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Conception, Pregnancy, and Childbirth

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Key Terms

Active Learning

Web Resources

Learning Objectives

- 2.1 Compare one's own emotional and cognitive reactions to three case studies.
- 2.2 Summarize some themes in the sociocultural context of conception, pregnancy, and childbirth.
- 2.3 Recognize important mechanisms of reproductive genetics.
- 2.4 Analyze the ways that humans try to get control over conception and pregnancy.
- 2.5 Summarize the major stages of fetal development.
- 2.6 Describe the special challenges faced by premature and low-birth-weight newborns and newborns with congenital anomalies.
- 2.7 Give examples of different circumstances under which people become parents.
- 2.8 Give examples of risk factors and protective factors in conception, pregnancy, and childbirth.
- 2.9 Apply knowledge of conception, pregnancy, and childbirth to recommend guidelines for social work engagement, assessment, intervention, and evaluation.

CASE STUDY 2.1

JENNIFER BRADSHAW'S EXPERIENCE WITH INFERTILITY

Jennifer Bradshaw always knew she would be a mom. She remembers being a little girl and wrapping up her favorite doll in her baby blanket. She would rock the doll and dream about the day when she would have a real baby of her own. Now, at 36, the dream of having her own baby is still just a dream as she struggles with infertility.

Like many women in her age group, Jennifer spent her late teens and 20s trying not to get pregnant. She focused on education, finding the right relationship, finances, and a career. As an African American woman, and the first person in her family to earn a graduate degree, she wanted to prove that she could be a successful clinical social worker. She thought that when she wanted to get pregnant, it would just happen; that it would be as easy as scheduling anything else on her calendar. When the time finally was right and she and her husband, Allan, decided to get pregnant, they couldn't.

With every passing month and every negative pregnancy test, Jennifer's frustration grew. First, she was frustrated with herself and had thoughts like *What is wrong with me? Why is this happening to us?* and *We don't deserve this.* She would look around and see pregnant teens and think, *Why them and not me?* She also was frustrated with her husband for not understanding how devastating this was to her and wondered to herself,

Could it be him with the problem? In addition, she was frustrated with her family and friends and started avoiding them to escape their comments and the next baby shower. Now, she is baby-less and lonely. It has also been hard for Allan. For many men, masculinity is connected to virility; Allan would not even consider that he might be the one with the fertility problem, even though it is a male-factor issue in about 50% of infertility cases.

After months of struggling to get pregnant, multiple visits to the obstetrician/gynecologist, a laparoscopic surgery, a semen analysis, and timed intercourse (which began to feel like a chore), and after taking Clomid, a fertility drug that made her feel horrible, she and Allan finally accepted that they might need to see a specialist. She will never forget the first visit with the reproductive endocrinologist (RE). She was expecting a "quick fix," thinking that the RE would give her some special pills and then she would get pregnant. But, instead, he casually said to her, "I think your only option is in vitro fertilization [IVF], which runs about \$16,000 per cycle, including medications." The RE also told her that for someone in her age range the success rate would be about 35% to 40%.

From her clinical practice and her friendship circle, Jennifer knows that many women think of in vitro as

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a backup plan when they delay pregnancy. But she is learning that in vitro is a big deal. First, it is expensive. The \$16,000 per cycle does not include the preliminary diagnostic testing, and in Jennifer's age group, the majority of women pursuing IVF will need at least two IVF cycles, \$32,000 for two tries; three tries brings the bill up to \$48,000. Jennifer has heard of couples spending close to \$100,000 for infertility treatments.

Although about 15 states mandate insurance companies to cover fertility treatments, in the state where Jennifer lives, there is no fertility coverage mandate; consequently, her insurance company does not cover any infertility treatments. So at the very least, Jennifer and Allan would need to come up with \$16,000 to give one IVF cycle a try. It's heartbreaking for them because they don't have \$16,000, and their parents can't help them out. So to give IVF even one try, they need to borrow the money. They are considering taking out a home equity loan to pay for the needed IVF cycles and know they are lucky to be in a position to do that. They have heard of people packing up and moving to states with mandated fertility coverage and/or quitting their jobs and finding jobs that carry specific insurance that will cover fertility treatments. Some couples are even traveling abroad for fertility treatments that can be had for much less than in the United States.

Jennifer has heard that IVF is physically and emotionally exhausting. First, the in vitro patient is forced into menopause, and then the ovaries are hyperstimulated to release numerous eggs (up to 15 to 17 instead of 1), which can be painful. The eggs are surgically extracted,

and finally the fertilized embryos are introduced to the IVF patient's body. Throughout this process, various hormone treatments are given via daily injections, multiple blood tests are taken, and at any point during the procedure something could go wrong and the IVF cycle could be called off. If all goes well, the IVF patient is left to keep her fingers crossed for the next 2 weeks waiting for a positive pregnancy test. If the test is negative, the treatment starts over again. Jennifer has heard that most women are an emotional wreck during the entire process because of the high stakes and the artificial hormones.

Jennifer and Allan decided to go the IVF route 7 months after visiting the RE. Before they made this decision, however, Jennifer carefully tracked her BBT (basal body temperature), purchased a high-tech electronic fertility monitor, used an ovulation microscope, took multiple fertility supplements, and used sperm-friendly lubricant during intercourse. Still nothing helped. When she heard that acupuncture has been found to increase the success rate of IVF, she started seeing a fertility acupuncturist on a weekly basis for both herbal formulas and acupuncture treatments. The acupuncture treatments and herbs are averaging about \$100 per week, also not covered by insurance in her state.

Jennifer and Allan have decided to give IVF three tries, and after that they will move on to the next plan, adoption. They adore each other and want more than anything to have their own biological little one, but if they cannot have that, they will adopt, and Jennifer will realize her dream of being a mom.

—Nicole Footen Bromfield

CASE STUDY 2.2

CECELIA KIN'S STRUGGLE WITH THE OPTIONS

June 9th: Maybe we just were not meant to have another baby!!! What we have been through is all too amazing: three miscarriages before we had our darling 18-month-old Meridy, plus two more miscarriages since then. Well, at least I know I can get pregnant and we did have a healthy kid, so why not again?

August 20th: YEH! This pregnancy is going sooo well: 10 weeks along ALREADY! I am tired, but I've thrown up only once and feel sooo much different from the pregnancies I lost!!! Looking back, I knew that each one was not right!!!! I felt AWFUL ALL the time!!!! But not this time!!!! What a relief!!!! Or is it a reward?

September 1st: It's been more than a week since I wrote!!! Today we went for the ultrasound, both of

us thinking it would be so perfect. It wasn't. How could this happen to us? What have we done or not done? Haven't I done everything I could possibly do? I eat right, steered clear of drugs, and hate any kind of alcohol!!!! I exercise regularly!!!! I am in perfect health!!!! Wham! I can't believe what we were told. I can't cry like this any longer. Writing about it may help; it usually does. So, here's how it went. We just sat there staring at each other after hearing, "A 1:25 chance of a baby with Down syndrome." And they told us, "Don't worry"! You have to be kidding! We both insisted that the next step be done right away, so in 3 (LONG) days, we go back again, this time for something called chorionic villus testing!!!! Never heard of it.

September 16th: I can't believe this is happening; I feel so angry, so out of control. Then I think of Meridy and that we should just be thankful we have her and believe that our lives can be full, totally complete with just one kid. But this is not what we want! How can I hold it all together? I don't want to cry all the time, especially at work!!! I feel like such a wuss, and I can't really tell anyone, just my husband!!! Worse yet, I don't think that we agree that we will terminate the pregnancy. I feel so guilty, so alone, so empty. How can HE say, "Oh, we can handle that"? I'M the one who arranges childcare, I'M the one who stays home if Meridy is sick, takes her to the doctor, buys her clothes, her food. He comes home to dinner and a smiling kid racing to jump in his arms. What would a child with Down syndrome be like? I can't bear to think of standing there holding this child while

HE plays with Meridy. Bills!!! I haven't even thought about that! Our life is great now, but I work to provide extras!!! I love my job. I love my kid. I love my husband. I HATE what is happening. If I don't work, our lives are drastically changed!!! Not an option: I carry the health insurance; he is self-employed. Perhaps this is all a mistake, you know, one of those "false positives" where I will get a call that all is just fine or they reported someone else's test!!! Right! Wishful thinking!!! Who could begin to understand where I AM COMING FROM? I know my family!!! They would never "get it"; I would be SOOOO judged if the word "abort" passed my lips, even by my mom, and we are sooo close!!! But not on this!!! And in this small, small town EVERYONE would know what I DID!!! Who can possibly help me—help us—with this mess?

CASE STUDY 2.3

THE THOMPSONS' PREMATURE BIRTH

Within days of discovering she was pregnant, Felicia Thompson's husband, Will, suddenly deployed to a combat zone. Through e-mails, occasional cell phone calls, and Skype, Felicia told Will details about the changes she experienced with the pregnancy, but his world was filled with smoke, dirt, bombs, and danger, punctuated with periods of boredom. Six months into the pregnancy, Felicia's changing figure was eliciting comments from her coworkers in the office where she worked part time as an office administrator. With weeks of nausea and fatigue behind her, she was experiencing a general sense of well-being. She avoided all news media as well as "war talk" at the office to protect herself from worry and anxiety. Yet even the sound of an unexpected car pulling up to the front of her home produced chills of panic. Was this the time when the officers would come to tell her that Will had been killed or wounded in combat? Her best friend only recently had experienced what every military wife fears may happen.

Then, with dawn hours away, Felicia woke to cramping and blood. With 14 more weeks before her delivery date, Felicia was seized with fear. Wishing that Will were there, Felicia fervently prayed for herself and her fetus. The ambulance ride to the hospital became a blur of pain mixed with feelings of unreality. When she arrived in the labor and delivery suite, masked individuals in scrubs took control of her body while demanding answers to a seemingly endless number of questions. Felicia knew everything would be fine if only she could

feel her son kick. Why didn't he kick? The pediatrician spoke of the risks of early delivery, and suddenly the doctors were telling her to push her son into the world.

In the newborn intensive care unit (NICU), a flurry of activity revolved around baby boy Thompson. Born weighing only 1 pound 3 ounces, this tiny red baby's immature systems were unprepared for the demands of the extra-uterine world. He was immediately connected to a ventilator, intravenous lines were placed in his umbilicus and arm, and monitor leads were placed on all available surfaces. Nameless to his caregivers, the baby, whom his parents had already named Paul, was now the recipient of some of the most advanced technological interventions available in modern medicine. About an hour after giving birth, Felicia saw Paul for the first time. Lying on a stretcher, she tried to find resemblance to Will, who is of Anglo heritage, or herself, a light-skinned Latina, in this tiny form. Felicia's breathing synchronized to Paul's as she willed him to keep fighting.

Later, alone in her room, she was flooded with fear, grief, and guilt. What had she done wrong? Could Paul's premature birth have been caused by paint fumes from decorating his room? From her anxiety and worry about Will?

The Red Cross sent the standard message to Will. Was he in the field? Was he at headquarters? It mattered because Paul may not even be alive by the time Will found out he was born. How would he receive the news? Who would be nearby to comfort him? Would the command

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allow him to come home on emergency leave? If he were granted permission for emergency leave, it could be days of arduous travel, waiting for space on any military plane, before he landed somewhere in the United States. Felicia knew that Will would be given priority on any plane available; even admirals and generals step aside for men and women returning home to meet a family crisis. But, then again, the command may consider his mission so essential that only official notification of Paul's death would allow him to return home.

Thirteen days after his arrival, Paul took his first breath by himself. His hoarse, faint cry provoked both ecstasy and terror in his mother. A few days earlier Felicia had been notified by the Red Cross that her husband was on his way home, but information was not available regarding his arrival date. Now that her baby was off the ventilator, she watched Paul periodically miss a breath, which would lead to a decreased heart rate followed by monitors flashing and beeping. She longed for Will's physical presence and support.

Will arrived home 2 days later. He walked into the NICU having spent the last 72 hours flying. He started the trip being delivered to the airport in an armed convoy and landed stateside to find the world seemingly unchanged from his departure months before. Although Paul would spend the next 10 weeks in the hospital, Will had 14 days before starting the journey back to his job.

Paul's struggle to survive was the most exhilarating yet terrifying roller-coaster ride of his parents' lives. Shattered hopes were mended, only to be reshattered

with the next telephone call from the NICU. Now Felicia dreaded the phone as well as the sound of an unfamiliar car. For Felicia, each visit to Paul was followed by the long trip home to the empty nursery. For Will, stationed thousands of miles away, there was uncertainty, guilt, helplessness, and sometimes an overwhelming sense of inadequacy. Felicia feared the arrival of a car with officers in it, and Will dreaded a Red Cross message that his son had died.

Great joy and equally intense anxiety pervaded Paul's homecoming day. After spending 53 days in the NICU and still weighing only 4 pounds, 13 ounces, Paul was handed to his mother. She made sure that a video was made so that Will could share in this moment. With more questions than answers about her son's future and her ability to take care of him, Felicia took their baby to his new home.

For the NICU social worker at the military hospital, the major goal is to support the family as they face this challenging transition to parenthood. In the past 53 days, the social worker has helped Felicia answer her questions, understand the unfamiliar medical language of the health care providers, and understand and cope with the strong emotions she is experiencing. The social worker also helped during the transition of Will's arrival from war and his departure back to war. Understanding the dynamics of the NICU, families in crisis, and the needs of the military family separated by an international conflict is critical to providing this family the level of support they need to manage their multifaceted role transitions.

SOCIOCULTURAL ORGANIZATION OF CHILDBEARING

These three stories tell us that conception, pregnancy, and childbirth are experienced in different ways by different people. The biological processes vary little for the vast majority of women and their families, but researchers continue to study the psychological, social, and spiritual dimensions of childbearing. This chapter presents a multidimensional overview of current knowledge about conception, pregnancy, and childbirth gleaned from the literatures of anthropology, genetics, medicine, nursing, psychology, social work, and sociology.

As you read, keep in mind that all elements of childbearing have deep meaning for a society. We can draw on the social constructionist perspective to think about this. This perspective proposes that social reality is created when people, in social interaction, develop shared meaning, a common understanding of their world (you

can read more about this in the chapter Theoretical Perspectives on Human Behavior in *Dimensions of Human Behavior: Person and Environment*). Meanings about and expectations for human behavior vary across time, place, and culture. Cultural groups develop common understandings about all aspects of procreation: the conditions under which it should happen; whether, and if so how, to control it; proper behavior of the pregnant woman and her family system; and the where and how of childbirth. Pregnancy and childbearing practices are changing with advances in technology and increased diversity in the population of childbearing age. We in the United States are in the midst of an ongoing national debate about health care policy, and social workers will need to monitor the impact of proposed policies on the well-being of women and their families during the childbearing years.

In the United States, the social meaning of childbearing has changed rather dramatically in several ways over the past several decades:

- Various options for controlling reproduction are more available and accessible but oftentimes only to the economically advantaged.
- Childbirth is more commonly delayed, and more people are seeking fertility treatment and remaining involuntarily childless.
- The marriage rate has declined, and more children are born to unmarried mothers.
- The birth rate has declined, resulting in smaller families.
- Teen pregnancy is at a historic low.
- There are greater variations in family values and sexual mores than in previous generations.
- Parents are less subject to traditional gender-role stereotyping.
- It is becoming much more common for gay and lesbian individuals and couples to become parents.

These trends have prompted considerable debate over how our society should define *family*. The family operates at the intersection of society and the individual. For most people it serves as a safe haven and cradle of emotional relationships. It is both the stage and partial script for the unfolding of the individual life course.

Conception and Pregnancy in Context

The three case studies at the beginning of this chapter remind us that emotional reactions to conception may vary widely. The Thompsons' conception brought anxiety and then joy, in contrast to Jennifer Bradshaw's frustration and lost dreams followed by her rising hopefulness; Cecelia Kin feels caught between her own values and wishes and those of important people in her life. The conception experience is influenced by expectations the parents learned growing up in their own families of birth as well as by many other factors, including the parents' ages, health, marital status, and social status; cultural expectations; peer expectations; school or employment circumstances; the social-political-economic context; and prior experiences with conception and childbearing, as well as the interplay of these factors with those of other people significant to the mother and father.

The conception experience may also be influenced by organized religion. The policies of religious groups reflect different views about the purpose of human sexual expression, whether for pleasure, procreation, or perhaps both. Many mainstream religions, in their policy statements, specify acceptable sexual behaviors (Kurtz, 2016). Unwanted conception may be seen as

an act of carelessness, promiscuity, or merely God's will—perhaps even punishment for wrongdoing. These beliefs are usually strongly held and have become powerful fodder for numerous social, political, economic, and religious debates related to conception, such as the continued debates about abortion legislation in the United States and around the globe.

Just as the experience of conception has varied over time and across cultures, so has the experience of pregnancy. It too is influenced by religious orientations, social customs, changing values, economics, and even political ideologies. For example, societal expectations of pregnant women in the United States have changed, from simply waiting for birth to actively seeking to maintain the mother's—and hence the baby's—health, preparing for the birth process, and sometimes even trying to influence the baby's cognitive and emotional development while the baby is in the uterus.

Childbirth in Context

Throughout history, families—and particularly women—have passed on to young girls the traditions of childbirth practices. These traditions are increasingly shaped by cultural, institutional, and technological changes. The multiple influences on and changing nature of childbirth practices are exemplified in three related issues: childbirth education, place of childbirth, and who assists childbirth.

Childbirth Education

It is probably accurate to say that education to prepare women for childbirth has been evolving for a very long time, but a formal structure of childbirth education is a relatively new invention. In the United States, the early



PHOTO 2.1 Societal views of pregnancy in the United States have changed from simply waiting to being actively involved in nurturing the mother's and baby's health.

roots of formal childbirth education were established during the Progressive Era when the Red Cross set up hygiene and health care classes for women as a public health initiative. In 1912, the U.S. Children's Bureau, created as a new federal agency to inform women about personal hygiene and birth, published a handbook titled *Prenatal Care*, emphasizing the need for medical supervision during pregnancy (Barker, 1998).

Childbirth education, as a formal structure, took hold in the United States and other wealthy countries in the 1960s, fueled by the women's and grassroots consumer movements. Pioneers in the childbirth education movement were reacting against the increasing medicalization of childbirth, and they encouraged women to regain control over the childbirth process. Early childbirth education classes were based on books by Grantly Dick-Read (1944), *Childbirth Without Fear*, and French obstetrician Dr. Fernand Lamaze (1958), *Painless Childbirth*. Lamaze proposed that women could use their intellect to control pain while giving birth if they were informed about their bodies and used relaxation and breathing techniques. Early classes involved small groups meeting outside the hospital during late pregnancy and emphasized unmedicated vaginal birth. Pioneers in the childbirth education movement believed that such childbirth classes would provide the knowledge and skills women needed to change maternity practices, and indeed, the movement had an impact on the development of family-centered maternity practices such as the presence of fathers in labor and delivery and babies rooming with mothers after birth. Over time, childbirth education became institutionalized and was taught in large classes based in hospitals (Lothian, 2008).

There have been many societal changes in the 50 years since childbirth education was formalized, and in 2007, DeVries and DeVries suggested that childbirth education as it currently exists fits the ethos of the 1960s but is out of step with current societal trends. Here are some examples of how the experience of pregnancy and childbirth has changed since the early days of the childbirth education movement.

- Pregnant women had few sources of information about pregnancy and birth in the 1960s, but women today are overloaded with information from multiple sources. A 2013 U.S. survey of women's childbearing experiences found that besides maternity care providers and childbirth education classes, women reported getting information from online resources by using a number of devices, including smartphone and tablet. Two out of three women received weekly educational e-mail messages, and one quarter received regular text messages about pregnancy and childbirth (Declercq, Sakala, Corry, Applebaum, & Herrlich, 2014). Other researchers have found that women rely heavily on the Internet (Lagan, Sinclair, & Kernohan, 2010) and reality television shows with a birth theme (Morris & McInerney, 2010) for this information. Women also make use of a plethora of books on pregnancy-based topics and learn from friends and family. Unfortunately, women may need help in sorting out inaccurate and out-of-date information from any of these sources. One study found that pregnant women sought information more often from commercial Internet sites than from not-for-profit organizational or professional sites, and misinformation may be a problem at some of these sites (Lima-Pereira, Bermudez-Tamayo, & Jasienska, 2012).
- The current generation of pregnant women is more likely than the earlier cohort of pregnant women to be involved in a variety of health promotion activities that will help them manage childbirth. For example, they may be involved in alternative modalities for relaxation and fitness, such as mindfulness meditation, yoga, Pilates, or massage (Fisher, Hauck, Bayes, & Byme, 2012; Morton & Hsu, 2007).
- Pregnant women are much more likely to be employed today than in the 1960s and 1970s. The multisession formats of most models of childbirth education often seem like an extra burden for contemporary pregnant women. One trend in maternity care is to provide group appointments for prenatal care, incorporating education and group support along with maternity checkups. Research shows that some women prefer group care and have better pregnancy and birth outcomes when participating in group care (Walker & Worrell, 2008).
- The current cohort of pregnant women are more likely to be unmarried than was true 50 years ago. The emphasis on husband involvement in traditional models of childbirth education may not resonate with many of these women.
- The current population of pregnant women is much more culturally diverse than the White, middle-class women for whom childbirth education was designed. Research indicates that childbirth education classes are still made

up largely of White, middle-class women (Lothian, 2008).

- Many new technological and pharmaceutical childbirth interventions have been introduced in the past 15 years, and many contemporary pregnant women prefer high-tech, pain-free, and scheduled (if possible) birth. This is not a good fit with models of childbirth education from the earlier era that discourage medical intervention. There is some evidence, however, that today's women are given little choice in whether to use medical interventions (Declercq et al., 2014).

A number of government initiatives promote access to childbirth resources, initiated by the Maternity Care Access Act of 1989, which provided support for low-income women (Rabkin, Balassone, & Bell, 1995). Healthy People 2000, 2010, and 2020, an effort by the federal government to enhance the nation's health, supports prenatal education (Healthy People, 2016).

The research is inconclusive about whether childbirth education classes in the traditional model produce better pregnancy and childbirth outcomes (Koehn, 2008; Lothian, 2008), and there are mixed results as to whether the father's role is enhanced through childbirth education (Premberg, 2006; Premberg, Hellström, & Berg, 2008). In a recent review of randomized trials of childbirth education, one research team found that the evidence indicates that expectant fathers who participated in childbirth education reported lower parenting stress 3 months after birth than expectant fathers who did not participate in childbirth education. They also reported lower postnatal anxiety 2 hours after birth, were more likely to participate in the delivery room, and reported more satisfaction with the birth experience (Suto, Takehara, Yamane, & Ota, 2017). As childbirth education branches from the traditional classroom model to home-based services and interactive media presentations, it is important for social workers to help parents negotiate the changing landscape to make the choice that fits them the best (Lothian, 2008) while ensuring that the educational needs of parents of all racial and ethnic groups, economic circumstances, disabilities, and localities are met (Linn, Wilson, & Fako, 2015).

Place of Childbirth

Large changes in the place of childbirth have occurred in many parts of the world in the past century. In 1900, almost all births in the United States and other countries occurred outside of hospitals, usually at home (MacDorman, Mathews, & Declercq, 2012). Today, in

high- and moderate-income countries, labor wards in hospitals are the usual settings for childbirth (Hodnett, Downe, & Walsh, 2012). In the United States, the percentage of births occurring outside the hospital dropped to 44% in 1940 and 1% in 1969 (MacDorman et al., 2012). As formalized medical training developed, so did the medicalization of childbirth, and the current childbirth experience commonly includes such medical interventions as intravenous lines, electronic fetal monitors, and epidural anesthesia (Lothian, 2008). Induced labor and cesarean delivery are becoming increasingly common.

In the early part of the 20th century, the feminist movement advocated for hospital childbirth because it was considered to be safer than home birth, but beginning in the 1960s, feminists began to advocate for less invasive deliveries in more friendly environments that give women more choices over their care (DeVries & DeVries, 2007). In the past few decades, in the United States and other wealthy countries, a variety of institutional care settings have been developed, ranging from freestanding birth centers located near a hospital to more home-like birthing rooms within hospital labor departments (Hodnett et al., 2012). In 2012, the Centers for Medicare and Medicaid Services (2012) included birthing center care as one of three options for enhanced prenatal care under the Strong Start Initiative. A very small minority of pregnant women, less than 1% in the United States, give birth at home (MacDorman et al., 2012; Wyckoff, 2013). The same is true for most European countries, with the exception of the Netherlands, where home birth has been seen as the first option for uncomplicated pregnancies; even so, the percentage of home births in the Netherlands decreased from 38.2% to 23.4% from 1990 to 2010 (Chervenak, McCullough, Brent, Leven, & Arabin, 2013). It is important to remember that in many low-income countries, high maternal mortality rates are due, in great part, to poor women in remote rural areas having no option but to give birth at home without access to emergency health care (Kristof & WuDunn, 2009). In some of these countries, birthing shelters provide dormitory rooms near hospitals so that women can receive emergency care during childbirth if the need arises (Brzeski, 2013).

Although alternatives to conventional hospital settings, such as birthing centers and home-like birthing rooms, have been somewhat slow to develop in the United States, they are not considered controversial, and available research indicates some benefits and no drawbacks to them. Women giving birth in such settings have reduced likelihood of medical interventions, increased likelihood of spontaneous vaginal birth, and increased satisfaction (Hodnett et al., 2012; Stapleton,

Osborne, & Illuzzi, 2013). Home birth has been very controversial, however. In 1975, the American College of Obstetricians and Gynecologists (ACOG) issued a policy statement that protested in-home births and asserted that acceptable levels of safety were only available in the hospital. This policy statement was reaffirmed in 2013; it was supported that same year by the American Academy of Pediatrics, who noted that babies born during a planned home birth have a two- to threefold increased risk of death (Wyckoff, 2013). In response, in 2012, three major midwifery groups (the American College of Nurse-Midwives, Midwives Alliance of North America, and National Association of Certified Professional Midwives) strongly endorsed the practice of home delivery and challenged the medical profession to consider the advantages of a woman delivering her **neonate** (newborn) in the sanctity of her home. One research team recently analyzed birth data for the years 2009–2013 and recommended five contraindications for a planned home birth: fetal malpresentation such as breech birth, multiple gestations, a history of cesarean delivery, first-time birth, and a gestation age of 41 weeks or more (Grünebaum, McCullough, Sapra, Arabin, & Chervenak, 2017).

Who Assists Childbirth

In most countries of the world, childbirth was assisted exclusively by women until the middle of the 19th century when physicians, who were almost exclusively male, began delivering babies (Gardiner, 2018). Before childbirth became medicalized, midwives, trained birthing specialists, assisted most births. Midwifery went into decline in the United States for a few decades, but today 1 in 8 vaginal deliveries are attended by a nurse midwife; most of these are in hospitals (Declercq, 2012). In 2014, most midwives worked in a hospital setting (94.2%), 3% worked in birthing centers, and 2.7% attended home deliveries (American College of Nurse-Midwives, 2015). Most birthing centers have midwives as the primary care provider (Stapleton et al., 2013).

In most times and places, fathers have been excluded from participation in childbirth. This began to change in the United States and other countries in the 1970s, and worldwide there is an increasing trend for fathers to be present at the birth of their babies (Steen, Downe, Bamford, & Edozien, 2012). In some cultures, however, there is still a taboo about fathers witnessing childbirth (Sengane, 2009). In the past 40 years of having fathers involved in



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PHOTO 2.2 A typical delivery—here a newborn baby is delivered by medical professionals in a hospital delivery room.

the birthing process, research has indicated a number of benefits of this involvement, including improved maternal well-being, improved father–infant attachment, and paternal satisfaction (Alio, Lewis, Scarborough, Harris, & Fiscella, 2013; Premberg, Carlsson, Hellström, & Berg, 2011). In recent years, however, several pieces of qualitative research have reported that fathers are struggling with their role in the birthing process. One research team (Steen et al., 2012) examined the qualitative research on fathers' involvement with childbirth published from 1999 to 2009. They found that most fathers saw themselves as partner, had a strong desire to support their partner, and wanted to be fully engaged. They also found that fathers often felt uncertain, excluded, and fearful. They felt frustrated about their helplessness to relieve their partner's pain, they felt good when they could support their partner but bad when they did not feel supported by the childbirth team, and they found the transition to fatherhood to be profoundly life changing. Another research team (Bäckström & Hertfelt Wahn, 2011) found that fathers perceived themselves as receiving support when they were allowed to ask questions, when they had an opportunity to interact with the midwife and their partner, and when they could choose when to be involved and when to step back from involvement. They want to be recognized as part of the laboring couple.

In the past 3 decades, birth doulas have become a part of the childbirth experience for increasing numbers of women. *Doulas* are laywomen who are employed to stay with the woman through the entire labor, assisting with the nonmedical aspects of labor and delivery, encouraging her, and providing comfort measures. A Cochrane systematic review of the research on the effects of continuous labor support found that women receiving such support had higher rates of spontaneous vaginal birth, lower rates of cesarean delivery, lower rates of epidural anesthesia, lower rates of instrument-assisted delivery, shorter labors, and higher levels of maternal satisfaction. They also found that labor support was most effective when provided by someone with special training, not on the hospital staff and not a family member or close friend (Hodnett, Gates, Hofmeyr, Sakala, & Weston, 2012). Given this latter finding, it is important that the doula support the role of the father when he is present. Some policy analysts have pointed out that neither private nor public health insurance covers the cost of doulas but should consider doing so given the cost savings from reduced cesarean delivery, epidurals, and instrument-assisted delivery (Kozhimannil, Hardeman, Attanasio, Blauer-Peterson, & O'Brien, 2013). The Patient Protection and Affordable Care Act (often referred to as the Affordable Care Act

or Obamacare), passed by Congress in 2010, allocated \$1.5 million for community-based doula programs, following the success of a model program for disadvantaged and teen mothers (Sonfield, 2010). Think about the Thompsons' situation with Will in Afghanistan, unaware of the pending birth of his first child, and Felicia in premature labor without any family present. Perhaps a doula would have been a great benefit in that situation, as well as situations of other military wives.

CRITICAL THINKING QUESTIONS 2.1

What were your reactions to the situations of the people in the three case studies at the beginning of this chapter? How would your reactions be helpful if you were to encounter each person in your social work practice? How would your reactions complicate your ability to be helpful to each one of them?

REPRODUCTIVE GENETICS

The life course perspective reminds us that we are linked back in time with our ancestry, as well as with our culture. Genetic factors are one important way we are linked to our ancestry. Recognition of the need for genetics knowledge is not new to social work. In fact, Mary Richmond (1917) advocated that a social worker “get the facts of heredity,” in the face of marriage between close relatives, miscarriage, tuberculosis, alcoholism, mental disorder, nervousness, epilepsy, cancer, deformities or abnormalities, or an exceptional ability. Very little was known about genetic mechanisms at the time, however.

Almost 40 years later, James Watson and Francis Crick (1953) first described the mechanisms of genetic inheritance. In 1990, the Human Genome Project (HGP) was funded by the U.S. Department of Energy and the National Institutes of Health as an international effort to map all the human genes, and that project was completed by 2003. As genetic knowledge continued to grow, the National Association of Social Workers established Standards for Integrating Genetics Into Social Work Practice in 2003. These standards cover ethics and values, genetics knowledge, practice skills, a client–practitioner collaborative practice model, interdisciplinary practice, self-awareness, genetics and cross-cultural knowledge, research, and advocacy (National Association of Social Workers, 2003). Genetic research continues around the world, with future findings that will impact social work practice.

Genetic Mechanisms

Chromosomes and genes are the essential components of the hereditary process. Genetic instructions are coded in **chromosomes** found in each cell; each chromosome carries **genes**, or segments of deoxyribonucleic acid (DNA), that contain the codes producing particular traits and dispositions. Each mature **germ cell**—ovum or sperm—contains 23 chromosomes, half of the set of 46 present in each parent's cells. As you can see in Exhibit 2.1, when the sperm penetrates the ovum (**fertilization**), the parents' chromosomes combine to make a total of 46 chromosomes arrayed in 23 pairs. The genes constitute

a “map” that guides the protein and enzyme reactions for every subsequent cell in the developing person and across the life course. Thus, almost every physical trait and many behavioral traits are influenced by the combined genes from the ovum and sperm.

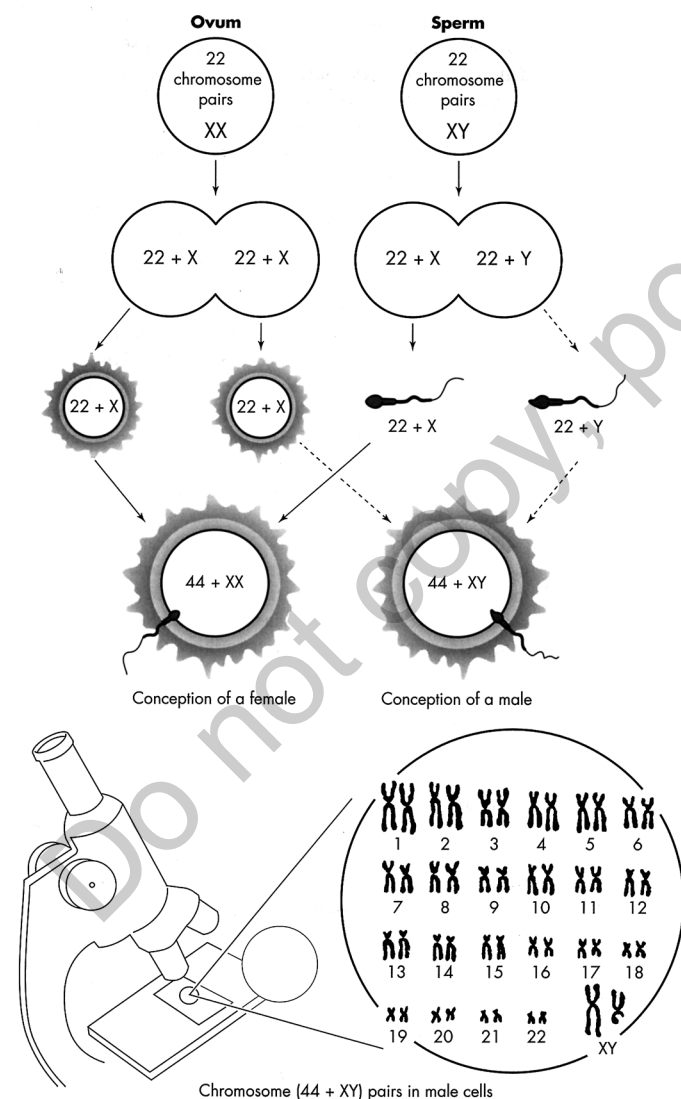
The Human Genome Project (1990–2003) researchers estimated that there are 20,000 to 25,000 genes in human DNA, with a broad range of total genes (449–2,400) across all chromosomes (National Human Genome Research Institute, 2010). Ongoing research has reduced the number of genes to 19,000 to 20,000, instead of the 20,000 to 25,000 originally identified (Ezkurdia et al., 2014). Research continues to articulate the complete sequencing of the 3 billion subunits of the human genome, an effort of global proportions involving both public and privately funded projects in more than 18 countries, including some developing countries (National Human Genome Research Institute, 2010).

Every person has a unique **genotype**, or array of genes, unless the person is an identical twin. Yet the environment may influence how each gene pilots the growth of cells. The result is a **phenotype** (observable trait) that differs somewhat from the genotype. Thus, even a person who is an identical twin has some unique characteristics. On initial observation, you may not be able to distinguish between identical twins, but if you look closely enough, you will probably find some variation, such as differences in the size of an ear, hair thickness, or temperament.

A chromosome and its pair have the same types of genes at the same location. The exception is the last pair of chromosomes, the **sex chromosomes**, which, among other things, determine sex. The ovum can contribute only an X chromosome to the 23rd pair, but the sperm can contribute either an X or a Y and therefore determines the sex of the developing person. A person with XX sex chromosomes is female; a person with XY sex chromosomes is male (refer to Exhibit 2.1).

A gene on one sex chromosome that does not have a counterpart on the other sex chromosome creates a **sex-linked trait**. A gene for red/green color blindness, for example, is carried only on the X chromosome. When an X chromosome that carries this gene is paired with a Y chromosome, which could not carry the gene, red/green color blindness

EXHIBIT 2.1 ● Germ Cell Division, Fertilization, and Chromosome Pairs



is manifested. So, almost all red/green color blindness is found in males. This gene for color blindness does not manifest if paired with an X chromosome unless the gene is inherited from both parents, which is rare. However, if a woman inherits the gene from either parent, she can unknowingly pass it on to her sons.

Whether genes express certain traits depends on their being either dominant or recessive. Traits governed by **recessive genes** (e.g., hemophilia, baldness, thin lips) will only be expressed if the responsible gene is present on each chromosome of the relevant pair. In contrast, traits governed by **dominant genes** (e.g., normal blood clotting, curly hair, thick lips) will be expressed even if only one chromosome has the gene. When the genes on a chromosome pair give competing yet controlling messages, they are called **interactive genes**, meaning that both messages may be followed to varying degrees. Hair, eye, and skin color often depend on such interactivity. For example, a light-skinned person with red hair and hazel eyes may mate with a person having dark skin, brown hair, and blue eyes and produce a child with a dark complexion, red hair, and blue eyes. Anomalies may occur in genetic transmission, an issue discussed later.

Genetic Counseling

Recent research has identified many genes that govern some of the physical traits and mental/medical problems that Mary Richmond noted in 1917. Today the goal is to develop genetic interventions to prevent, ameliorate, or cure various diseases or disorders as well as inform decisions about conception, pregnancy, and childbirth. One example is the Preimplantation Genetic Diagnosis (PGD) test for more than 100 genetic conditions used for in vitro fertilization to ensure that the embryo has no mutations (American Pregnancy Association, 2017a). Almost 54,000 genetic tests for over 10,000 conditions are listed through the Centers for Disease Control and Prevention Genetic Test Registry. Many tests are marketed prematurely to the public (Centers for Disease Control and Prevention [CDC], 2017a). Of special note are the 2008 Genetic Information and Nondiscrimination Act (GINA) that prohibits discrimination by U.S. insurance companies based on genetic test results and the June 2013 unanimous Supreme Court decision to prohibit patenting of genes (Liptak, 2013).

Our rapidly increasing ability to read a person's genetic code and understand the impact it could have on the person's life oftentimes demands the expertise of a genetic counselor to provide information and advice to guide decisions for persons concerned about hereditary abnormalities. Social workers, with their biopsychosocial perspective, are well positioned to assess the

need and in some circumstances provide such services, and the interdisciplinary field of genetic counseling acknowledges social work as one of its essential disciplines (National Association of Social Workers, 2003; Price, 2008a, 2008b). Social workers need to understand the rising bioethical concerns that genetic research fosters and to use such knowledge to help clients faced with genetically related reproductive decisions. The U.S. government has the largest bioethics program in the world to address questions such as the following: Who should have access to genetic information? Do adoptive parents have the right to know the genetic background of an adoptee? Will genetic maps be used to make decisions about a pregnancy? Which genes should be selected for reproduction? Will persons who are poor be economically disadvantaged in the use of genetic information? Should all genetic information be shared with a client?

Recent advances in genetic research allow for earlier in utero diagnosis, which reduces or prevents the effects of some rare diseases and may provide more options for action. Today, for example, a late-life pregnancy can be evaluated genetically using amniocentesis in the third trimester, or earlier in the first trimester using chorionic villus sampling, which allowed Cecelia Kin to know that her unborn child had Down syndrome. Such evaluation could lead to difficult decisions ranging from abortion to preparation for parenting a child with a disability. However, these options typically are laced with economic, political, legal, ethical, moral, and religious considerations.

Ethical issues related to genetic engineering have an impact not only at the individual and family levels but also at the societal level. For example, when we are able to manipulate genes at will, we must be on guard against genetic elitism. It is one thing to use genetic engineering to eliminate such inherited diseases as sickle-cell anemia but quite another to use it to select the sex, body type, or coloring of a child. We are living in a time of tremendous ethical complexity, involving the interplay of new reproductive technologies; changing family structures, values, and mores; political and religious debate; and economic considerations. As increasing numbers of persons gain the ability to control conception, plan pregnancy, and control pregnancy outcomes, social workers need to protect the interests of those who lack the knowledge and other resources to do so.

CONTROL OVER CONCEPTION AND PREGNANCY

One way that humans exercise human agency is to attempt to get control over conception and pregnancy.

The desire to plan the timing of childbearing is an ancient one, as is the desire to stimulate pregnancy in the event of infertility. Contraception and induced abortion have probably always existed in every culture but continue to generate much controversy. Effective solutions for infertility are more recent. It is important to remember that not all methods of controlling conception and pregnancy are equally acceptable to all people. Cultural and religious beliefs, as well as personal circumstances, make some people more accepting of certain methods than others. Social workers must be aware of this diversity of attitudes and preferences related to the control of conception and pregnancy. Cultural and religious beliefs also drive social policy in this area. Under the U.S. Patient Information and Affordable Care Act passed in 2010, employers were required to provide insurance to cover women's birth control at no charge. With the urging of religious leaders, President Donald Trump announced plans to overturn that requirement in October 2017.

Although there is evidence that many women of the world want to control conception and pregnancy, unintended pregnancy is a global problem, estimated to be 40% of all pregnancies worldwide (Sedgh, Singh, & Hussain, 2014). About 45% of all pregnancies in the United States are unintended (Finer & Zolna, 2016). The unintended pregnancy rate is significantly higher in the United States than in many other wealthy nations. A greater percentage of unintended pregnancies are reported by teenagers, women aged 18 to 24, cohabiting women, low-income and less educated women, and minority women (Finer & Zolna, 2016; Guttmacher Institute, 2016). For those pregnancies resulting in birth, unintended births (vs. intended births) are associated with delayed or no prenatal care (19% of unintended vs. 8.2% intended births), smoking during pregnancy (16% vs. 10%), low birth weight (12% vs. 7.2%), and no breastfeeding (39% vs. 25%) (Mosher, Jones, & Abma, 2012). Unintended pregnancy and birth are also associated with increased likelihood of perinatal depression, psychological aggression, and neglect in mothers and physical aggression in fathers (Abajobir, Maravilla, Alati, & Najman, 2016; Guterman, 2015).

Contraception

The range of birth control options available today provides women and men in many parts of the world with the ability to plan pregnancy and childbirth more than ever before. Currently 62% of U.S. women of reproductive age use some form of contraception, and 99.1% of

sexually active women use a contraceptive during their lifetime (Jones, Mosher, & Daniels, 2012). However, it is estimated that 214 million women in low-income countries who don't want to get pregnant have no access to contraceptives (World Health Organization [WHO], 2017a). Forms of birth control are varied, in both effectiveness and costs. Complete sexual abstinence is the only form of contraception that has no financial cost and is completely effective. It is important for social workers to be familiar with the choices women have. Each birth control option needs to be considered in light of its cost, failure rate, potential health risks, and probability of use, given the user's sociocultural circumstances. Exhibit 2.2 summarizes the types of currently available female and male contraception, including model of delivery, failure rate, advantages, and complications and side effects.

Induced Abortion

Induced abortion may be the most politicized, hotly debated social issue related to pregnancy today in the United States and elsewhere. Researchers have found that highly restrictive abortion laws do not lead to fewer abortions. Global data indicate that the abortion rate is lowest in regions of the world that have liberal abortion laws (Sedgh et al., 2016). Abortion laws do make a difference, however, in whether abortion is safe or unsafe.

In 1973, in *Roe v. Wade*, the U.S. Supreme Court legalized abortion in the first trimester and left it to the discretion of the woman and her physician. Three years later, in 1976, the Hyde Amendment limited federal funding for abortion, and the Supreme Court ruled in 1989, in *Webster v. Reproductive Health Services*, that Medicaid could no longer fund abortions, except in cases of rape, incest, or life endangerment (Guttmacher Institute, 2018). Renewed annually, this ban on the use of federal funds for abortion has now extended to all federal employees and women in the military and the Indian Health Service. With much of the decision making related to abortion left to the states, there is wide variation in who has access to abortion, when, how, and at what cost. In some states, new rules effectively decrease access, particularly for poor and minority populations and others who are educationally disadvantaged. Seventeen states and the District of Columbia use state-only funds to cover abortions for women on Medicaid and four other states ban abortion coverage by private insurers. In 2014, 90% of U.S. counties did not have a clinic provider, and 37% of women aged 15 to 44 live in these counties (Guttmacher Institute, 2016), resulting in rural disparities in access to abortion.

EXHIBIT 2.2 • Types of Male and Female Contraception

Type	Mode of Delivery	Failure Rate	Advantages	Complications/ Side Effects	Reference
Breastfeeding (lactational amenorrhea method)		2% with perfect use	Free, 98% effective with perfect use	17.2% to 26% of U.S. women have perfect use (still experiencing amenorrhea, breastfeeding exclusively, nursing at least 6 times every 24-hour period); no protection from sexually transmitted infections (STI)	CDC, 2014a; Garad, McNamee, Bateson, & Harvey, 2012; Warboys, 2015
Coitus interruptus		18%	Free, can be used during breastfeeding	No protection from STI; hard to predict when to withdraw penis; some sperm may enter vagina; may be harder for woman to have an orgasm	CDC, 2015a; Jones, Lindberg, & Higgins, 2014; Mayo Clinic, 2015; Reproductive Health Access Project, 2014
Fertility awareness-based methods (FABMs) (periodic abstinence; rhythm method). Six subcategories: (1) basal body temperature, (2) cervical mucus or ovulation, (3) symptothermal method, (4) calendar method, (5) standard days method, (6) 2-day method		24%	Minimal costs; no health risks	Requires careful record keeping; no protection from STI; abstinence required several days every month	CDC, 2015b; Garad et al., 2012; Smoley & Robinson, 2012
Barrier methods: male condom	Personal application	18%	Easily obtained; low cost; most effective protection from STI	Can break or slip off; decreases sensation	CDC, 2015b; Garad et al., 2012
Barrier methods: female condom	Can be inserted in vagina up to 8 hours before intercourse	21%; failure rate decreases with use over time	Inexpensive; can help prevent STI	Can decrease sensation; can be noisy; can be hard to insert; may slip out of place during sex	Beksinska, Smit, Greener, Piaggio, & Joanis, 2015; Reproductive Health Access Project, 2014

(Continued)

EXHIBIT 2.2 • (Continued)

Type	Mode of Delivery	Failure Rate	Advantages	Complications/ Side Effects	Reference
Implant (only Nexplanon approved in the United States)	Insertion by MD under skin of upper arm; effective for up to 3 years	0.05% (highest effectiveness of any contraceptive)	Simple office procedure; dysmenorrhea will improve	Obese women have increased chance of bleeding; acne flairs; amenorrhea; no STI protection	CDC, 2015b; Jacobstein & Polis, 2014; Kolman, Hadley, & Jordahlfrato, 2015
Contraceptive patch	Applied to skin (lower abdomen, buttocks, upper body) and changed once weekly for 3 weeks; removed for 1 week	9%; increased failure for women who weigh more than 198 pounds	Periods can be less painful and more regular	Possible increase in blood clots compared to combined oral contraceptive pill; can irritate skin; no STI protection	Garad et al., 2012; M. Perry, 2015
Injectables	Injection by health professional, usually every 12 weeks (note: a new form has been developed that is subcutaneous and could be self-administered)	0.40%	Can be used up to age 50; immediate effectiveness; no drug interactions	Decreased bone density; irregular bleeding	CDC, 2015a; Garad et al., 2012; Kolman et al., 2015
Intrauterine devices (IUD). Four devices approved by U.S. FDA (3 hormonal and 1 copper)	Insertion by health professional; 86% required two or more visits for insertion	<.01%	May be left in place 3–12 years (depending on type); can be used when breastfeeding	Possible uterine perforation at insertion or removal; increased bleeding and pain (primarily with copper IUD); expulsion of devise; increased or decreased bleeding at menses; no STI protection	Berry-Bibee et al., 2016; Branum & Jones, 2015; Luchowski et al., 2014; Reproductive Health Access Project, 2014
Oral contraceptives: progesterone only pill	Oral	.01%–.08%	May reduce arterial disease; good option for women who cannot have estrogen; safe for breastfeeding women	Poor efficacy in younger women; can cause depression, hair/skin changes, changed sex drive, changes in bleeding patterns; no STI protection	Angioni et al., 2015; Jacobstein & Polis, 2014; Reproductive Health Access Project, 2014

Type	Mode of Delivery	Failure Rate	Advantages	Complications/ Side Effects	Reference
Combined oral contraceptives: estrogen & progesterone	Oral	.01%–.08%	Periods more regular, less painful; improves acne; prevents ovarian cancer	Nausea; weight gain; higher risks if woman has migraines; arterial cardiovascular disease; hypertension; no STD protection	Daniels, Daugherty, & Jones, 2014; Dragoman, 2014; Reproductive Health Access Project, 2014; Xu, Eisenberg, Madden, Secura, & Peiper, 2014
Male oral contraceptive (in development; may take 10 years)	Oral		Only current contraceptives for men are condoms or vasectomy	Concern by women that men may not take it; possible change in blood pressure and heart rate; possible change in ejaculation volume	Anguita, 2014; National Library of Medicine, 2017; Roth, Page, & Bremner, 2016
Emergency contraception (EC)	Oral or vaginal insertion	0.1%–50% (most effective is insertion of copper IUD)	Some over the counter	No STI protection; time limitations to use; costs; need for medical care for some forms of EC	Cleland, Raymond, Westley, & Trussell, 2014; Jatlaoui & Curtis, 2016
Vaginal ring	Insertion; remains in place for 3 weeks and is removed for 1 week	9%	Less menstrual discomfort; ability to manipulate hormonal cycles; long-term dosing; ease of administration; reversibility	Contraindicated for obese women and those with migraines with auras; increased vaginal discharge; heavy bleeding; acne; no STI protection	Nappi, 2013; Reproductive Health Access Project, 2014
Surgical sterilization: female (tubal ligation)	Surgical	.002%–.01%, depending on procedure	Possible reversal; can prevent cancer	Surgical complications	CDC, 2015a; Daniels et al., 2014; Garipey, Creinin, Smith, & Xiao, 2014; Malacova et al., 2015; van Seeter, Chua, Mol, & Koks, 2017
Surgical sterilization: male (vasectomy)	Surgical	0.10%	55% can be reversed in first 10 years, 25% after 10 years	Surgical complications	Gutmacher Institute, 2015; Herrel, Goodman, Goldstein, & Hsiao, 2015

During the first trimester and until **fetal viability** (the point at which the baby could survive outside the womb) in the second trimester, U.S. federal law allows for a pregnant woman to legally choose an abortion, although states can narrow this option. Data from 2013 indicate that 89% of abortions in the United States are performed during the first 12 weeks of pregnancy, 10% from 13 to 20 weeks, and 1.3% after 21 weeks (Guttmacher Institute, 2018). Recent controversy regarding procedures for terminating a pregnancy after fetal viability has called attention to ethical and legal dilemmas that are being addressed in the legal system, by most religions, and in other parts of U.S. culture. Opinion polls reveal, however, that the majority of Americans favor abortion as an option under specified conditions. A Pew Research Center (2017a) poll revealed that 57% of the U.S. population think abortion should be legal in all or most cases in comparison to 40% who believe it should be illegal in all or most cases. These attitudes have been relatively consistent since 1975. According to the Guttmacher Institute (2018), 12% of women obtaining an abortion in the United States are teenagers, and 61% are in their 20s. Non-Hispanic White women receive 39% of abortions, non-Hispanic Black women receive 28%, and Hispanic women receive 25%. Women who have never married and are not cohabiting receive 46% of abortions, and 59% are obtained by women who have one or more children. About half, 49%, of women obtaining abortions have incomes 100% below the federal poverty level.

Two types of abortion are available to women.

1. *Medication abortion.* Medication abortion is the term used to refer to an abortion brought about by medication taken to end pregnancy. Most commonly, the drugs mifepristone (also known as RU-486) and misoprostol are used in combination in the first 9 weeks after the woman's last period. In the United States, a few states limit the use to 49 days after the last period. In 2014, medication abortions made up 31% of all non-hospital abortions and 45% of abortions before 9 weeks' gestation (Guttmacher Institute, 2018). The number of medication abortions increased from 2001 to 2011 (growing from 6% to 23% of all abortions) while the overall number of abortions declined. Medication abortion works about 97% of the time.

2. *Surgical abortion.* Surgical abortions must be done in a health provider's office or clinic. There are several surgical options, depending on how far along a woman is in her pregnancy. The standard first-trimester vacuum aspiration, also called D&A (dilation and aspiration) is the type most frequently performed in the first 16 weeks after the woman's last period. A suction device

is threaded through the cervix to remove the contents of the uterus. The use of this procedure decreased by 14% from 2005 to 2014. Sometimes, a spoon-shaped instrument called a curette is used to scrape the uterine lining, a procedure called a D&C. In the second trimester (13th to 24th week), dilation and evacuation (D&E) is typically performed. This involves instruments, such as forceps, to empty the uterus (Jatlaoui et al., 2017).

Regardless of the timing or type of abortion, most women should be carefully counseled before and after the procedure. One research team (Fergusson, Horwood, & Boden, 2009) found that more than 85% of women reported feeling at least one negative reaction, such as grief, guilt, sadness, or sorrow, after having an abortion. These negative reactions were offset by positive reactions, and over 85% of the women also reported feeling relief, happiness, and satisfaction. The researchers also found that looking back at the abortion decision later, nearly 90% reported that the decision to have an abortion was the correct decision, and only 2% reported that it was the wrong decision. Women who reported more negative reactions were more likely to have later mental health problems. Another research team (Steinberg & Finer, 2011) found that women who had risk factors such as physical or sexual abuse prior to abortion were more likely to have mental health issues after abortion. They also found that women with prior mood and anxiety disorders were more likely to have multiple abortions. It is important for social workers working with clients with unintended pregnancy to assess for prior traumatic experiences as well as know the current federal and state legalities and resources, especially when clients have limited income. They also need to be mindful of their personal views about abortion to help clients make informed decisions that reflect their own values, religious beliefs, and available options as well as agency/organization policy related to abortion.

Infertility Treatment

Infertility, the inability to create a viable embryo after 1 year of intercourse without contraception (Centers for Disease Control and Prevention, 2017b), is a major life stressor. Because both male and female factors are involved, determining infertility prevalence rates is challenging. It is estimated that one in four couples in low-income countries struggle with infertility (Mascarenhas, Flaxman, Boerma, Vanderpoel, & Stevens, 2012) and that 12.1% of women in the United States have reduced fertility and 6.7% are infertile (Centers for Disease Control and Prevention, 2016a). It is estimated that one third of the problems reside in the man and one third in the woman. Sometimes no cause can be found (MedlinePlus, 2015).

Jennifer Bradshaw poignantly conveys her emotional distress about infertility, but we don't know much about what her husband was experiencing. Although it is thought that infertility causes emotional distress to both women and men (Mascarenhas et al., 2012), little is known about the impact on men. Recent research indicates that men with the most infertility distress are likely to see infertility as an attack on their masculinity and perceived need to maintain emotional control (Dooley, Dineen, Sarma, & Nolan, 2014). Available research indicates that infertility places women at risk for depression, anxiety, substance abuse, social stress, isolation, and marital dissatisfaction (see, e.g., Baldur-Felskov et al., 2013; Rockwood & Pendergast, 2016). Women have traditionally sought informal support whereas men have

focused on the financial impact of infertility. Social support, specifically a positive marital relationship, has been found to be positively associated with increased coping skills, but the process of disclosing one's infertility to others can increase anxiety (Martins et al., 2013). Both the experience of infertility and the treatment of infertility can cause emotional distress (Greil, McQuillan, Lowry, & Shreffler, 2011). Narrative, existential, and cognitive behavioral approaches have been shown to be effective for this population (Ridenour, Yorgason, & Peterson, 2009; Stark, Keathley, & Nelson, 2011).

The causes of infertility are many and complex. Infertility, like other aspects of human behavior, is multidetermined. Exhibit 2.3, which draws on numerous sources to identify medical causes, environmental

EXHIBIT 2.3 • Possible Causes of Male and Female Infertility

Male Causes	Female Causes
<p><i>Medical Causes</i></p> <ul style="list-style-type: none"> • Varicocele (swelling of the veins that drain the testicle) • Infection (sexually transmitted infections, inflamed testicles due to mumps) • Antibodies that attack sperm • Tumors and treatments for tumors (surgery, radiation, and chemotherapy) • Undescended testicles • Hormone imbalances • Sperm duct defects • Chromosome defects (e.g., Klinefelter's syndrome, cystic fibrosis) • Problems with sexual intercourse (erectile dysfunction, premature ejaculation) • Celiac disease • Medications (testosterone replacement therapy, anabolic steroids, antifungal medications, some ulcer drugs) 	<p><i>Medical Causes</i></p> <ul style="list-style-type: none"> • Ovulation disorders (polycystic ovary syndrome [PCOS], hypothalamic dysfunction, premature ovarian insufficiency, too much prolactin) • Damage to fallopian tubes (caused by pelvic inflammatory disease, previous surgery in abdomen, or pelvic tuberculosis) • Endometriosis • Uterine or cervical causes (uterine polyps or tumors, abnormally shaped uterus, cervical stenosis, cervical mucus insufficiency) • Sexually transmitted infections
<p><i>Environmental Causes</i></p> <ul style="list-style-type: none"> • Industrial chemicals (benzenes, toluene, xylene, pesticides, herbicides, painting material, lead) • Heavy metal exposure • Radiation or X-rays • Overheating the testicles (frequent use of saunas and hot tubs, sitting for long periods, wearing tight clothing, working on laptop computer for long stretches) 	<p><i>Environmental Causes</i></p> <ul style="list-style-type: none"> • Industrial chemicals • Radiation • Chemotherapy

(Continued)

EXHIBIT 2.3 ● (Continued)	
Male Causes	Female Causes
<p><i>Health, Lifestyle, and Other Causes</i></p> <ul style="list-style-type: none"> • Illegal drug use (cocaine or marijuana) • Alcohol use • Tobacco smoking • Occupation (those involving extended use of computers, shift work, work-related stress) • Emotional stress • Obesity • Prolonged bicycling 	<p><i>Health, Lifestyle, and Other Causes</i></p> <ul style="list-style-type: none"> • Illegal drug use • Alcohol use • Tobacco smoking • Physical and emotional stress • Eating disorders, obesity

causes, and health and lifestyle causes, demonstrates this complexity. New research also indicates that some men have a genetic factor that intersects with environmental factors to increase the risk of infertility (Hamada, Esteves, & Agarwai, 2011; Miyamoto et al., 2012). Medical causes have received more research attention than other causes; consequently, there is clearer evidence for medical causes. Fertility decreases as men and women age (Amudha, Rani, Kannan, & Manavalan, 2013). There are racial differences in infertility in the United States, with Black and

Hispanic women having twice the rate but using infertility services significantly less than White women (Greil, McQuillan, Shreffler, Johnson, & Slauson-Blevins, 2011).

In the past, infertile couples could keep trying and hope for the best, but medical technology has given today's couples a variety of options, summarized in Exhibit 2.4. Women may be advised to lose or gain weight or to modify exercise habits to maximize the chances of ovulation and pregnancy. Medications may be used to help women ovulate, to treat infections in

EXHIBIT 2.4 ● Treatments for Infertility			
Male Infertility		Female Infertility	
Problem	Treatment	Problem	Treatment
Low sperm count	Change of environment; antibiotics; surgery; hormonal therapy; artificial insemination	Vaginal structural problem	Surgery
		Abnormal cervical mucus	Hormonal therapy
Physical defect affecting transport of sperm	Microsurgery	Abnormal absence of ovulation	Antibiotics for infection; hormonal therapy
Genetic disorder	Artificial insemination	Blocked or scarred fallopian tubes	Surgery; IVF
Exposure to work environment substances	Early detection and changes in work environment	Uterine lining unfavorable to implantation	Hormone therapy; antibiotics; surgery
Alcohol and caffeine use and cigarette smoking	Reduction or abstinence preconception	Obesity	Weight reduction
Advancing age	Sperm banking at younger age; artificial insemination	Alcohol and caffeine use and cigarette smoking	Abstinence preconception (and postconception to maximize pregnancy outcome)

both men and women, and to treat ejaculation problems in men (Amudha et al., 2013). Surgeries may be used to correct structural problems in the reproductive systems of both men and women (Mayo Clinic, 2018). Today, a little over 1% of infants born in the United States are the result of **assisted reproductive technologies (ART)** (CDC, 2017b). ART is any fertility treatment in which both eggs and embryos are handled. As demonstrated by the Jennifer Bradshaw case, by the time a couple considers the use of ART, they have often struggled with infertility for some time, emotionally and physically, and may be desperate. But the high cost and limited success rates deter some prospective candidates. The most common types of ART include the following.

- *IVF.* In vitro fertilization (IVF) is the most common and most effective ART used today. The woman is treated with a drug that causes the ovaries to produce multiple eggs. Mature eggs are surgically removed from the woman and combined with sperm in a dish in the lab. Healthy embryos are then implanted in the woman's uterus (American Society for Reproductive Medicine, 2013). This method is often used when a woman's fallopian tubes are blocked or a man produces too few sperm. Treatment costs may vary widely among clinics and states, with one cycle of IVF averaging \$12,000 with an additional \$5,000 for drugs used in the process. Genetic testing, egg and embryo freezing, and other procedures, when desired, can add another \$100,000 to the costs (McCarter, 2016). Some clinics allow partial or complete refunds if pregnancy does not occur with higher-priced multiple-cycle plans, a practice referred to as "shared risk" (Advanced Fertility Center of Chicago, 2014). Success rates vary, but most clinics suggest that with a single cycle of IVF, there is a 40% success rate for women age 34 and younger, 4% for women age 40, and 1% for women age 44 (Gordon et al., 2013; National Center for Chronic Disease Prevention and Health Promotion, 2014). Previously frozen eggs may also be used, but the rate of success decreases.
- *Intracytoplasmic sperm injection (ICSI).* ICSI is typically used for couples when there are serious problems with the sperm. In ICSI, rather than mixing egg and sperm in a dish, a single sperm is injected into a single mature egg (American Society for Reproductive Medicine, 2013).
- *Egg donors and gestational carriers.* A couple may use donor eggs to be fertilized with the sperm of the male partner and then have the fertilized egg placed in the uterus of the female partner. The resulting child will be genetically related to the egg donor and the male partner. Another option is to implant a gestational carrier with the couple's embryo produced through IVF. This option may be used when the woman can produce healthy eggs but is unable to carry a pregnancy to term. Donor eggs or sperm may also be used in IVF to produce the embryo, which is then placed in the gestational carrier. The resulting child has no genetic relationship to the gestational carrier (American Society for Reproductive Medicine, 2013). The costs of using a gestational carrier can easily reach \$100,000 because insurance usually does not cover the medical costs of the pregnancy (Herron, 2013).
- *Intrauterine insemination (IUI).* Healthy sperm are collected, washed, and concentrated, then placed directly into the uterus through a fine tube inserted through the cervix around the time the ovary releases one or more eggs (American Society for Reproductive Medicine, 2013). It is the primary treatment for male infertility. It is also the treatment of choice for lesbian couples and single parents, using sperm of a male donor (De Brucker et al., 2009). The sperm of the male partner of a couple may also be placed in the uterus of a surrogate who gestates and carries the pregnancy for the couple. The resulting child will be biologically related to the male partner and the surrogate, but not to the female partner in the couple.
- *INVOcell (IVC),* a new method. Following the retrieval of the eggs (after mild stimulation of the ovaries with medication), they are combined with sperm and placed in a small plastic chamber. This is then inserted into the woman's vagina for 3 to 5 days. After retrieval, the most viable embryos are transferred to the uterus. The cost of IVC (\$6,500) is significantly less than traditional IVF, bringing assistance to a larger population. Some centers continue to incubate the embryos in a laboratory setting because this method allows direct observation of the embryos. The birth rates for IVF and IVC are similar. Many women feel that this method is more natural and provides emotional bonding (Doody, Boome, & Doody, 2016).

- *Uterine transplantation* is another infertility treatment that is on the frontier. The first successful live birth after a uterine transplant was in Sweden in 2014, and by 2017, uterine transplants in Sweden had resulted in five pregnancies and four live births (Brown, 2014; Fayed, 2018).

Each ART procedure carries risks. These include multiple gestations, which carry higher risks of maternal and neonate complications. In 2009, almost half of ART births resulted in more than one neonate (CDC, 2016a, 2017b). IVF can be used by a parent or parents who know they have a genetic defect that can be passed to the child. The embryos are harvested and checked at the 8-cell growth level, and those with genetic defects are not implanted (Eckman, 2014).

The new technologies for assisting reproduction raise a number of ethical and legal issues. A major issue relates to the disparities in access to these technologies and the related question of whether some groups should be refused access (Brezina & Zhao, 2012). Another issue is what should happen to unused embryos created by IVF (Clark, 2009). There are also questions about whether embryos created by IVF should be allowed to be selected based on gender or specific physical traits. There are many questions about the roles, rights, and responsibilities of surrogates and gestational carriers (Frith & Blyth,

2013; James, Chilvers, Havermann, & Phelps, 2010). Uterine transplantation carries many questions about access, risks, and costs (Catsanos, Rogers, & Lotz, 2013). Questions are also raised about the costs of reproductive technologies in light of the need for adoptive families.

Adoption is another alternative for the infertile couple. In 2012, there were 119,514 adoptions in the United States, a 6% decrease from 2008 (U.S. Department of Health and Human Services, 2016). Recent data indicate that 25% of adopted children in the United States are international adoptions, 38% are private domestic adoptions, and 37% are foster care adoptions (Statistic Brain, 2017). On average, adoption is a highly successful solution to providing permanent family relationships to children whose biological parents are unavailable. The adoption process is almost as emotionally daunting as infertility treatment, however. A time-consuming multiphase evaluation, which includes a home study, is required before finalization of custody. The idea of parenting an infant with an unknown genetic heritage may be a challenge for some people, particularly because an increasing number of problems previously thought to be environmentally induced are being linked—at least in part—to genetics. On the positive side, however, some individuals and couples prefer adoption to the demands and uncertainties of ART, and some adoptive parents are also committed to giving a home to children in need of care. And, truthfully, most of us are not aware of all the genetic secrets in our lineage.



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PHOTO 2.3 After week 8, the embryo is mature enough to be called a fetus.

CRITICAL THINKING QUESTIONS 2.2

In recent years, there has been much controversy about sex education in public schools. Some people argue that there should be no sex education in public schools. What is your opinion on this topic? If you think there should be sex education in public schools, at what age do you think it should start? If you think there should be sex education in public schools, what should it cover?

FETAL DEVELOPMENT

The 40 weeks of **gestation**, during which the fertilized ovum becomes a fully developed infant, are a remarkable time. **Gestational age** is calculated from the date of the beginning of the woman's last menstrual period, a fairly easy time for the woman to identify. In contrast, **fertilization age** is measured from the time of fertilization, approximately 14 days after

the beginning of the last menstrual period. The average pregnancy lasts 280 days when calculated from gestational age and 266 days from the time of fertilization. Conventionally, the gestation period is organized by trimesters of about 3 months each. This is a convenient system, but note that these divisions are not supported by clearly demarcated events.

First Trimester

In some ways, the first 12 weeks of pregnancy are the most remarkable. In an amazingly short time, sperm and ovum unite and are transformed into a being with identifiable body parts. The mother's body also undergoes dramatic changes.

Fertilization and the Embryonic Period

Sexual intercourse results in the release of an average of 200 million to 300 million sperm. Their life span is relatively short, and their journey through the female reproductive tract is fraught with hazards. Thus, only about one or two in 1,000 of the original sperm reach the fallopian tubes, which lead from the ovaries to the uterus. Typically, only one sperm penetrates the ripened ovum, triggering a biochemical reaction that prevents entry of any other sperm. The **zygote** (fertilized egg) continues to divide and begins an approximately 7-day journey to the uterus.

Following implantation in the uterine wall, the zygote matures into an **embryo**. The placenta, which acts like a filter between the mother and the growing embryo, also forms. The umbilical cord connects the fetus to the placenta. Oxygen, water, and glucose, as well as many drugs, viruses, bacteria, vitamins, and hormones, pass through the placenta to the embryo. Amniotic fluid in the uterus protects the embryo throughout the pregnancy.

By the 3rd week, tissue begins differentiating into organs. During this period, the embryo is vulnerable to **teratogens**—substances that may harm the developing organism—but most women do not know they are pregnant. Exhibit 2.5 shows how some relatively common drugs may have a teratogenic effect in the earliest stage of fetal development. The importance of a healthy diet cannot be overestimated for the pregnant woman because her choices can have a lifelong impact on her baby (Stanford Children's Health, 2018). Studies have found that nutritional deficiency in the first trimester results in an increase in brain abnormalities and early death from natural causes (Ekamper, van Poppel, Stein, Bijwaard, & Lumey, 2015). High-fat diets negatively affect the development of the hippocampus, which helps control

EXHIBIT 2.5 • Potential Teratogens During the First Trimester

Substance	Effects on Fetal Development
Antacids	Increase in anomalies
Antianxiety medications	Cranial facial
Anticonvulsant medications	Facial defects, neural tube defects
Barbiturates	Increase in anomalies
Bisphenol A (BPA)	Mammary glands, immune system, brain, reproductive tract
Glucocorticoids (steroids)	Cleft palate, cardiac defects
Haloperidol	Limb malformations
Insulin	Skeletal malformations
Lithium	Goiter, eye anomalies, cleft palate
LSD	Chromosomal abnormalities
Podophyllin (in laxatives)	Multiple anomalies
Selective serotonin reuptake inhibitors (SSRIs)	May lead to neurobehavioral disturbances
Tetracycline (antibiotic)	Inhibition of bone growth, discoloration of teeth
Tricyclic antidepressants	Central nervous system and limb malformations

long-term memory and spatial navigation. Researchers have discovered that offspring of women who were either obese or pregnant during a famine were at significantly increased risk for developing schizophrenia (Khandaker, Dibben, & Jones, 2012; Roseboom, Painter, van Abeelen, Veenendall, & de Rooij, 2011). Isothiocyanate and cruciferous vegetables (such as broccoli, brussels sprouts, radishes, turnips), beta-carotenes (found in yellow, red, and orange fruits and vegetables and whole grains), and carotenoid lycopenes (found in tomatoes, guava, apricots, watermelons, and papaya) have been found to promote healthy cellular growth in the fetus (Kaur et al., 2013). The intake of folate and folic acid (found in cereal, spinach, beans, oranges, and peanuts) helps to prevent birth defects; calcium (found in cereal, milk, juice, yogurt, cheese, and salmon) strengthens the bones as

does Vitamin D (found in fish, milk, juice, and eggs) (U.S. Department of Agriculture, 2015). The development of a healthy cellular structure promotes health throughout the life course, and the positive effects appear to extend into future generations because the change occurs at the cellular level (Kaur et al., 2013).

Ectopic pregnancy is one type of mishap that occurs during this period. An ectopic pregnancy occurs if the zygote implants outside the uterus, 93% of the time in the fallopian tubes (Murano & Cocuzza, 2009) and sometimes in the ovaries. Approximately 1% to 2% of pregnancies in the United States result in an ectopic pregnancy. Women older than 35 have a 3.5% greater chance of an ectopic pregnancy. Women who experience one ectopic pregnancy have higher rates of future ectopic pregnancies (5% to 20%) and infertility (ranging from 20% to 70%) (Healthline, 2018). Chlamydia, the most commonly occurring sexually transmitted disease, increases the risk for an ectopic pregnancy (Centers for Disease Control and Prevention, 2018a).

With advancements in ultrasound technology and microsurgery, the maternal mortality rates in cases of ectopic pregnancy have decreased (Creanga et al., 2011). The treatment for ectopic pregnancy is either medication to terminate the pregnancy or surgery (American College of Obstetricians and Gynecologists, 2017a).

The Fetal Period

By about the 8th week after fertilization, the embryo implanted in the uterine wall is mature enough to be called a **fetus**, or unborn baby, and the mother is experiencing signs of her pregnancy. Usually the mother has now missed one or two menstrual periods, but if her cycle was irregular, this may not be a reliable sign. A **multigravida**, or woman who has had a previous pregnancy, often recognizes the signs of excessive fatigue and soreness in her breasts as a sign of pregnancy. Approximately 80% of women experience nausea and vomiting (morning sickness) during the first trimester, as was the case for Felicia Thompson. It has been found that women are at a greater risk for morning sickness if there is a low protein intake. Some early studies have demonstrated that there may be positive benefits in stabilizing early fetal nutrition when a woman experiences morning sickness (Patil, Abrams, Steinmetz, & Young, 2012). Ginger, which has been used for more than 2,000 years to treat morning sickness, has been scientifically shown to reduce vomiting (Ozgoli, Goli, & Simbar, 2009). A few women experience vomiting so severe that it causes dehydration and metabolic changes requiring hospitalization. Hyperemesis gravidarum (HG) occurs in about 1% of all pregnant women

and is characterized by excessive and persistent nausea and vomiting (Stokke et al., 2015). It can last through all three trimesters and has been associated with prematurity, low birth weight, preeclampsia, placental abruption, and stillbirth (Bolin, Akerud, Cnattingius, Stephansson, & Wikstrom, 2013). Furthermore, mental health is negatively affected by HG at the time of pregnancy, and this situation may continue after childbirth (Senturk, Yildiz, Yorguner, & Cakmak, 2017). Researchers have also found that women with HG are significantly more likely to self-report physical and psychosocial issues both before and after pregnancy (Tian, MacGibbon, Martin, Mulin, Fejzo, 2017). Norwegian researchers have found enteral tube feeding to be a feasible treatment to produce sufficient maternal weight gain and favorable pregnancy outcomes (Stokke et al., 2015). Teaching the mother progressive muscle relaxation along with medication management has been shown to reduce HG (Gawande, Vaidya, Tadke, Kirpekar, & Bhave, 2011).

From the 7th to 12th week, the fetal heart rate can be heard using a Doppler fetal monitor (Merce, Barco, Alcazar, Sabatel, & Trojano, 2009). Early ultrasounds are used to predict prenatal complications (Parra-Cordero et al., 2013). At 12 weeks, the sex of the fetus usually can be detected, and the face is fully formed. The fetus is moving within the mother, but it is still too early for her to feel the movement.

Newly pregnant women often feel ambivalence. Because of hormonal changes, they may experience mood swings and become less outgoing. Anxiety and depression have been found to be higher during the first trimester and in the postpartum period than the subsequent two trimesters and can affect attachment to the fetus (Fan et al., 2009; Figueiredo & Conde, 2011). Maternal depression, occurring in 10% of pregnant women, increases the rate of prematurity, low birth weight, intrauterine growth restriction, and postnatal complications (Eke, Saccone, & Berghella, 2016). Concerns about the changes in their bodies, finances, the impact on their life goals, lifestyle adjustments, and interpersonal interactions may cause anxiety. Often the father experiences similar ambivalence, and he may be distressed by his partner's mood swings. Parents who have previously miscarried may have a heightened concern for the well-being of this fetus.

Miscarriage, or **spontaneous abortion**, is a pregnancy loss prior to 20 weeks of gestation and is most prevalent in the first trimester. Approximately 17% of pregnancies end in miscarriage, 18% in medical abortion, and 65% in live birth (Oaklander, 2015). Recurrent miscarriage, three or more consecutive miscarriages, occurs in 1% of women and carries a higher risk for maternal

and fetal complications (Fawzy, Saravelos, Li, & Metwally, 2016). Sometimes the causes of miscarriage are not clear, but researchers have identified a number of potential causes. It is estimated that about half of all miscarriages are caused by abnormalities in the genetic makeup of the fetus. Chronic conditions such as uncontrolled diabetes, thyroid disease, high BMI, and other underlying maternal health conditions increase the risk of miscarriage, as do smoking and alcohol use (Matijila, Hoffman, & van der Spuy, 2017). Other potential causes are problems in placental development, womb structure abnormalities, polycystic ovary syndrome, obesity and underweight, environmental toxins, and some medications.

The signs and symptoms of miscarriage include vaginal spotting or bleeding, cramping or pain in the abdomen or lower backache, fluid or tissue discharge from the vagina, and feeling faint or light-headed (American Pregnancy Association, 2017b). These symptoms do not always mean a woman is having a miscarriage, and sometimes miscarriage happens with no symptoms (American College of Nurse-Midwives, 2013). Miscarriage is most commonly diagnosed these days by ultrasound; blood tests may also be done (Al-Memar, Kirk, & Bourne, 2015). Some women choose to allow the miscarriage to pass naturally; this may take 2 weeks. Sometimes it is not possible to pass all of the pregnancy without further assistance. Women may take medication to help the body pass the miscarriage, and sometimes surgery is needed to complete the miscarriage (American College of Nurse-Midwives, 2013). Counseling of women who struggle with miscarriages focuses on genetics and the biopsychological needs of the woman and her family (Randolph, Hruby, & Sherif, 2015). Social workers need to understand the possibility of both short-term and long-term grief following a pregnancy loss and attachment issues that might arise during subsequent pregnancies (Chetu, 2017). They should be prepared to talk with women about whether a subsequent pregnancy is planned, the importance the mother attributes to motherhood, and fertility issues (Shreffler, Greil, & McQuillan, 2011; Wright, 2011).

Second Trimester

By the 16th week, the fetus is approximately 19 centimeters (7.5 inches) long and weighs 100 grams (3.3 ounces). The most rapid period of brain development is during the second trimester (Zhan et al., 2013). In recent years, there have been controversies about pregnant women eating fish, but recent evidence shows that eating fish during the second trimester may have a positive effect on fetal birthweight. Two fish meals per week are recommended,

without the earlier worries about mercury levels (Taylor, Golding, & Emond, 2016). Insufficient weight gain by the pregnant woman during this trimester has been shown to be associated with a small-for-gestational-age (SGA) neonate (Drehmer, Duncan, Kac, & Schmidt, 2013). Excessive weight gain during this period can lead to hypertension and diabetes (Ruhstaller et al., 2016). The second trimester is generally a period of contentment and planning for most women, as it seems to have been for Felicia Thompson. For problem pregnancies, or in troubled environments, quite the opposite may occur. However, the fatigue, nausea and vomiting, and mood swings that often accompany the first few weeks usually disappear in the second trimester.

Hearing the heartbeat and seeing the fetus via ultrasound often bring the reality of the pregnancy home. As seen in the story of the Thompsons, *quickenings*—the experience of feeling fetal movement—usually occurs around this time, further validating the personhood of the fetus. *Fetal differentiation*, whereby the mother separates the individuality of the fetus from her own personhood, is usually completed by the end of this trimester. Many fathers too begin to relate to the fetus as a developing offspring.

Some fathers enjoy the changing shape of the woman's body, but others may struggle with the changes. Unless there are specific contraindications, sexual relations may continue throughout the pregnancy, and some men find the second trimester a period of great sexual satisfaction. Often during the second trimester the pregnant woman also experiences a return of her prepregnancy level of sexual desire.

Third Trimester

The third trimester is critical for continued fetal development and preparation for birth. The mother must be able to effectively meet both her nutritional needs and those of the growing fetus. Women who have excessive weight gain are at risk for preterm delivery and higher rates of cesarean section (Drehmer et al., 2013). Maternal smoking decreases fetal circulation and has been correlated with lower birth weight; older mothers have increasingly negative effects from smoking while pregnant (Trojner-Bregar et al., 2018; Zheng, Suzuki, Tanaka, Kohama, & Yamagata, 2016). Spouses who smoke increase the nicotine level in the nonsmoking pregnant woman, even if the spouse smokes outside (Andriani & Hsien, 2014). The provision of in-home services early in the pregnancy to encourage smoking cessation has been shown to be effective in reducing the incidence of smoking during the third trimester (Windsor, Clark, Davis, Wedeles, & Abroms, 2017).

More than 30% of women are iron-deficient by the third trimester, placing the neonate at risk for anemia. Low iron levels can result in permanently altered developmental and metabolic processes and negatively impact brain development (Cao & O'Brien, 2013). In addition, maternal stress can reduce fetoplacental blood flow and fetal weight gain (Helbig, Kaasen, Mait, & Haugen, 2013). Today, a 3-D diffusion tensor image MRI can be used to visualize the movement in the fetal brain (Fogtmann et al., 2014). By 24 weeks, the fetus is considered viable in many hospitals. In spite of fetal viability, parents are not usually prepared for childbirth early in the third trimester. Felicia Thompson, for instance, was not prepared for the birth of her son, Paul, who at 26 weeks' gestation struggled to survive.

The tasks of the fetus during the third trimester are to gain weight and mature in preparation for delivery. As delivery nears, the increased weight of the fetus can cause discomfort for the mother, and often she looks forward to delivery with increasing anticipation. Completing preparations for the new baby consume much of her attention.

Labor and Delivery of the Neonate

Predicting when labor will begin is impossible. However, one indication of imminent labor is *lightening* (the descent of the fetus into the mother's pelvis). For a **primipara**—a first-time mother—lightening occurs approximately 2 weeks before delivery. For a **multipara**—a mother who has previously given birth—lightening typically occurs at the beginning of labor. Often the mother experiences Braxton Hicks contractions, brief contractions that prepare the mother and fetus for labor—what is often referred to as “false labor.” Usually, true labor begins with a show or release of the mucous plug that covered the cervical opening.

Labor is divided into three stages.

1. In the first stage, the cervix thins and dilates. The amniotic fluid is usually released during this stage (“water breaking”), and the mother feels regular contractions that intensify in frequency and strength as labor progresses. Many factors determine the length of this stage, including the number of pregnancies the mother has experienced, the weight of the fetus, the anatomy of the mother, the strength of the contractions, and the relaxation of the mother in the process. Despite the stories that abound, most mothers have plenty of time to prepare for the upcoming birth. Near the end of this phase, “transition” occurs, marked by a significant increase in the intensity and frequency of the contractions and by heightened maternal emotionalism. The head crowns (is visible at the vulva) at the end of this stage.

2. The second stage is delivery, when the neonate is expelled from the mother. If the newborn is born breech (feet or buttocks first) or is transverse (positioned horizontally in the birth canal) and cannot be turned prior to birth, the mother may require a cesarean section.

3. Typically, within 1 hour after delivery, the placenta, the remaining amniotic fluid, and the membrane that separated the fetus from the uterine wall are delivered with a few contractions. If the newborn breastfeeds immediately, the hormone oxytocin is released to stimulate these contractions.

Following birth, the neonate undergoes rapid physiological changes, particularly in its respiratory and cardiac systems. Prior to birth, oxygen is delivered to the fetus through the umbilical vein, and carbon dioxide is eliminated by the two umbilical arteries. Although the fetus begins to breathe prior to birth, breathing serves no purpose until after delivery. The neonate's first breath, typically in the form of a cry, creates tremendous pressure within the lungs, which clears amniotic fluid and triggers the opening and closing of several shunts and vessels in the heart. The blood flow is rerouted to the lungs.

Many factors, such as maternal exposure to narcotics during pregnancy or labor, can adversely affect the neonate's attempts to breathe—as can prematurity, congenital anomalies, and neonatal infections. Drugs and other interventions may be administered to maintain adequate respiration. To measure the neonate's adjustment to extrauterine life, Apgar scores—simple measures of breathing, heart rate, muscle tone, reflexes, and skin color—are assessed at 1, 5, and 10 minutes after birth. Apgar scores determine the need for resuscitation and indicate whether there are heart problems. The other immediate challenge to the newborn is to establish a stable temperature. Inadequately maintained body temperature creates neonatal stress and thus increased respiratory and cardiac effort, which can result in respiratory failure. Close monitoring of the neonate during the first 4 hours after birth is critical to detect any such problems in adapting to extrauterine life.

Sometimes the baby is born showing no signs of life; this is known as stillbirth. The Centers for Disease Control and Prevention (2017c) define stillbirth as “the death of or loss of a baby before or during delivery” (para. 1). They further classify stillbirth as *early* (occurring from 20 to 27 completed weeks of pregnancy), *late* (occurring from 28 to 36 completed weeks), and *term* (occurring at 37 or more completed weeks). The World Health Organization (2016a) reports that in 2015, there were an estimated 2.6 million late or term stillbirths around the world, with

98% taking place in low-income and middle-income countries. In the United States 1% of pregnancies end in stillbirth. Advanced technology and improved prenatal care have reduced the number of late and term stillbirths in the past 30 years, but the rate of early stillbirth has remained about the same over time (Centers for Disease Control and Prevention, 2017c). The primary causes of stillbirth are well known: advanced maternal age, non-communicable infections, nutrition deficits, obesity, smoking, poor prenatal care, and lifestyle issues (The Lancet, 2016). There is a greater chance of subsequent pregnancies ending in stillbirth once this has occurred (Barclay, 2009). In cases of fetal death, labor generally proceeds immediately and is allowed to occur naturally. But the pregnancy may continue for several days following cessation of movement. Although this wait can be distressing for the mother, cesarean sections are usually avoided because of the potentially high number of complications for the mother (Barclay, 2009). Stillbirths are often unexpected, resulting in great stress and anguish for parents, who blame themselves and struggle with unresolved guilt. Social workers can help parents understand and cope with the strong emotions they are experiencing due to such a significant loss (Navidian, Saravani, & Shakba, 2017).

CRITICAL THINKING QUESTIONS 2.3

How is ultrasound technology changing the process of fetal development for the mother? What are the benefits to these technologies? What ethical issues are raised by the use of these technologies?

PREGNANCY AND THE LIFE COURSE

The childbearing age for women is usually listed as 15 to 44, but physiologically, women are considered to be at the optimal age for pregnancy from the ages of 20 to 35. Pregnant women of every age need the support of caring family members, friends, and health providers, but women of different ages face pregnancy with different biological bodies and different psychological and social resources. The special circumstances and needs of pregnant adolescents are discussed in Chapter 6, and this section considers pregnancy during young adulthood as well as what is referred to as delayed pregnancy after age 35.

Pregnancy during young adulthood is a normative event in most cultures. Psychosocially, young adults are involved in establishing life goals, and both parenthood and employment are often a part of those goals. Women in young adulthood are trying to balance love and work, become more financially secure, and develop a career path or other positive work trajectory (Koert & Daniluk, 2017). Over the last 3 decades, pregnant women's employment patterns have seen major changes, with more women working overall and longer into the pregnancy cycle. From 2006 to 2008, two thirds of first-time mothers in the United States worked during their pregnancy, up from 44% from 1961 to 1965 (Martin, Hamilton, Osterman, Driscoll, & Matthews, 2017). There are legal, physical, and psychosocial considerations for maintaining employment during pregnancy. Salihu and colleagues (Salihu, Myers, & August, 2012) have done an in-depth review of research related to these considerations. The following three paragraphs summarize their important findings.

In terms of the legal considerations, a number of countries have laws to protect the rights of pregnant women in the workplace. In the United States, the Pregnancy Discrimination Act (PDA), passed in 1978, established that organizations cannot refuse to hire a woman because she is pregnant, cannot fire a woman or force her to leave because she is pregnant, cannot take away credit for previous years of work during maternity leave, and cannot fire or refuse to hire a woman because she had an abortion. It further states that a pregnant woman may be eligible for temporary job reassignment if she is unable to perform current duties during pregnancy. In 2015, the United States Supreme Court ruled that employers subject to the PDA may be required to make reasonable accommodations for pregnancy. This ruling was based on the Equal Employment Opportunity Commission's (EEOC) 2015 ruling that requires employers under the Americans with Disabilities Act to provide reasonable accommodations for pregnant women (Martin, Kitchen, & Wheeler, 2016; U.S. Equal Employment Opportunity Commission, 2015). Other countries have laws that provide additional financial and legal protections. In spite of these laws, researchers have found that pregnant women experience a large amount of discrimination. Pregnant women continue to be terminated and demoted when their employers learn they are pregnant.

In terms of physical considerations, most of the available studies have found little or no negative physical effects on either the fetus or the mother from typical job activity, and high levels of physical activity have a positive effect on some pregnancy outcomes (Spracklen,

Ryckman, Triche, & Saftlas, 2016). There is evidence, however that exposure to solvents and radiation in the workplace is hazardous to the fetus.

In terms of psychosocial considerations, research has found no differences in stress, depression, and anxiety between pregnant homemakers, part-time workers, and full-time workers. Some researchers have found, however, that some pregnant women face negative stereotypes about pregnant women from their work colleagues (Deardorf, 2016). They also found that pregnant women tend to respond by delaying informing the workplace that they are pregnant and by refusing special accommodations or time off.

An increasing number of women are delaying child-birth until their late 30s and 40s, even into their 50s and 60s. In the United States, the average age of first-time mothers has increased from 21.4 in 1970 to 25.8 in 2012. For all births in 2012, 14.9% were to women older than 34 (Martin et al., 2013). Many women struggle with infertility for years before becoming pregnant; others, like Jennifer Bradshaw, deliberately choose to wait until their careers are established. Other women choose to have children with a new partner. Some single women, driven by the ticking of the so-called biological clock, may decide to have a child on their own, often using artificial insemination or, more recently, banking their eggs for a future pregnancy.

At birth a woman has 6 to 7 million oocytes, but at menarche these decrease to 250,000, declining to only 25,000 at age 37 and declining again at age 38 to a few hundred to 1,000. Although there is no absolute fertility age for men, semen volume and sperm motility decrease with age, and there are some changes in sperm cell morphology (Balasch & Gratacos, 2011). Despite decreasing odds of conception as one ages, because of the increasing success rate of infertility treatment, there are reports of women bearing their own child or grandchild(ren) at an elderly age (Hale & Worden, 2009; Weingartner, 2008). However, waiting until later in the life course to reproduce increases pregnancy risks (Asgharpour et al., 2017; Bellieni, 2016).

In a national representative sample of U.S. women of reproductive age (25–45), Simoni, Lin, Collins, and Mu (2017) found that career-focused women are more likely than women who do not have a strong career focus to put a high value on family planning and planned pregnancies, to have increased optimism about ART's success, and to have increased ethical acceptance of the use of donor gametes in preference to IVF and IUI using partner sperm. Their optimism appears to far exceed the medical reality. Egg freezing has become socially acceptable, but the risks of delaying pregnancy must be considered

(Dunne & Roberts, 2016). As with Jennifer and Allan Bradshaw, couples may be faced with a rude awakening when they start the process of fertility treatment.

Women with delayed pregnancy have increased challenges but also some protective factors. Older mothers are more likely to seek early prenatal care, to be of a higher socioeconomic group, and to have private health insurance (Vaughan, Cleary, & Murphy, 2013). They are also more likely to be obese or to have medical conditions such as hypertension or diabetes. The likelihood of birth by cesarean section increases with the age of the mother, as do preterm birth and low birth weight. Neonates born to older mothers are more likely to require admission to the neonatal unit and to have fetal chromosomal abnormalities (Vaughan et al., 2013).

AT-RISK NEWBORNS

Not all pregnancies proceed smoothly and end in routine deliveries. Every year an estimated 15 million babies are born preterm (before 37 completed weeks of gestation) worldwide, and this rate is increasing (World Health Organization, 2017b). Preterm birth complications are the leading cause of death of children under age 5. Across the world, the rate of preterm birth ranges from 5% to 18% of babies born. One in ten births in the United States is premature, with prematurity the leading cause of neonatal illness and responsible for 17% of infant deaths (Centers for Disease Control and Prevention, 2017d). In low-income countries, half of the babies born at or below 32 weeks die, but most of these babies survive in high-income countries (World Health Organization, 2017b). More than 75% of the deaths of premature infants are preventable with low-cost interventions such as providing warmth, basic care, and breastfeeding (World Health Organization, 2017b). Compared with 34 high-income countries, the United States ranks 31st in infant mortality, despite having state-of-the-art medical services (Heisler, 2012). There are subcategories of preterm birth, based on gestational age: *extremely preterm* (less than 28 weeks), *very preterm* (28 to 32 weeks), and *moderate to late preterm* (32 to 37 weeks).

Prematurity and Low Birth Weight

Prematurity has a profound long-term effect on the family, including parental mental health problems related to parental stress (Mathews & MacDorman, 2013; Treyvaud et al., 2011). It is estimated that the cost associated with premature birth in the United States is \$26.2 billion each year: \$16.9 billion in medical and health care costs for the baby, \$1.9 billion in labor and delivery costs for the

mother, \$611 million in early intervention services, \$1.1 billion for special education services, and \$5.7 billion in lost work and pay for people born prematurely (March of Dimes, 2015). The average cost of a premature neonate is 10 times greater than a full-term neonate.

Approximately 70% of premature births (6.8% of all births) occur from 34 to 36 weeks (40 weeks is full gestation), and the rate of these **late preterm births** has increased whereas the rate of preterm births before 34 weeks has decreased (Martin et al., 2017). Most of these late preterm births are precipitated by induced labor, an elective cesarean, or maternal medical complications (including incorrect gestational estimation) (Loftin, Habli, & DeFranco, 2010). These babies may weigh more than 2,500 grams (5.5 pounds) but are still premature. They are at risk for respiratory distress during the neonatal period as well as increased respiratory problems during the first year of life, feeding problems, hypoglycemia (low blood sugar), hypothermia (low body temperature), and hyperbilirubinemia (jaundice) (Cohen, McEvoy, & Castile, 2010; Loftin et al., 2010).

Low-birth-weight (LBW) neonates (weighing from 1,500 to 2,500 grams, 3.3 to 5.5 pounds) account for 8.07% of preterm births. Sometimes the LBW infant is **small for gestational age (SGA)**, generally weighing below the 10th percentile for sex and gestational age (Martin et al., 2017). In other situations, the LBW infant is premature. These neonates have an increased risk for death in the neonatal period when they need support in feeding, temperature maintenance, and respiration (Cohen et al., 2010). Later, they have a 5.2% increased risk for developing asthma, showing delayed growth patterns, developing eye problems, and experiencing cardiovascular and renal disorders (McCormick, Litt, Smith, & Zupancic, 2011; Simeoni, Ligi, Buffat, & Boubred, 2011). Additionally, they are at higher risk for depression, anxiety, and inattention/hyperactivity than are full-term infants (Hall, Jaekel, & Wolke, 2012; Serati, Barkin, Orsenigo, Altamura, & Buoli, 2017; Sullivan, Msall, & Miller, 2012). The risks continue into the next generation; it has been shown that women who themselves were premature or SGA had a higher risk for pregnancy complications (Boivin et al., 2012). Depression prior to pregnancy has been associated with the delivery of an LBW neonate, and the social worker needs to be aware of the multiple stressors these mothers face (Witt, Wisk, Cheng, Hampton, & Hagen, 2012).

The rate of **very-low-birth-weight (VLBW)** infants—infants weighing less than 1,500 grams (3 pounds, 3 ounces)—is approximately 1.5% (Martin et al., 2017). These neonates are at greater risk for poor physical growth, a lower IQ, learning problems, and dropping

out of high school (Child Trends Data Bank, 2016; Tamaru et al., 2011). Some will develop cerebral palsy (2 to 3 per 1,000 live births) (Lie, Groholt, & Eskild, 2011) and experience a lower quality of life (McCormick et al., 2011). There is a higher incidence of anxiety disorder and attention deficit/hyperactivity disorder in VLBW and SGA children compared with their full-term counterparts (Lund et al., 2011). Although the cause(s) of all LBWs may not be known, maternal smoking, low pre-pregnancy weight, infection, increased maternal weight gain during pregnancy, and domestic violence have been shown to be contributors, as have multiple pregnancies. When a neonate is both premature and SGA, there are additive negative physiological and neurological effects (Boulet, Schieve, & Boyle, 2011).

Extremely low-birth-weight (ELBW) infants—infants weighing less than 1,000 grams (2.2 pounds)—add dramatically to the neonatal and infant mortality rates. Approximately 1.4% of all births are VLBW neonates, and the rate of survival of these neonates has been improving with neonatal technologies (Subramanian, 2014). The smallest survivors have a very high risk of lifelong neurological, psychological, and physical problems, including cerebral palsy, blindness, deafness, cognitive delays, feeding intolerance, chronic lung disease, failure to thrive, anxiety, and attention deficit/hyperactivity disorder (Boat, Sadhasivam, Loepke, & Kurth, 2011; Boyle et al., 2011; Dewey et al., 2011). One research team recently found mild impairments of motor ability, learning, and behavior in a sample of healthy 11- to-13-year-old ELBW children. They recommended that supporting motor competence in ELBW children can contribute to improved attention and social behaviors (Danks, Cherry, Burns, & Gray, 2017). Another research team found that a quarter of ELBW teenagers in Iceland have disabilities, mostly mild, and half (57%) have long-term health problems that require regular medical attention (Georgsdottir, Erlingsdottir, Hrafnkelsson, Haraldsson, & Dagbjartsson, 2012). We know that most ELBW births are due to obstetric complications (especially placental insufficiency due to hypertension) (Claas, de Vries, & Bruinse, 2011). Social workers have an essential role in helping the family because most parents are not aware of the long-term implications of an ELBW neonate and are often asked to make decisions regarding interventions that may involve ethical consideration during a time of crisis (Govande et al., 2013). Paul Thompson is considered an ELBW newborn, and at approximately 540 grams, he has a 50% chance of survival.

The social worker needs to be familiar with some of the key risk factors for prematurity and low birth weight. Smoking during pregnancy increases the risks of ectopic

pregnancy, placental abruption, stillbirth, and LBW. Women who abuse substances, including alcohol, are among the heaviest cigarette smokers, compounding risks (Burns, Mattick, & Wallace, 2007). Advanced maternal age (greater than 30), high blood pressure (Laskov et al., 2012), and obesity also are associated with higher rates of prematurity (Aly et al., 2010). A variety of other factors have been shown to increase the risk of prematurity, including exposure to air pollution (DeFranco et al., 2014); male neonate (Society for Maternal and Fetal Medicine, 2015); feelings of unhappiness during the pregnancy (Eke et al., 2016); STIs, especially in adolescent pregnancy (Borges-Costa, Matos, & Pereira, 2012); and intrauterine infections (Claas et al., 2011). Mothers enrolled in Medicaid have increased rates of prematurity and infant death compared with mothers enrolled in nonpublic insurance plans (Eisenhauer, Uddin, Albert, Paton, & Stoughton, 2011), a factor no doubt related to economic status. The mother's adequate nutrition prior to conception, as well as during pregnancy, is another important factor in fetal health. Worldwide, more than one third of infant deaths are related to maternal and child malnutrition (Zerfu & Ayele, 2013).

Several policy initiatives in the United States address the issue of prematurity. Passage of the Prematurity Research Expansion and Education for Mothers who Deliver Infants Early (PREEMIE) Act in 2006 (Pub. L. No. 109-450) mandated interagency coordination, improved data collection, and education for health care professionals. In 2013, the PREEMIE Reauthorization Act (S-252, 113th Congress) was passed to promote further federal funding and awareness campaigns (Govtrack, 2013). The March of Dimes (2017) has promoted a National Prematurity Campaign since 2003 and has been at the forefront in bringing attention to this serious health problem. The Affordable Care Act of 2010 has a provision for in-home services for pregnant women and mothers, but states have the option to opt out of the block grants that fund this initiative (National Partnership for Women & Families, 2012).

Newborn Intensive Care

The survival rates of premature infants in high-income countries have improved largely because of explosive growth in the field of neonatal medicine and the establishment of regional neonatal intensive care units (NICUs). Studying the long-term effects of prematurity is difficult because today's 5-year-old who was born at LBW received significantly less sophisticated care than will the current patients in the NICU.

As the Thompsons know all too well, parents' expectations for a healthy newborn are shattered when their

child is admitted to an NICU. Their fear and anxiety often make it hard for them to form a strong emotional bond with their newborn. About 90% of mothers and 80% of fathers report developing an attachment to the infant during the third trimester of pregnancy (Latva, Lehtonen, Salmelin, & Tamminen, 2007). But when an infant is premature, the parents have not had the same opportunity. With premature birth, maternal postnatal attachment has been found to be most related to the mother's own antenatal internal attachment to the fetus, whereas the father's postnatal attachment is associated with marital quality (Luz, George, Vieux, & Spitz, 2017). Fear that a sickly newborn may die inhibits some parents from risking attachment (Al Maghaireh, Abdullah, Chan, Piaw, & Al Kawafha, 2016). Some parents are consumed with guilt about their baby's condition and believe that they will only harm the newborn by their presence. Developmental outcomes have been linked to the level of maternal sensitivity during the NICU experience, especially for VLBW neonates (Neri et al., 2017). The NICU experience places both parents at high risk for anxiety and depression. Cognitive behavioral intervention has been shown to reduce the depressive symptoms but not to influence anxiety (Iono et al., 2016; Mendelson, Cluxton-Keller, Vullo, Tandon, & Noazin, 2017). Felicia and Will Thompson had to work hard to contain their anxiety about Paul's frailties.

With increased awareness of prematurity, parents often have more questions. The importance of effective communication and support from the NICU team is critical to short-term and long-term outcomes for both the neonate and the parents (Al Maghaireh et al., 2016; Barr, 2015). The response has been a movement toward family-centered NICU environments that are structured to promote interaction between the infant and the parents, siblings, and others in the family's support system. Mothers seem to more readily engage in caring for their infants in this environment than fathers (Enke, Hausmann, Miedaner, Roth, & Wooten, 2017; Noergaard, Johannessen, Fenger-Gron, Kofoed, & Ammentorp, 2016; Yaman & Atlay, 2015). Ample opportunity to interact with Paul facilitated Felicia and Will Thompson's attempts to bond with him.

Neuroscientists have recently called attention to the physical environment needs of prematurely born babies, noting the competing needs of these vulnerable babies and the medical staff that care for them in NICUs. The medical staff need lights, noisy equipment, and alarms to signal physiological distress. The vulnerable baby needs a physical environment that more nearly approximates the uterus, without bright lights and stressful noise stimulation, and the premature brain is negatively affected

by the stressful neonatal environmental conditions (Xiong & Zhang, 2013). With this discrepancy in mind, NICUs are being modified to accommodate the neurological needs of the vulnerable newborns (Haumont, 2016; Ramm, Mannix, Parry, & Gaffney, 2017; Romeu, Cotrina, Perapoch, & Lines, 2016).

Neonatology, the care of critically ill newborns, has only recently been recognized as a medical specialty. It is a much-needed specialty, however. Since the advent of the NICU in the 1970s, the survival rate of critically ill neonates has continued to increase. It is highly unlikely that Paul Thompson would have survived in 1970. Social workers in an NICU must negotiate a complex technological environment requiring specialized skill and knowledge while attempting to respond with compassion, understanding, and appropriate advocacy. Research has clearly shown the need for social work intervention that enables parents to bond with their children and decreases stress. The National Association of Perinatal Social Workers (NAPSW, 2017) is taking the lead in this area. It helps to remember that the effort could affect a neonate's complete life course.

Major Congenital Anomalies

Overall, only 2% to 4% of all surviving newborns have a birth defect. However, the number of neonates born with anomalies caused by genetics, exposure to teratogens, or nonhereditary factors that affect development of the fetus does not reflect the number of abnormal embryos. Fewer than half of all fertilized ova result in a live birth; the rest are spontaneously aborted, oftentimes before a woman knows she is pregnant. Based on data from a 10-year study of placental tissue following pregnancy loss, 80.5% of these spontaneous abortions were caused by a genetic anomaly (Kliman & Milano, 2013). Social workers need to be mindful of the low probability that a child will be born with a genetic disorder or congenital anomaly when responding to parental fears.

The U.S. Health Resources and Services Administration (HRSA, 2016) provides a Recommended Uniform Screening Panel of 34 core and 26 secondary metabolic, endocrine, and hemoglobin disorders for newborns. The National Newborn Screening and Global Resource Center (NNSGRC) also provides genetic and newborn screening information, including resources for parents and providers to respond to positive testing results (NNSGRC, 2014). A *screening* test may not be definitive, however, and, if positive, is usually followed by a *diagnostic* test to confirm a genetic mishap. Some screening may be done before birth (Centers for Disease Control and Prevention, 2016b).

Preventing, diagnosing, and predicting the outcome of genetic disorders are very difficult because of

the complexities of many genetic processes, including the following (National Human Genome Research Institute, 2017).

- *Variable expressivity.* Genes manifest differently in different people. For example, persons with cystic fibrosis, caused by a recessive gene, display wide variability in the severity of symptoms. The expression of the disorder appears to be influenced by the interplay of psychological, social, political, economic, and other environmental factors. The effects can be exacerbated by maternal substance abuse, inadequate maternal nutrition, birth trauma, and poverty.
- *Genetic heterogeneity.* The same characteristic may be a consequence of one of several genetic anomalies. For example, neural tube defects may result either from gene mutations or from exposure to specific teratogens.
- *Pleiotropy principle.* The same gene may influence seemingly unrelated systems. Hair color, for example, is typically linked to a particular skin color (such as blonde hair with light complexion, black hair with olive complexion).
- *Epigenetics.* Environmental factors may influence gene expression (phenotype) without changing the genetic makeup of a person (genotype). These factors influence the chemicals that trigger (methyl groups) or inhibit (acetyl groups) genetic expression. Furthermore, these chemicals appear to have a generational influence without genetic alterations. Examples of these epigenetic environmental influences include nutrition, trauma such as childhood abuse, and teratogens (Kubota & Hata, 2013). The epigenetic influences in many cases are preventable and treatable, especially if identified early in development.

Congenital anomalies fall into four categories, summarized in Exhibit 2.6, which includes examples of the most prevalent anomalies (Pierce, 2017).

1. *Inheritance of a single abnormal gene.* An inherited anomaly in a single gene may lead to a serious disorder. The gene may be recessive, meaning that both parents must pass it along, or it may be dominant, in which case only one parent needs to have the gene in

EXHIBIT 2.6 • Four Categories of Congenital Anomalies

Inheritance of Single Abnormal Gene			
Recessive	Dominant	Sex-Linked	
Sickle-cell anemia	Neurofibromatosis	Hemophilia	
Tay-Sachs disease	Huntington's disease	Duchenne muscular dystrophy	
Cystic fibrosis			
Multifactorial Inheritance			
Possible mental illness, alcoholism, heart disease, diabetes			
Chromosomal Aberration			
Down syndrome (additional 21st chromosome), Turner syndrome (X), Klinefelter syndrome (XXY)			
Exposure to Teratogens			
Radiation	Infections	Maternal Metabolic Imbalance	Drugs and Environmental Chemicals
Neural tube defects	Rubella: deafness, glaucoma Syphilis: neurological, ocular, and skeletal defects Zika virus: microcephaly and ocular defects	Diabetes: neural tube defects Folic acid deficiency: brain and neural tube defects Hyperthermia (at 14–28 days): neural tube defects	Alcohol: intellectual disability Heroin: attention deficit disorder Amphetamine: congenital defects

order for it to be expressed in the child. A third possibility is that the disorder is sex-linked, meaning that it is passed along by either the father or the mother (National Human Genome Research Institute, 2017; Pierce, 2017).

2. *Multifactorial inheritance.* Some genetic traits, such as height and intelligence, are influenced by environmental factors such as nutrition. Their expression varies because of **multifactorial inheritance**, meaning they are controlled by multiple genes. Multifactorial inheritance is implicated in traits that predispose a person to mental illnesses, such as depression. However, these traits are merely predisposing factors, creating what is called **genetic liability**. Siblings born with the same genetic traits thus may vary in the likelihood of developing a specific genetically based disorder, such as alcoholism or mental illness (National Human Genome Research Institute, 2017).

3. *Chromosomal aberration.* Some genetic abnormalities are not hereditary but rather caused by a

genetic mishap during development of the ovum or sperm cells. Sometimes the cells end up missing chromosomes or having too many. When the ovum or sperm cell has fewer than 23 chromosomes, the probability of conception and survival is minimal. But in the presence of too many chromosomes in the ovum or the sperm, various anomalies occur (National Human Genome Research Institute, 2017). Down syndrome, or trisomy 21, the most common chromosomal aberration, is the presence of 47 chromosomes—specifically, an extra chromosome in the 21st pair. Its prevalence is 1 in 691 live births overall, but it increases to 1 in 214 for women over age 35, and to 1 in 25 for women over the age of 45. Yet, although the prevalence increases with maternal age, 80% of children born with Down syndrome are to mothers under the age of 35 (National Down Syndrome Society [NDSS], 2018).

4. *Exposure to teratogens.* Teratogens can be divided into four categories: radiation, infections, maternal metabolic imbalance, and drugs and environmental

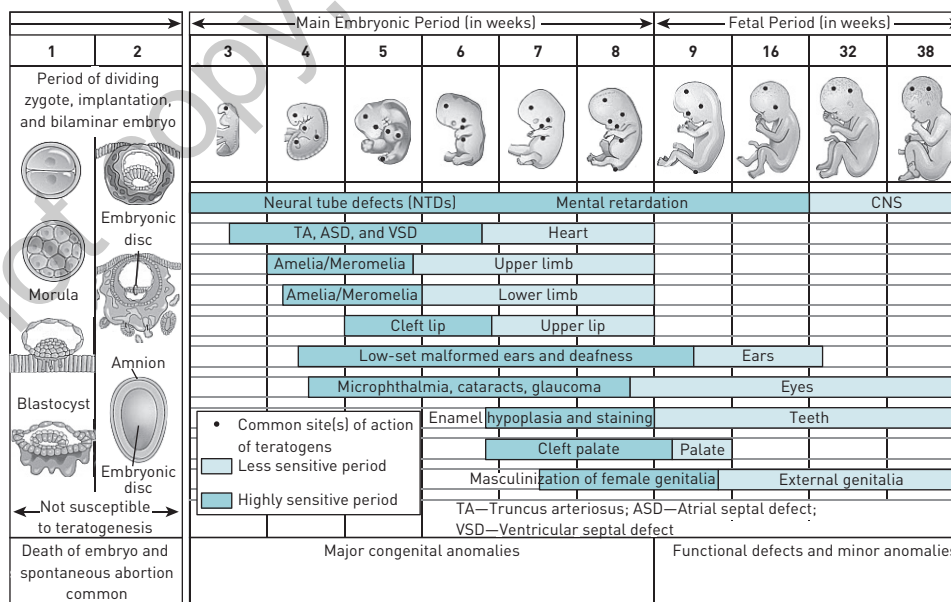
chemicals. In the Thompson story, Felicia wondered if Paul's premature birth was a result of prenatal exposure to paint fumes. It may have been, depending on what specific chemicals were involved, when exposure occurred, and to what degree. Parents who, like the Thompsons, are experiencing considerable guilt over their possible responsibility for their baby's problems may take comfort from the knowledge that the impact of exposure to teratogens can vary greatly. Much depends on the timing of exposure. The various organ systems have different critical or **sensitive periods**, summarized in Exhibit 2.7.

Today most pregnant women in the United States undergo a maternal blood screen and ultrasound from week 11 to week 13. Most recently recommended is the noninvasive prenatal screening, or NIPS (American College of Medical Genetics, 2016; Centers for Disease Control and Prevention, 2016b). Second trimester screening, weeks 15 to 20, includes a maternal serum screen and an anomaly ultrasound (18 to 20 weeks), which produces a visual image of the developing fetus. Based on these results, the doctor may offer diagnostic tests such as high-resolution ultrasound and chorionic villi sampling (CVS). CVS involves the insertion of a catheter through the cervix into the uterus to obtain a sample of the developing placenta and can be done as early as 10 to 12 weeks. *Amniocentesis* is the extraction

of amniotic fluid for chromosomal analysis; it involves inserting a hollow needle through the abdominal wall during the second trimester. At greater risk of a genetic anomaly are women older than age 35, carriers of sex-linked genetic disorders and single gene defects, parents with chromosomal disorders, and women who have had previous and recurring pregnancy loss. When any of these risks is present, screening or diagnostic tests may be offered earlier in pregnancy (American Pregnancy Association, 2017a; Centers for Disease Control, 2016b).

If an anomaly is detected, the decisions that need to be made are not easy ones. The possibility of false readings on these tests makes the decisions even more complicated. Should the fetus be aborted? Should fetal surgery be undertaken? Could gene replacement therapy, implantation of genetic material to alter the genotype—still a costly experimental procedure—prevent an anomaly or limit its manifestation? Do the parents have the financial and psychological means to care for a neonate with a disability? What is the potential impact on the marriage and extended family system? What is the potential long-term impact of knowing one's genetic makeup? For example, the 2008 Genetic Information Nondiscrimination Act (GINA) prohibits insurance companies and employers from using genetic information

EXHIBIT 2.7 • Critical Periods in Prenatal Development



Source: Moore, K. L., Persaud, T. V. N., & Torchia, M. G. (2013). *Before we were born: Essentials of embryology and birth defects* (8th ed.). Philadelphia: Saunders/Elsevier, Figure 19-11.

in discriminatory ways (U.S. Equal Employment Opportunity Commission, 2008). However, as the U.S. health care system undergoes change and new knowledge about genetic engineering emerges, this is an issue that should be considered by social workers. We do know that nonurgent decisions should be postponed until parents have an opportunity to adjust to the crisis and acquire the necessary information (National Association of Social Workers, 2003).

CRITICAL THINKING QUESTIONS 2.4

Why do you think the rate of prematurity is higher in the United States than in most other industrialized countries? How could you learn more about the answer to this question?

CONCEPTION, PREGNANCY, AND CHILDBIRTH UNDER DIFFERENT CIRCUMSTANCES

Social workers should recognize the many different circumstances under which conception, pregnancy, and childbirth occur. Many prenatal groups have to contend with negative stereotypes and prejudice, by health care professionals as well as the general public. Some of them fear that other health issues will be exposed by their participation in maternity care. Some need assistance to manage other health problems in the context of maternity care. Six circumstances of becoming a parent are discussed here, but this discussion is not meant to be inclusive of all circumstances for becoming a parent.

Substance-Abusing Pregnant Women

Our knowledge of the developmental impact of maternal use of illegal and legal substances is rapidly increasing. The good news is that health care professionals are increasingly able to avoid prescribing legal drugs that might harm the developing fetus, once pregnancy is confirmed. The bad news is that too many pregnant women are still harming their babies through use of illegal drugs or abuse of legal substances. And, unfortunately, many women do not know they are pregnant during the first trimester, a period when the fetus is very vulnerable to teratogens.

The 2010 National Survey on Drug Use and Health (NSDUH) found that 4.4% of pregnant women aged 15 to 44 reported using illicit substances in the past month, an increase from 3% in 2002 (Wendell, 2013). These figures are considered to be a low estimate because drug

use during pregnancy is underreported. The rate of illicit drug use by pregnant women was 16.2% among pregnant women aged 15 to 17, 7.4% aged 18 to 25, and 1.9% aged 26 to 44. There is also an epidemic of prescription drug abuse of such opioids as oxycodone and fentanyl, and this issue needs further attention (Centers for Disease Control and Prevention, 2016c; Sheehan & Sheehan, 2013).

From 2000 to 2009, opioid use among U.S. women who gave birth increased from 1.19 to 5.63 per 1,000 hospital births per year (Patrick et al., 2012). Data combined from 2007 to 2012 revealed that almost 1% of pregnant women ages 15 to 44 misused opioids within the past month. This misuse was more common among 15- to 17- and 18- to 25-year-olds than among 26- to 34-year-olds. Misuse also was more common among those living below the federal poverty level than among those living at or above it (Smith & Lipari, 2017). The impacts of prescription opioid misuse on the developing child include congenital heart, spine, brain, and abdominal wall defects. Three out of four heroin users start with the abuse of prescription medications, making this rising epidemic even more important to address (Tavernise, 2015).

Despite the opioid epidemic, marijuana (*cannabis sativa*) is the drug most commonly used by women who are pregnant, with self-reported prevalence rates from 2% to 5% in most studies (American College of Obstetricians and Gynecologists, 2017b, 2017c). This rate increases to 15% to 28% for young, urban, socioeconomically disadvantaged women in part due to the misbelief that marijuana is not harmful, and it can be less expensive than cigarettes. Because current research points to impaired neurodevelopment during fetal development, the American College of Obstetricians and Gynecologists recommends that women planning to become, or who are, pregnant should not use marijuana even when it is for medicinal purposes (American College of Obstetricians and Gynecologists, 2017b, 2017c).

Possible effects of commonly abused legal and illegal substances are presented in Exhibit 2.8. Social workers are collaborating with other professionals to provide public education to women and men in the child-bearing years about the teratogenic effects of alcohol, tobacco, and other drugs.

Pregnant Women With Eating Disorders

Eating disorders, primarily anorexia nervosa (self-imposed starvation) and bulimia (binging and purging), among U.S. teenagers and women in the United States increased during the past century, but the rate has stabilized in the last 2 decades (Smink, vanHoeken, & Hoek, 2012). The

EXHIBIT 2.8 • Commonly Abused Drugs and Fetal Effects

	Alcohol	Cocaine	Amphetamines	Cigarettes	Opioids
Abortion	X	X	X		X
Stillbirth	X	X	X		X
Prematurity	X	X	X	X	X
Low birth weight	X	X	X	X	X
Intrauterine growth restriction	X	X	X	X	X
Respiratory distress	X	X			X
Withdrawal	X	X	X		X
Fine motor problems	X				X
Malformations	X	X	X		X
Developmental delays	X	X	X		X

four most common eating disorders recognized by *DSM-5* are anorexia nervosa, bulimia nervosa, binge eating disorder, and other specified feeding or eating disorders (OSFED). Eating disorders are most commonly found in women of childbearing age and are estimated to be an issue for 7,000,000 women in the United States annually (American Pregnancy Association, 2017c), but incidence among pregnant women is reported to be lower than that (Broussard, 2012). Several researchers have found that women with eating disorders reduce or suspend symptoms while pregnant and return to disordered eating after giving birth (Broussard, 2012).

Restricting caloric intake, binge eating, purging, or any combination of these behaviors can lead to nutritional insufficiency for both the mother and the fetus. Maternal outcomes can include poor nutrition, dehydration, cardiac irregularities, gestational diabetes, preeclampsia, depression, labor complications, and nursing difficulties (American Pregnancy Association, 2017c; National Eating Disorders Association, 2016). Diets lacking in essential nutrients have been associated with infertility, spontaneous abortion, preterm birth, low birth weight, and SGA neonates. SGA neonates are at great risk for perinatal death, congenital anomalies, impaired postnatal growth, and neurological disabilities (Broussard, 2012). It is critical that maternity care providers screen for eating disorders.

Pregnant Women With Disabilities

More than 27 million women in the United States have a disability, and, due to longer life expectancy, that number

is growing, especially for those who reach childbearing age (Centers for Disease Control and Prevention, 2014b). For example, women with spina bifida are a population that, because of medical advances, only recently is living beyond sexual maturity (Jackson & Mott, 2007). People with physical or mental disabilities may be perceived as “asexual,” and health care providers may not consider conception, pregnancy, and childbirth as relevant issues for them (Sawin, 1998). Health care providers may communicate unwarranted negative expectations about pregnancy outcomes or not take the woman’s disability into consideration when providing contraceptive options. For example, women with spinal cord injury should not use IUDs due to an increased risk of bleeding, and barrier methods requiring manual dexterity may not be feasible. This is an issue worldwide and is perhaps even more pervasive in nonindustrialized countries (Emmett & Alant, 2006; Kristof & WuDunn, 2009).

Most women with disabilities can manage pregnancy and give birth to healthy babies if they have a health provider familiar with the disability and related risks, and they are monitored more closely than are women without disabilities (Center for Research on Women with Disabilities, 2017). Some risks include increased blood clots for women who use wheelchairs, risk of pneumonia when a respiratory impairment preexists, bladder infections that can lead to spontaneous abortion and miscarriage, and preterm labor and low-birth-weight babies. Women with spinal cord injury may have more spasticity, seizures, and a life-threatening sudden rise in blood

pressure that is not related to pregnancy, *per se*. Some chronic problems such as multiple sclerosis and rheumatoid arthritis may improve during pregnancy (Center for Research on Women with Disabilities, 2017).

Despite public distaste for the practice, some persons with disabilities continue to be targets of forced or coerced sterilization (International Federation of Persons with Physical Disability, 2017). Professionals do not agree about how to handle the reproductive rights of individuals with severe inheritable disorders or with limited capacity to care for a child. Many do agree, however, that physical, environmental, interpersonal, informational, and policy barriers leave people with disabilities disenfranchised from both the reproductive health system and other reproductive options. As society continues to recognize persons with disabilities as full members, some of the negative implications of conception, pregnancy, and childbirth with this population may decline. Social workers can be partners in this quest.

Incarcerated Pregnant Women

Although women are still a minority in jails and prisons, the population of women incarcerated in the United States increased by 657% from 1980 to 2013, with approximately 213,000 women incarcerated on any given day (Goshin, Arditti, Dallaire, Shlafer, & Hollihan, 2016). This dramatic increase is largely due to mandatory drug sentencing laws, and most of the women are incarcerated for nonviolent offenses. Approximately one third of the world's incarcerated women are in U.S. correctional facilities (Goshin et al., 2016).

More than three quarters (76%) of incarcerated women are of childbearing age. Bureau of Justice statistics estimate that 3% to 4% of incarcerated women in the United States are pregnant at the time of admission, but other estimates suggest the pregnancy rates are much higher. For example, according to one study, nearly 30% of incarcerated women in New York were pregnant at the time of admission (Shlafer, Stang, Dallaire, Forestell, & Hellerstedt, 2017). Prior to entering the criminal justice system, these women are less likely than other pregnant women to receive prenatal care and more likely than both incarcerated men and other pregnant women to have experienced poverty, trauma, serious mental illness, and substance dependence (Goshin et al., 2016). For some women, pregnancy is a leading factor in their arrest, with three states (Alabama, Tennessee, and South Carolina) making prenatal drug abuse a crime and additional states introducing "chemical endangerment" laws in recent years (Goshin et al., 2016).

Guidelines developed by the National Commission on Correctional Health Care, the American College of

Obstetricians and Gynecologists, and the American Public Health Association Task Force on Correctional Health Care Standards recommend that correctional facilities provide "pregnancy counseling, prenatal care, appropriate nutrition, and prenatal health education, as well as care for substance use and mental illness" for incarcerated pregnant women (Goshin et al., 2016, p. 56). The evidence is clear that correctional facilities are not adhering to these guidelines. In 2011, the National Women's Law Center reported that 43 U.S. states do not require medical examinations as a part of prenatal care for incarcerated pregnant women, 41 states do not require prenatal nutrition counseling or provide appropriate nutrition, 34 do not require screening and treatment for women with high-risk pregnancies, and 48 do not require screening for HIV. Advocacy organizations have protested the routine shackling of pregnant women that continues to go on in some state prisons. In addition, federal courts have ruled that restraint during active labor violates the Eighth Amendment's prohibition of inhumane treatment (Dignam & Adashi, 2014).

These mothers and babies are a particularly vulnerable group. Social workers working in prisons and jails can advocate for conditions to improve birth outcomes for the infants and pregnancy circumstances of the mothers and their extended families. We can begin with Shlafer and colleagues' (2017) six recommendations for securing the nutritional status of incarcerated pregnant women:

- Pregnancy testing upon intake
- Prenatal vitamins upon diagnosis of pregnancy
- Adherence to the nutrition recommendations outlined by the Academy of Nutrition and Dietetics for healthy pregnancy
- Additional food provided and modifications made to meet pregnancy needs
- Regular access to water
- Resources and education on healthy diet provided as well as nutrition information for food available in the cafeteria and the commissary

HIV-Infected Pregnant Women

Worldwide, women were more than half of all people living with HIV/AIDS in 2016, and new infections among young women aged 15 to 24 were 44% higher than among men of the same age (amfAR, the Foundation for AIDS Research, 2017). In the United States, women accounted for 24% of new HIV diagnoses in 2015, with 86% of these resulting from heterosexual contact and 13% attributable to injection drug use. Among White women, however,

32% of HIV diagnoses were attributed to injection drug use. Among all women diagnosed with HIV in 2015, 61% were African American, 19% were White, and 15% were Hispanic/Latina. Women accounted for 24% of all new AIDS diagnoses in 2015 and 20% of the cumulative AIDS diagnoses. The good news is that from 2010 to 2014, the annual HIV diagnosis rate in the United States declined 20% among all women (Centers for Disease Control and Prevention, 2017e).

Approximately 8,500 women living with HIV give birth annually, but the annual number of infections to newborn babies has declined by more than 90% since the 1990s. It is estimated that 21,956 cases of perinatally acquired HIV infections were prevented from 1994 to 2010 (Centers for Disease Control and Prevention, 2017e). Women with HIV who take antiretroviral (ARV) medications, refrain from breastfeeding, and provide HIV medicines to the baby for 4 to 6 weeks postpartum can reduce the risk of transmitting the disease to their babies to less than 1%. To avoid transmitting HIV to the partner while attempting to become pregnant, HIV-infected women and their partners can use assisted insemination at home or in a provider's office, using the partner's semen (National Institutes of Health, 2017). Women who are HIV negative but whose partner is HIV positive can reduce the risk of transmission to a baby by taking preexposure prophylaxis (PrEP) medicines. It should be noted, however, that in low-income countries without potable water, formula feeding may be more dangerous than breastfeeding with an HIV-infected mother (Centers for Disease Control and Prevention, 2017e).

In 2003 a coordinated response of multinational and U.S. agencies to the worldwide HIV/AIDS epidemic was launched, the President's Emergency Plan for AIDS Relief, or PEPFAR, with promising results. As of 2017, five of the 12 African countries with the highest rates of HIV and AIDS are approaching epidemic control. From 2000 to 2016, there was a 70% decrease globally in new HIV infections in children, and since 2014 there has been a 50% increase in the number of people accessing treatment worldwide (Centers for Disease Control and Prevention, 2017e). In 2016, 76% of pregnant women living with HIV received medicines to prevent the transmission of HIV to their children (amfAR, 2017). Currently the WHO recommends early HIV testing of all pregnant women. In spite of decreasing treatment costs, treatment barriers continue, including the stigma of HIV/AIDS paired with the low status of women in many countries (Gable, Gostin, & Hodge, 2008; Kristoff & WuDunn, 2009). Treatment barriers in the United States include the lack of financial resources and health insurance; limited transportation; and responsibilities to

care for others, especially children (American College of Obstetrics and Gynecology, 2012a). Working to increase HIV awareness and promote clear notification of HIV status will continue to be important social work roles.

Pregnant Transmen

Population surveys rarely ask questions to identify transgender people, but the best available data indicate that about 0.6% of the adult population in the United States, about 1.4 million adults, identify as transgender. The data also indicate that younger adults are more likely than older adults to identify as transgender (Flores, Herman, Gates, & Brown, 2016). A *transman* is a person born biologically female with a male gender identity. Many transmen may desire to undergo surgical changes to their bodies, but most do not do so thereby retaining the biological ability (ovaries, uterus, and hormones) to become pregnant and give birth (Obedin-Maliver & Makadon, 2016). It is common, however, that transmen use hormone therapy to develop male characteristics such as facial hair and lower voice tone. The desire to parent may remain, however, and drive the decision to bear a genetically related child (Wierckx et al., 2012). To fulfill this desire transmen are advised to stop testosterone therapy before becoming pregnant, but a pregnancy still can occur even without resuming menses (Light, Obedin-Maliver, Sevelius, & Kerns, 2014). After stopping testosterone, the person's body acquires female characteristics such as enlarged breasts, loss of facial hair, and higher voice pitch. These changes then may result in gender dysphoria or psycho-emotional discomfort due to the pregnancy changes not aligning with male gender identity (Obedin-Maliver & Makadon, 2016).

In a study of 41 transmen who were pregnant, 61% reported having used testosterone before pregnancy. Of those who had used testosterone, 80% had resumed menstruation within 6 months after stopping testosterone. Five respondents conceived while still amenorrheic from testosterone. Most of the transmen in this study became pregnant within 4 months of trying. Two thirds of the pregnancies were planned, with most of the unplanned pregnancies occurring in transmen who had never used testosterone. Most respondents (88%) in this study used their own eggs fertilized by a partner's sperm. There were no differences in pregnancy, delivery, and birth outcomes between those who had previously used testosterone and those who had never used testosterone (Light et al., 2014). Another pregnancy option for transmen is oocyte cryopreservation, or the freezing of one's eggs for a future pregnancy of the transman or a surrogate (Practice Committees of American Society for Reproductive Medicine, 2013).

Obstacles exist, however. Transmen already face societal stigmatization and discrimination, and a gender-variant

pregnancy can further these negative experiences. A qualitative study of eight transmen indicated that transmen pregnancies involved significant loneliness and a lack of role models to help navigate pregnancy (Ellis, Wojnar, & Pettinato, 2014). Transmen who are pregnant also can be burdened with ongoing management of the perceptions of others coupled with their own apprehension to disclose their thoughts and feelings related to the pregnancy. This can lead to inadequate access to, underuse of, and disparities within the health care system (Hoffkling, Obedin-Maliver, & Sevelius, 2017).

Although the psychosocial dimensions of the pregnancy experience are different for transmen compared to others, the biological course of pregnancy is the same. Another important decision faced by transmen is whether to chest (breast) feed the newborn (McDonald et al., 2016), a parental role that aligns with the desire to provide for a child but does not align with the role of being male.

Although the larger society may struggle with the idea of this variation of pregnancy, the medical community is embracing the need to provide appropriate care and support to transmen who want to be, or are, pregnant. Guidelines for the education of health care professionals and practice standards have been developed by several health care

groups to promote patient-centered perinatal health care services to transmen (American College of Nurse-Midwives, 2012; American College of Obstetricians and Gynecologists, 2012b). Research is ongoing to inform the medical community about the unique needs of transmen (Obedin-Maliver & Makadon, 2016; Redfern & Sinclair, 2014).

RISK AND PROTECTIVE FACTORS IN CONCEPTION, PREGNANCY, AND CHILDBIRTH

As the life course journey begins, human behavior is being shaped by risk factors and protective factors. Throughout this chapter, you have read about factors that either increase risk or offer protection for healthy processes of conception, pregnancy, and childbirth. Selected factors are summarized in Exhibit 2.9. A confluence of biological, psychological, and social factors determine whether a couple can conceive. Once the woman is pregnant, an interplay of biological, psychological, and social factors influence the growth and development of the fetus, the childbirth experience, and the health of the new baby. You also read about how the health of the new baby has long-term implications across the life course.

EXHIBIT 2.9 ● Selected Risk and Protective Factors for Conception, Pregnancy, and Birth

	Risk Factors	Protective Factors
Conception	Low sperm count	Father drug abstinence (marijuana)
	Fallopian tubal factors	Gynecological care
	Genetic abnormality	Genetic counseling
	Adolescent promiscuity	Family life education; contraception; abstinence
	Endometriosis	Hormone therapy; surgery
	Inadequate nutrition for sexually active women of childbearing age	Folic acid supplement
	Obesity	
Pregnancy	Obesity	Normal weight maintenance
	Sexually transmitted diseases	Barrier birth control methods
	Female age (<18 or →35)	Family life education; birth control
	Delivery before 38 weeks	Women, Infants, and Children program
	Gestation, toxemia, diabetes	Prenatal care
	Stress because of inadequate resources	Social and economic support
	Trauma	Accident prevention (falls, fire, car)
Smoking	smoking cessation program	
Birth	Venereal diseases such as gonorrhea and positive Group B strep	Prenatal care; antibiotic eye drops for neonate; maternal testing
	Meconium aspiration; anoxia	C-section delivery; drugs during pregnancy; well-managed labor and delivery
	Prolonged and painful labor	Birth classes; social support; father's presence at birth; adequate pain control
	Obesity	Newborn screening tests

There is growing evidence from life course epidemiological research that experiences in these earliest days of a human life course have health impacts at every stage of the life course. This has led to a new developmental model for the origins of disease (for an overview of this model, see Barker & Thornburg, 2013). This model proposes that nutrition during fetal life is a key factor in later chronic disease. The fetal response to malnutrition is to slow growth and alter the metabolism in order to survive. It is not just the mother's diet during pregnancy that matters but also her nutrient stores at the time of conception. There is much research evidence that a range of chronic diseases have their origin in malnutrition during fetal life and infancy, including cardiovascular disease, type 2 diabetes, some cancers, and chronic infections. Research also indicates that a baby's birth weight is affected not only by maternal nutrition before and during pregnancy but also by the shape and size of the placenta at birth. And certain patterns of shape and size of the placenta have been found to be a risk factor for heart disease, hypertension, and some forms of cancer. How and why the placenta develops a particular shape and size is not well understood, but animal research has found that the placenta enlarges in response to malnutrition in midpregnancy. Barker and Thornburg (2013) conclude that this research on fetal nutrition indicates that "protecting the nutrition and health of girls and young women should be the cornerstone of public health" (p. 518).

Seldom is one environmental, social, or biological risk factor solely responsible for an outcome. As you review the selected risk and protective factors in Exhibit 2.9, keep in mind that most outcomes are influenced by several factors, and ongoing research shows an ever-increasing complexity of interacting factors.

CRITICAL THINKING QUESTIONS 2.5

Pregnancy is a powerful experience for the pregnant woman as well as for her partner. What are the biological needs of the pregnant woman? The psychological needs? The social needs? Where there is an involved father, what are the biological needs of the father? The psychological needs? The social needs?

IMPLICATIONS FOR SOCIAL WORK PRACTICE

Social workers practicing with persons at the stage of life concerned with conception, pregnancy, and childbirth should follow these principles.

- Respond to the complex interplay of biopsychosocial and spiritual factors related to conception, pregnancy, and childbirth.
- When working with clients, both females and males, of childbearing age, always consider the possibility of conception, pregnancy, and childbirth; their potential outcomes; and their impact on the changing person–environment configuration.
- Identify the needs of vulnerable or at-risk groups and work to provide services for them. For example, structure birth education classes to include not only family but family-like persons and provide interpreters for the hearing impaired or use appropriate technology to deliver content.
- Actively pursue information about particular disabilities and their impact on conception, pregnancy, and childbirth and include this topic in client assessment.
- Acquire and apply skills in advocacy, education about reproductive options, consumer guidance in accessing services, and case management.
- Assume a proactive stance when working with at-risk populations to limit undesirable reproductive outcomes and to help meet their reproductive needs. At-risk groups include adolescents; low-income women; women involved with substance abuse; women with eating disorders; and women with disabilities who lack access to financial, physical, psychological, and social services.
- Assist parents faced with a potential genetic anomaly to gain access to genetic screenings, prenatal diagnosis, postnatal diagnosis, treatment, and genetic counseling.
- Involve parents in decision making to the greatest extent possible by delaying nonurgent decisions until parents have had a chance to adjust to any crisis and acquire the necessary information to make an informed decision.
- Establish collaborative relationships with other professionals to enhance and guide assessment and intervention.
- Identify and use existing programs that provide education and prenatal services to women, particularly for those most at risk of undesirable outcomes.

Key Terms

assisted reproductive technologies (ART) 53	genotype 44	phenotype 44
chromosomes 44	germ cell 44	primipara 58
dominant genes 45	gestation 54	recessive genes 45
embryo 55	gestational age 54	sensitive period 65
extremely low birth weight (ELBW) 61	infertility 50	sex chromosomes 44
fertilization 44	interactive genes 45	sex-linked trait 44
fertilization age 54	late preterm birth 61	small for gestational age (SGA) 61
fetal viability 50	low birth weight (LBW) 61	spontaneous abortion 56
fetus 56	miscarriage 56	teratogens 55
genes 44	multifactorial inheritance 64	very low birth weight (VLBW) 61
genetic liability 64	multigravida 56	zygote 55
	multipara 58	
	neonate 42	

Active Learning

1. Locate the National Association of Social Workers Code of Ethics on the organization's website at www.naswdc.org. Choose an ethical issue from the following list. Using the Code of Ethics as a guide, what values and principles can you identify to guide decision making related to the issue you have chosen?
 - Should all women and men, regardless of marital status or income, be provided with the most current technologies to conceive when they are unable to do so?
 - What are the potential issues of preservation and gestational surrogacy in terms of social justice and diversity?
 - Should pregnant women who abuse substances be incarcerated to protect the developing fetus?
 - Do adoptive parents have the right to know the genetic background of an adoptee?
 - Which genes, if any, should be selected for reproduction?
 - Will persons who are poor be economically disadvantaged in the use of genetic information?
2. Select one of the three life journeys that introduced this chapter: Jennifer Bradshaw's, Cecelia Kin's, or the Thompsons'. Identify the risk and protective factors related to their conception, pregnancy, and childbirth experience. Then change one factor in the story; for example, assume that Cecelia Kin's income was not needed. How might that alter her life course? Then try changing one factor in another story; for example, assume Jennifer had only a 10th-grade education. How does that change the trajectory of her story? Try again; for example, assume Felicia Thompson was being treated for depression when she became pregnant. Again, how does that factor alter her life course and that of her child?
3. In student groups of three or four, or working individually, review the list of contraception options presented in this chapter. With each group representing a different 3- to 5-year age range of the childbearing age spectrum (ages 15 to 44), discuss the potential access and use or misuse of each form of contraception. Also, consider the role of a social worker in various social welfare settings in helping women (who represent different age, religious, and ethnic groups) select a form of birth control.

Web Resources

American College of Obstetricians and Gynecologists (ACOG): www.acog.org

Site provides educational information and resources related to sexuality and women's health, including a section for patients, and offers materials in both Spanish and English.

American Pregnancy Association: americanpregnancy.org

Site presented by the American Pregnancy Association contains information on a number of pregnancy-related topics, including infertility, adopting, pregnancy options, multiples pregnancy, and the developing baby.

Center for Research on Women with Disabilities (CROWD): www.bcm.edu/research/centers/research-on-women-with-disabilities

Site presented by the Center for Research on Women with Disabilities contains reports on sexual and reproductive health for women with disabilities, educational materials, and links to other related research.

Centers for Disease Control and Prevention: www.cdc.gov

U.S. government site contains public health information, current research, and health census data that include diseases and conditions related to conception, pregnancy, and childbirth with a focus on prevention; materials in both Spanish and English.

Childbirth.org: www.childbirth.org

Award-winning site maintained by Robin Elise Weiss contains information on conception, pregnancy, and birth, including recommended pregnancy books and access to a free online childbirth class.

National Healthy Mothers, Healthy Babies Coalition (HMHB): www.hmhb.org

Site maintained by HMHB, an informal coalition dedicated to improving the quality and reach of public education about prenatal and infant care, contains a blog, newsroom, and virtual library.

The National Human Genome Research Institute (NHGRI): www.genome.gov

Site maintained by NHGRI, which oversaw the Human Genome Project completed in 2003, provides quick access to recent news, including legislation related to genetics for use by students, educators, researchers, and the general public; available in both Spanish and English.

Planned Parenthood: www.plannedparenthood.org

Official site of the Planned Parenthood Federation of America Inc. contains information about Planned Parenthood, health and pregnancy, birth control, abortion, STDs, prochoice advocacy, educational tools for parents and educators, and information for teens.