Having Healthy Babies: The Science Inside

HEALTHY PEOPLE LIBRARY PROJECT
American Association for the Advancement of Science
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Most people think that human reproduction “just comes naturally.” It is certainly true that women had been giving birth for thousands of years before reproduction was understood by science. But for most of those centuries, pregnancy and childbirth were highly dangerous for both mothers and babies. Today, because of advances in science, we know more than ever before about how to have healthy babies and how to keep them healthy.

Science and technology have given us tools that would have been hard to imagine just 50 years ago. Now, a mother can actually see a picture of her unborn baby in the womb. Infants who are born too early have a much greater chance of surviving than ever before. Doctors can perform tests that show parents, even before the mother becomes pregnant, where they might have trouble having a healthy baby. Scientific research shows which risk factors can lead to an unhealthy pregnancy and how to avoid these risks.

Many scientific studies have shown that mothers who receive good prenatal care are at lower risk for having health problems in pregnancy. A mother and her baby are healthier when the mother seeks prenatal care early in her pregnancy. Nurses, doctors, and other professionals monitor the health of the mother and the growth of the baby in the womb. They treat the normal discomforts of pregnancy and help mothers reduce the risks of the complications of pregnancy.

Every parent needs to have knowledge about the “natural” process of reproduction. They need to know that a baby’s health begins with the parents’ health—that mothers and fathers with healthy lifestyles have better chances of producing infants who are born healthy and who stay healthy. Parents need to know how the process of childbirth can be made safer for both mothers and
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babies. They also need to know how the proper care of newborn infants helps them grow up healthy and strong.

This book summarizes what health professionals know about healthy babies and mothers. It also directs readers to more sources of information and to the latest scientific research. Most of that research delivers a positive message: pregnancy, childbirth, and infant care can be safe, happy, and healthy experiences. Doctors can identify risk factors for unhealthy pregnancy. Parents can change their lifestyles to avoid these risks and give infants the best possible start in life. Armed with knowledge, mothers can look forward with peace of mind to the joy of childbirth and of having healthy children and families.

Health Professionals for Mothers and Babies

primary doctor: monitors the patient’s overall health, directs medical treatment, and coordinates care
gynecologist: specializes in women’s health
obstetrician: specializes in care of pregnant women and their developing babies
nurse-midwife: advises mothers on labor and delivery; delivers babies with physician emergency backup
pediatrician: specializes in children’s health
lactation consultant: helps women learn to breastfeed their newborns
dietician, nutritionist: matches the patient with an eating plan and provides training and support so the patient eats properly
dentist: regularly checks the mother’s mouth to prevent or treat gum disease
pharmacist: dispenses prescriptions, helps the patient keep track of medications, and offers advice on tools and supplements
PART 1: Who’s at risk in pregnancy?

Risk factors and risk disparities

Pregnancy always carries some health risks, because the needs of the growing baby make extra demands on the mother’s body. Mothers who are not healthy are more likely to have unhealthy babies. Scientists have identified many risk factors that increase the chances that a mother and her baby will have health problems. A risk factor for pregnancy is any behavior or condition that might harm the mother’s or baby’s health.

Researchers often identify risk factors by counting how often they occur at the same time as certain medical problems. For example, smoking is a risk factor for an unhealthy pregnancy. According to the Office of the Surgeon General, smoking is probably the most important risk factor of poor pregnancy outcomes among women in the United States. Women who smoke during pregnancy subject themselves and their developing fetus and newborn to special risks, including an increased risk of miscarriage, pregnancy complications, premature birth, low birth weight infants, infections, stillbirth, and infant death.

The data on smoking do not provide a scientific explanation of how smoking harms the fetus. Nor do the numbers allow for other risk factors that often go along with smoking, such as alcohol abuse or obesity. The findings are, however, strong evidence that smoking is one of the causes of low-birth-weight babies.

A risk disparity is a noticeable difference in risk data between members of one racial, ethnic, or other social group and the population as a whole. For example, researchers counted the incidence of various risk factors in mothers of different racial origins. The results showed that the percentage of health risks in pregnancy is significantly higher among African Americans than among other racial groups.

Like the smoking data, these statistics have some limitations. For example, the table includes no categories for mixed races. A mother with one Asian-American parent and one African-American parent would have to be assigned to just

Smoking and Pregnancy

- Women who smoke have increased risk for conception delay and for both primary and secondary infertility.
- Women who smoke may have a modest increase in risks for ectopic pregnancy (fallopian tube or peritoneal cavity pregnancy) and spontaneous abortion.
- Studies show a link between smoking and the risk of sudden infant death syndrome (SIDS) among the offspring of women who smoke during pregnancy.
one of the groups for reporting purposes. However, for all their limitations, risk disparities can be clues to the causes of health problems and can guide researchers in their search for cures.

Identifying a risk disparity is not the same as identifying what causes the disparity. Risk disparities can be the result of social conditions (such as lower incomes and less access to health care), as well as medical conditions (such as personal and family medical problems).

**How risk factors cause harm**

If a woman understands how risk factors can harm her health, she might be motivated to lower her health risks by getting better health care, changing bad habits, and paying attention to her own and her family’s health histories.

Listed below are just a few examples of risk factors in pregnancy and what medical science knows about their causes. These causes include those that relate to diet, genetics, viruses, bacteria, smoking, substance abuse, and teenage pregnancy. More facts about the health problems of pregnant women and infants—and about the risk factors for those problems—appear in Parts 3, 4, and 5 of this book.

**Diet.** Folic acid deficiency is an example of a risk factor related to diet—specifically to folic acid, one of the B vitamins. Folic acid is found in green, leafy vegetables and citrus fruits. It can also be obtained from most multiple vitamins or other vitamin supplements. Folic acid contains
chemicals that help build normal red blood cells and healthy nerve cells. Without folic acid, the mother runs a risk of anemia (a shortage of red blood cells) and other problems. The unborn baby is also at risk because it needs folic acid to develop a healthy nervous system. The most critical time for the embryo to get folic acid is during the first few weeks of pregnancy, when its nerve cells are first being formed.

Folic acid deficiency is a leading cause of spina bifida and other birth defects of the brain and spinal cord. Spina bifida, also called “open spine,” affects the backbone and the spinal cord and can cause paralysis of the legs, as well as problems with bladder and bowel control. Folic acid deficiency causes another neural tube defect called anencephaly. Babies with this deadly condition are born with severely undeveloped brains and skulls. Low levels of folic acid have also been related to miscarriages, premature (early) deliveries, and low birth weight babies.

Genetics. Sickle cell disease is an example of a risk factor that is genetic, or inherited. This disease is caused by a defective form of hemoglobin, which is found in all red blood cells. Red blood cells with normal hemoglobin are round, flexible, and move easily through the blood vessels to deliver oxygen throughout the body. Red blood cells with sickle cell hemoglobin, however, can become rigid and bent into a C (or sickle) shape. Sickled red blood cells are sticky and can clump together, forming temporary plugs in small blood vessels that stop blood flow and cause pain. While normal blood cells live about 120 days, sickled cells die after about 10 to 20 days. Because they cannot be replaced fast enough, the blood becomes short of red blood cells, a condition called anemia. Pregnant women with sickle cell disease may suffer more pain and infections during pregnancy than women without the disease. They are also at increased risk for heart problems, miscarriage, and preterm (early) labor.

Sickle cell disease is also dangerous because the genetic trait for the disease can be passed on to the unborn baby. If both parents carry the sickle cell gene, there is a 50/50 chance that their baby will also carry the sickle cell gene. Most cases of sickle cell disease in the

Currently, roughly one in eight or more than 500,000 women smoke during pregnancy in the United States. Birth complications caused by smoking during pregnancy or prenatal exposure to secondhand smoke result in as much as $2 billion in additional health care costs in the U.S. each year.

According to the U.S. Agency for Healthcare Research and Quality, infant respiratory distress syndrome and prematurity/low birth weight, which can both be caused by maternal smoking, are two of the three most expensive conditions requiring hospital care.
United States occur among African Americans and Hispanic Americans from the Caribbean. Scientists estimate that about 1 in 12 African Americans in the United States carries the sickle cell trait. About 1 in every 400 African Americans actually gets sickle cell disease.

Viruses. Rubella (German measles) is an example of a risk factor that is carried by a virus. A virus is a tiny organism that invades the cells of living things. Once inside a body, a virus becomes a parasite, living off the cells of its host, reproducing itself, and spreading disease. The virus that causes rubella is carried through the mother’s bloodstream and into the bloodstream of the fetus. Infection by the rubella virus can cause miscarriages or stillbirths, or even congenital rubella syndrome (CRS). CRS is a group of severe birth defects, including mental retardation, heart disease, deafness, and cataracts.

Bacteria. Chlamydia is an example of a sexually transmitted infection (STI). Chlamydia is caused by bacteria. The bacteria enter the vagina during sexual intercourse, where they multiply and spread to the uterus, fallopian tubes, and ovaries. Unless it is treated, chlamydia can lead to inflammation throughout the woman's reproductive system. Pelvic inflammatory disease (PID) damages the fallopian tubes, which can lead to ectopic pregnancy (tubal pregnancy) or infertility. Pregnant women with chlamydia are at greater risk for miscarriage and preterm deliveries. Mothers with chlamydia also risk passing the
infection on to their babies during delivery. Babies born with chlamydia can develop eye infections and pneumonia.

**Smoking.** Smoking is an example of a risk factor caused by addictive behavior. It can cause damage in several different ways. First, smoking is dangerous because it deposits nicotine, carbon, sulfur, and other harmful chemicals into the lungs. These harmful chemicals penetrate deep into the smallest branches of the lungs—the tiny air sacs. Inside the air sacs, oxygen breathed in from the air is supposed to pass into the bloodstream. Air sacs that are clogged from smoking cannot deliver enough oxygen to the blood. Damage to the mother’s blood in turn causes damage to the fetus. Through the bloodstream, the damage from smoking spreads throughout the body’s systems. Each system becomes less able to produce the substances it needs. For example, smoking weakens the immune system, making it harder for the body to produce antibodies to fight off viruses and infections. Because smoking damages so many parts of the body, it is not always possible to trace every path by which danger from smoking reaches the unborn infant. But statistics link smoking to many of the worst health problems of pregnancy: miscarriage, ectopic pregnancy, placental complications, low birth weight, and even birth defects.

**Substance Abuse.** Alcohol, cocaine, and other substance abuse, like smoking, are risk factors caused by addictive behavior. Addictions have complex causes that include home environment and social pressures, in addition to chemical reactions. For pregnant women, the risks of substance abuse extend to the unborn child. For example, babies born to mothers who used cocaine during pregnancy can be born addicted to the drug. Mothers who drink alcohol...
during pregnancy put their babies at risk for **fetal alcohol syndrome.** This is a combination of mental and physical birth defects, including mental retardation, heart problems, and abnormal brain development.

**Teenage pregnancy.** Teenage pregnancy is a risk factor with many physical and social causes. Scientists know that younger mothers are at risk because so many health problems occur more often among them. Women under 20 are at greater risk for high blood pressure, anemia, and premature labor during pregnancy. Teenage mothers also have a higher chance of having low birth weight babies. The younger a mother is, the greater the chance that her baby will not weigh enough at birth.

It is not always possible to pinpoint the causes of health problems among teenage mothers. Studies show that teenagers are more likely to have poor eating habits and are less likely to receive early prenatal care than older mothers. Teenage mothers also tend to gain less weight during pregnancy. (A healthy, non-overweight woman should gain between 25 and 35 pounds.)

**Reducing risks: maternal health before pregnancy**

Fortunately, there are steps women can take to reduce many of the risk factors of pregnancy and childbirth. For the best health, doctors recommend these steps for all women of childbearing age.

- Take at least 400 micrograms (400mg) of folic acid every day. For most women, this means taking a multiple vitamin to supplement the folic acid received from food. Since a human embryo needs folic acid even before the mother knows she is pregnant, the USDA recommends that all women of childbearing age take folic acid.
- Eat a healthy, well-balanced diet that is high in fiber and low in salt and sugar.
- Learn your personal and family medical histories. A woman’s medical history can help predict and prevent problems she might have in pregnancy. The medical history of the father can also be important. Many risk factors for pregnancy are medical conditions like heart disease and high blood pressure, which can be passed down through both sides of the family.
- Refrain from smoking, drinking alcohol, and using cocaine and other chemical substances.
- Refrain from having sex with multiple partners and from other behaviors that spread sexually transmitted diseases.
- Get regular medical and dental checkups.
- Make sure you are immunized against mumps and rubella and keep other **immunizations** up to date.
For Wendy Hilliard, Prenatal Exercise Scores a Perfect “10”

Wendy Hilliard is as comfortable stretching on mats in a gym as she is sitting on a sofa in her living room. After years of triumphing in world-class competitions in rhythmic gymnastics, she knows the rewards of a steady exercise regimen are more than gold medals and cheers from an appreciative audience. That’s why, when she became pregnant for the first time at age 41, she immediately began to think about ways in which exercise could continue to promote her own good health – and that of her unborn child. “I’ve been an athlete my entire life, but having a baby changes everything. I wanted to be sure that I did exercise that was good for me and for my baby,” said Hilliard.

“As it turns out, I did have to make adjustments to my routine, both in terms of exercise and work.”

Before becoming pregnant, Hilliard engaged three to five times a week in Bikram yoga, a demanding method in which a heated exercise area bolsters the difficulty of the workout. After years of training and competition, she loved the intensity of the workout; however, it was that intensity that caused concern among her doctors. After considering the many exercise options available to pregnant women, she switched to a weekly routine of prenatal yoga at the Prenatal Yoga Center in New York City, supplemented by 3-mile walks.

Prenatal yoga, with its focus on Kegel exercises and proper breathing techniques, is aimed at making pregnancy and childbirth easier on the
body—something any mom-to-be can appreciate. It also helps to reduce stress, to boost energy, and to teach self-discipline.

For Hilliard, being disciplined has never been a problem. From first-hand experience, she knows that hard work and training yield results. In 1978, she became the first African American to represent the United States in rhythmic gymnastics and she remained on the National Team a record-setting nine times. A national and international gold medalist, Hilliard represented the U.S. in more than 15 foreign countries and at three world championships.

Her personal and professional lives still reflect the energy and intensity level of the city she calls home, New York, where she serves as managing director of sports for NYC2012, an organization committed to bringing the Olympics to the Big Apple.

As if that isn’t enough, she is also founder and president of the Wendy Hilliard Foundation, an organization that has helped more than 5,000 New York inner-city youth enjoy rhythmic gymnastics programs and its associated disciplines.

Yet, no matter how busy her schedule, Hilliard always makes time for exercise.

Like so many moms-to-be across the country and the world, she is enthusiastic about her new form of exercise. “I love it. It’s a healthy, life-long activity that really has a calming influence, and I am able to bond with the other moms-to-be in my class.”

For Hilliard and other moms-to-be, prenatal exercise scores a perfect “10.”
Part 2: What is a healthy baby?

**Healthy conception**

Conception takes place when a male sperm cell fertilizes a female egg. A woman is born with thousands of eggs in her ovaries, and usually only one of those eggs matures per menstrual cycle. After the egg is released, it travels through the fallopian tube toward the uterus. Sperm cells meet the egg in the fallopian tube and fertilize it. The fertilized egg then enters the uterus and is implanted in its wall, which begins a pregnancy. (Sometimes, more than one egg mature and become fertilized, which leads to twins or other multiple births.)

Conception can take place only within a very short amount of time each month. A woman’s most fertile time is in the middle of her monthly cycle. This occurs about two weeks from the first day of the menstrual period, or between 12 and 14 days before the next menstrual period is due. Once the single-celled egg is fertilized, it immediately begins to divide.

**Healthy development**

Most babies are born between 38 and 42 weeks after conception. Obstetricians use the first day of the last menstrual period plus 40 weeks as a formula for estimating the expected delivery date. Medical science divides a pregnancy by trimesters—periods of about three months each.

The first trimester. In a healthy pregnancy, the fertilized egg moves down the fallopian tube into the uterus. The egg implants itself into the wall of the uterus. This causes certain hormones to be released,
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which signal the uterus to begin its gradual change into a womb. By three to four weeks after conception, the fertilized egg has developed into an **embryo**. The cells of the embryo very rapidly divide into specialized cells that will become the body’s major systems. By nine or ten weeks after conception, the embryo has grown into a **fetus**.

Meanwhile, the mother’s body has been changing to provide the fetus with what it needs. By the end of the first trimester, the place in the uterus where the egg was implanted has developed into the **placenta**. For the rest of the pregnancy, the placenta will nourish the fetus and eliminate its wastes. A **mucous plug** develops to seal off the mother’s cervix, which creates a secure womb.

**The second trimester.** During the second trimester, the baby further develops the complex systems it will need to survive on its own. Healthy babies call more and more attention to themselves during their fourth, fifth, and sixth months in the womb. Mothers and their doctors can hear the baby’s heartbeat and determine its sex and age.

Second-trimester babies begin moving their muscles, stretching, and kicking. The skeletal, muscular, and other systems grow stronger at an ever-increasing rate. By the end of month five, a healthy baby weighs about one pound. It weighs two pounds or more by the end of month six. By the end of the second trimester, the fetus still almost completely relies on the placenta for nourishment and waste disposal. But the baby has begun swallowing, digesting, and breathing on its own.

**The third trimester.** During the seventh month of pregnancy, the fetus moves ten or more times every hour. The mother feels most of these motions. During the seventh and eighth month, the baby will get into birth position. The baby may move around considerably before settling down. The usual position is with the head pointing down toward the birth canal.

The unborn baby gains most of its weight during the third trimester. A healthy baby reaches about four pounds by week 30 of pregnancy and five pounds or more by week 35. The baby is considered full term by week 37. The healthy baby will weigh about 7.5 pounds at birth.

**Healthy birth**

In a healthy birth, the baby is born with no complications in labor and delivery and no harm to the baby. The birth process is described in detail in Part 3: “Health care during pregnancy and childbirth.” To first-time parents, a newborn baby may not look especially healthy. Its skin may have spots or patches of waxy, flaky substances. Its head may
Part 2: What is a healthy baby?

have a funny shape. The baby may very well be red and wrinkled. These are normal effects of childbirth and need not cause alarm. Birth attendants begin cleaning the baby as soon as it is born. Babies cannot see well at birth. An infant’s vision takes some time to adjust to the world.

These ordinary conditions of childbirth usually clear up within a very few days.

Healthy infancy and early childhood

During its first month, the infant will gradually stretch itself out after being cramped so long in the fetal position. After stretching out, the infant becomes ever more interactive. Gradually the baby learns to hold up its head, roll over, squirm along, crawl, stand up, and then finally walk. A baby’s skills develop quickly in early childhood.

Mother’s Milk—
A Recipe for Success

Morena Parada, a mother of three girls, understands that breastfeeding can be a complicated issue for new moms. On one hand, researchers point to a wide range of benefits that breastfeeding affords a baby—from a stronger immune system to a higher I.Q. But for some women, nursing can be difficult or even painful at first. Some women may also worry about how people will react if they nurse their baby—especially if they are the first person in their family or the only one among friends who decides to breastfeed.

“For me, it came down to doing the best thing for my baby,” says Parada, a 31-year-old mother from Alexandria, Virginia. “I think nursing has helped my girls be healthier. They rarely get sick, and I think that nursing is one of the reasons.”

Parada first made the decision to breastfeed eleven years ago when her eldest daughter, Vicky, was born. Initially, the decision was made based on convenience: Parada liked not having to worry about warming milk in the middle of the night, toting bottles whenever she went out, or paying for expensive formula. But there was an intangible benefit that outweighed all others: the time spent nursing made her feel especially close to her baby.

“It was our special time,” Parada said. “I would sing to her in Spanish, and hold her as close to me as I could.”

When her second baby, Karina, now 4½ years old, was born Parada knew she would again breastfeed. And she did for 2½ years.

Currently nursing her third child, Diana, age 1, Parada is a veteran of breastfeeding and a vocal advocate. As part of her commitment to keep her children healthy, Parada visits the clinic sponsored by the Alexandria Neighborhood Health Services, Inc., a neighborhood-based center that is geared toward the Hispanic population and dedicated to making sure that women and children in need receive basic health care. While at the clinic, Parada encourages expectant mothers to give nurs-
ing a try, and for new mothers who are having a difficult time, she urges perseverance.

Breastfeeding came easy to Parada, but she knows that is not the case for everyone. “It is not always easy for new mothers. They complain about soreness and sometimes the baby doesn’t take to it right away. It can be frustrating. I just tell the moms to give it a chance, but I understand that for some mothers it’s really hard, especially when they don’t get support from others.”

Support is something Parada feels blessed to have. Her husband, Nicholas, understands and appreciates what she is doing for their baby, and she finds comfort in knowing that so many of her friends and relatives have made the same choice.

In fact, research shows that Parada has a lot of company. A recent national survey found that breastfeeding in the United States is at a record high, with 69.5 percent of new mothers starting out breastfeeding. Equally impressive is that 32.5 percent are still nursing six months later.

For a variety of reasons, breastfeeding is not for every mother, but clearly more and more women like Parada are viewing breast milk as a recipe for their children’s success.
Part 3: Health care during pregnancy and childbirth

Recognizing pregnancy
As soon as conception begins, the mother’s body begins to change. The first unmistakable sign of pregnancy is missing a menstrual period. A sexually active woman who misses a period should suspect pregnancy first, even though there may be other causes. Other early warning signs include sore breasts, more frequent urination, nausea and vomiting (morning sickness), and fatigue. A woman who suspects she is pregnant might want to use a home pregnancy test to confirm her suspicions.

By the time the mother recognizes the pregnancy, the embryo has probably been alive for two to four weeks or more. A woman who thinks she is pregnant should immediately behave as if pregnant—stop smoking, stop drinking alcohol, and abusing drugs. The doctor will ask what prescription and over-the-counter drugs she is taking. Often the doctor will recommend that she stop taking the drugs and suggest alternative treatments during pregnancy.

The doctor will also review the mother’s medical history for diseases or conditions that might be risk factors in the pregnancy. When the mother has a medical condition such as obesity, diabetes, or high blood pressure, the doctor will advise her on how to control disease during this critical time. The doctor will test the mother for rubella (German measles), HIV, and hep-

Prenatal care
The first trimester. The first prenatal care consultation should take place soon after the first signs of pregnancy, preferably by the end of the second month. A mother will profit most from the visit if she comes prepared with the medical histories of both herself and the child’s father.

At the first visit, health care professionals will ask questions about the mother and father’s general health and lifestyles. If necessary, they will recommend changes. The mother might be asked to stop smoking, drinking alcohol, and abusing drugs. The doctor will ask what prescription and over-the-counter drugs she is taking. Often the doctor will recommend that she stop taking the drugs and suggest alternative treatments during pregnancy.

The doctor will also review the mother’s medical history for diseases or conditions that might be risk factors in the pregnancy. When the mother has a medical condition such as obesity, diabetes, or high blood pressure, the doctor will advise her on how to control disease during this critical time. The doctor will test the mother for rubella (German measles), HIV, and hep-
HIV/AIDS and Pregnancy
- HIV (human immunodeficiency virus) causes AIDS (acquired immune deficiency syndrome). AIDS is passed on through sexual intercourse or exposure to infected blood.
- Being infected with HIV (being “HIV positive”) and having AIDS are risk factors for pregnancy. They are associated with premature births and other complications in pregnancy and with low-birth-weight babies.
- Mothers can pass on HIV and AIDS to their unborn infants. Without treatment, babies are infected in 1 out of every 4 cases.
- The risk of infection to infants can be greatly reduced by treating the mother with the drug AZT (zidovudine) during pregnancy.
- To avoid blood exchange and contamination of the baby during delivery, the doctor might recommend delivery by caesarean section (c-section).
- Babies of mothers who have HIV or AIDS should be tested soon after birth. New tests can identify most infected babies by one month.
- Babies of mothers who have HIV or AIDS are at continued risk from the virus during their first year of life.

Sickle cell disease—diseases that are especially harmful to the embryo. A hemoglobin test establishes how healthy the mother’s blood is.

Whenever possible, the father’s medical history is reviewed as well. Looking at the genetic history helps parents and their doctors decide whether to perform genetic testing. Some genetic conditions have a much higher incidence among certain ethnic groups. For example, people of European descent have a higher rate of cystic fibrosis. Tay-Sachs, Canavan, and Gaucher’s diseases are more common among Jewish people. Sickle cell disease has a higher incidence among African Americans. Thalassemia occurs more often among Asian Americans and those of Mediterranean descent.

Prenatal health care professionals will also advise mothers about diet, nutrition, exercise, health environments, and other aspects of pregnancy. They will set up a prenatal care schedule for the rest of the pregnancy, usually with monthly visits.

During the first trimester of pregnancy, many women suffer discomforts such as nausea, backaches, and fatigue. Health care professionals can help women alleviate these discomforts. Good nutrition, exercise, and other good health habits can also help the mother feel better.

The second trimester. This is usually the most comfortable trimester for both healthy babies and healthy mothers. The discomforts of early pregnancy usually go away. The baby begins to grow, and the mother begins gaining weight. A healthy amount to gain during the second trimester is 3 to 4 pounds per month. Regular prenatal care should continue, with visits to the doctor at least once a month. By this time, the baby will have grown enough for the mother and doctor to hear the baby’s heartbeat. The mother also feels the baby moving inside her womb.
In normal, healthy pregnancies, health care providers can easily monitor the baby’s progress without high technology. They measure the mother’s expanding body and check the position of the fetus and the shape of the uterus. Vaginal examination also shows how a pregnancy is progressing. Doctors and nurses ask questions about abnormal spotting or other symptoms the mother might be experiencing. Additional blood and urine testing might also be used to monitor health.

Under special circumstances, the doctor might also order more advanced tests of the baby’s health. Ultrasound tests, amniocentesis, chorionic villus sampling (CVS), and alpha-fetoprotein screening help health care professionals monitor the health of both the mother and the baby. These tests are not routine. They are done if the mother asks for them, or if the doctor thinks they are medically necessary. At least two of the procedures—amniocentesis and CVS—have some possible harmful side effects. Women and their doctors or midwives must weigh these risks when deciding on this testing.

The third trimester. The last trimester can get increasingly uncomfortable for both the baby and the mother. The baby moves around less, but restricts the movements of the mother more. It might become necessary to have more frequent prenatal care visits. The mother should be careful to eat properly and to gain the right amount of weight. The total weight gain during pregnancy should be 25 to 35 pounds (for mothers of normal weight).

During the third trimester the mother might experience more discomfort—such as frequent urination and constipation—as a direct result of the growing baby. Backaches, swollen veins, and other problems might also develop. The mother should watch herself closely, keep track of her symptoms, and discuss them with her obstetrician. This is especially true for high-risk pregnancies.

This is the time when the woman and her doctor or midwife will be making decisions about how and when the baby will be delivered. The medical condition of the mother or baby might lead the doctor to advise a caesarean section.
(c-section). In a c-section, the baby is delivered through a surgical incision of the uterus. For routine **vaginal birth**, the mother might elect to give birth without medications. The mother might want to attend a childbirth class to prepare for labor and delivery. The father is also encouraged to attend these classes. Parenting classes help parents prepare for feeding, changing, and cleaning the newborn infant. Health experts recommend that parents get as much training as possible while they await the baby’s birth.

## Nutrition, exercise, and environment

Good prenatal care is up to the mother as well as her doctors. The mother

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### Common Medical Conditions during Pregnancy

These conditions are usually not dangerous and can be treated by changing your diet, behavior patterns, or medications. However, your doctor should monitor any of these conditions, since they can lead to more serious complications.

**Morning sickness.** Nausea and vomiting, which usually occur during the first trimester. Affects about half of all pregnant women. Recommended treatments include eating crackers or other bland food before getting out of bed, eating several small meals a day, avoiding foods that trigger nausea, drinking plenty of fluids, and drinking tea or eating foods that contain ginger.

**Anemia.** An inadequate level of hemoglobin in the blood that is caused by too little iron or folic acid in the diet. Symptoms include fatigue, fainting, pale skin, heart palpitations, and breathlessness. Treatment includes adding iron-rich foods (leafy green vegetables, lentils, cooked dry beans, and citrus fruits) to your diet. This condition must be monitored carefully to avoid more serious problems.

**Edema.** Swelling caused by extra fluid in the mother’s body that is often brought on by warm weather. Treatment includes putting cold-water compresses on the affected areas, avoiding salt, and elevating the legs and feet. Sudden swelling of the face, legs, or feet requires immediate medical attention.

**Varicose veins.** Painful and swollen veins, especially in the legs, due to an increased volume of blood in the body. Afflicts about 20 percent of pregnant women. Treatment includes staying off your feet and wearing support stockings and loose clothing.

**Constipation.** Slowed bowel activity, often caused by pressure from the growing baby. Treatment includes drinking 2–3 quarts of fluids per day; getting moderate daily exercise; eating fruits, whole grains, and vegetables; and taking fiber formers or laxatives under a doctor’s supervision.

**Hemorrhoids.** Enlarged veins in the anus, often due to the increased pressure of constipation. Treatment includes avoiding constipation, avoiding strain during bowel movements, taking warm baths, and applying witch hazel cream.

**Heartburn.** Burning sensation in the stomach, often caused by the expanding uterus pushing on the stomach. Treatment includes eating smaller meals more often, eating more slowly, avoiding greasy foods and coffee, raising the head slightly during sleep, and taking simple antacids under a doctor’s supervision.

**Backache.** Low-level pain in the lower back or ligaments, caused by the weight of the growing baby. Treatment includes controlling weight, eliminating strain, and getting moderate exercise.

**Disturbed sleep.** Can be caused by all of the above discomforts, as well as by stress, anxiety, or depression. Treatment includes avoiding caffeine, avoiding large meals before bedtime, and getting more exercise.
Nutrition. A pregnant woman should stop smoking or inhaling second-hand smoke. She should stop drinking alcohol. She should stop using illegal drugs. She should cut down on or eliminate sugar, junk foods, fatty and salty foods, and caffeine. Instead, she should follow a well-balanced diet that is rich in whole grains, fruits, and vegetables.

Variety in nutrition is important in order to make sure the mother and baby get all the nutrients they need. Pregnant women need protein for cell growth and blood production; carbohydrates for daily energy; calcium for strong bones and teeth as well as for muscle contraction and nerve functions; iron for red blood cell production; and fat for stored body energy.

The role of vitamins in promoting health is also well known. Pregnant women need vitamin A for healthy skin, good eyesight, and strong bones; vitamin C for healthy gums, teeth, and bones and for healthy absorption of iron; vitamin B6 for healthy blood cell formation and to help the body use proteins, fats, and carbohydrates; vitamin B12 for red blood cell formation and maintaining nervous system health; vitamin D for healthy bones and to aid in absorbing calcium; and folic acid for blood and protein production. Most pregnant women should take vitamin supplements to make sure all their needs are met.

Exercise. Research shows that exercise is not just safe for pregnant women but beneficial. A woman should consult her doctor, however, before beginning her exercise program. If she already exercises regularly, she should clear her routine with her doctor during her first prenatal care visit. Jogging, running, horseback riding, and other exercises that require jerky, bouncy movements are not recommended for pregnant women.

Exercises to strengthen the pelvic muscles are especially recommended for pregnant women. Kegel exercises strengthen the muscles that support the uterus, bladder,
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urethra, and rectum. During the last trimester of pregnancy, mothers should undertake exercise plans to prepare for labor. Mothers can learn such exercises at Lamaze or other childbirth classes.

**Safe environments.** Clean household and work environments protect the mother and baby from bacterial infections during pregnancy and early infancy. These are the most critical times for the baby’s health. The mother and other household members should take extra care to use high standards of hygiene. Changing cat litter is unsafe for a pregnant woman because cat feces carry the bacteria toxoplasmosis.

Pregnant women and their babies are more vulnerable to listeriosis and other forms of food contamination. According to the Center for Disease Control, pregnant women are 20 times more likely than other healthy adults to get listeriosis. Changes caused by hormones are thought to make pregnant women more susceptible. Greater care than usual should go into keeping kitchen surfaces clean, washing food, and cooking food thoroughly.

Health care experts are also becoming more concerned about unsafe work environments during pregnancy. Pregnant women who work should examine the hygiene standards in their workplace restrooms and kitchen areas. Women should also check for potential health hazards, such as harmful chemicals, that are used in the process of their work. Women should discuss their environmental safety concerns with health care professionals.

**Labor and delivery**

In most pregnancies, labor begins with a series of noticeable changes.

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**Pain Relief during Delivery**

Each of these methods has advantages and drawbacks. The mother and her doctor or midwife should discuss available options and make decisions as pregnancy advances.

**Epidural.** Insertion of a needle into the epidural space at the end of the spine. This numbs the lower body.

**Intravenous analgesic.** Pain-relieving drug administered through a tube inserted into a vein.

**Lamaze (natural childbirth).** Series of techniques for breathing and for stretching and relaxing the muscles to aid in labor and delivery without medications.

**Local analgesic.** Pain-relieving drug administered locally through a needle inserted into a muscle.

**Pudendal block.** A procedure that numbs the area around the vulva.
The mother feels the baby descending into the pelvis. The mother might begin to feel small, irregular contractions of her uterus. Cramps in the lower back are another sign labor is approaching.

When these signs appear, the mother and her health care providers should make final plans for the delivery. One important decision to be made is what kind of pain relief, if any, will be used during the delivery.

The unmistakable signs of labor are regular labor pains and breaking water. A woman's water sometimes breaks first, but it usually happens after labor pains have begun. The pains come more frequently and strongly as labor progresses. A woman who has begun labor should immediately set the delivery plan in motion—call the doctor or midwife, or get to the hospital or birth center. The mother will be examined and then admitted or sent home to remain on close watch, with emergency plans in place.

Most births are healthy. The mother’s uterus contracts, which widens the cervix. When the cervix is wide enough, the mother begins to push. The baby is thrust downward with each contraction, and then finally slides down into the birth canal and emerges head-first. The doctor and medical attendants guide the baby gently into the world. Attendants quickly remove the mucus from the baby’s mouth and nose, and the baby makes its first cry. Often the baby is placed immediately on its mother’s stomach. The umbilical cord is cut.

Several quick screening tests are performed on the baby immediately after birth, usually right in the delivery room. Attendants weigh and measure the baby. They perform a simple visual test and give
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the infant an **Apgar score**, which measures the baby’s overall responsiveness. They wrap the baby in a blanket for warmth. They give the baby an injection of vitamin K, which prevents bleeding. They also use eye drops that contain an **antibiotic**, to clean out possible infections from the birth canal.

Most births that are not routine also result in healthy infants. For example, a **breech birth**, in which the baby emerges feet first, makes for a more complicated delivery. But when modern delivery procedures are followed, there is usually no harm to the baby. Birth by caesarean section (c-section) is a safe alternative in complicated deliveries.

For the baby, the medical procedure immediately after birth by c-section is usually the same as in a routine vaginal delivery. However, the medical staff will be alert for possible complications and prepared to offer emergency care to both mother and infant. For example, a birth by c-section might require the temporary use of an **incubator**. Delivery by surgery will also mean a different recovery process for the mother.

**Postnatal care**

Most new mothers and their infants go home after only a few days in the hospital. Recovery from even a healthy, normal pregnancy and delivery takes several weeks. Both mother and baby need adequate diets, plenty of rest, and freedom from stress.

**Feeding the newborn infant.** Whenever possible, mothers should **breastfeed** their infants right after birth. To encourage breastfeeding, many health care centers offer breastfeeding classes, beginning very late in pregnancy. Mothers who cannot breastfeed can be reassured that bottle feeding is also a healthy alternative. If a c-section has been performed or there have been complications during delivery, breastfeeding might have to be delayed a few hours or days. In some cases, bottle feeding is actually healthier for the baby. For example, the mother might be too tired to nurse, or she may be using a drug that enters her breast milk. The decision of whether to breastfeed or bottle feed depends on the mother’s individual circumstances.

**Recovery for the newborn infant.** A newborn infant spends most of the first few days after birth sleeping and recuperating. The newborn is quite fragile, especially in the neck and spine. It is usual for babies to lose weight during the first few days after birth, because they are losing extra body fluids. At about five days old, the healthy infant starts to regain weight, reaching the original birth weight about ten days after birth. After that, the baby gains weight quite rapidly.
Snuffing out SIDS

It seems like children have been tagging around after Amanda Sue Bordeaux all her life – and Bordeaux couldn’t be happier about it. As the third-oldest in a family of nine kids, Bordeaux learned at a young age how to comfort and care for babies. When she was in high school, she ran a tutoring and nutrition program for younger children after school. Now that she’s a grandmother, Bordeaux isn’t slowing down; she runs an in-home daycare program with 12 to 15 children.

“I think my daycare career really started when I was 10 years old,” laughed Bordeaux as she chased her two-year-old grandson around her home in Rosebud, South Dakota.

But a moment later, she turned serious. Bordeaux, who is Native American, has become increasingly worried about the number of babies on her reservation who have died in their sleep from Sudden Infant Death Syndrome, or SIDS.

“Recently there have been a lot of baby deaths, and I’m kind of baffled about it,” Bordeaux said. “Because I take care of a lot of kids I hear about it from different people. Fortunately I’ve never had anything happen to a child in my care, but one of my fellow daycare providers had taken care of a child who passed away from SIDS recently.”

That’s why Bordeaux, who is a member of the Comanche tribe, attended a recent two-day conference on SIDS held in Rosebud, which drew experts from as far away as Washington, D.C. The conference was both scary and reassuring, said Bordeaux. It frightened her to realize that South Dakota is in the region of the country that has the highest rate of SIDS. But she felt better knowing that parents and caregivers can do many things to decrease the chance that SIDS will strike their babies.

The conference was really a brainstorming session, said Bordeaux. “The main objective was how we can get the word out to the Native American
people about SIDS being at the highest rate in our area and how we can promote awareness of ways to prevent it.”

Although Bordeaux already knew the importance of putting babies to sleep on their backs, rather than on their stomachs, and of keeping soft bedding and stuffed animals out of the crib until a child turns one year old, other tips she learned at the conference came as a surprise.

“I didn’t realize there was an association with cigarette smoking and SIDS,” she said. “Everybody talks about how you shouldn’t smoke around kids, but I never realized smoking could be so bad for kids even before they’re born.”

So now Bordeaux warns pregnant women on her reservation not to smoke—and not to stand too close to anyone else who is smoking either.

“My own daughter is due with her baby in July, and she didn’t even know that,” said Bordeaux.

When that baby arrives, it’ll be grandchild number three for Bordeaux – but she sometimes feels as though she’s a grandmother to hundreds of kids. Just recently, a young woman who once attended Bordeaux’s in-home daycare telephoned and asked Bordeaux to come with her to the hospital: It was time for her to deliver her own baby.

Bordeaux can’t wait to sing that new little baby girl a lullaby – before she puts the baby down to sleep on her back, of course.
Infertility

Infertility is the inability to conceive children. Doctors think of couples as infertile if they are not able to conceive children after a year of sexual intercourse without birth control.

Infertility has many causes. Problems with the male reproductive system occur in about 30 percent of infertility cases. Up to 70 percent of infertility problems originate in the female reproductive system. Known causes of infertility for both men and women include emotional stress, malnutrition, obesity, cancer, abuse of alcohol and drugs, smoking, and certain medical conditions (diabetes, thyroid disease, HIV/AIDS, and others). Female infertility is most often caused by diseases of the reproductive system, such as pelvic inflammatory disease and endometriosis.

Medications and treatments for infertility are as varied as the causes. Intense screening and diagnostic tests might be necessary to establish the source of the problem. The woman might be treated with fertility drugs. These are medications, often hormones, which regulate or bring about ovulation. When a disease such as endometriosis has caused permanent damage to the reproductive system, in vitro fertilization might be used. In this procedure, the egg...
and sperm are joined in the laboratory and then transferred to the uterus.

**Miscarriage and other pregnancy loss**

**Miscarriage.** A miscarriage is the loss of an unborn child during the first 20 weeks of a pregnancy. It often occurs before the mother learns she is pregnant. Between 15 and 20 percent of known pregnancies end in miscarriage. Its medical term is **spontaneous abortion**.

Miscarriage is almost never caused by exercise or sexual intercourse. In most miscarriages, the fertilized egg does not develop normally. The abnormal development is due to genetic factors. Miscarriages are also associated with risk factors in the mother’s health, such as smoking, alcohol and illegal drug use, chronic disease, and older age. A condition called an **incompetent cervix** is responsible for some repeated miscarriages. Women who have already had several pregnancy losses are at greater risk for miscarriage in the future. However, miscarriages also take place in low-risk pregnancies. They are usually not preventable.

Warning signs of a miscarriage include vaginal spotting or bleeding, losing fluid or tissues from the vagina, abdominal pain, and cramping. A woman with those symptoms should call her health care providers and seek help immediately.

**Ectopic pregnancy.** An ectopic pregnancy, also called a tubal pregnancy, is one in which the fertilized egg develops outside the uterus. Most of the time (about 95 percent), the egg settles in the fallopian tube. The egg might also become implanted in the cervix, abdomen, or ovaries. As an ectopic pregnancy goes on, the growing embryo or fetus can burst the organ that contains it. The rupture causes internal bleeding and puts the mother in danger of her life. Most ectopic pregnancies do not develop into live births.

Ectopic pregnancies occur in about 2 percent of all pregnancies. Early detection of an ectopic pregnancy can save the mother’s life. The warning signs include vaginal bleeding, followed by worsening pain in the lower abdomen. There might also be shoulder pain, dizziness, nausea, and vomiting.

**Molar pregnancy.** A molar pregnancy is one in which the placenta grows abnormally. The baby may not form at all, or be unformed and unable to survive. The rate of frequency is about 1 in 1,000 pregnancies.

Ultrasound technology (sonograms) can help detect molar pregnancies early. Surgery is needed to remove the molar tissue. After the surgery, the woman is monitored for a year for **choriocarcinoma**, a cancer that can develop in any remaining molar tissue.
Warning signs of molar pregnancy include vaginal bleeding a week after a missed period, abdominal cramping, severe nausea and vomiting, and high blood pressure.

**Stillbirth.** A *stillbirth* takes place when a baby dies in the womb after the 20th week of pregnancy. This happens in about 1 in 200 pregnancies. Only about 1 in 7 stillbirths takes place during labor and delivery. Many stillbirths happen without warning in an otherwise healthy pregnancy. Women with high blood pressure and diabetes are at higher risk.

A mother’s first notice of a stillbirth is that the baby stops kicking and moving around. Bleeding from the vagina is another sign. A stillbirth is often diagnosed by ultrasound. Doctors induce labor after the diagnosis in order to save the health of the mother. The baby and placenta are examined. However, the cause of death in a stillbirth cannot always be determined.

**Diabetes**

*Diabetes* is a disease that prevents the body from digesting sugars and starches properly. Women who have diabetes before they are pregnant have more risk factors for pregnancy.

**Type 1 and Type 2 diabetes.**

Type 1, or insulin-dependent, diabetes is caused by the failure of the *pancreas* to produce the hormone *insulin*. Young people usually develop this form of diabetes before age 20. Patients with Type 1 diabetes require daily insulin shots. Type 2, or noninsulin-dependent diabetes, is brought on by overeating and poor diet and is associated with obesity. This type of diabetes can often be brought under control with proper diet, weight loss, and oral medication. Both Type 1 and Type 2 diabetes are risk factors for pregnancy. Pregnant women who are diabetic may need to discontinue or change their medications to avoid harm to the baby.
**Gestational diabetes.** Gestational diabetes occurs during pregnancy and goes away after the pregnancy is over. Between 3 and 5 percent of pregnant women in the United States experience this complication. In gestational diabetes, the pregnant woman’s system is unable to properly regulate the release of insulin. As the placenta and fetus grow, more insulin is needed, until the pancreas can no longer make enough insulin to keep up with demands.

There are many risk factors associated with gestational diabetes, such as obesity, a family history of diabetes, having too little amniotic fluid, or having a history of very large births, stillbirths, or births with birth defects. Older mothers are also at greater risk. But many women without those risk factors also develop gestational diabetes.

Doctors recommend that all pregnant women be tested for gestational diabetes. Women who are diagnosed with this condition will be asked to help control their blood sugar levels with diet. The health of the fetus and mother will be monitored to reduce complications during later pregnancy and childbirth. Health problems due to gestational diabetes are manageable and preventable.

**High blood pressure**

High blood pressure (or hypertension) can exist before pregnancy or develop during pregnancy (gestational hypertension). Both types can lead to health problems and complications during pregnancy. Hypertension can damage the mother’s kidneys and other organs. A disease associated with high blood pressure is preeclampsia. Preeclampsia can lead to an even more serious condition, eclampsia. Problems related to high blood pressure occur in 6 to 8 percent of pregnancies in the United States.

Doctors may advise a pregnant woman with high blood pressure to control her weight, increase exercise, and make other dietary and lifestyle changes. Pregnant women should tell their doctors about blood pressure medications they are taking. Preeclampsia is characterized by a combination of high blood pressure and increased protein in the mother’s urine. Increased protein in the urine might be the result of kidney problems. The kidney problems could be the result of the mother having high blood pressure or diabetes before pregnancy.

Preeclampsia occurs more frequently in mothers over 40 and under 20, obese mothers, and mothers with diabetes, kidney disease, rheumatoid arthritis, lupus, or scleroderma. It is also more common during multiple births.
Preeclampsia prevents the placenta from getting enough blood. The placenta therefore cannot nourish the baby adequately. This can cause low birth weight and other problems. Warning signs of preeclampsia include severe headaches, excessive swelling of hands and feet, diminishing urine, blood in the urine, vomiting, double or blurred vision, fever, pain in the abdomen, rapid heartbeat, and dizziness. Special prenatal care is needed.

Fortunately, only a small percentage of women with preeclampsia develop eclampsia, a serious condition characterized by seizures. Hospitalization late in pregnancy might also be required if the doctor feels that eclampsia is a threat.

**Stress, anxiety, and depression**

Mental health during pregnancy is another issue that concerns health care professionals. Recent studies have shown that depression, stress, anxiety, and other mood disorders strike many mothers, both during and after pregnancy.

Stress can contribute to emotional and mental problems during pregnancy. Normal worries of parents, such as where to find the extra income to care for the new baby, can put stress on the mother. The discomforts of pregnancy can also lead to stress. Research suggests that stress is harmful because it releases a hormone that can trigger contractions of the uterus. Stress also causes higher blood pressure, elevated

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**Symptoms of Postpartum Depression**

The U. S. government’s Office on Women’s Health recommends that mothers who exhibit these symptoms seek professional help:

- Restlessness, irritability, or excessive crying
- Headaches, chest pains, heart palpitations, numbness, or hyperventilation
- Inability to sleep, extreme exhaustion, or both
- Loss of appetite and weight loss
- Overeating and weight gain
- Difficulty concentrating, remembering, or making decisions
- Excessive concern or disinterest with the new baby
- Feelings of inadequacy, guilt, and worthlessness
- Fear of harming the baby or oneself
- Loss of interest in sex and other normal activities
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heart rate, and other negative physical reactions. Indirectly, stress can cause harm by leading to smoking, drinking, or not eating well. Mood swings and feelings of depression also trouble many pregnant women. Changes in the body’s hormones are the cause of some of these emotional changes. Health care professionals can recommend a variety of techniques for reducing stress and improving mental health. Deep breathing, meditation, and other relaxation techniques help many women. Support groups and childcare classes relieve anxieties about pregnancy.

Postpartum depression among mothers who have just given birth ranges from mild to severe. About 10 percent of pregnancies result in postpartum depression. An even more serious mental illness, postpartum psychosis, may affect as many as 1 in 1,000 new mothers. Women who suffer postpartum depression exhibit a wide variety of physical symptoms. Studies have linked these symptoms to hormonal changes and to drops in thyroid levels. There are significant links between postpartum depression and pre-existing mental disorders, as well as to extreme stress and abuse at home. Although the exact causes of postpartum depression are not yet known, health care professionals do know about medications and other treatments that alleviate the condition. Pregnant women and new mothers are urged to seek professional help and to discuss their feelings openly with their nurses and doctors. Postpartum depression, like all forms of depression, is treated with combinations of counseling and drug therapy.

Premature labor and childbirth

The best chance for a healthy baby is a full-term pregnancy. The baby needs those last weeks in the womb to develop its lungs for breathing on their own. Important brain growth also occurs during the last weeks of pregnancy. A full-term delivery happens about 40 weeks after the mother’s last menstrual period. Ten to eleven percent of babies are born premature—they are delivered 3 or more weeks before the due date.

Premature labor. Premature labor can take place at any time during the last four months of pregnancy. Early labor poses some health risks to the mother. But doctors sometimes induce early labor in mothers, in
cases where the health dangers are greater if the pregnancy continues. In general, the later in the pregnancy the mother gives birth, the better her baby’s chances will be for healthy survival.

Not all premature labor ends in immediate delivery. In many cases, doctors are able to stop premature contractions. Extra fluids, bed rest, and medications such as muscle relaxants are used to stop contractions. Extra care, even hospitalization, may be required for the rest of the pregnancy. If premature labor cannot be stopped, doctors give mothers medications that prepare the baby for birth. They might also give mothers medications that stop labor briefly, to make a safer premature delivery possible.

**Premature delivery.** Risks to the mother during premature delivery are higher than for full-term births. The higher risks are partly due to differences in procedure. For example, premature births are often medical emergencies. Early births more often involve c-sections and other extra procedures. Medications that stop contractions can also cause fluid to build up in the lungs, which can complicate delivery. In spite of the higher risk, however, most premature deliveries are physically safe for the mother.

Babies are at much higher risk than mothers during and after premature delivery. Premature babies usually need perinatal care to survive.

Very premature babies will require months in intensive care in the hospital. Mothers who give birth prematurely are at high risk for postpartum depression and may need medication, counseling, or both.

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**Premature Labor: Signs and Causes**

Pregnant women should stay alert for these warning signs of premature labor:
- vaginal spotting or bleeding
- abdominal cramps like menstrual cramps
- low back pain
- feeling pressure on the pelvis

A woman should seek medical help as soon as she experiences any of the above warning signs.

Medical emergencies that require a doctor immediately are:
- regular contractions of the uterus
- watery discharge from the vagina

Only about half of the cases of premature labor can be explained. Known causes of premature labor include:
- a rupture in the amniotic sac
- infections and disorders of the uterus, cervix, or urinary tract
- certain chronic diseases, including high blood pressure, kidney disease, diabetes, and hyperthyroidism
- previous premature deliveries
- smoking, alcohol, and drug use by the mother
- malnutrition in the mother
- congenital defects in the baby
Neonatal intensive care

Perinatal care is the medical care of premature infants who cannot survive on their own. Such care takes place in the hospital, in neonatal intensive care units (NICUs). (Neonatal means newborn.) NICUs also care for full-term babies who develop problems after birth.

Most babies in NICUs are kept in incubators. The incubator serves as an artificial womb for the premature child. It keeps the baby warm and free of infections. Depending on its age, the baby will receive intravenous feeding, be fed through a tube in the nose, or be fed with a bottle. The baby’s blood pressure, heart rate, breathing, and temperature are carefully monitored.

Infants stay in NICUs until they no longer need continuous hospital care. To go home, a baby must have a stable temperature, be able to nurse, and be gaining weight. Such infants will need special care at home. They often cannot breastfeed. Infants born prematurely need closer monitoring, more frequent doctor’s visits, and more medications than full-term infants.

NICUs are increasingly successful in keeping even very premature babies alive. However, very young premature babies (between 23 and 25 weeks old) have higher death rates and higher risks of serious medical problems. Only 30 to 50 percent of babies born at 23 weeks survive. Babies 25 weeks old have a 60 to 90 percent survival rate.

Very young premature babies who survive are at high risk. About two-thirds of premature babies who weigh less than 2 pounds at birth have developmental problems. Half of those (one-third of the total) are serious medical problems, such as cerebral palsy, seizures, and hydrocephalus (too much fluid in the brain). There may also be lasting nerve damage. The other half (one-third of the total) are less serious chronic health problems, including slower growth rates, increased incidence of infections, vision and hearing problems, and slower rates of learning.

Older premature babies have higher chances of surviving and growing up healthy. However, all premature babies are at high risk for low birth weight. Babies who weigh less than 5 pounds, 8 ounces are at higher risk for medical complications than babies who are born at normal weight (7–8 pounds).
Barbara Bowman knew she’d found her life’s calling when she walked into a nursery school and looked into the bright eyes of young children.

At the time, Bowman was a college student, and visiting the nursery school was a requirement for a school course. But Bowman discovered that even after she’d completed the class, she didn’t want to say good-bye to the kids.

“I was fascinated with how interesting young children were, even babies,” she says. “I was pretty good at talking to them, responding to them. They liked me and I liked them.”

Now Bowman stands as one of the nation’s foremost experts in early childhood education. During her 50-year career, she has served on White House panels, national science advisory boards – and she even has a street named after her in her hometown, Chicago. But ask her about her most important achievement, and you can hear the pride in her voice shine through as she talks about her own daughter and 17-year-old granddaughter.

As a parent and an educator, Bowman knows every mother and father can take simple steps to set the stage for a lifetime of better learning for their children. Just because babies don’t yet talk doesn’t mean they’re not capable of learning. In fact, research shows the most rapid and significant growth of a person’s brain occurs during the first year of life.

Parents don’t need flashcards or special kinds of music to stimulate their babies’ brains. In fact, the most important thing they can do is spend time playing with and talking to their children, Bowman says.

“We know when infants are stimulated pleasantly – not too much, not too little – it does make them smarter,” Bowman says. “Letting babies
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handle things, playing with them, and giving them body rubs are examples of things that children get pleasure from that are good for them and help make them smart.”

Bowman says that while reading to children is important, parents who are unable to read well themselves might shy away from books. There’s a simple solution, she says: Take your children to story time at the local library and encourage them to retell stories they have heard.

Bowman has seen firsthand how the challenges of preparing children to learn are felt around the world. After she married, she traveled with her husband to Iran and worked with children in orphanages and public schools and spent time with tribes. After returning to Chicago, she helped form the Erikson Institute, which trains daycare directors, teachers of young children, and other child-centered professionals to enter the workforce.

Bowman knows that just as strong, healthy roots allow a tree to stretch toward the sky, giving young children the things they need early on lets them soar to their full potential. And to a child, love is just as important as food to eat and air to breathe.

“The early experience of being well taken care of and having somebody enjoy being with you and all those very simple things are what builds a child’s capacity to love,” Bowman says.

With those kinds of roots, the sky can be the limit for any child.
Part 5: Health care of infants and toddlers

Caring for an infant at home

Feeding the new baby. Breast milk or infant formula is the main source of nutrition for a baby in its first year of life. The advantages of breastfeeding infants are well established. Breast milk from a healthy mother strengthens the baby’s immune system, provides the baby with complete nutrition, and is easier than formula for the infant to digest.

The alternative to breast milk is an infant formula. The mother should consult health care professionals in choosing the best type and brand for the baby’s specific needs. Infant formulas must be prepared and stored safely to protect the baby’s health.

Babies can start eating solid food when they are 4 to 6 months old. Solid food should be introduced little by little. The baby’s specific diet should be planned with the help of health care professionals. Doctors might recommend vitamin supplements or dietary changes for underweight or overweight infants.

Baby’s Milk

For most babies, the healthiest food is their mother’s milk. Here are some of the advantages of breast milk from a healthy mother:

- Strengthens the infant’s immune system
- Provides complete nutrition for the infant
- Is easier for the infant to digest
- Helps low birth weight babies gain weight faster
- Costs much less than infant formula

Infant formula is also healthy for infants when it is prepared and stored correctly. Here are some rules for safe bottle feeding.

- Sterilize all bottles and nipples before use.
- Formula should be mixed only with water that has been boiled. Boil the water for at least two minutes. After the water has cooled to warm, mix with the formula.
- Mix the formula in the correct proportions.
- Keep prepared formula in the refrigerator. Use within 48 hours.
- Warm the refrigerated formula before feeding the baby.

Whole milk is not good for infants. It should not be part of a baby’s diet until sometime around the first birthday.
Keeping clean. Newborn babies should get warm sponge baths until the umbilical cord falls off and the baby is otherwise recovered from childbirth. Cleanup after each diaper use and daily sponge baths remain the safest forms of bathing until the baby can hold its head up on its own. Bathing a newborn in a sink or tub should be done only with extreme care, preferably by two adults.

The baby’s entire environment should be kept as clean as possible. People who handle the baby should observe good hygiene habits, especially washing the hands thoroughly after using the bathroom and after changing the baby’s diapers. The baby’s toys should be sterilized or washed frequently.

Keeping safe. Parents have the responsibility to provide a safe home environment. This is more of a challenge as the baby becomes more able to move on its own. A house should be “baby-proofed” to eliminate accident risks, such as open electrical plugs and household chemicals (most cleaning products). Playpens and other safe areas can also reduce danger. Consumer guidelines should be followed in buying car seats, cribs, playpens, walkers, and other baby furniture and toys.

Postnatal medical care

Regular visits to doctors and clinics help keep babies healthy. It is common for the baby to have two doctor’s appointments in the first month of life and one visit a month for the first year. High-risk infants may require more frequent visits.

During visits, health care professionals monitor the baby’s growth and discuss any concerns the parents may have about the baby’s health. They can help the parents learn to recognize common childhood ailments and how to treat them. Doctors also recommend that infants and toddlers be immunized against common childhood diseases.

Risks to infant health

A healthy baby is born with a strong immune system, which gets even stronger if the baby is breastfed by a healthy mother. With good nutrition and a healthy, caring environment, most infants stay healthy and grow up normally. There are, however, some medical conditions that threaten infants, especially infants who are already at risk.

Sudden infant death syndrome (SIDS). Sudden infant death syndrome (SIDS) is the sudden and unexplained death of a baby under one year of age. The cause is not known. However, certain risk factors are known. SIDS occurs more often when mothers smoke during or after
pregnancy, or if the baby is born prematurely or with low birth weight.

Doctors have an important new message to spread: babies who sleep on their backs have a significantly lower rate of SIDS than babies who sleep on their stomachs. Putting the baby to sleep on its back dramatically reduces the risk of SIDS.

**Failure to thrive.** Failure to thrive is the term used when a baby is consistently behind normal growth for its age group. Premature, low birth weight, and undernourished babies are most likely to suffer from it. Failure to thrive can result from many different causes. The warning signs include being underweight and having low levels of response, a high rate of infections and childhood illnesses, and learning disabilities.

**Shaken baby syndrome.** Shaken baby syndrome is a severe head injury that occurs when a baby is shaken hard enough to cause the baby’s brain to bounce against his or her skull. Sometimes, parents or other caregivers may shake a baby out of frustration, thinking that it is harmless. Shaking a baby, however, can be just a dangerous as hitting or other forms of abuse. The bouncing of the brain against the skull may cause bruising, swelling, and bleeding of the brain, which may lead to permanent, severe brain damage or death.

The warning signs of shaken baby syndrome may include changes in behavior, irritability, tiredness, loss of consciousness, pale or bluish skin, vomiting, and seizures.

It is important for parents to be on the alert for any signs of illness or unusual behavior in infants and babies. Even small concerns should be brought to a doctor’s attention during regular medical checkups.

**Health in infancy and early childhood**

Babies who are one to three months old become ever more interactive. They discover their parents and other familiar faces. They learn to smile and make noises in response to other people. They learn to reach for and grasp objects. They play with their toes.

New babies continue to kick, stretch, and develop stronger bones and muscles during their fourth through seventh months. Gradually the baby learns to hold up its head, roll over, squirm along, and start to crawl. He or she responds more and more to toys, starts to imitate adult movements—and keeps working toward crawling and walking.

Babies make a huge amount of progress in their intelligence, mobility, language skills, and interactions with others as they approach their first birthdays. Between their

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**Reducing the Risk of SIDS**

The National Institute of Child Health and Human Development recommends the following to help lower the risk of sudden infant death syndrome:

- Place the baby on his or her back to sleep.
- Place the baby on a firm mattress.
- Remove all pillows, fluffy blankets, and stuffed toys from the crib.
- Keep the baby’s head and face uncovered during sleep.
- Do not smoke before or after the birth of the baby.
- Keep the baby from overheating during sleep.
eighth and twelfth months, babies learn to crawl. They love doing it and get better and better at it. They also learn to pull themselves up.

Most babies start to walk by their first birthday and improve their walking in the months that follow. As the child masters walking, he or she may also be learning to climb stairs or to bend over and stand up again without falling.

A baby’s skills (what the baby can do) develop quickly in early childhood. Health care and early childhood experts use skills to mark the progress of children’s mental and

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<th>Warning Signs in Infancy and Early Childhood</th>
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The American Medical Association lists these signs as warnings that a baby is not developing normal skills:

### 1 to 3 months
- Cannot support its own head
- Cannot hold its head up 45 degrees
- Cannot grasp or hold objects
- Cannot make fist
- Does not press down legs when feet are on a flat surface

### 4 to 7 months
- Has stiff or tight muscles
- Feels extremely floppy
- Does not use one side of the body
- Favors one arm or leg
- Cannot get objects to his or her mouth
- Cannot roll over by 5 months
- Cannot sit when supported by 6 months
- Cannot control head adequately at 7 months
- Does not reach for objects by end of 7 months

### 8 to 12 months
- Cannot crawl
- Cannot stand when supported
- Does not use both sides of the body equally

- Cannot control hands
- Says no simple words (“mama,” “dada”)
- Does not use gestures, such as waving or shaking head
- Does not point to objects or pictures

By the end of 3 years
- Falls frequently
- Has difficulty with stairs
- Drools persistently
- Has very unclear speech
- Cannot build a tower of more than four blocks
- Has difficulty manipulating small objects
- Cannot copy a circular shape
- Cannot communicate in short phrases
- Does not get involved in “pretend” play
- Fails to understand simple instructions
- Shows little interest in other children
- Has extreme difficulty in separating from mother

physical health. Such guidelines from the experts are very useful in understanding the general progress of a healthy baby’s growth. However, the guidelines should never be read as absolute. Health care professionals know that healthy babies develop at different rates. They can help mothers, fathers, and other caregivers give the baby the best possible environment for healthy growth.

**Smart babies: Learning through play**

New research shows that a baby’s brain starts developing much earlier than experts used to think. Parents today are encouraged to start teaching their infants soon after birth by stimulating the baby’s senses and through **guided play**. Early teaching can help high-risk children avoid learning disabilities and help babies interact better with others at a much younger age.

Health care professionals can now teach parents simple physical exercises that encourage the baby’s muscle and bone growth. Parents can learn how to use tones of voice, gestures, shapes and colors, and toys to focus the baby’s attention and help its growing brain make connections. The exciting field of early childhood learning is proving that one of the healthiest things parents can do is to play with their baby.

*Helping a baby learn brings rich rewards.*
When she was a little girl, Stacey Garnett loved to carry around her aunt’s black nurses’ bag and cure the imaginary fevers and scrapes of her baby dolls. All that practice came in handy; today, many of Garnett’s patients are the same size as those dolls from long ago.

Garnett is indeed the nurse she dreamed of becoming, and her job is more rewarding than she ever imagined. As the director of maternal-child health nursing at Mercy Medical Center in Baltimore, Maryland, she gets to witness daily miracles as she oversees the hospital’s labor-delivery unit.

“The care of a laboring woman is so exciting,” says Garnett. “Helping them through the delivery of a baby, when everyone in the room is crying or looking on in amazement or yelling, is one of the best parts of my job.”

But Garnett knows not every pregnancy has a picture-perfect ending. She also manages the neonatal intensive unit, where sick and premature babies are treated. Although science has made great strides in treating babies born too early, she notes, women still need to do everything they can to carry their babies a full nine months.

One of the most important steps women should take is also one of the easiest: Take prenatal vitamins. “Women should start taking prenatal vitamins if they even think they’re going to conceive,” she stresses.

Seeing a doctor regularly is critical, since pregnancy can sometimes be accompanied by diabetes or other life-threatening conditions.

“Doctors take blood and look at different things, like whether a woman is anemic,” Garnett says. “They can also test to see if a woman is HIV-positive. If she is, she and the baby can receive treatment. Doctors will also take ultrasounds to make sure the baby is growing properly and is in the uterus.”
Garnett feels a special concern for women who live in the inner city, since many of them are poor and it can be hard without a car to get to a doctor. But it’s those very women who can gain the most from medical care, she adds. By contacting a local social service office, pregnant women often can see doctors through the Medicaid program – and learn about other programs that can help them pay for things like groceries and infant formula.

“Many women don’t realize the resources available to them, and in most cases, because you’re pregnant, they’re free,” says Garnett.

But Garnett is trying to spread the word. Recently, she began to travel to area high schools to talk to students about her job. Her goal is twofold: She wants to stress the importance of good health care to students who may become pregnant – and she wants to encourage students to consider entering the field of nursing.

After all, there aren’t many jobs that pay you to witness miracles.
Identifying risk factors and risk disparities

Much of today’s research on pregnancy and childbirth involves counting and calculating the number of times certain risk factors appear in certain kinds of women. Research on risks can help pinpoint both medical and social causes for health problems.

For example, researchers examined the hospital records of 38,402 black women and 144,285 white women who had given birth in a hospital, looking for risk factors for eclampsia. The study found that younger women (ages 15 to 19) had a higher risk of eclampsia than older women (ages 20 to 39). There was a higher incidence of eclampsia among women with diabetes and urinary tract infections. The most impressive findings showed that, regardless of race, women with chronic hypertension had an 11 times greater risk of suffering eclampsia during pregnancy.

In general, data on risk factors are more reliable if more cases are counted. In one study, researchers studied birth records for more than 11 million live births between 1995 and 1997. The study found that women who had maternal fever during labor had a three times

Grim Statistics on Pregnancy and Childbirth

These figures come from the Safe Motherhood Initiative of the National Center for Chronic Disease Prevention and Health Promotion:
• In the United States, 2 or 3 women every day die from complications of pregnancy.
• African-American women are 4 times as likely as white women to die from complications of pregnancy. American Indians are nearly twice as likely to die as whites.
• Deaths of women from pregnancy declined sharply between 1900 and 1982. But there has been no significant progress since 1982.
• Up to 300,000 pregnant women in the United States each year are victims of violence from their intimate partners.
greater risk of early neonatal death (death among prematurely born babies) and twice the risk of death of their full-term infants. The data also showed that maternal fever was associated with respiratory disorders in both premature and full-term newborn infants.

As researchers examine hospital and Medicaid records and other data, they often note critical risk disparities within the population of the United States. For example, research shows African-American women to be at higher risk for complications during pregnancy, premature births, and low birth weight babies than white women. If a particular ethnic group has a higher incidence of a medical condition, researchers look for clues in the diets and lifestyles of that group as well as in that group’s genetic profile. In trying to explain the disparity, researchers also look at such contributing factors as access to medical care.

Science has made clear cause-and-effect connections between many risk factors and pregnancy complications. For example, lack of folic acid in the diet has been shown to cause spina bifida and other birth defects. This research has led to dramatic, very quick progress in reducing spinal-related birth defects—simply by educating women of childbearing age to add folic acid to their diets.

**Discovering causes for pregnancy complications**

Scientists are making impressive advances in discovering the actual mechanisms by which risk factors work. For example, researchers found that women with high levels of stress in the midpoint of their pregnancies (weeks 18 to 20) were more likely to have high levels of CRH (corticotropin-releasing hormone) in their blood. High levels of CRH have been linked to preterm labor. The hormone signals the uterus to begin contracting, which helps bring on labor.

The race to understand and cure HIV/AIDS and other modern diseases has led to many recent advances in immunology. Now science is starting to connect disorders of the immune system to miscarriage and other forms of pregnancy loss. Scientists estimate that up to 40 percent of unexplained infertility and up to 80 percent of unexplained pregnancy loss might be due to immune system problems. Researchers have identified at least four autoimmune problems that can cause frequent miscarriages.

These findings encourage couples to test their immune systems before pregnancy or in its early stages. Tests of the immune system (such as tests for HIV/AIDS) become even more
important if a mother also has other risk factors for pregnancy (such as being under 20 years old or having a sexually transmitted disease).

The findings have also encouraged doctors to prevent pregnancy loss by treating the autoimmune systems. For example, a doctor might prescribe aspirin or heparin to reduce the risk of inflammation and clotting, or prednisone, a steroid used to treat inflammation. Continuing clinical trials of these and other treatments will establish their safety and the most effective way to use them.

New discoveries in genetics are also helping scientists understand the mechanisms of pregnancy. For example, a study conducted in 1997 found that as many as 1 out of 7 people carried a genetic trait that causes a deficiency in folic acid. People carrying this trait have trouble breaking down the vitamin in their blood. A different study showed that pregnant women with this genetic trait might have an increased risk of problems with the placenta. Because of these research results, the scientists recommended that women with this genetic trait take more folic acid during pregnancy.

Evaluating prenatal and postnatal care

Some research on pregnancy and childbirth focuses on the medical care that women and babies receive. The goals of such research are often social as well as medical. Researchers might try to find the best methods of reaching women with important health information or find better ways to give more women access to prenatal and postnatal care. Some research focuses on how doctors and hospitals manage medical care.

A good example is the research on caesarean sections (c-sections). The rate of c-sections performed in the United States rose rapidly during the 1950s, 1960s, and 1970s. It leveled off in the 1980s and then began to go down. However, many authorities say that the rate is still too high: In 1995, 20.8 percent—about 1 in 5—deliveries took place by c-section.

Researchers at the University of Syracuse are currently trying to identify the factors that cause these high rates.

Earlier research has suggested that the causes may be financial as well as medical. For example, researchers studied all the hospitals in one coun-
A California study of more than 3,000 low-income women also identified other barriers to adequate prenatal care: unwanted or unplanned pregnancy, lack of a regular healthcare provider, and having less than a high school education.

The vital role of volunteers

Advances in care for women and their babies depend upon research volunteers. These are women who agree to share information about their health to survey takers, donate tissue samples for lab study, and participate in clinical trials.

Research shows huge risk disparities between mothers from different racial, ethnic, and income backgrounds. Women’s health research needs research volunteers from all racial and ethnic groups, of both genders, and of all ages and lifestyles.

Women who enroll themselves and their babies in clinical trials stand a better chance of receiving potentially effective treatments earlier than others. At the very least, medical personnel will monitor their health during the course of the trial, and they will have the best standard of care. These volunteers also get the satisfaction of helping to uncover information that could someday improve health for mothers, babies, families, and communities.

For low-income women, the lack of health insurance is a major cause of not seeking adequate prenatal care.
Conclusion: Making mothers and babies healthier

Pregnancy, childbirth, and infant care do not have to mean so much risk to so many mothers and babies. Many of the worst problems can be avoided by changes in lifestyle and following simple procedures. Here are some steps you can take:

**Educate yourself and others about pregnancy and childbirth.** You have begun to do so by reading this book. Keep up this education process. Check the books and periodicals in your library. Use a computer to search the Internet. Librarians will help you in your Internet search. As you read, write down questions. Then search for the key words in your questions to find more information. The Resources section of this book lists places to start your search.

**Recognize that you can make a difference in your own health and the health of your baby.** It is critical that you get both prenatal and postnatal care. But just as important are the health measures—healthy lifestyles, good nutrition, clean environments—that mothers practice at home.

**Identify risk factors and prepare for them.** If any of the risk factors for pregnancy (see pages 3-7) apply to you, bring them to the attention of your doctor. Read more about the risk factors and make recommended changes in your lifestyle and diet.

**Help bring well-mother and well-baby programs into your community.** Learn from the programs that have succeeded in communities like yours. Do volunteer work with local organizations that run clinics for women, education programs, and similar efforts. (To obtain a small grant to support your community prevention program, see Healthy People 2010 in the Resources list on page 52.)

**Volunteer for research trials.** Obtain information on upcoming trials. Volunteer yourself for a trial, and promote these opportunities to other women. Find out if your community can be a site for a research trial on health issues related to pregnancy, childbirth, and childcare.
Resources

Agency for Healthcare Research and Quality
Department of Health and Human Services
www.ahrq.gov

American Academy of Pediatrics
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
847-434-4000
847-434-8000 (fax)

American Diabetes Association
Promotes diabetes prevention and treatment and advocates for improved quality of life for people with diabetes.
National Service Center
1701 North Beauregard Street
Alexandria, VA 22311
800-DIABETES or 703-549-1500
www.diabetes.org

Body Mass Index Information for Adults and Children
Provides automatic calculators of body mass index (useful for determining risk of diabetes and other conditions based on overweight and obesity).
Found at the website of the Centers for Disease Control.
www.cdc.gov/nccdphp/dnpa/bmi/

ClinicalTrials.gov
A web-based resource for finding clinical trials in need of volunteers.
www.clinicaltrials.gov
Select the “pregnancy” topic to search for pregnancy-related trials.

Comprehensive Health Information Database
A web-based service that combines resources on maternal and child health and other health topics from several federal agencies. A service of the National Institutes of Health.
www.chid.nih.gov/simple/simple.html
Erikson Institute
Graduate school and research institute that specializes in early learning.
420 North Wabash Avenue
Chicago, IL 60611-5627
312-755-2250
www.erikson.edu

Healthy People 2010
A nationwide health promotion and disease prevention campaign sponsored by
the Department of Health and Human Services. One of the goals of the cam-
paign is to reduce health disparities.
Office of Disease Prevention and Health Promotion
200 Independence Avenue SW., Room 738G
Washington, DC 20201
www.healthypeople.gov
For information on the “Healthy People 2010 Microgrant” program that finances community-based prevention activities:
www.healthypeople.gov/implementation/community/

Indian Health Service National Diabetes Program
Supports and promotes health efforts that prevent and control diabetes among
Native Americans.
Indian Health Service
5300 Homestead Road, NE
Albuquerque, NM 87110
505-248-4182

March of Dimes Foundation
The foundation maintains a massive online library of detailed information about pregnancy, pregnancy disorders, infant and maternal health, and birth defects and their prevention.
www.modimes.org

Medem.com
A comprehensive service of online health information, provided by members of several medical societies.
www.medem.com

Medlineplus
A comprehensive source of health information, provided by the National Library of Medicine.
www.nlm.nih.gov/medlineplus
Resources

National Black Child Development Institute
1023 15th Street N.W., Suite 600
Washington, D.C. 20005
202-387-1281
202-234-1738 (fax)
www.nbcdi.org

National Center for Chronic Disease Prevention and Health Promotion
Promotes the transfer of research knowledge into actual prevention and treatment strategies. Provides information to the general public.
Centers for Disease Control and Prevention
Division of Diabetes Translation
Mail Stop K-10
4770 Buford Highway, NE
Atlanta, GA 30341-3717
800-CDC-DIAB
www.cdc.gov/diabetes/

National Center on Minority Health and Health Disparities
Promotes the health of racial and ethnic populations through research and education and through support of minority involvement in research careers. Affiliated with the National Institutes of Health.
6707 Democracy Blvd., Suite 800
MSC 5465
Bethesda, MD 20892-5465
800-444-6472 or 301-402-1366
www.ncmhd.nih.gov

National Institutes of Health
The biomedical arm of the federal government, which funds research and promotes education on pregnancy and hundreds of related issues.
Website for general information about NIH publications:
www.nichd.nih.gov
See also Medlineplus for health information available to the public online.

National Women’s Health Information Center
NWHIC is a service of the Office on Women’s Health in the United States.
Department of Health and Human Services.
1-800-994-WOMAN
www.4women.gov
Native American Research Centers for Health
Research centers that link the Native American community with health research and that work to increase the number of Native American scientists and health professionals.
National Institute of General Medical Sciences
National Institutes of Health
45 Center Drive MSC 6200
Bethesda, Maryland 20892-6200
301-496-7301

New York Online Access to Health
A searchable health information resource in English and Spanish.
www.noah-health.org/index.html

Office for Protection from Research Risks
A source of information on the guidelines and ethics of research studies with humans.
National Institutes of Health
Office for Protection from Research Risks
6100 Executive Blvd., Rm. 3D01
Rockville, MD 20892-7507

Office of Minority Health Resource Center
Serves as a national resource and referral service on minority health issues, including pregnancy. Affiliated with the U.S. Department of Health and Human Services.
P.O. Box 37337
Washington, D.C. 20013-7337
1-800-444-6472
www.omhrc.gov/omhrc/
Appendix 1: Questions to Ask Your Doctor about Pregnancy and Childbirth

If you want to get pregnant or think you might be pregnant...
• Am I at risk during pregnancy?
• Should I be tested for genetic traits?
• How should I change my lifestyle diet to prepare for pregnancy?
• What help is available for making those changes?

If you have been diagnosed as pregnant...
• What tests do I need right away?
• How often should I see the doctor?
• What is the treatment plan?
• What lifestyle changes are required by this treatment plan?
• What other specialists do I need to see?
• What medications should I be taking or not taking?
• With my medical history, what risks should especially concern me?
• What can I do to make pregnancy and childbirth easier?
• What are the emergency signs I should look out for?
• Can you help me locate a clinical trial to join?
• Are the conditions I am experiencing something to worry about?
• Why am I feeling this discomfort?

When you are caring for infants...
• What are the risks to my infant because of my experiences in pregnancy?
• How often should the baby see the doctor?
• What immunizations should my baby receive, and when?
• Am I giving my baby proper nutrition?
• Why is my baby not acting like other babies the same age?
• What medications should my baby be taking or not taking?
• What are the emergency signs I should look out for?
• Can you help me locate a clinical trial to join?
Appendix 2: Taking Part in Research Studies—Questions to Ask

A research study is a way for finding answers to difficult scientific or health questions. Here are important questions you should ask of anyone who wants you or members of your family or community to be part of a research study on pregnancy, childbirth, or infant health.

1. What is the study about?
   • Why are you doing this study?
   • Why do you want to study me or people like me? Who else is being studied?
   • What do you want to get out of this study?
   • What will you do with the results?
   • Have you or others done this type of study ever before? Around here? What did you learn?

2. Who put this study together?
   • Who is running or in charge of this study?
   • Whose idea was this study?
   • How were people like me part of putting it together?
   • Who are the researchers? Are they doctors or scientists? Who do they work for?
   • Have they done studies like this before?
   • Is the government part of this study? Who else is a part of this study?
   • Who is paying for this study?
   • Who will make money from the results of this study?

3. How can people like me share their ideas as you do this study?
   • How will the study be explained in my community?
   • Who of people like me will look at this study before it starts?
   • Who of people like me are you talking to as you do this study? A Community Advisory Board?
   • Who from the study can I go to with ideas, questions, or complaints?
   • How will people like me find out about how the study is going?

4. Who is going to be in this study?
   • What kinds of people are you looking for? Why?
   • Are you trying to get minorities in this study?
   • Are you including people less than 18 years old?
   • How are you finding people for this study?
   • Are transportation and/or daycare provided for people in this study?
   • Do I need to sign to participate?
Appendix

• Will you answer all of my questions before I sign the consent form?
• Can I quit the study after signing the consent form? If I quit the study, will anything happen to me?

5. What will I get out of this study?
• What are the benefits?
• Is payment involved? How will I be paid?
• Will I get free health care or other services if I participate? For how long?
• Will I get general health care and/or psychological care if I participate? For how long?

6. How will I be protected from harm?
• Do I stand a chance of being harmed in this study? In the future?
• Does the study protect me from all types of harm?
• If I get harmed, who will take care of me? Who is responsible?
• If I get harmed in any way, will I get all needed treatment? Who pays for treatment?

7. How will my privacy be protected?
• Who is going to see the information I give?
• Will my name be used with the information?
• What happens to the information I gave if I quit the study?
• Is there a written guarantee of privacy?

8. What do I have to do in this study?
• When did you start this study? How long will it last?
• How much of this study have you already done?
• Have there been any problems so far?
• Will I get treated the same as everyone else?
• What kinds of different treatments are offered in this study? Are there both a real and a fake treatment?

9. What will be left behind after the study is over?
• What will happen to the information people give? How will it be kept?
• What are you going to do with the results of the study?
• How will the public learn about the results? Will results be in places where the public can see them?
• Are you going to send me a copy of the results? When?
• What other studies are you planning to do here?

The questions above are from a pamphlet developed by Project LinCS (Linking Communities and Scientists), Community Advisory Board (Durham, NC), and Investigators (University of North Carolina Center for Health Promotion and Disease Prevention) in cooperation with the Centers for Disease Control and Prevention, Atlanta, GA, email: hivmail@cdc.gov. For copies of this brochure: CDC National Prevention Information Network 1-800-458-5231
Appendix 3: *Recommended Childhood and Adolescent Immunization Schedule*
Bibliography


alpha-fetoprotein (AFP): a protein that is produced by a growing fetus. It is found in the amniotic fluid, the fetus's blood, and the mother’s blood.

alpha-fetoprotein screening: blood testing that measures the levels of alpha-fetoprotein (AFP) in the mother's blood. A higher than normal amount of AFP can indicate brain and spinal cord defects. A lower than normal amount of AFP can indicate a baby with Down syndrome. This screening can also give the exact due date and the presence of more than one fetus.

amniocentesis: a test of the fluid that surrounds the developing fetus, usually performed between weeks 15 and 20 of pregnancy. Cells from the fetus are used to detect genetic disorders such as Down syndrome, sickle cell, anemia, and cystic fibrosis and abnormalities such as spina bifida. Also detects the sex of the fetus.

amniotic fluid: the fluid that fills the womb during pregnancy. It provides a fluid, cushioned environment for the fetus.

anemia: an inadequate level of hemoglobin in the blood; a shortage of red blood cells.

anencephaly: a fatal neural tube defect in which the baby is born with a severely undeveloped brain.

antibiotic: a drug that kills bacteria.

antibodies: disease-fighting agents in the blood.

Apgar score: a score given to a newborn infant after a simple tactile test of the infant’s responses.

bac•te•ri•a: tiny organisms that survive on living and nonliving surfaces, performing many chemical functions. Some bacteria, such as listeriosis, cause diseases in people.

birth canal: the channel that the fetus passes through during birth. It is formed by the cervix, vagina, and vulva.

birth center: a medical facility designed for giving birth, often located within a hospital.

birth control: reducing or eliminating the chance of pregnancy.

birth defects: diseases or conditions that are present at birth, such as cystic fibrosis and spina bifida.

birth position: the position of the baby in the birth canal. Normal position is head down. In the breech position, the baby’s feet point toward the birth canal.

breaking water: the release of the amniotic fluid, a clear signal that labor is beginning.

breastfeeding: feeding an infant on its mother's natural milk. This is the recommended method for feeding newborn babies.

breech birth: when the baby emerges from the birth canal feet first, instead of the usual head first. This makes for a more complicated delivery.

caesarean section (c-section): delivery of a baby by surgically cutting into the uterus.

Canavan disease: a rare, inherited disorder that usually affects children of Eastern European Jewish descent. Symptoms may include mental retardation, loss of motor skills, feeding diffi-
culties, poor head control, and an enlarged head. The disease usually results in death by age 10.

**cell:** the smallest unit of production in a living thing.

**cerebral palsy:** caused by a prenatal brain defect or by brain injury during birth; characterized by spasms and difficulty in controlling the muscles.

**cervix:** the neck-like part of the uterus that extends into the vagina. It becomes the beginning of the birth canal.

**chlamydia:** a sexually transmitted disease caused by bacteria.

**choriocarcinoma:** cancer that can develop in molar tissue that was not removed by surgery after a molar pregnancy.

**chorionic villus sampling (CVS):** a test performed in the 10th to 12th week of pregnancy that identifies the same abnormalities as amniocentesis. CVS can also detect the baby's sex and risk of spina bifida.

**chronic:** long-lasting and on-going. Diabetes and high blood pressure are chronic diseases that put pregnant women at risk.

**clinical trials:** research that is performed using people to test the success of a medical treatment, medicine, or prevention strategy. A clinical trial usually is conducted only after the test has been successful in the laboratory and on animals.

**complications of pregnancy:** problems that are not expected in a healthy pregnancy. These include birth defects, illness at birth for the mother or baby, injury or death to the newborn, and injury or death to the mother.

**conception:** the fertilization of an egg from a female by sperm from the male.

**congenital:** present at birth.

**congenital rubella syndrome (CRS):** a group of severe birth defects, including mental retardation, heart disease, deafness, and cataracts.

**constriction:** slowed bowel activity. In late pregnancy, it is often caused by pressure from the growing baby.

**consumer guidelines:** published by government agencies and trade organizations to help people choose safe products, such as car seats, cribs, playpens, and other baby furniture, and to use them correctly.

**CRH (corticotropin releasing hormone):** a protein produced in the body that commands the body's response to stress.

**cystic fibrosis:** a serious hereditary disease that results in serious respiratory and other health problems, as well as early death (often in the teens and early 20s, although because of medical advances, the average life span for someone with this disease is now 30).

**data:** collections of statistics, such as those gathered from hospital records.

**diabetes:** a set of illnesses characterized by improper amounts of glucose (sugar) in the blood. Gestational diabetes is a form that occurs during pregnancy.

**diagnosis:** a professional medical opinion, based on an exam of the patient, about what is causing symptoms of illness.

**eclampsia:** life-threatening condition characterized by swelling, seizures, high blood pressure, and protein in the urine.

stortion of pregnancy: a pregnancy in which the fetus develops outside the womb, usually in the fallopian tube. Also called tubal pregnancy.

embryo: a fertilized human cell very early in a pregnancy, before it develops into a fetus.

endometriosis: a condition that occurs when bits of the endometrium (the tissue that lines the uterus) escape the uterus and become implanted on the ovaries, fallopian tubes, or other pelvic organs.

expected delivery date: the date when a baby is expected to be born. The date is calculated at 40 weeks from the start of the last menstrual period.

failure to thrive: a term used when an infant is consistently behind normal growth for its age group.

fallopian tube: a tube that leads from the ovary to the uterus.

fertility drugs: medications, often hormones, which regulate or bring about ovulation.

fertilization: when a male sperm cell joins with a female egg to form an embryo.

fetal alcohol syndrome: a group of birth defects, suffered by babies born with alcohol in their bloodstream, that include mental retardation, heart problems, and abnormal brain development.

fetal position: the position of the unborn child within the womb. See also birth position.

fetus: an unborn child still in the womb. An embryo develops into a fetus in about the 10th week of pregnancy.

folic acid: a form of vitamin B contained in leafy green vegetables, dried beans, citrus fruits, and other foods. Recommended for all women of childbearing age to prevent birth defects and to reduce risks of illness and complications of pregnancy.

folic acid deficiency: a shortage of folic acid in the body.

Gaucher's disease: an inherited disorder in which harmful amounts of a fatty substance build up in the spleen, liver, lungs, bone marrow, and, in rare cases, the brain.

genes: units of hereditary information contained in each cell of the body.

genetic: inherited.

genetic profile: an outline of the diseases or conditions a person might have inherited to determine the risk for passing a condition on to their children.

genetics: the field of science that looks at how genes are passed down from one generation to another to influence traits.

genetic trait: a physical characteristic that is passed down through the genes.

German measles: See rubella.

gestation al diabetes: See diabetes.

gestational hypertension: high blood pressure that develops during pregnancy, which may be an indication of preeclampsia.

guided play: teaching an infant or young child in specific ways that develop his or her motor skills and learning ability.

hemoglobin: the coloring matter in red blood cells. Its main purpose is to move oxygen from the lungs to the tissues of the body.
**hep•a•ti•tis B:** a disease of the immune system characterized by weight loss, fatigue, and jaundice and which is often sexually transmitted.

**high blood pres•sure:** a condition in which blood is pushed through the body's blood vessels at greater force than normal. It can lead to tiredness, heart attack, stroke, and other health problems. High blood pressure is also known as hypertension.

**high risk:** a term used to describe conditions or people that stand a good chance of developing negative outcomes.

**high-risk preg•nan•cy:** pregnancy in which there are one or more factors that have been associated with miscarriages, complications of pregnancy, premature deliveries, low-birth-weight babies, and other negative outcomes.

**HIV/AIDS:** AIDS (acquired immune deficiency syndrome) is a disease of the immune system caused by the presence of HIV (human immunodeficiency virus). It is passed on through sexual intercourse and exposure to infected blood.

**home preg•nan•cy test:** a self-administered test of whether a woman is pregnant. The test indicates the presence or lack of a hormone that is produced during pregnancy.

**hor•mone:** a protein produced by an organ of the body to trigger activity in other locations. Insulin is an example of a hormone.

**hy•dro•ceph•a•lus:** too much fluid in the brain. This condition occurs most often to infants and causes the head to greatly increase in size.

**hy•per•ten•sion:** another term for high blood pressure.

**im•mune sys•tem:** the coordinated responses of the body that serve to protect it against outside invaders such as viruses and bacteria.

**im•mu•ni•za•tion:** producing resistance to a disease by injecting the patient with a weakened form of the disease or with the antibodies for the disease.

**im•mu•nol•o•gy:** the branch of medicine that deals with the body’s response to disease.

**in•com•pe•tent cer•vix:** a condition in which the cervix is weakened by the pressure of the growing baby. It can bring on premature labor.

**in•cu•ba•tor:** an enclosed, warmed bassinet that serves as a temporary womb for premature babies or other infants who cannot survive on their own.

**in•fant for•mu•la:** an artificial substitute for a mother’s breast milk.

**in•fec•tion:** invasion of body tissue by a virus or harmful bacteria, resulting in disease.

**in•fer•til•i•ty:** the inability to conceive or bear children.

**in•su•lin:** a hormone released by the pancreas that regulates blood sugar levels by helping body tissues take in glucose (sugar) to be used for energy.

**in•tra•ve•nous feed•ing:** nutrients given through the vein.

**in vi•tro fer•til•i•za•tion:** procedure in which the egg and sperm are joined in the laboratory and then transferred to the uterus.

**Keg•el ex•er•cis•es:** a series of exercises of the pelvic muscles to help bladder control and strengthen the muscles needed for childbearing.

**kid•neys:** the pair of organs that filters the blood and gets rid of waste products through the urine.
La•maze: a series of techniques for controlling pain during labor and delivery through breathing and other natural methods.

lis•te•ri•o•sis: a common disease-carrying bacteria to which pregnant women are particularly susceptible. This bacteria in pregnant women may lead to miscarriage or stillbirth.

low birth weight: weighing less than 5 pounds 8 ounces at birth. Babies with low birth weight are at greater risk for health problems and learning disabilities.

lupus: a chronic disease that causes pain and inflammation of the joints, as well as rashes across the nose and cheeks.

men•stru•a•tion, men•stru•al pe•ri•od: the discharge of blood and tissue from the lining of a woman’s uterus each month.

mid•wife or nurse-mid•wife: a nurse who is trained in pregnancy, labor, and delivery. Midwives can deliver babies in or outside the hospital but usually have emergency physician backup.

mis•car•riage: the loss of a developing baby during the first 20 weeks of pregnancy. The medical term is spontaneous abortion.

mo•lar preg•nan•cy: a pregnancy in which the fetus does not develop because the placenta develops abnormally. It requires surgery to save the mother’s life.

mood dis•ord•ers: mental health problems, such as depression and mania, relating to a person’s frame of mind.

morn•ing sick•ness: nausea and vomiting caused by pregnancy. Can occur at any time of day, and usually is most frequent in the first trimester.

mu•cous plug: a small mass of soft tissue that covers the opening of the cervix during pregnancy, sealing off the womb.

ne•o•na•tal: newborn.

neonatal intensive care unit (NICU): the part of a hospital that takes care of premature and other high-risk babies in artificial environments.

neu•ral tube de•fects: birth defects, such as spina bifida, that affect the brain and spinal cord.

o•be•si•ty: the condition of being overweight. It is a risk factor for pregnancy.

ob•ste•tri•cian: a doctor who specializes in the care of pregnant women and their developing babies.

o•var•y: the female reproductive gland. This is the organ that produces eggs in the female.

ov•u•la•tion: the process of shedding an egg from the ovary.

pan•cre•as: a gland near the stomach that secretes the hormone insulin.

par•a•site: an organism that lives off of another organism. Viruses, most bacteria, and some worms are parasites.

pel•vic in•flam•ma•tor•y dis•ease (PID): an infection of the lining of the uterus, the fallopian tubes, or the ovaries.

per•i•na•tal care: care of premature infants in artificial environments that copy the conditions in a healthy mother’s womb.

pla•cen•ta: a structure that forms from the lining of the uterus during pregnancy. It is responsible for nourishing the fetus, providing it with oxygen, and eliminating its wastes.
**post•natal care**: care of the infant after birth.

**post•par•tum de•pres•sion**: depression that occurs after and as a result of pregnancy and childbirth.

**post•par•tum psy•cho•sis**: severe mental problems that occur after and as a result of pregnancy and childbirth.

**pre•e•clamp•si•a**: a disease that is characterized by a combination of high blood pressure and increased protein in the mother’s urine. Severe preeclampsia reduces the flow of oxygen and nutrients from the **placenta** to the fetus and can lead to life-threatening organ damage and seizures in the pregnant woman. Mild PIH can usually be kept under control until birth, but severe cases may require **preterm delivery**. See also eclampsia.

**pre•ma•ture in•fant**: a baby born three or more weeks before the expected due date. Babies as young as 25 weeks have a good chance of survival with perinatal care.

**pre•ma•ture or pre•term de•liv•er•y**: delivery that takes place three or more weeks before the expected due date of the baby.

**pre•ma•ture or pre•term la•bor**: labor that takes place three or more weeks before the expected due date of the baby.

**pre•na•tal care**: care of the unborn baby and its mother during pregnancy.

**rheu•ma•toid ar•thri•tis**: a chronic disease that causes the joints to become inflamed.

**risk dis•par•i•ty**: a noticeable difference in risk data between members of one racial, ethnic, or social group and the population as a whole.

**risk fac•tor**: any medical or social condition that might contribute to a negative medical outcome.

**ru•bel•la (Ger•man meas•les)**: a common childhood disease caused by a **virus**. It can infect the bloodstream of the fetus and cause pregnancy complications and **birth defects**.

**scl•ro•der•ma**: a serious disease in which all the layers of the skin become hardened and rigid.

**sei•zure**: uncontrollable muscle spasms, as of epilepsy or some other disease.

**sex•u•ally trans•mit•ted dis•eas•es (STDs) or in•fec•tions (STIs)**: diseases caused by viruses and bacteria that are passed on through sexual intercourse.

**shaken baby syndrome**: a severe head injury that occurs when a baby is shaken hard enough to cause the baby’s brain to bounce against the skull. This can cause severe brain injury or even death.

**sick•le cell dis•ease**: an inherited form of anemia characterized by C-shaped red blood cells.

**spi•na bi•fi•da**: a birth defect in which the tissue surrounding a baby’s developing spinal cord does not close properly. Also called “open spine,” it affects the backbone and the spinal cord and can cause paralysis of the legs, as well as problems with bladder and bowel control.

**spon•ta•ne•ous a•bor•tion**: medical term for miscarriage.

**spot•ting**: leaking small amounts of blood from the **vagina** during pregnancy or between menstrual periods.

**sta•tis•tics**: a collection of numerical data.

**still•birth**: delivery of a baby who has died in the womb after the 20th week of pregnancy.
stroke: damage to the blood vessels in the brain that can result in the inability to speak or move part of the body.

sudden infant death syndrome (SIDS): sudden and unexplained death of a baby under one year of age. Putting the baby to sleep on its back has been shown to reduce SIDS.

symp•tom: a sign of a problem, such as a disease.

Tay-Sachs dis•ease: a fatal inherited disease of the central nervous system. Symptoms usually first appear at 4 to 6 months of age, resulting in death by age 5. The disease occurs most frequently in descendants of Central and Eastern European (Ashkenazi) Jews.

thal•as•se•mi•a: a group of inherited diseases of the blood that affect a person’s ability to produce hemoglobin, resulting in anemia.

tox•o•plas•mo•sis: an infection caused by a parasite present in cat feces. If infected while pregnant, a woman can pass the disease on to her unborn child.

tri•mes•ter: one of three 3-month periods into which a pregnancy is divided.

ul•tra•sound test: sonar imaging technology that allows experts to take “pictures” of internal operations, such as the development of a baby in the womb. Used to monitor the health of high-risk and other infants.

um•bil•i•cal cord: the cord that connects the fetus to the placenta, allowing nourishment to the fetus. It is cut and removed during childbirth.

u•ter•us: the organ of the female reproductive system in which an unborn baby develops. In pregnancy, the uterus is also known as the womb.

va•gi•na: a duct that connects the uterus and the exterior of the body.

vag•i•nal birth: the routine process of birth, during which the baby emerges through the birth canal.

vi•rus: a tiny organism that carries disease. It spreads throughout the body by using the body’s cells to make copies of itself.

vi•ta•mins: organic substances that provide the body with essential nutrients.

vul•va: the outer female genitals.

womb: See uterus.
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