it even more like the real thing.

are the primary caregivers. As a result, the father or partner may feel excluded from many of the pleasures of childrearing and, hence, find it more difficult to bond with the baby. They may even experience feelings of jealousy over the relationship between the mother and the newborn (Greenberg, 1985). One father, asked to describe some of the feelings he was having since the birth of his first child, replied:

I feel a strong sense of responsibility for my baby, yet my wife and baby are so insulated by what seems to be a natural connection between mother and child. My wife nurses him, sleeps with him, and is very protective of him. I don't have the level of caretaking skills that she does because I was never taught them as a child. I even feel distrusted. At the hospital, the nurse would not leave the baby with me if my wife was in the bathroom, and even though I make a point of going along to the pediatrician, the doctor ignores me and directs her instructions to my wife. (Personal communication to author, 1997)

While little research has been published on fathers' experiences with parenthood (and even less on the experiences of partners who are not the child's father), one study showed that an overwhelming majority (84.2%) of new fathers rated that the experience of fatherhood was wonderful. Despite adjustments to a changing life-style, sleep loss, difficulties in calming the baby, and concerns about other factors related to parenthood (relational and financial issues), the majority



*The joy of parenting is not only reserved for women.*

reported feelings of pride, happiness, excitement, and being loved (Chalmers & Meyer, 1996). Overall, new fathers' experiences are extremely positive.

## SEXUAL AND PARTNER RELATIONS

Advice to new parents on when to resume sexual intercourse ranges from the general “when the woman feels comfortable with it” to the more specific “after 6 weeks.” Even after any genital and vaginal trauma heals, a woman may experience some discomfort during sex. Discomfort can result from tenderness around an episiotomy. Breast-feeding women, in particular, may experience some vaginal dryness because of the hormones they produce while nursing. A lubricant can help with this problem. It is important for the couple to avoid sexual intercourse as long as it is painful, because negative experiences may make the woman less comfortable with having sex in the future (see Chapter 12 on sexual dysfunctions).

When a couple brings a new baby home, the dynamics of their relationship inevitably change. So much energy and time are necessarily given to the care and comfort of the baby that the couple's interpersonal relationship is likely to take a back seat. If at all possible, the couple should set aside time to nurture their relationship. If someone is available to care for the newborn, they might try scheduling short outings alone—even just a trip to the grocery store to pick up more diapers.

The process of conceiving, carrying the pregnancy to term, and giving birth is an extraordinary one, but it is not something to embark on without first examining very carefully your readiness for it and for the many, many years of parenthood to follow. Now that you have read this chapter, take time to read Reflect on This: To Be or Not to Be a Parent and to examine your thoughts on becoming a parent.



## Reflect ON THIS

### TO BE OR NOT TO BE A PARENT

Many of us learn during childhood that people (implying *all* people) grow up, get married, and have a family (two kids and a dog, to be exact)—in that order. Despite the fact that many people do not opt for this path in life, it is still generally assumed to be “normal” to do so, and people who opt not to have children are often questioned or pressured by family and friends. Think about your own situation: If you are already a parent, did you *assume* that parenthood was in your future, or did you recognize it as a choice, not a given? If you do not have children yet, what are your assumptions about becoming a parent?

If you haven't already had children or if you are considering having another child, you might want to think about the questions below. Keep in mind that your answers to these questions can change dramatically in the future, and you might want to assess yourself again sometime (such as the next time you decide to forgo using contraception!).

1. How do I rate my energy level and general health?
2. Could I handle the demands of both a job and a child?
3. How do I define personal freedom? How important is it to me?
4. Is doing what I want when I want to important to me?
5. How flexible am I? How do friends and family rate my flexibility? Am I able to change directions and plans easily with little fuss?
6. How much of my social life am I willing to curtail in order to care for a child?
7. Have I fully considered what it will mean to my own growth and development to devote the greatest portion of my time to a child for the next 18–20 years? Is this the number-one way I want to spend the next two decades of my life? If not, what is?
8. Am I happy now? In what ways would a child make me happy?
9. Do I feel as if I am incomplete without children? If so, is this a good reason to have a child?
10. Do I feel pressure to have children from friends, family, the culture in general? Would I feel like I fit in if I had children? Are these good reasons to have children?
11. Do I enjoy being with children? Do I like children?
12. Am I patient by nature?
13. Do I have a temper that is difficult to restrain?
14. Is control a major issue for me?
15. Am I critical or judgmental by nature?
16. What is my history with intimate relationships? Divorce?
17. Is loving someone easy for me? Am I affectionate?
18. Do I enjoy teaching or explaining things?
19. What is my view of discipline? How well could I discipline a child?

SOURCE: Adapted from Lafayette, 1995

**CRITICAL THINKING CHECKPOINT 4.6** *Knowing what you do about the difficulties of being a new parent, in what specific ways could you support a friend who just became one?*

## HEALTHY DECISION MAKING

Anyone who chooses to have a baby wants a healthy one. Therefore, it is surprising to find that so many pregnant women and their significant others persist in behavior that could potentially harm the developing baby. Why? There are probably countless explanations—cultural standards or a woman's feelings of powerlessness and lack of influence over people around her. One obvious possibility is that many women simply do not know that their behavior can have an impact on their baby, or they have been wrongly advised. Alcohol consumption is a case in point. Many pregnant women may have been advised by their doctors that it is acceptable to have an occasional alcoholic beverage during pregnancy. Research, however, suggests that it is a gamble—even small amounts of alcohol have been shown to have detrimental effects. Why gamble with your baby's health or life?

Whether you are a woman or a man, if you think you might ever become a parent, now is the time to learn about the influence of your behaviors on fetal and child health. If you do have children in the future, you will have to make decisions about how to put what you have learned into practice. Pregnancy can be a stressful and difficult time; therefore, pregnant women need support in practicing good health behaviors. A family member or significant other can help by not smoking, by preparing nutritious meals, by not bringing temptations (nonnutritious foods, alcohol, cigarettes) into the home environment, by setting a good example by eating well and exercising, and by helping the mother-to-be get plenty of rest. We cannot control everything that influences the health of a developing baby, but we can certainly make healthy decisions regarding those factors that we can control.

## SUMMARY

### CONCEPTION AND FETAL DEVELOPMENT

- ▶ The miracle of life begins with the joining of a sperm from the male and an egg cell, or ovum, from the female. The fertilized egg is a single cell that divides and differentiates into a full-grown human being.
- ▶ Once conception has occurred, the cell is called a zygote. It begins to divide, forming a blastocyst. The blastocyst moves down the fallopian tube and into the uterus, where it implants itself into the uterine wall.
- ▶ During the next 8 weeks, known as the period of the embryo, the cells differentiate into the major organ systems of

the body. The placenta, umbilical cord, and amniotic sac also form.

- ▶ From the 8th to the 40th week, the period of the fetus, the organ systems that were established in the first 8 weeks grow and mature.

### THE EXPERIENCE OF PREGNANCY

- ▶ A woman begins to suspect she is pregnant when she misses a menstrual period. She might also notice other changes such as fatigue, nausea, and vomiting. As early as 7–10 days after

conception, pregnancy can be detected through a change in the level of hCG in the woman's urine.

- ▶ Pregnancy is confirmed by detection of a fetal heartbeat and often by visualizing the fetus in a sonogram.
- ▶ Women experience multiple physical symptoms throughout pregnancy. In the first trimester, heartburn and increased urination are common as the woman's internal organs shift to make room for the growing fetus; sensations of bloating and tender breasts from hormonal changes are also common. The second trimester is often easier. The woman may feel renewed energy as her body adjusts to the pregnancy. In the third trimester, the woman may begin to feel more fatigued, but her fatigue may be tempered by anticipation of delivery.
- ▶ A pregnant woman and her partner also go through many psychological adjustments. The emotional responses to pregnancy vary considerably, and emotional ups and downs are perfectly normal.

## PRENATAL CARE

- ▶ Good prenatal care is imperative. Such care includes regular prenatal checkups and good self-care, such as avoidance of cigarette smoke, alcohol, and drugs; good nutrition; use of vitamin supplements; appropriate exercise; and avoidance of excessive weight gain.

## PRENATAL MEDICAL COMPLICATIONS

- ▶ Some pregnancies involve medical complications, such as ectopic pregnancy, miscarriage, or premature birth. With modern technology, many premature babies survive. The older the fetus, the greater the chance of survival. Some babies are post-mature, which can be dangerous since the placenta may begin to break down.
- ▶ Other rare but potentially fatal complications in pregnancy are pregnancy-induced hypertension, eclampsia, and Rh incompatibility.

## INFERTILITY AND TECHNOLOGICAL ADVANCES IN CONCEPTION

- ▶ Only about 8% of all couples in the United States fail to get pregnant after 1 year of trying. Infertility can be caused by a number of reproductive problems affecting either the woman or the man.
- ▶ Infertile couples have many options today, including artificial insemination, drug therapies to promote ovulation, and various assisted-reproduction technologies. One such technology is in vitro fertilization.
- ▶ Surrogate motherhood is another option pursued by some infertile couples, particularly when the woman is unable to carry a child. Generally, the man's sperm are used to impregnate an-

other woman who has agreed to carry the fetus and then relinquish the baby to the couple after it is born.

## ADVANCES IN TESTING FOR AND TREATING FETAL PROBLEMS

- ▶ Technological and medical advances have greatly increased the odds that fetal problems will be detected.

## LABOR AND DELIVERY

- ▶ As labor approaches, the woman's body begins to undergo changes in preparation for the event. The woman may experience a bloody show (a pink discharge) as her cervix begins to change. A mucus plug that once blocked the cervical opening may also be discharged. If her amniotic sac bursts, she experiences a gush of liquid from her vagina. Once labor begins, the woman experiences contractions in her back and lower abdomen.
- ▶ Labor occurs in four stages. In Stage I, the woman experiences contractions, the cervix begins to dilate, and the fetus moves lower in the pelvis. Stage II starts when the cervix is dilated to 10 centimeters. The woman begins to push with contractions until the baby is delivered. Stage III is the delivery of the placenta, and Stage IV is the recovery phase.
- ▶ Many couples undergo training in prepared childbirth. All methods of prepared childbirth have a common goal of giving the couple more control over the delivery process and providing a natural method of controlling labor pain.
- ▶ Whether or not prepared childbirth is used, a woman can opt to receive a number of different pain medications. Long before doing so, however, she and her partner should investigate all the risks inherent in using drugs during labor and delivery.
- ▶ Occasionally, a baby cannot be delivered through the vaginal canal, and a physician performs a cesarean section—delivery of the baby through an incision in the abdominal and uterine walls. C-sections are most common in deliveries involving a breech presentation, difficult or abnormal labor, fetal distress, or a previous c-section.

## THE POSTPARTUM PERIOD

- ▶ The days and weeks following the birth of a baby can be a tremendous adjustment for both the mother and her partner. Lack of sleep especially can take a toll.
- ▶ Many new mothers experience a brief period of postpartum blues as they adjust physically and emotionally to having a child. These blues usually go away on their own.
- ▶ Fathers and partners must also adjust to changes in their lives. Unfortunately, their needs often go unnoticed, and they may experience feelings of jealousy and neglect.



# CHAPTER TEST

- From the 8th week of gestation until the time of delivery, the developing human is referred to as a
  - fetus.
  - zygote.
  - embryo.
  - baby.
- The fetus is protected by the
  - umbilical cord.
  - amniotic fluid.
  - placenta.
  - all of the above
- Home pregnancy tests work by detecting
  - gonatropin-stimulating hormone.
  - human chorionic gonadotropin hormone.
  - follicle-stimulating hormone.
  - all of the above
- Male factor infertility is generally caused by
  - inability of the sperm to move.
  - low sperm count.
  - abnormalities in the structure of the sperm.
  - all of the above
- The procedure couples commonly use when the man has seminal problems is
  - drug therapy.
  - artificial insemination.
  - extrauterine insemination.
  - in vitro fertilization.
- The hamster egg test is conducted to determine
  - the ability of the sperm to move.
  - the ability of the sperm to penetrate the egg.
  - the structure of the sperm.
  - the sperm count.
- All of the following are refinements of in vitro fertilization procedures except
  - frozen embryo transfer.
  - zygote intrafallopian transfer.
  - in vitro embryo transfer.
  - gamete intrafallopian transfer.
- Another name for an ultrasound screening is
  - an x-ray.
  - an ultragram.
  - a sonogram.
  - a transducer.
- Amniocentesis is performed \_\_\_\_\_ weeks of gestation.
  - between 14 and 20
  - between 16 and 18
  - between 14 and 22
  - between 12 and 20
- The term *effacement* refers to
  - the woman's water breaking.
  - the thinning of the cervix.
  - Braxton-Hicks contractions.
  - the loss of the mucous plug.
- Which stage of labor is known as the placental phase?
  - Stage II
  - Stage I
  - Stage III
  - Stage IV
- Any method designed to allow a woman and her husband or birthing partner to maintain control of the birth process is known as
  - prepared childbirth.
  - natural childbirth.
  - the Lamaze method.
  - relaxed childbirth.
- Cesarean sections are performed for which of the following reasons?
  - The baby is in a breech position.
  - The fetus is distressed.
  - Labor is difficult or abnormal.
  - All of the above
- Underwater birth is an alternative to a typical hospital delivery and is also known as the \_\_\_\_\_ method.
  - gentle birth
  - midwifery
  - passive
  - natural
- All of the following are terms for the short period of dysphoria following delivery except
  - postnatal anxiety.
  - baby blues.
  - postnatal blues.
  - postpartum blues.

## ANSWERS

1. A 2. B 3. B 4. D 5. B 6. B 7. C 8. C 9. A 10. B 11. C 12. A 13. D 14. A 15. A