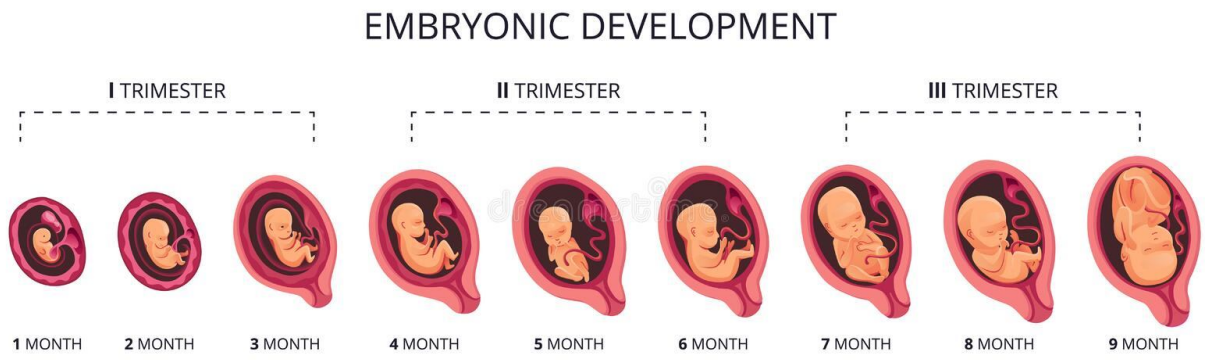
Stages of Fatal Development

Fetal development is an orderly and intricate process. It begins before you even know you're pregnant and ends with the birth of your baby. Between conception and delivery, there are many detailed steps that have to occur.

There are three stages of fetal development: germinal, embryonic and fetal. Most people don't talk about their pregnancy in these terms, but it can be helpful to know.



Germinal stage

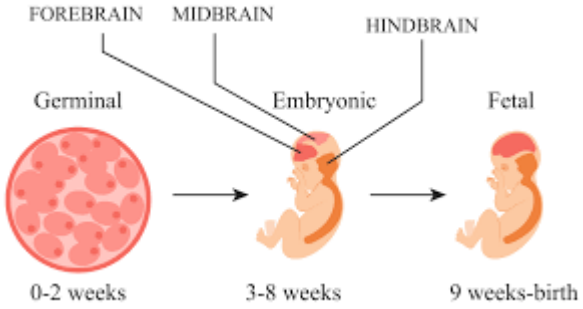
The germinal stage is the shortest stage of fetal development. It begins at conception when a sperm and egg join in your fallopian tube. The sperm fertilizes the egg and creates a zygote. The zygote begins its journey down to your uterus over the course of about one week. During this journey, the zygote divides many times, eventually creating two separate structures. One structure eventually becomes the embryo (and later, the fetus) and the other becomes the placenta. Cell division continues at a rapid pace. Eventually, the zygote turns into a blastocyst. The blastocyst arrives at your uterus and implants into your uterine lining. If implantation is successful, your body immediately begins producing hormones to support a pregnancy. This also stops your menstrual period.

Embryonic stage

The embryonic stage lasts from about the third week of pregnancy until the eighth week of pregnancy. The blastocyst begins to take on distinct human characteristics. It's now called an embryo. Structures and organs like the neural tube (which later becomes the brain and spinal cord), head, eyes, mouth and limbs form. The embryo's heart begins to develop and pulse around the sixth week. Buds that will become arms and legs also form around the sixth week. By the end of the eighth week, most of the embryo's organs and systems take shape. For a lot of people, this is the point in pregnancy where morning sickness begins.

Fetal stage

The fetal stage of development begins around the ninth week and lasts until birth. This is when the embryo officially turns into a fetus. The fetus gets its assigned sex around nine weeks of pregnancy, although your healthcare provider can't detect it on ultrasound yet. The fetus's major organs and body systems continue to grow and mature. Things like fingernails, eyelashes and hair also grow. The fetus is able to move its limbs, although you may not feel it until 20 weeks of pregnancy. The majority of growth — in both weight and length — happens in the fetal stage.



When does a pregnancy start?

The start of pregnancy is actually the first day of your last menstrual period (LMP). This is the gestational age of the fetus. It's about two weeks ahead of when conception actually occurs. Though it may seem strange, the date of the first day of your last period will be an important date when determining your due date. Your healthcare provider will ask you about this date and will use it to figure out how far along you are in your pregnancy.

How does conception work?

Each month, your body goes through a reproductive cycle that can end in one of two ways. You'll either have a menstrual period or become pregnant. This cycle is continuously happening during your reproductive years — from starting your period to menopause around age 50.

In a cycle that ends with pregnancy, there are several steps. First, a group of eggs (called oocytes) gets ready to leave your ovary for ovulation (release of the egg). The eggs develop in small, fluid-filled cysts called follicles. Think of these follicles as small containers for each immature egg. Out of this group of eggs, one will become mature and continue through the cycle.

The mature follicle now opens and releases the egg from your ovary. This is ovulation.

After ovulation, the opened follicle develops into a structure called the corpus luteum. This releases the hormones progesterone and estrogen. Progesterone helps prepare your uterine lining for pregnancy. If you don't become pregnant during a cycle, this lining is what your body sheds during your period. If sperm

fertilizes the egg, conception occurs and the fertilized egg begins its journey to your uterus, where it will implant.

How long is a pregnancy?

Traditionally, we think of pregnancy as a nine-month process. However, this isn't always the case. A full-term pregnancy is 40 weeks, or 280 days. Depending on what months you're pregnant during (some are shorter and some longer) and what week you deliver, you could be pregnant for either nine months or 10 months. This is completely normal and healthy.

Stages of Growth Month-by-Month in Pregnancy

The fetus will change a lot throughout a typical pregnancy. This time is divided into three stages, called trimesters. Each trimester is a set of about three months. Your healthcare provider will probably talk to you about fetal development in terms of weeks. So, if you're three months pregnant, you're about 12 weeks.

You'll see distinct changes in the fetus, and yourself, during each trimester of pregnancy.

First trimester

The first trimester will span from conception to 12 weeks. This is generally the first three months of pregnancy. During this trimester, the fertilized egg will change from a small grouping of cells to a fetus that begins to have human features. The first trimester is exciting, but also when most people develop unpleasant symptoms like morning sickness and fatigue.

Month 1 (weeks 1 through 4)

Although it's strange, the first two weeks of pregnancy are a "getting ready" period. Your body slowly releases more hormones and your uterus prepares for a potential pregnancy. At the end of the second week, your ovary releases an egg (ovulation). If sperm meets an egg just after ovulation, the process to pregnancy continues.

Week 3: Fertilization occurs during the third week. A sperm and egg join and create a zygote.

Week 4: The tiny bundle of cells turns into a blastocyst and implants into your uterine lining. The beginning of what will become the placenta forms. A water-tight sac forms around the blastocyst. This is the amniotic sac, and it provides cushioning to a fetus during pregnancy.

By the end of the fourth week, the blastocyst is about 2 millimeters (mm) long — the size of a poppy seed.

Month 2 (weeks 5 through 8)

The second month of pregnancy is when most people realize they're pregnant. Pregnancy hormones go into overdrive, and by about the fifth week, an at-home pregnancy test will show as positive. This is when many people begin to feel symptoms of pregnancy.

Week 5: The neural tube (brain, spinal cord and other neural tissue of the central nervous system) forms. The tiny "heart" tube will beat 110 times a minute by the end of the fifth week.

Week 6: Tiny buds that become arms and legs also develop. Blood cells are taking shape, and circulation will begin. Structures that'll become the ears, eyes and mouth take form. Your healthcare provider can probably detect a heartbeat on a vaginal ultrasound.

Week 7: Bones begin replacing soft cartilage and genitals begin to form. The embryo's head is large in proportion to the rest of its body. Some people think the embryo resembles a small tadpole or seahorse due to its prominent tail (which becomes legs) and large head.

Week 8: All of the major organs and body systems are developing. The fetus has web-like hands and feet. Eyes become visible and ears begin to form. The umbilical cord is fully developed and helps to transport oxygen and blood to the embryo.

After the 8th week, healthcare providers refer to the embryo as a fetus. It will remain a fetus until birth.

By the end of the second month, the fetus is about 0.5 to 1 inch (in) long — about the size of a black bean.

Month 3 (weeks 9 through 12)

The third month of pregnancy is when an embryo becomes a fetus. It's a period of rapid growth and development. The fetus develops distinct facial features, limbs, organs, bones and muscles. By the end of the 12th week, the fetus has an assigned sex, but it won't be visible on ultrasound for several more weeks.

Week 9: The beginnings of teeth and taste buds are forming. Its muscles are forming and its body shape takes on more of a human appearance. But, its head is still 50% of its length. Your provider may be able to hear its heartbeat with a Doppler ultrasound.

Week 10: The arms, hands, fingers, feet and toes are fully formed (no more webbed fingers). Fingernails and toenails are beginning to develop and the external ears form. The external genitals also begin to form, but it's too soon to see them on an ultrasound.

Week 11: The fetus is starting to explore a bit by doing things like opening and closing its fists and mouth. Its knees, elbows and ankles are working, but it's too soon to feel any kicks. The bones are hardening, but its skin is still see-through. Facial features are more prominent.

Week 12: All the organs, limbs, bones and muscles are present and will continue to develop in order to become fully functional. The circulatory, digestive and urinary systems are also working and the liver produces bile. The fetus is drinking and peeing amniotic fluid.

Since the most critical development has taken place, your chance of miscarriage drops considerably after 12 weeks (the end of the first trimester). Most people begin feeling some relief from morning sickness now, too.

At the end of the third month, the fetus is about 2.5 to 3 inches long — about the size of a plum.

Second trimester

The second trimester of pregnancy is often thought of as the best part of the experience. By this time, any morning sickness is probably gone and the discomfort of early pregnancy has faded. You may also start to feel movement as the fetus flips and turns in your uterus. During this trimester, many people find out about the fetus's assigned sex. This is typically done during an anatomy scan (an ultrasound that checks physical development) at around 20 weeks.

Month 4 (weeks 13 through 16)

Many people begin showing signs of being pregnant at this point in pregnancy, especially if you've been pregnant before. Your pregnancy care provider can hear the fetal heartbeat loud and clear on a Doppler ultrasound. The fetus can even suck its thumb, yawn, stretch and make faces.

Week 13: Vocal cords form and the fetus's large head begins to grow proportionate to its body.

Week 14: The fetus's skin starts to thicken and fine hair begins to grow. It can start bringing its fingers to its mouth and turn its head. External genitals are fully developed and fingerprints begin to form.

Week 15: Some organs, like intestines and ears, are moving to their permanent location. The fetus still uses amniotic fluid to practice breathing, but its lungs are beginning to develop. The fetus begins to make more purposeful movements, like sucking its thumb or smiling.

Week 16: The fetus has lips and its ears are developed enough that it can hear you talk. Even though its eyes are closed, the fetus can react to light by turning away from it.

By the end of the fourth month, the fetus is about 5 inches long and weighs about 4 ounces. For reference, that's about as big as an avocado.

Month 5 (weeks 17 through 20)

By the end of the fifth month of pregnancy, most people begin to feel the fetus moving around. The first movements are called quickening and can feel like a flutter. If your pregnancy has been healthy to this point, you'll finally get your first ultrasound. You may even get to find out the fetus's assigned sex.

Week 17: The fetus still has thin skin, but will start to put on fat. Its skin is covered with a whitish coating called vernix. This "cheesy" substance is thought to protect fetal skin from long-term exposure to amniotic fluid.

Week 18: The fetus is covered in lanugo, a peach fuzz-like hair. It helps keep the fetus warm and provides another layer of protection. The fetus may have a sleep-wake cycle, and loud noises may wake the fetus if it's asleep.

Week 19: The fetus is getting stronger and most people begin to feel kicks and punches. The fetus also has its own unique set of fingerprints and can hiccup.

Week 20: The fetus's nails grow towards the end of its fingers. The area of the brain responsible for its five senses begins to develop.

By the end of the fifth month, the fetus is about 9 to 10 inches long and weighs about 1 pound.

Month 6 (weeks 21 through 24)

If you could look inside your uterus right now, you'd see that the fetus's skin is reddish in color, wrinkled and veins are visible through translucent skin. In the sixth month of pregnancy, its eyelids begin to part and you may notice regular, jerky movements. The fetus responds to sounds by moving or increasing its pulse.

Week 21: Limb movements are coordinated and frequent. The fetus has bone marrow that helps it produce blood cells.

Week 22: The fetus's grasp is getting stronger and it can touch its ears and the umbilical cord. It can hear your heartbeat, your stomach rumble and your breathing.

Week 23: If born prematurely, the fetus may survive after the 23rd week with intensive care. It will begin rapidly adding fat to its body.

Week 24: The fetus's lungs are fully developed, but not well enough to work outside your uterus.

By the end of the sixth month, the fetus is about 12 inches long and weighs about 2 pounds.

Month 7 (weeks 25 through 28)

The fetus continues to mature and develop reserves of body fat. The fetus changes position frequently and responds to stimuli, including sound, pain and light. The amniotic fluid begins to diminish.

Week 25: More body fat makes the fetus's skin less wrinkled and plumper. Its nervous system is quickly maturing.

Week 26: The fetus makes melanin, the substance that gives skin and eyes their color. The fetus's lungs start to make surfactant, a substance that helps it breathe after birth.

Week 27: The fetus can open its eyes and blink. It also has eyelashes.

Week 28: The fetus may begin turning head-down in your uterus as it gets ready for birth. At the end of the seventh month, the fetus is about 14 to 15 inches long and weighs between 2 and 3 pounds.

Third trimester

This is the final part of your pregnancy. You may be tempted to start counting down the days to your due date and hope that it comes early, but each week of this final stage of development helps the fetus prepare for birth. Throughout the third trimester, the fetus gains weight quickly, adding body fat that'll help after birth.

Your healthcare provider will monitor you closely as you approach your due date. You'll visit your provider biweekly and then weekly. Make sure to ask your provider any questions you have about labor and delivery.

Month 8 (weeks 29 through 32)

The fetus continues to mature and develop reserves of body fat. The brain develops most rapidly during this time. The fetus can see and hear most stimuli. Most internal systems are well-developed, but the lungs may still be immature.

Week 29: You may notice the kicks and jabs feel more like pokes now that the fetus is getting cramped in the amniotic sac.

Week 30: The fetus can control its own body heat. Its brain is maturing and growing rapidly.

Week 31: The fetus can process more information and stimuli. You can probably notice more distinct patterns in when it's awake and when it's asleep.

Week 32: The fetus's skin isn't translucent anymore. Other than the lungs and brain, most other organs are well-formed and ready for birth.

The fetus is about 17 to 18 inches long and weighs as much as 5 pounds.

Month 9 (weeks 33 through 36)

During this stage, the fetus continues to grow and mature. The lungs are close to being fully developed at this point in pregnancy. The ninth month is mostly about putting the finishing touch on growth and brain development.

Week 33: The fetus's bones are hardening, with exception of its brain, which needs to be soft to descend the birth canal.

Week 34: The vernix that protects the fetus's skin starts to get thicker.

Week 35: The fetus's brain continues to grow, but still only weighs two-thirds of what it should at birth.

Week 36: The fetus loses its lanugo and it has hair on its head.

The fetus is about 17 to 19 inches long and weighs from 6 to 7 pounds.

Month 10 (Weeks 37 through 40)

In this final month, you could go into labor at any time. At this point, the fetus's position may have changed to prepare for birth. Ideally, it's head-down in your uterus. You may feel very uncomfortable in this final stretch of time as the fetus drops down into your pelvis and prepares for birth. Your provider may encourage you to perform kick counts, which is a way to track how much the fetus moves.

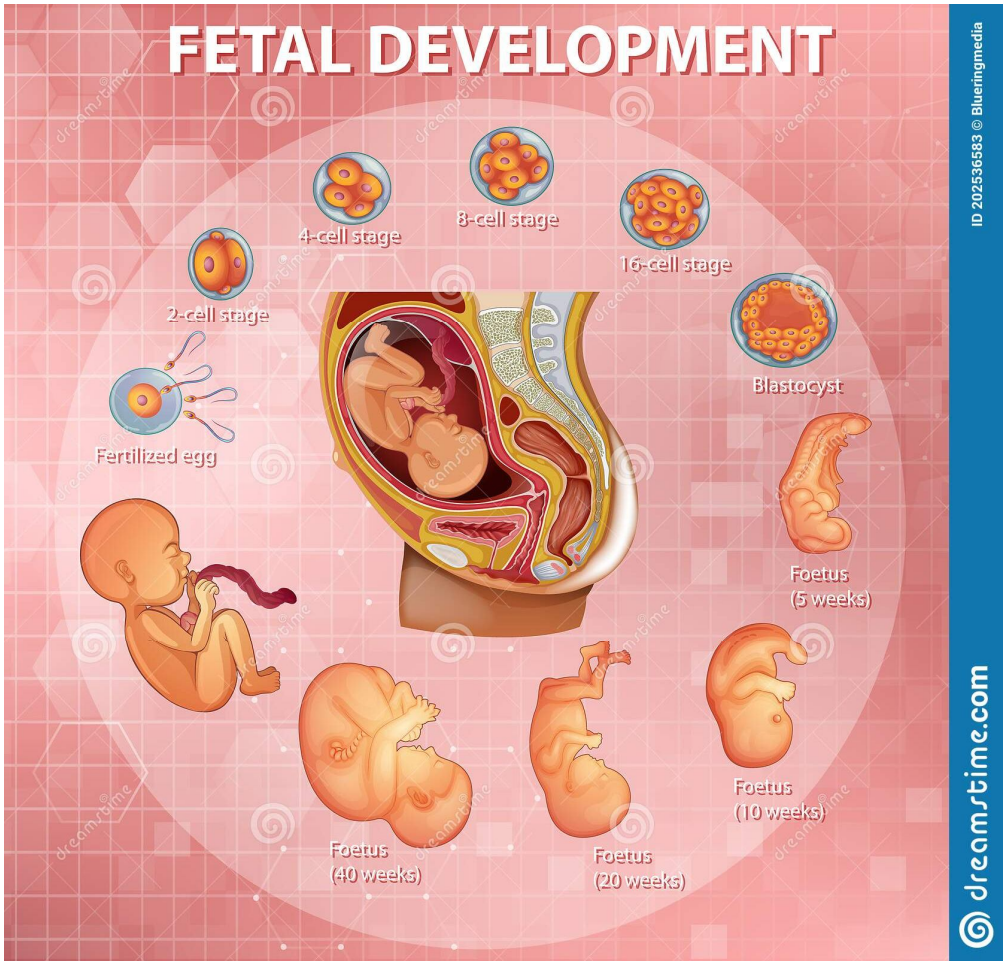
Week 37: The fetus's toenails reach the end of its toes. You may start to feel the fetus drop into your pelvis.

Week 38: The fetus is packing on 0.5 pounds per week to get to its final size.

Week 39: The fetus is full-term and ready to meet the world!

Week 40: It's your due date week. Call your pregnancy care provider if you notice any signs of labor.

The fetus is about 18 to 20 inches long and weighs about 7 to 9 pounds.



First stage: dilatation

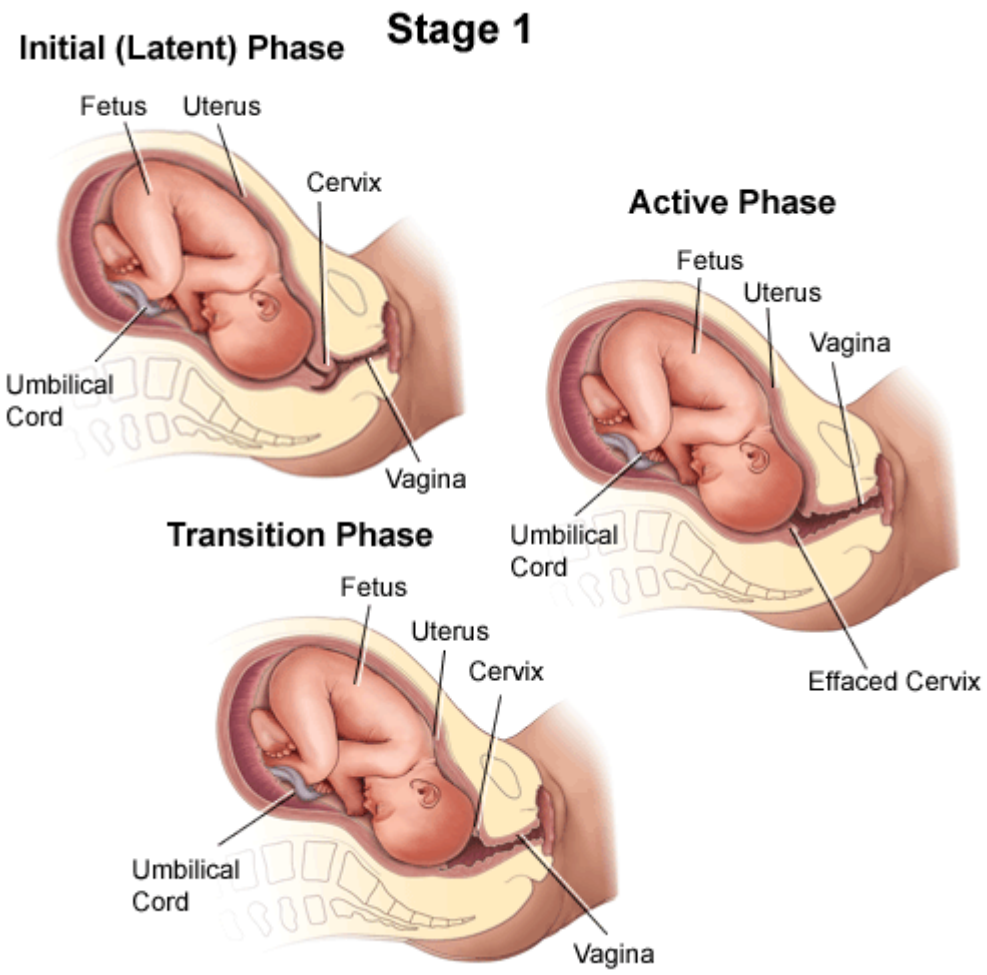
Early in labour, uterine contractions, or labour pains, occur at intervals of 20 to 30 minutes and last about 40 seconds. They are then accompanied by slight pain, which usually is felt in the small of the back.

As labour progresses, those contractions become more intense and progressively increase in frequency until, at the end of the first stage, when dilatation is complete, they recur about every three minutes and are quite severe. With each contraction a twofold effect is produced to facilitate the dilatation, or opening, of the cervix. Because the uterus is a muscular organ containing a fluid-filled sac called the amnion (or "bag of waters") that more or less surrounds the child, contraction of the musculature of its walls should diminish its cavity and compress its contents. Because its contents are quite incompressible, however, they are forced in the direction of least resistance, which is in the direction of the isthmus, or upper opening of the neck of the uterus, and are driven, like a wedge, farther and farther into this opening. In addition to forcing the uterine contents in the direction of the cervix, shortening of the muscle fibres that are attached to the neck of the uterus tends to pull those tissues upward and away from the opening and thus adds to its enlargement. By this combined action each contraction of the uterus not only forces the amnion and fetus downward against the dilating neck of the uterus but also pulls the resisting walls of the latter upward over the advancing amnion, presenting part of the child.

In spite of this seemingly efficacious mechanism, the duration of the first stage of labour is rather prolonged, especially in women who are in labour for the first time. In such women the average time required for the completion of the stage of dilatation is between 13 and 14 hours, while in women who have previously given birth to children the average is 8 to 9 hours. Not only does a previous labour tend to shorten this stage, but the tendency often increases with succeeding pregnancies, with the result that a woman who has given birth to three or four children may have a first stage of one hour or less in her next labour.

The first stage of labour is notably prolonged in women who become pregnant for the first time after age 35, because the cervix dilates less readily. A similar delay is to be anticipated in cases in which the cervix is extensively scarred as a result of previous labours, amputation, deep cauterization, or any other surgical procedure on the cervix. Even a woman who has borne several children and whose cervix, accordingly, should dilate readily may have a prolonged first stage if the uterine contractions are weak and infrequent or if the child lies in an inconvenient position for delivery and, as a direct consequence, cannot be forced into the mother's pelvis.

On the other hand, the early rupturing of the amnion often increases the strength and frequency of the labour pains and thereby shortens the stage of dilatation; occasionally, premature loss of the amniotic fluid leads to molding of the uterus about the child and thereby delays dilatation by preventing the child's normal descent into the pelvis. Just as an abnormal position of the child and molding of the uterus may prevent the normal descent of the child, an abnormally large child or an abnormally small pelvis may interfere with the descent of the child and prolong the first stage of labour.



Second stage: expulsion

About the time that the cervix becomes fully dilated, the amnion breaks, and the force of the involuntary uterine contractions may be augmented by voluntary bearing-down efforts of the mother. With each labour pain, she can take a deep breath and then contract her abdominal muscles. The increased intra-abdominal pressure thus produced may equal or exceed the force of the uterine contractions. These bearing-down efforts may double the effectiveness of the uterine contractions.

As the child descends into and passes through the birth canal, the sensation of pain is often increased. This condition is especially true in the terminal phase of the stage of expulsion, when the child's head distends and dilates the maternal tissues as it is being born.

Fetal presentation and passage through the birth canal

The manner in which the child passes through the birth canal in the second stage of labour depends upon the position in which it is lying and the shape of the mother's pelvis. The sequence of events described in the following paragraphs is that which frequently occurs when the mother's pelvis is of the usual type and the child is lying with the top of its head lowermost and transversely placed and the back of its head

(occiput) directed toward the left side of the mother (*see* onset of labour in the figure). The top of the head, accordingly, is leading, and its long axis lies transversely.
The force derived from the uterine contractions and the bearing-down efforts exerts pressure on the child's buttocks and is transmitted along the vertebral column to drive the head into and through the pelvis. Because of the attachment of the spine to the base of the skull, the back of the head advances more rapidly than the brow with the result that the head becomes flexed (i.e., the neck is bent) until the chin comes to lie against the breastbone (*see* flexion in the figure). As a consequence of this flexion mechanism, the top of the head becomes the leading pole and the ovoid head circumference that entered the birth canal is succeeded by a smaller, almost circular circumference, the long diameter of which is about 2 cm (0.75 inch) shorter than that of the earlier circumference.

As the head descends more deeply into the birth canal, it meets the resistance of the bony pelvis and of the slinglike pelvic floor, or diaphragm, which slopes downward, forward, and inward. When the back of the head, the leading part of the child, is forced against this sloping wall on the left side, it naturally is shunted forward and to the right as it advances (*see* internal rotation of head in the figure). This internal rotation of the head brings its longest diameter into relation with the longest diameter of the pelvic outlet and thus greatly assists in the adaptation of the advancing head to the configuration of the cavity through which it is to pass.

Further descent of the head directly downward in the direction in which it has been traveling is opposed by the lower portion of the mother's bony pelvis, behind, and the resisting soft parts that are interposed between it and the opening of the vagina (*see* internal rotation of head in the figure). Less resistance, on the other hand, is offered by the soft and dilatable walls of the lower birth canal, which is directed forward and upward. The back of the child's head accordingly advances along the lower birth canal, distending its walls and dilating its cavity while the head progresses. Soon the back of the child's neck becomes impinged against the bones of the pelvis, in front, and the chin is forced farther and farther away from the breastbone. Thus, as extension (bending of the head backward) takes the place of flexion, the occiput, brow, eye sockets, nose, mouth, and chin pass successively through the external opening of the lower birth canal and are born (*see* extension in the figure).

The neck, which was twisted during internal rotation of the head, untwists as soon as the head is born. Almost immediately after its birth, therefore, the top of the head is turned toward the left and backward.

As the child's lower shoulder advances, it meets the sloping resistance of the pelvic floor on the right side and is shunted forward and to the left toward the middle of the pelvis in front. This position brings the long diameter of the shoulder circumference into relation with the anteroposterior, or long diameter, of the pelvic cavity. Because of this internal rotation of the shoulders, the top of the head undergoes further external rotation backward and to the left so that the child's face comes to look directly at the inner aspect of the mother's right thigh (*see* external rotation of head in the figure).

Soon after the shoulders rotate, the one in front appears in the vulvovaginal orifice and remains in this position while the other shoulder is swept forward by a lateral bending of the trunk through the same upward and forward curve that was followed by the head as it was being born. After this shoulder is delivered, the shoulder in front and the rest of the child's body are expelled almost immediately and without any special mechanism.

An average of about one hour and 45 minutes is required for the completion of the second stage of labour in women who give birth for the first time. In subsequent labours the average duration of the stage of expulsion is somewhat shorter.

Other fetal presentations

Posterior presentation

The child may lie so that the back of its head is directed backward and toward either the right or left side. The leading pole is then in the right or left posterior quadrant of the mother's pelvis, and the presentation is referred to as occipitoanterior position. In such cases the back of the child's head usually rotates to the front of the pelvis and labour proceeds as in transverse positions. Because of the longer rotation required, labour may be somewhat more prolonged than in transverse positions.

Face presentation

When the child's head becomes bent back (extended) so that it enters and passes through the pelvis face first, the condition is known as a face, or cephalic, presentation. The chin is then the leading pole and follows the same course that is followed by the back of the head in occipital presentations. If the chin lies to the front as it enters the pelvis, labour often is easy and of short duration. Should it be directed backward, on the other hand, considerable difficulty may be encountered, and the head may have to be flexed or rotated artificially.

Breech presentation

Passage of the lower extremities or the buttocks through the pelvis first, called breech presentation, is encountered in 3 to 4 percent of deliveries. Because the head in such cases is the last part of the child to be delivered and because this part of the delivery is the most difficult, the umbilical cord may be compressed while the aftercoming head is being born, with the result that the child may be asphyxiated. Asphyxia or injuries to the child that result from the attendant's effort to hasten the delivery in order to prevent the child's asphyxiation are responsible for the loss of three times as many breech babies as head-on babies. For this reason the child may need to be manipulated into a head-on position by the attendant or be delivered by the surgical procedure called cesarean section.

The infant mortality rate in developed countries varies from 2 to 10 percent according to the size of the child and skill of the attendant. Because very small premature infants are particularly susceptible to the dangers of breech delivery, the mortality among them is very high when they are born breech first.

Transverse presentation

In this relatively rare situation the long axis of the child tends to lie across, or transverse to, the long axis of the mother. Unless the child is very small, delivery through the natural passages is impossible in such cases; therefore, delivery by cesarean section is necessary.

Because the above-mentioned complications are infrequent and can be cared for easily, the maternal death rate is less than 1 per 1,000 and would be still lower if the deaths caused by complicating systemic diseases were excluded. The infant mortality rate is also low, ranging between 1.5 and 3 percent. It would be much lower if premature and poorly developed infants were excluded. In other

words, the risk to a healthy mother who carries her child to maturity is less than 1 per 1,000, and the risk to her mature child is about 0.5 percent.

Third stage: placental stage

With the expulsion of the child, the cavity of the uterus is greatly diminished (*see* uterus immediately after birth in the figure). As a consequence, the site of placental attachment becomes markedly reduced in size, with the result that the placenta (afterbirth) is separated in many places from the membrane lining the uterus. Within a few minutes subsequent uterine contractions complete the separation and force the placenta into the vagina, from which it is expelled by a bearing-down effort. The third stage of labour, accordingly, is of short duration, seldom lasting longer than 15 minutes. Occasionally, however, the separation may be delayed and accompanied by bleeding, in which case surgical removal of the placenta is necessary.

Natural childbirth

In the 1930s Grantly Dick-Read, a British obstetrician, developed a technique of delivery called natural childbirth that minimized the surgical and anesthetic aspects of delivery and concentrated upon the mother's conscious effort to give birth to her child. Although opposed by many physicians who felt that it denied the progress of modern medicine and needlessly primitivized the process of birth, the method was gradually accepted and by the late 1950s was practiced by a sizable percentage of women, especially in the United States and England.

Natural childbirth—sometimes called psychoprophylaxis, prepared childbirth, or the Lamaze method—as formulated by Dick-Read and later advanced by Fernand Lamaze, Elisabeth Bing, Robert Bradley, and Charles Leboyer, stems from the premise that childbirth need not be accompanied by excessive pain. It is believed that labour pains are the result of unnatural physical tension caused by fear, which can be counteracted by understanding and by developing the ability to relax. The various methods prescribe for the expectant mother and a partner a lengthy course of instruction in the mechanics of labour and birth as well as exercises to strengthen the musculature and to encourage proper breathing. Emphasis is placed on involving other family members, especially the father, in the birth process. During her labour the mother is aided by trained personnel and her partner, or "coach," and anesthetic is made available to her when needed. No claims are made that natural childbirth is totally painless; rather it enables the mother's physical response to transcend discomfort.

Natural childbirth presents the advantage of allowing the woman to participate actively, rather than passively, in labour and to experience the actual moment of birth. The prenatal instruction course also provides women with information about the birthing process, which affords them a greater sense of control over this event.

Operative obstetrics

Most women deliver a baby spontaneously. However, complications that were present before labour or that develop during labour may threaten the life of the mother or of the baby and may require intervention by the attending physician.

Cesarean section

When a child cannot be delivered through the vagina, it may be necessary to resort to cesarean section, a procedure in which the fetus is delivered through a surgical opening made in the uterus after the uterus has been exposed through an opening made in the abdominal wall. The cesarean section evolved from being a surgical procedure used only in extreme cases and from which the mother rarely recovered to one of the most commonly performed procedures in the United States. Prior to the 20th century, women undergoing a cesarean section usually developed peritonitis and died. Not until the advent of aseptic technique, dependable anesthesia, and proper suturing methods that controlled hemorrhage was the cesarean delivery considered a reasonable alternative to vaginal delivery.

Cesarean delivery is considered appropriate in various situations in which the risks of vaginal delivery to the fetus or mother are deemed to be greater than the risks from abdominal delivery. Common indications for the procedure include failure of labour to progress, premature delivery for medical reasons, fetal distress, and improper positioning of the fetus for delivery. In addition, cesarean section is often used if the birth canal is too small for vaginal delivery. The procedure is used to avoid further hemorrhage when there is bleeding from placenta praevia (attachment of the placenta to the uterine wall in such a way that it covers the cervix) or from a prematurely separated placenta. If the mother is infected with recurrent genital herpes and lesions are apparent at the time of delivery, a cesarean delivery is usually recommended. It is also resorted to if a woman's blood pressure rises precipitously during labour, as can occur with preeclampsia (although, in general, vaginal delivery is preferable to cesarean delivery for women with preeclampsia). Unusual cases, such as an anomaly of the genitalia or a paralytic muscular disorder that prevents the mother from pushing during labour, will generally require this procedure.

Maternal complications are still associated with cesarean section. Blood loss, injury to the bowel or bladder, and infection are common risks. Healing of the incision also lengthens recovery. Although the procedure is often done for the benefit of the fetus at risk from asphyxia or trauma resulting from a vaginal birth, there are associated neonatal risks. Infants who have been delivered at various gestational ages sometimes develop respiratory illness. The cause is not completely understood, but the syndrome is most often seen in infants delivered abdominally in the absence of labour. Accidental lacerations of the fetus with the scalpel sometimes occur. Cesarean delivery also is linked with a higher incidence of placenta praevia in future pregnancies.