

Maternal- Neonatal Facts

WORLD
OF
WOMEN

2nd
edition

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Title: *Maternal-Neonatal Facts Made Incredibly Quick!, 2nd Edition*

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> Front of Book > Authors

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Common abbreviations

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ABG

arterial blood gas

AED

automated external defibrillator

AFP

alpha fetoprotein

AV

atrioventricular

BLS

basic life support

BP

blood pressure

CBC

complete blood count

CF

cystic fibrosis

CMV

cytomegalovirus

CPD

cephalopelvic disproportion

CPR

cardiopulmonary resuscitation

CSF

cerebrospinal fluid

CST

contraction stress test

CVS

chorionic villus sampling

FFP

fresh frozen plasma

FHR

fetal heart rate

FHT

fetal heart tone

FSH

follicle-stimulating hormone

GDM

gestational diabetes mellitus

GH

growth hormone

GYN

gynecology

HAV

hepatitis A virus

HBV

hepatitis B virus

hCG

human chorionic gonadotropin

HCV

hepatitis C virus

HIV

human immunodeficiency virus

HPV

human papillomavirus

I&O

intake and output

IUD

intrauterine device

IUFD

intrauterine fetal death

LGA

large for gestational age

LH

luteinizing hormone

LML

left mediolateral

LMP

last menstrual period

LNMP

last normal menstrual period

NKA

no known allergies

NKDA

no known drug allergies

NPO

nothing by mouth

NSR

normal sinus rhythm

NST

nonstress test

OCT

oxytocin challenge test

PAT

paroxysmal atrial tachycardia

PCA

patient-controlled analgesia

PDA

patent ductus arteriosus

PEA

pulseless electrical activity

PFT

pulmonary function test

PICC

peripherally inserted central catheter

PID

pelvic inflammatory disease

PKU

phenylketonuria

PMH

past medical history

PPD

purified protein derivative

PROM

premature rupture of membranes

PSVT

paroxysmal supraventricular tachycardia

PT

prothrombin time

PTT

partial thromboplastin time

PVC

premature ventricular contraction (complex)

RBC

red blood cell

RDA

recommended daily allowance

RML

right mediolateral

ROM

rupture of membranes

SGA

small for gestational age

SIDS

sudden infant death syndrome

STD

sexually transmitted disease

TPAL

Term, **P**remature birth, **A**bstentions, **L**iving children

US

ultrasound

UTI

urinary tract infection

VAP

vascular access port

VBAC

vaginal birth after cesarean

VF

ventricular fibrillation

VT

ventricular tachycardia

WBC

white blood cell

WPW

Wolff-Parkinson-White

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Prenatal

Taking an obstetric history

When taking the pregnant patient's obstetric history, make sure to ask her about:

- genital tract anomalies
- medications used during this pregnancy
- history of hepatitis, PID, acquired immunodeficiency syndrome, blood transfusions, and herpes or other STDs
- partner's history of STDs
- previous abortions
- history of infertility.

Pregnancy particulars

Also ask the patient about past pregnancies. Make sure to note the number of past full-term and preterm pregnancies and obtain the following information about each of the patient's past pregnancies, if applicable:

- Was the pregnancy planned?
- Did any complications—such as spotting, swelling of the hands and feet, surgery, or falls—occur?
- Did the patient receive prenatal care? If so, when did it start?
- Did she take any medications? If so, what were they? How long did she take them? Why?
- What was the duration of the pregnancy?
- How was the pregnancy overall for the patient?

Birth and baby specifics

Also obtain the following information about the birth and postpartum condition in all previous pregnancies:

- What was the duration of labor?
- What type of birth was it?
- What type of anesthesia did the patient have, if any?
- Did the patient experience complications during pregnancy or labor?
- What were the birthplace, condition, gender, weight, and Rh factor of the neonate?
- Was the labor as she had expected it? Better? Worse?
- Did she have stitches after birth?
- What was the condition of the neonate after birth?
- What was the neonate's Apgar score?
- Was special care needed for the neonate? If so, what?
- Did the neonate experience problems during the first several days after birth?
- What's the child's present state of health?

- Was the neonate discharged from the health care facility with the mother?
- Did the patient experience postpartum problems?

Summarizing pregnancy information

Typically, an abbreviation system is used to summarize a woman's pregnancy information. Although many variations exist, a common abbreviation system consists of five digits—GTPAL.

Gravida = the number of pregnancies, including the present one.

Term = the total number of infants born at term or 37 or more weeks.

Preterm = the total number of infants born before 37 weeks.

Abortions = the total number of spontaneous or induced abortions.

Living = the total number of children currently living.

For example, if a woman pregnant once with twins delivers at 35 weeks' gestation and the neonates survive, the abbreviation that represents this information is "10202." During her next pregnancy, the abbreviation would be "20202."

An abbreviated but less informative version reflects only the *Gravida* and *Para* (the number of pregnancies that reached the age of viability—generally accepted to be 24 weeks, regardless of whether or not the babies were born alive).

In some cases, the number of abortions also may be included. For example, "G3, P2, Ab1" represents a woman who has been pregnant three times, who has had two deliveries after 24 weeks' gestation, and who has had one abortion. "G2, P1" represents a woman who has been pregnant two times and has delivered once after 24 weeks' gestation.

Formidable findings

When performing the health history and assessment, look for the following findings to determine if a pregnant patient is at risk for complications.

Demographic factors

- Maternal age younger than 16 years or older than 35 years
- Fewer than 11 years of education

Lifestyle

- Smoking (> 10 cigarettes/day)
- Substance abuse
- Long commute to work
- Refusal to use seatbelts
- Alcohol consumption
- Heavy lifting or long periods of standing
- Lack of smoke detectors in home
- Unusual stress

Obstetric history

- Infertility
- Grand multiparity
- Incompetent cervix
- Uterine or cervical anomaly

- Previous preterm labor or birth
- Previous cesarean birth
- Previous infant with macrosomia
- Two or more spontaneous or elective abortions
- Previous hydatidiform mole or choriocarcinoma
- Previous ectopic pregnancy
- Previous stillborn neonate or neonatal death
- Previous multiple gestation
- Previous prolonged labor
- Previous low-birth-weight infant
- Previous midforceps delivery
- Diethylstilbestrol exposure in utero
- Previous infant with neurologic deficit, birth injury, or congenital anomaly
- < 1 year since last pregnancy

Medical history

- Cardiac disease
- Metabolic disease
- Renal disease
- Recent UTI or bacteriuria
- GI disorders
- Seizure disorders
- Family history of severe inherited disorders
- Surgery during pregnancy
- Emotional disorders or mental retardation
- Previous surgeries, particularly involving reproductive organs
- Pulmonary disease
- Endocrine disorders
- Hemoglobinopathies
- STD
- Chronic hypertension
- History of abnormal Pap smear
- Malignancy
- Reproductive tract anomalies

Current obstetric status

- Inadequate prenatal care
- Intrauterine growth-restricted fetus
- Large-for-gestational-age fetus

- Gestational hypertension
- Abnormal fetal surveillance tests
- Polyhydramnios
- Placenta previa
- Abnormal presentation
- Maternal anemia
- Weight gain of < 10 lb (4.5 kg)
- Weight loss of > 5 lb (2.3 kg)
- Overweight/underweight status
- Fetal or placental malformation
- Rh sensitization
- Preterm labor
- Multiple gestation
- PROM
- Abruptio placentae
- Postdate pregnancy
- Fibroid tumors
- Fetal manipulation
- Cervical cerclage
- Maternal infection
- Poor immunization status
- STD

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Psychosocial factors

- Inadequate finances
- Social problems
- Adolescent
- Poor nutrition, poor housing
- More than two children at home with no additional support
- Lack of acceptance of pregnancy
- Attempt at or ideation of suicide
- No involvement of baby's father
- Minority status
- Parental occupation
- Inadequate support systems
- Dysfunctional grieving
- Psychiatric history

Making sense out of pregnancy signs

This chart organizes signs of pregnancy into three categories: presumptive, probable, and positive.

Sign	Time from implantation (in weeks)	Other possible causes
<i>Presumptive</i>		
Breast changes, including feelings of tenderness, fullness, or tingling and enlargement or darkening of areola	2	<ul style="list-style-type: none"> ● Hyperprolactinemia induced by tranquilizers ● Infection ● Oral hormonal contraceptives ● Prolactin-secreting pituitary tumor ● Pseudocyesis ● Premenstrual syndrome
Nausea or vomiting upon arising	2	<ul style="list-style-type: none"> ● Gastric disorders ● Infections ● Psychological disorders, such as pseudocyesis and anorexia nervosa
Amenorrhea	2	<ul style="list-style-type: none"> ● Anovulation ● Blocked endometrial cavity ● Endocrine changes ● Medications (phenothiazines, Depo-Provera) ● Metabolic changes
Frequent urination	3	<ul style="list-style-type: none"> ● Emotional stress ● Pelvic tumor ● Renal disease ● UTI
Fatigue	12	<ul style="list-style-type: none"> ● Anemia ● Chronic illness ● Depression or stress
Uterine enlargement in which the uterus can be palpated over the symphysis pubis	12	<ul style="list-style-type: none"> ● Ascites ● Obesity ● Uterine or pelvic tumor
Quickening (fetal movement felt by the woman)	18	<ul style="list-style-type: none"> ● Excessive flatus ● Increased peristalsis
Linea nigra (line of dark pigment on the abdomen)	24	<ul style="list-style-type: none"> ● Cardiopulmonary disorders ● Estrogen-progestin hormonal contraceptives ● Obesity ● Pelvic tumor
Melasma (dark pigment on the face)	24	<ul style="list-style-type: none"> ● Cardiopulmonary disorders ● Estrogen-progestin hormonal contraceptives ● Obesity ● Pelvic tumor
Striae gravidarum (red streaks on the abdomen)	24	<ul style="list-style-type: none"> ● Cardiopulmonary disorders ● Estrogen-progestin hormonal contraceptives ● Obesity ● Pelvic tumor
<i>Probable</i>		
Laboratory tests revealing the presence of hCG hormone in blood or urine	1	<ul style="list-style-type: none"> ● Choriocarcinoma (urine hCG) ● Hydatidiform mole (blood hCG)
Chadwick's sign (vagina changes color from pink to violet)	6	<ul style="list-style-type: none"> ● Hyperemia of cervix, vagina, or vulva

Goodell's sign (cervix softens)	6	<ul style="list-style-type: none"> ● Estrogen-progestin hormonal contraceptives
Hegar's sign (lower uterine segment softens)	6	<ul style="list-style-type: none"> ● Excessively soft uterine walls
Sonographic evidence of gestational sac in which characteristic ring is evident	6	<ul style="list-style-type: none"> ● None
Ballottement (fetus can be felt to rise against abdominal wall when lower uterine segment is tapped during bimanual examination)	16	<ul style="list-style-type: none"> ● Ascites ● Uterine tumor or polyps
Braxton Hicks contractions (periodic uterine tightening)	20	<ul style="list-style-type: none"> ● Gastric upset ● Hematometra ● Uterine tumor
Palpation of fetal outline through abdomen	20	<ul style="list-style-type: none"> ● Subserous uterine myoma
Positive		
Sonographic evidence of fetal outline	8	<ul style="list-style-type: none"> ● None
Fetal heart audible by Doppler ultrasound	10 to 12	<ul style="list-style-type: none"> ● None
Palpation of fetal movement through abdomen	20	<ul style="list-style-type: none"> ● None

Physiologic adaptations to pregnancy

Cardiovascular system

- Cardiac hypertrophy
- Displacement of the heart
- Increased blood volume and heart rate
- Supine hypotension
- Increased fibrinogen and hemoglobin levels
- Decreased hematocrit

Gastrointestinal system

- Gum swelling
- Lateral and posterior displacement of the intestines
- Superior and lateral displacement of the stomach
- Delayed intestinal motility and gastric and gallbladder emptying time
- Constipation
- Displacement of the appendix from McBurney's point
- Increased tendency of gallstone formation

Endocrine system

- Increased basal metabolic rate (up 25% at term)
- Increased iodine metabolism
- Slight parathyroidism

- Increased plasma parathyroid hormone level
- Slightly enlarged pituitary gland
- Increased production of prolactin
- Increased cortisol level
- Decreased maternal blood glucose level
- Decreased insulin production in early pregnancy
- Increased production of estrogen, progesterone, and human chorionic somatomammotropin

Respiratory system

- Increased vascularization of the respiratory tract
- Shortening of the lungs
- Upward displacement of the diaphragm
- Increased tidal volume, causing slight hyperventilation
- Increased chest circumference (by about 23/8" [6 cm])
- Altered breathing, with abdominal breathing replacing thoracic breathing as pregnancy progresses
- Slight increase (two breaths/minute) in respiratory rate
- Increased pH, leading to mild respiratory alkalosis

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Metabolic system

- Increased water retention
- Decreased serum protein level
- Increased intracapillary pressure and permeability
- Increased serum lipid, lipoprotein, and cholesterol levels
- Increased iron requirements and carbohydrate needs
- Increased protein retention
- Weight gain of 25 to 30 lb (11.3 to 13.6 kg)

Integumentary system

- Hyperactive sweat and sebaceous glands
- Hyperpigmentation
- Darkening of nipples, areolae, cervix, vagina, and vulva
- Pigmentary changes in nose, cheeks, and forehead (facial chloasma)
- Striae gravidarum and linea nigra
- Breast changes (such as leaking of colostrum)
- Palmar erythema and increased angiomas
- Faster hair and nail growth with thinning and softening

Genitourinary system

- Dilated ureters and renal pelvis
- Increased glomerular filtration rate and renal plasma flow early in pregnancy

- Increased clearance of urea and creatinine
- Decreased blood urea and nonprotein nitrogen levels
- Glycosuria
- Decreased bladder tone
- Increased sodium retention from hormonal influences
- Increased uterine dimension
- Hypertrophied uterine muscle cells (5 to 10 times normal size)
- Increased vascularity, edema, hypertrophy, and hyperplasia of the cervical glands
- Increased vaginal secretions with a pH of 3.5 to 6
- Discontinued ovulation and maturation of new follicles
- Thickening of vaginal mucosa, loosening of vaginal connective tissue, and hypertrophy of small-muscle cells
- Changes in sexual desire

Musculoskeletal system

- Increase in lumbosacral curve accompanied by a compensatory curvature in the cervicodorsal region
- Stoop-shouldered stance due to enlarged breasts pulling the shoulders forward
- Separation of the rectus abdominis muscles in the third tri-mester, allowing protrusion of abdominal contents at the midline

Nägele's rule

Nägele's rule is considered the standard method for determining the estimated date of delivery. The procedure is as follows:

- Ask the patient to state the first day of her last menses.
- Subtract 3 months from that first day of her last menses.
- Add 7 days.

Example:

First day of last menstrual period = October 5

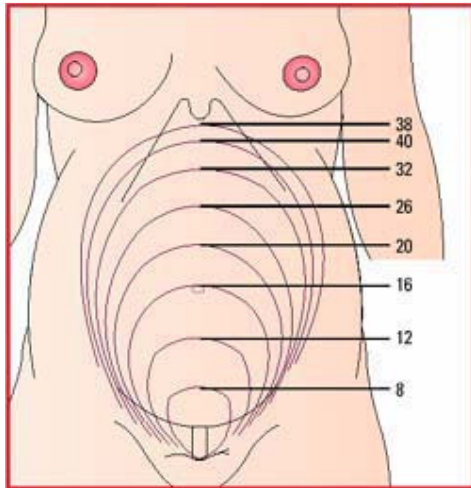
Subtract 3 months = July 5

Add 7 days = July 12

Estimated date of delivery = July 12

Fundal height throughout pregnancy

This illustration shows approximate fundal heights at various times during pregnancy. The times indicated are in weeks. Note that between weeks 38 and 40, the fetus begins to descend into the pelvis.



Performing Leopold's maneuvers

You can determine fetal position, presentation, and attitude by performing Leopold's maneuvers. Ask the patient to empty her bladder; then assist her to a supine position and expose her abdomen. Perform these four maneuvers in order.

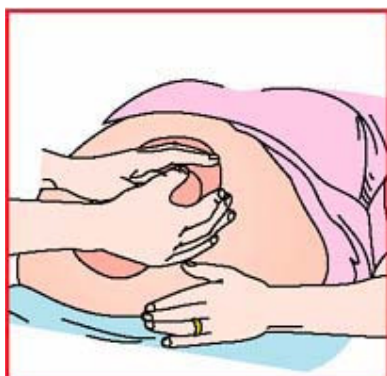
First maneuver

Face the patient and warm your hands. Place your hands on the patient's abdomen to determine fetal position in the uterine fundus. Curl your fingers around the fundus. When the fetus is in the vertex position (head first), the buttocks should feel irregularly shaped and firm. When the fetus is in the breech position, the head should feel hard, round, and movable.



Second maneuver

Move your hands down the side of the abdomen, applying gentle pressure. If the fetus is in the vertex position, you'll feel a smooth, hard surface on one side—the fetal back. Opposite, you'll feel lumps and knobs—the knees, hands, feet, and elbows. If the fetus is in the breech position, you may not feel the back at all.



Third maneuver

Spread apart your thumb and fingers of one hand. Place them just above the patient's symphysis pubis. Bring your fingers together. If the fetus is in the vertex position and hasn't descended, you'll feel the head. If the fetus is in the vertex position and has descended, you'll feel a less distinct mass. If the fetus is in the breech position, you'll also feel a less distinct mass, which could be the feet or knees.



Fourth maneuver

The fourth maneuver can determine flexion or extension of the fetal head and neck. Place your hands on both sides of the lower abdomen. Apply gentle pressure with your fingers as you slide your hands downward, toward the symphysis pubis. If the head is the presenting fetal part (rather than the feet or a shoulder), one of your hands is stopped by the cephalic prominence. The other hand descends unobstructed more deeply. If the fetus is in the vertex position, you'll feel the cephalic prominence on the same side as the small parts; if it's in the face position, you'll feel the cephalic prominence on the same side as the back. If the fetus is engaged, you won't be able to feel the cephalic prominence.



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Dealing with pregnancy discomforts

This table lists common discomforts associated with pregnancy and suggestions for the patient on how to prevent and manage them.

Discomfort	Patient teaching
Urinary frequency	<ul style="list-style-type: none">● Void as necessary.● Avoid caffeine.● Perform Kegel exercises.
Fatigue	<ul style="list-style-type: none">● Try to get a full night's sleep.● Schedule a daily rest time.● Maintain good nutrition.
Breast tenderness	<ul style="list-style-type: none">● Wear a supportive bra, especially during sleep if breast tenderness interferes with sleep.
Vaginal discharge	<ul style="list-style-type: none">● Wear cotton underwear.

	<ul style="list-style-type: none"> ● Avoid tight-fitting pantyhose. ● Bathe daily.
Backache	<ul style="list-style-type: none"> ● Avoid standing for long periods. ● Apply local heat, such as a heating pad (set on low) or a hot water bottle. Make sure to place a towel between the heat source and the skin to prevent burning. ● Stoop to lift objects—don't bend.
Round ligament pain	<ul style="list-style-type: none"> ● Slowly rise from a sitting position. ● Bend forward to relieve pain. ● Avoid twisting motions.
Constipation	<ul style="list-style-type: none"> ● Increase fiber intake in the diet. ● Set a regular time for bowel movements. ● Drink more fluids, including water and fruit juices (unless contraindicated). Avoid caffeinated drinks.
Hemorrhoids	<ul style="list-style-type: none"> ● Rest on the left side with the hips and lower extremities elevated to provide better oxygenation to the placenta and fetus. ● Avoid constipation. ● Apply witch hazel pads to the hemorrhoids. ● Get adequate exercise. ● Take sitz baths with warm water as often as needed to relieve discomfort. ● Apply ice packs for reduction of swelling, if preferred over heat.
Varicosities	<ul style="list-style-type: none"> ● Walk regularly. ● Rest with the feet elevated daily. ● Avoid standing or sitting for long periods. ● Avoid crossing the legs. ● Avoid wearing constrictive knee-high stockings; wear support stockings instead. ● Stay within recommended weight gain range during pregnancy.
Ankle edema	<ul style="list-style-type: none"> ● Avoid standing for long periods. ● Rest with the feet elevated. ● Avoid wearing garments that constrict the lower extremities.
Headache	<ul style="list-style-type: none"> ● Avoid eyestrain. ● Rest with a cold cloth on the forehead.
Leg cramps	<ul style="list-style-type: none"> ● Straighten the leg and dorsiflex the ankle. ● Avoid pointing the toes. ● Rest frequently with feet elevated.

Assessing pregnancy by weeks

Here are some assessment findings you can expect as pregnancy progresses in your patient.

Weeks 1 to 4

- Amenorrhea occurs.
- Breasts begin to change.
- Immunologic pregnancy tests become positive: Radioimmunoassay test results are positive a few days after implantation; urine hCG test results are positive 10 to 14 days after amenorrhea occurs.
- Nausea and vomiting begin between the fourth and sixth weeks.

Weeks 5 to 8

- Goodell's sign occurs (softening of the cervix and vagina).
- Ladin's sign occurs (softening of the uterine isthmus).
- Hegar's sign occurs (softening of the lower uterine segment).
- Chadwick's sign appears (purple-blue coloration of the vagina, cervix, and vulva).

- McDonald's sign appears (easy flexion of the fundus toward the cervix).
- Braun von Fernwald's sign occurs (irregular softening and enlargement of the uterine fundus at the site of implantation).
- Piskacek's sign may occur (asymmetrical softening and enlargement of the uterus).
- The cervical mucus plug forms.
- The uterus changes from pear-shaped to globular.
- Urinary frequency and urgency occur.

Weeks 9 to 12

- Fetal heartbeat detected using ultrasonic stethoscope.
- Nausea, vomiting, and urinary frequency and urgency lessen.
- By the 12th week, the uterus is palpable just above the symphy-sis pubis.

Weeks 13 to 17

- Mother gains 10 to 12 lb (4.5 to 5.5 kg) during the second tri-mester.
- Uterine souffle is heard on auscultation.
- Mother's heartbeat increases by about 10 beats/minute between 14 and 30 weeks' gestation. Rate is maintained until 40 weeks' gestation.
- By the 16th week, the mother's thyroid gland enlarges by about 25%, and the uterine fundus is palpable halfway between the symphysis pubis and the umbilicus.
- Maternal recognition of fetal movements, or *quickenings*, occurs between 16 and 20 weeks' gestation.

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Weeks 18 to 22

- The uterine fundus is palpable just below the umbilicus.
- Fetal heartbeats are heard with the fetoscope at 20 weeks' gestation.
- Fetal rebound or ballottement is possible.

Weeks 23 to 27

- The umbilicus appears to be level with abdominal skin.
- Striae gravidarum are usually apparent.
- Uterine fundus is palpable at the umbilicus.
- The shape of the uterus changes from globular to ovoid.
- Braxton Hicks contractions start.

Weeks 28 to 31

- Mother gains 8 to 10 lb (3.5 to 4.5 kg) in third trimester.
- The uterine wall feels soft and yielding.
- The uterine fundus is halfway between the umbilicus and xiphoid process.
- The fetal outline is palpable.
- The fetus is mobile and may be found in any position.

Weeks 32 to 35

- The mother may experience heartburn.
- Striae gravidarum become more evident.
- The uterine fundus is palpable just below the xiphoid process.
- Braxton Hicks contractions increase in frequency and intensity.
- The mother may experience shortness of breath.

Weeks 36 to 40

- The umbilicus protrudes.
- Varicosities, if present, become very pronounced.
- Ankle edema is evident.
- Urinary frequency recurs.
- Engagement, or *lightening*, occurs.
- The mucus plug is expelled.
- Cervical effacement and dilation begin.

Fetal developmental milestones

By the end of the 4th week of gestation, the fetus begins to show noticeable signs of growth in all areas assessed. The fetus typically achieves specific developmental milestones by the end of certain gestational weeks.

By 4 weeks

- Head becomes prominent, accounting for about one-third of the entire embryo.
- Head is bent to such a degree that it appears as if it's touching the tail; embryo is C-shaped.
- Heart appears in a rudimentary form as a bulge on the anterior surface.
- Eyes, ears, and nose appear in a rudimentary form.
- Nervous system begins to form.
- Extremities appear as buds.

By 8 weeks

- Organ formation is complete.
- Head accounts for about one-half of the total mass.
- Heart is beating and has a septum and valves.
- Arms and legs are developed.
- Abdomen is large, with evidence of fetal intestines.
- Facial features are readily visible; eye folds are developed.
- Gestational sac is visible on ultrasound.

By 12 weeks

- Nail beds are beginning to form on extremities; arms appear in normal proportions.
- Heartbeat can be heard using a Doppler ultrasound stethoscope.
- Kidney function is beginning; fetal urine may be present in amniotic fluid.

- Tooth buds are present.
- Placenta formation is complete with presence of fetal circulation.
- Gender is distinguishable with external genitalia's outward appearance.

By 16 weeks

- Fetal heart sounds are audible with stethoscope.
- Lanugo is present and well formed.
- Fetus demonstrates active swallowing of amniotic fluid.
- Fetal urine is present in amniotic fluid.
- The skeleton begins ossification.
- Intestines assume normal position in the abdomen.

By 20 weeks

- Mother can feel spontaneous movements by the fetus.
- Hair begins to form, including eyebrows and scalp hair.
- Fetus demonstrates definite sleep and wake patterns.
- Brown fat begins to form.

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- Sebum is produced by the sebaceous glands.
- Meconium is evident in the upper portion of the intestines.
- Lower extremities are fully formed.
- Vernix caseosa covers the skin.

By 24 weeks

- Well-defined eyelashes and eyebrows are visible.
- Eyelids are open and pupils can react to light.
- Meconium may be present down to the rectum.
- Hearing is developing, with the fetus being able to respond to a sudden sound.
- Lungs are producing surfactant.
- Passive antibody transfer from the mother begins (possibly as early as 20 weeks' gestation).

By 28 weeks

- Surfactant appears in amniotic fluid.
- Alveoli in the lungs begin to mature.
- In the male, the testes start to move from the lower abdomen into the scrotal sac.
- Eyelids can open and close.
- Skin appears red.

By 32 weeks

- Fetus begins to appear more rounded as more subcutaneous fat is deposited.
- Moro reflex is active.

- Fetus may assume a vertex or breech position in preparation for birth.
- Iron stores are beginning to develop.
- Fingernails increase in length, reaching the tips of the fingers.
- Vernix caseosa thickens.

By 36 weeks

- Subcutaneous fat continues to be deposited.
- Soles of the feet have one or two creases.
- Lanugo begins to decrease in amount.
- Fetus is storing additional glycogen, iron, carbohydrate, and calcium.
- Skin on the face and body begins to smooth.

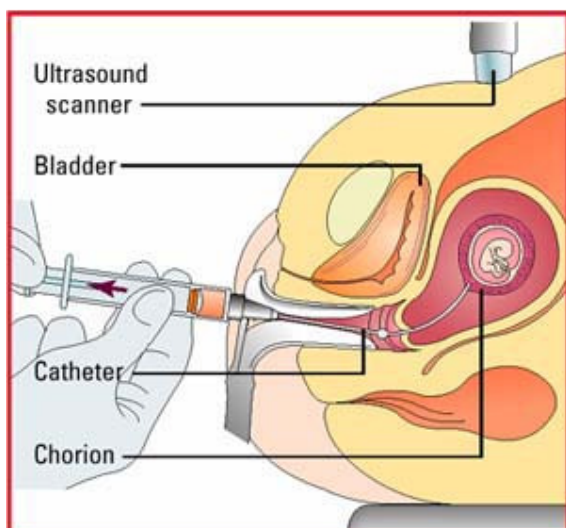
By 40 weeks

- Fetus begins to kick actively and forcefully, causing maternal discomfort.
- Vernix caseosa is fully formed.
- Soles of the feet demonstrate creases covering at least two-thirds of the surface.
- Conversion of fetal hemoglobin to adult hemoglobin begins.
- In the male, testes descend fully into the scrotal sac.

Understanding CVS

Procedure

To collect a sample for CVS, place the patient in the lithotomy position. The practitioner checks the placement of the uterus bimanually, inserts a Graves' speculum, and swabs the cervix with an antiseptic solution. If necessary, he may use a tenaculum to straighten an acutely flexed uterus, permitting cannula insertion.



Guided by ultrasound and possibly endoscopy, he directs the catheter through the cannula to the villi. He applies suction to the catheter to remove about 30 mg of tissue from the villi. He then withdraws the sample, places it in a Petri dish, and examines it with a microscope. Part of the specimen is then cultured for further testing.

Glucose challenge values in pregnancy

To the right are normal values for pregnant patients taking the oral glucose challenge test to determine risk of diabetes. These values are determined after a 100-g glucose load.

Normal blood glucose levels should remain between 90 and 120 mg/dl. If a pregnant woman's plasma glucose exceeds these levels, she should be treated as a potential diabetic.

Test type	Pregnancy glucose level (mg/dl)
Fasting	95
1 hour	180
2 hour	155
3 hour	140

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Amniotic fluid analysis findings

Test component	Normal findings	Fetal implications of abnormal findings
Color	Clear, with white flecks of vernix caseosa in a mature fetus	Blood of maternal origin is usually harmless. "Port wine" fluid may signal abruptio placentae. Fetal blood may signal damage to fetal, placental, or umbilical cord vessels.
Bilirubin	Absent at term	High levels indicate hemolytic disease of the neonate.
Meconium	Absent (except in breech presentation)	Presence indicates fetal hypotension or distress.
Creatinine	More than 2 mg/dl (SI, 177 µmol/L) in a mature fetus	Decrease may indicate fetus less than 37 weeks.
Lecithin- sphingomyelin ratio	More than 2	Less than 2 indicates pulmonary immaturity.
Phosphatidyl glycerol	Present	Absence indicates pulmonary immaturity.
Glucose	Less than 45 mg/dl (SI, 2.3 mmol/L)	Excessive increases at term or near term indicate hypertrophied fetal pancreas.
Alpha fetoprotein	Variable, depending on gestational age and laboratory technique	Inappropriate increases indicate neural tube defects, impending fetal death, congenital nephrosis, or contamination of fetal blood.
Bacteria	Absent	Presence indicates chorioamnionitis.
Chromosome	Normal karyotype	Abnormal indicates fetal chromosome disorders.
Acetylcholinesterase	Absent	Presence may indicate neural tube defects, exomphalos, or other malformations.

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Interpreting NST and OCT results

This chart lists the possible interpretations of results from an NST and an OCT, commonly called a *stress test*. Appropriate actions are also included.

	Interpretation	Action
NST result		
Reactive	Two or more FHR accelerations of 15 beats/minute lasting 15 seconds or more within 20 minutes; related to fetal movement	Repeat NST biweekly or weekly, depending on rationale for testing.
Nonreactive	Tracing without FHR accelerations or with accelerations of fewer than 15 beats/minute lasting less than 15 seconds throughout fetal movement	Repeat in 24 hours or perform a biophysical profile immediately.
Unsatisfactory	Quality of FHR recording inadequate for interpretation	Repeat in 24 hours or perform a biophysical profile immediately.

OCT result

Negative	No late decelerations; three contractions every 10 minutes; fetus would probably survive labor if it occurred within 1 week	No further action needed at this time.
Positive	Persistent and consistent late decelerations with more than half of contractions	Induce labor; fetus is at risk for perinatal morbidity and mortality.
Suspicious	Late decelerations with less than half of contractions after an adequate contraction pattern has been established	Repeat test in 24 hours.
Hyperstimulation	Late decelerations with excessive uterine activity (occurring more often than every 2 minutes or lasting longer than 90 seconds)	Repeat test in 24 hours.
Unsatisfactory	Poor monitor tracing or uterine contraction pattern	Repeat test in 24 hours.

Laboratory values for pregnant and nonpregnant patients

	Pregnant	Nonpregnant
Hemoglobin	11.5 to 14 g/dl	12 to 16 g/dl
Hematocrit	32% to 42%	36% to 48%
WBCs	5,000 to 15,000 cells/mm ³	4,000 to 10,000 cells/mm ³
Neutrophils	60% ±10%	54% to 75%
Lymphocytes	34% ±10%	30%
Platelets	150,000 to 350,000/mm ³	140,000 to 400,000/mm ³
Serum calcium	7.8 to 9.3 mg/dl	8.4 to 10.2 mg/dl
Serum sodium	Increased retention	136 to 146 mmol/L
Serum chloride	Slight elevation	98 to 106 mmol/L
Serum iron	65 to 120 mcg/dl	50 to 170 mcg/dl
Fibrinogen	450 mg/dl	200 to 400 mg/dl
RBCs	1,500 to 1,900/mm ³	1,600/mm ³
Fasting blood glucose	Decreased	70 to 105 mg/dl
2-hour postprandial blood glucose	< 140 mg/dl (after a 100-g carbohydrate meal)	< 140 mg/dl
Blood urea nitrogen	Decreased	10 to 20 mg/dl
Serum creatinine	Decreased	0.5 to 1.1 mg/dl
Renal plasma flow	Increased by 25%	490 to 700 ml/minute
Glomerular filtration rate	Increased by 50%	88 to 128 ml/minute
Serum uric acid	Decreased	2.3 to 6 mg/dl
Erythrocyte sedimentation rate	Elevated during second and third trimesters	0 to 20 mm/hour
PT	Decreased slightly	10 to 14 seconds

Biophysical profile

A biophysical profile combines data from two sources: real time B-mode ultrasound imaging, which measures amniotic fluid volume (AFV) and fetal movement, and FHR monitoring.

Normal score is 8 to 10; a score of 4 to 6 indicates the fetus is in jeopardy; 0 to 4 signals severe fetal compromise, for which delivery is indicated.

Biophysical variable	Normal (score = 2)	Abnormal (score = 0)
NST	Reactive	Nonreactive
Fetal breathing movements	One or more episodes in 30 minutes, each lasting \geq 30 seconds	Episodes absent or no episode \geq 30 seconds in 30 minutes
Fetal body movements	Three discrete and definite movements of the arms, legs, or body	Less than three discrete movements of arms, legs, or body
Fetal muscle tone	One or more episodes of extension with return to flexion	Slow extension with return to flexion or fetal movement absent
AFV	Largest pocket of fluid is $>$ 1 cm in vertical diameter without containing loops of cord	Largest pocket is $<$ 1 cm in vertical diameter without loops of cord

Childbearing practices of selected cultures

A patient's cultural beliefs can affect her attitudes toward illness and traditional medicine. By trying to accommodate these beliefs and practices in your care plan, you can increase the patient's willingness to learn and comply with treatment regimens. Because cultural beliefs may vary within particular groups, individual practices may differ from those described here.

Asian-Americans

- View pregnancy as a natural process
- Believe mother has "happiness in her body"
- Omit milk from diet because it causes stomach distress
- Believe inactivity and sleeping late can result in a difficult birth
- Believe childbirth causes a sudden loss of "yang forces," resulting in an imbalance in the body
- Believe hot foods, hot water, and warm air restore the yang forces
- Are attended to during labor by other women (usually patient's mother)—not the father of the baby
- Have stoic response to labor pain
- May prefer herbal medicine
- Restrict activity for 40 to 60 days postpartum
- Believe that colostrum is harmful (old, stale, dirty, poisonous, or contaminated) to baby so may delay breast-feeding until milk comes in

Native-Americans

- View pregnancy as a normal, natural process
- May start prenatal care late
- Prefer a female birth attendant or a midwife

- May be assisted in birth by mother, father, or husband
- View birth as a family affair and may want entire family present
- May use herbs to promote uterine contractions, stop bleeding, or increase flow of breast milk
- Use cradle boards to carry baby and don't handle baby much
- May delay breast-feeding because colostrum is considered harmful and dirty
- May plan on taking the placenta home for burial

Hispanic-Americans

- View pregnancy as a normal, healthy state
- May delay prenatal care
- Prefer a *paterna* or midwife
- Bring together the mother's legs after childbirth to prevent air from entering uterus

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- Are strongly influenced by the mother-in-law and mother during labor and birth and may listen to them rather than the husband
- View crying or shouting out during labor as acceptable
- May wear a religious necklace that's placed around the neo-nate's neck after birth
- Believe in hot and cold theory of disease and health
- Restrict diet to boiled milk and toasted tortillas for first 2 days after birth
- Must remain on bed rest for 3 days after birth
- Delay bathing for 14 days after childbirth
- Delay breast-feeding because colostrum is considered dirty and spoiled
- Don't circumcise male infants
- May place a bellyband on the neonate to prevent umbilical hernia

Arab-Americans

- May not seek prenatal care
- Seek medical assistance when medical resources at home fail
- Fast during pregnancy to produce a son
- May labor in silence to be in control
- Limit male involvement during childbirth

African-Americans

- View pregnancy as a state of well-being
- May delay prenatal care
- Believe that taking pictures during pregnancy may cause stillbirth
- Believe that reaching up during pregnancy may cause the umbilical cord to strangle the baby
- May use self-treatment for discomfort
- May cry out during labor or may be stoic
- May receive emotional support during birth from mother or another woman
- May view vaginal bleeding during postpartum period as sickness

- May prohibit tub baths and shampooing hair in the postpartum period
- May view breast-feeding as embarrassing and therefore bottle-feed
- Consider an infant who eats well to be “good”
- May introduce solid food early
- May oil the baby's skin
- May place a bellyband on the neonate to prevent umbilical hernia

RDAs for pregnant women

Energy and calorie requirements increase during pregnancy. This increase is necessary to create new tissue and meet increased maternal metabolic needs. Nutrient requirements during pregnancy can be met by a diet that provides all of the essential nutrients, fiber, and energy in adequate amounts.

Calories	2,500 kcal
Protein	60 g
<i>Fat-soluble vitamins</i>	
Vitamin A	800 mcg
Vitamin D	10 mcg
Vitamin E	10 mcg
<i>Water-soluble vitamins</i>	
Ascorbic acid (vitamin C)	75 mg
Niacin	17 mg
Riboflavin	1.6 mg
Thiamine	1.5 mg
Folic acid	400 mcg
Vitamin B ₆	2.2 mcg
Vitamin B ₁	2.2 mcg
<i>Minerals</i>	
Calcium	1,200 mg
Phosphorus	1,200 mg
Iodine	175 mcg
Iron	30 mg
Zinc	15 mg

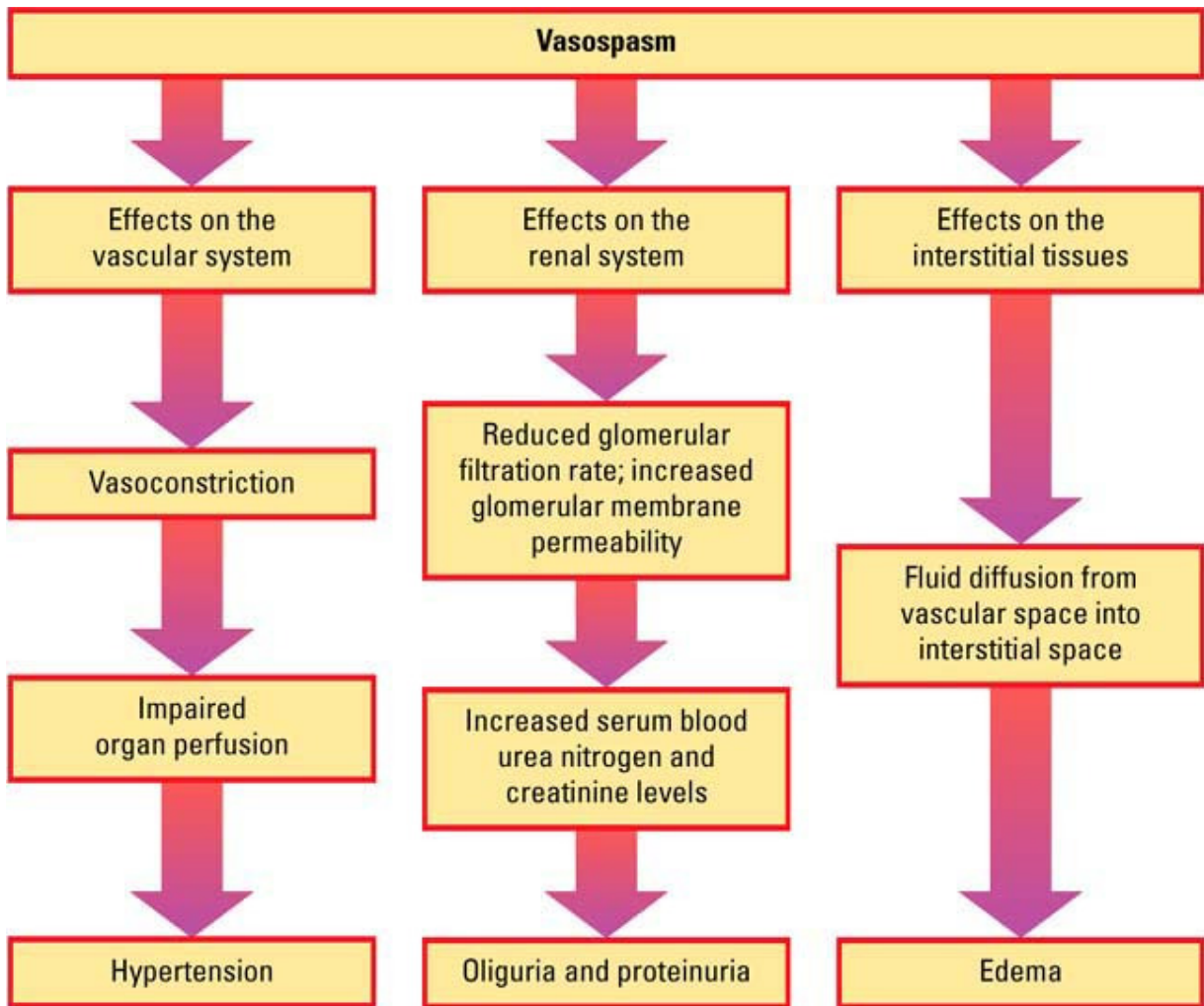
Heart disease and pregnancy

A patient with heart disease may experience a difficult pregnancy; success depends on the type and extent of the disease. A patient with Class I or II heart disease usually completes a successful pregnancy and delivery without major complications. A patient with Class III heart disease must maintain complete bed rest to complete the pregnancy. A patient

with Class IV heart disease is a poor candidate for pregnancy and should be strongly urged to avoid becoming pregnant.

Class	Description
I	The patient has unrestricted physical activity. Ordinary physical activity causes no discomfort, cardiac insufficiency, or angina.
II	The patient has a slight limitation on physical activity. Ordinary activity causes excessive fatigue, palpitations, dyspnea, or angina.
III	The patient has a moderate to marked limitation on physical activity. Less than ordinary activity causes excessive fatigue, palpitations, dyspnea, or angina.
IV	The patient can't engage in any physical activity without discomfort. Cardiac insufficiency or angina occurs even at rest.

Changes associated with gestational hypertension



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Intrapartum

Types of spontaneous abortion

Spontaneous abortions occur without medical intervention and in various ways.

Complete abortion

The uterus passes all products of conception. Minimal bleeding usually accompanies complete abortion because the uterus contracts and compresses the maternal blood vessels that feed the placenta.

Habitual abortion

Spontaneous loss of three or more consecutive pregnancies constitutes habitual abortion.

Incomplete abortion

The uterus retains part or all of the placenta. Before 10 weeks' gestation, the fetus and placenta are usually expelled together; after the 10th week, they're expelled separately. Because part of the placenta may adhere to the uterine wall, bleeding continues. Hemorrhage is possible because the uterus doesn't contract and seal the large vessels that feed the placenta.

Inevitable abortion

Membranes rupture and the cervix dilates. As labor continues, the uterus expels the products of conception.

Missed abortion

The uterus retains the products of conception for 2 months or more after the fetus has died. Uterine growth ceases; uterine size may even seem to decrease. Prolonged retention of the dead products of conception may cause coagulation defects such as disseminated intravascular coagulation.

Septic abortion

Infection accompanies abortion. This may occur with spontaneous abortion but usually results from a lapse in sterile technique during therapeutic abortion.

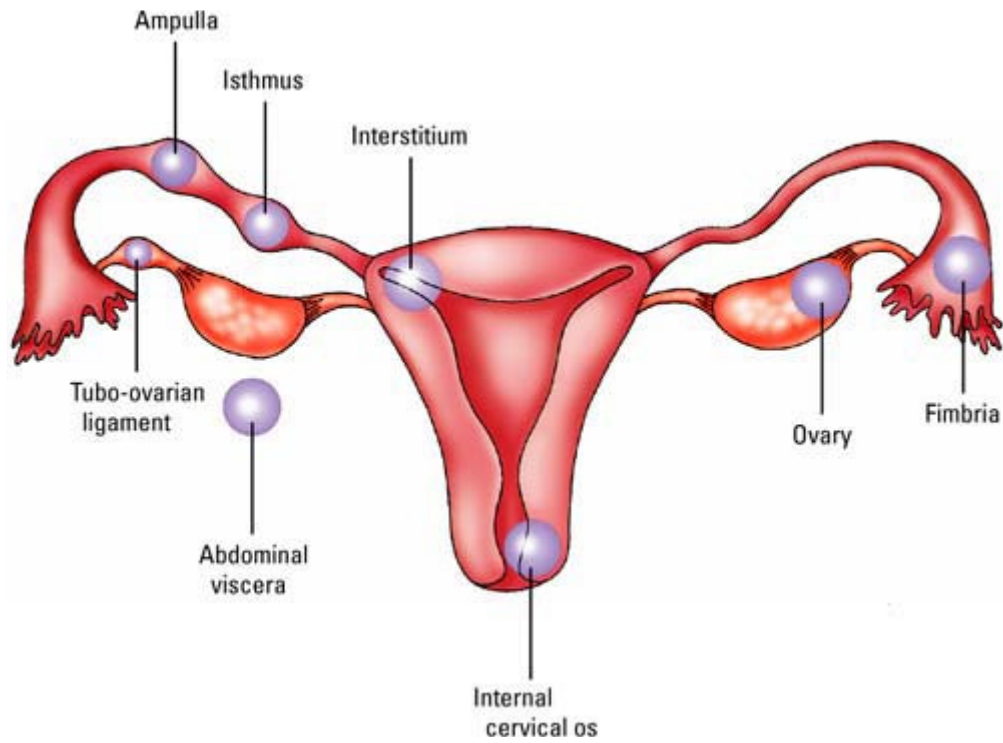
Threatened abortion

Bloody vaginal discharge occurs during the first half of pregnancy. About 20% of pregnant women have vaginal spotting or actual bleeding early in pregnancy. Of these, about 50% abort.

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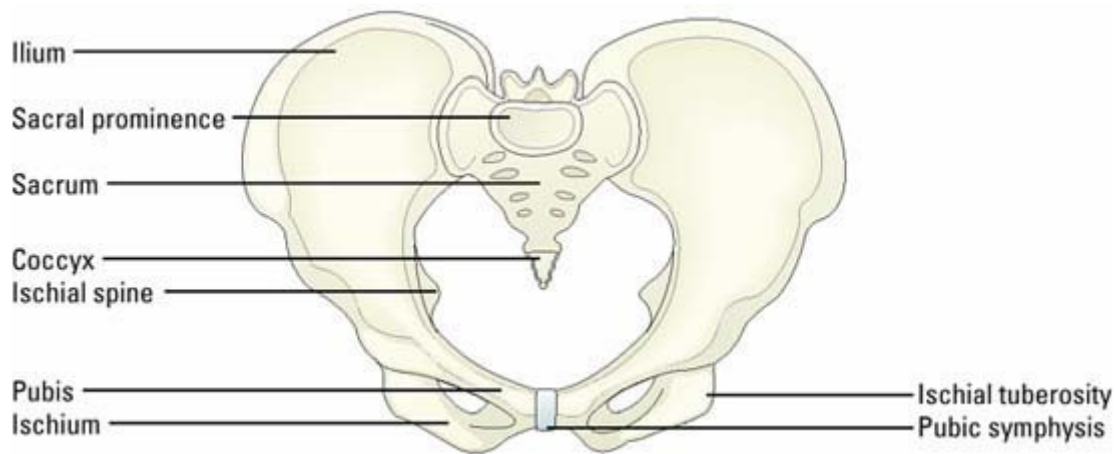
Sites of ectopic pregnancy

In most women with ectopic pregnancy, the ovum implants in the fallopian tube, either in the fimbria, ampulla, or isthmus. Other possible sites of implantation include the interstitium, tubo-ovarian ligament, ovary, abdominal viscera, and internal cervical os.



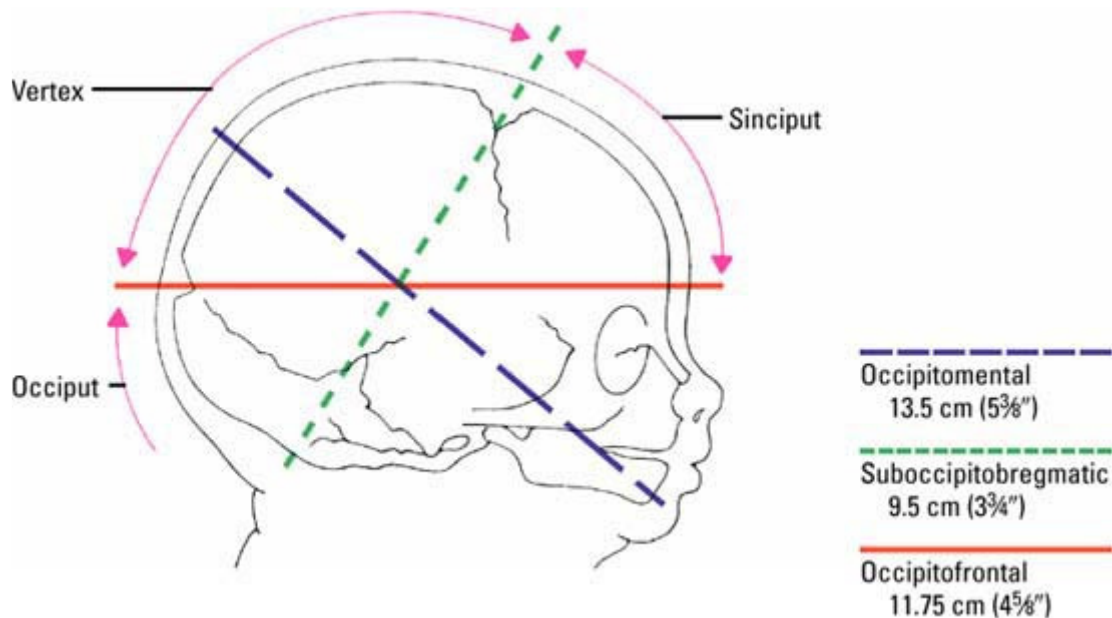
The female pelvis

The female pelvis protects and supports the reproductive and other pelvic organs.



Head diameters at term

This illustration depicts three commonly used measurements of fetal head diameters. The measurements are averages for term neonates. Individual measurements vary with fetal size, attitude, and presentation.



Distinguishing between true and false labor

True labor	False labor
<ul style="list-style-type: none"> ● Regular contractions ● Back discomfort that spreads to the abdomen ● Progressive cervical dilation and effacement ● Gradually shortened intervals between contractions ● Increased intensity of contractions with ambulation ● Contractions that increase in duration and intensity 	<ul style="list-style-type: none"> ● Irregular contractions ● Discomfort that's localized in the abdomen ● No cervical change ● No change or irregular change ● Contractions may be relieved with ambulation ● Usually no change in contractions

Stages of labor

Stage 1

- It begins at onset of true labor.
- It lasts until complete dilation, which is about 6 to 18 hours in the primipara and 2 to 20 in the multipara.
- It's divided into the latent, active, and transitional phases.

Latent phase

- Cervical dilation measures 0 to 3 cm.
- Contractions are irregular, short, and last 20 to 40 seconds.
- Phase lasts about 6 hours for a primipara and 4½ hours for a multipara.

Active phase

- Cervical dilation measures 4 to 7 cm.
- Contractions are 5 to 8 minutes apart and last 45 to 60 seconds.
- Phase lasts about 3 hours for a primipara and 2 hours for a multipara.

Transitional phase

- Cervical dilation measures 8 to 10 cm.

- Contractions are 1 to 2 minutes apart and last 60 to 90 seconds.
 - At the end of this phase, the patient feels the urge to push.
-

Stage 2

- It extends from complete dilation to delivery of the neonate.
- It lasts from 1 to 3 hours for the primipara and 30 to 60 minutes for the multipara.
- It occurs in seven cardinal movements.
- It's divided into the latent, active, and transitional phases.

Latent phase

- It begins at onset of contractions and ends when rapid cervical dilation begins.
- Phase lasts about 10 to 30 minutes.

Active phase

- Cervical dilation rapidly moves from 4 to 7 cm.
- Phase duration varies.

Transitional phase

- Maximum dilation is 8 to 10 cm.
- Average duration is 5 to 15 minutes.

Stage 3

- It extends from the delivery of the neonate to delivery of the placenta.
- It lasts from 5 to 30 minutes.
- It's divided into the placental separation and the placental expulsion phases.

Stage 4

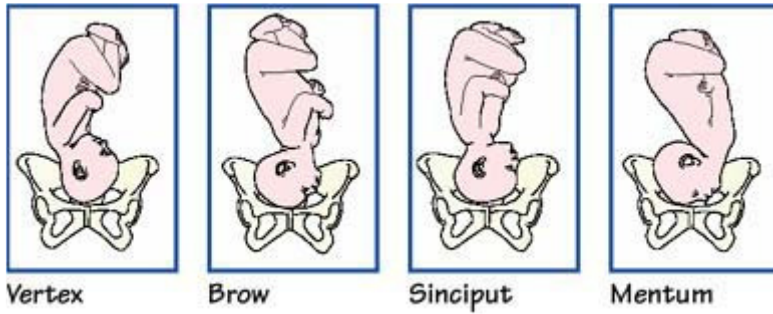
- It covers the time immediately after delivery of the placenta.
 - Typically, it's the first hour after delivery.
 - It's referred to as the *recovery period*.
-

Classifying fetal presentation

Fetal presentation may be broadly classified as cephalic, breech, shoulder, or compound. Cephalic presentations occur in almost all deliveries. Of the remaining three, breech deliveries are most common.

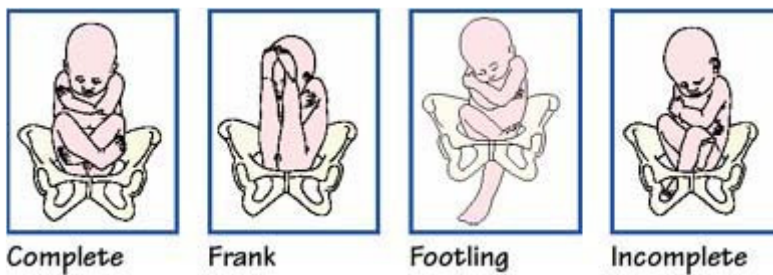
Cephalic

In the cephalic, or head-down, presentation, the fetus' position may be classified by the presenting skull landmark: vertex, brow, sinciput, or mentum (chin).



Breech

In the breech, or head-up, presentation, the fetus' position may be classified as *complete*, where the knees and hips are flexed; *frank*, where the hips are flexed and knees remain straight; *footling*, where neither the thighs nor lower legs are flexed; and *incomplete*, where one or both hips remain extended and one or both feet or knees lie below the breech.



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Shoulder

Although a fetus may adopt one of several shoulder presentations, examination can't differentiate among them; thus, all transverse lies are considered shoulder presentations.



Compound

In compound presentation, an extremity prolapses alongside the major presenting part so that two presenting parts appear in the pelvis at the same time.



Fetal position abbreviations

These abbreviations, organized according to variations in presentation, are used when documenting fetal position.

Vertex presentation (occiput)

LOA, left occiput anterior

LOP, left occiput posterior
LOT, left occiput transverse
ROA, right occiput anterior
ROP, right occiput posterior
ROT, right occiput transverse

Breech presentation (sacrum)

LSaA, left sacrum anterior
LSaP, left sacrum posterior
LSaT, left sacrum transverse
RSaA, right sacrum anterior
RSaP, right sacrum posterior
RSaT, right sacrum transverse

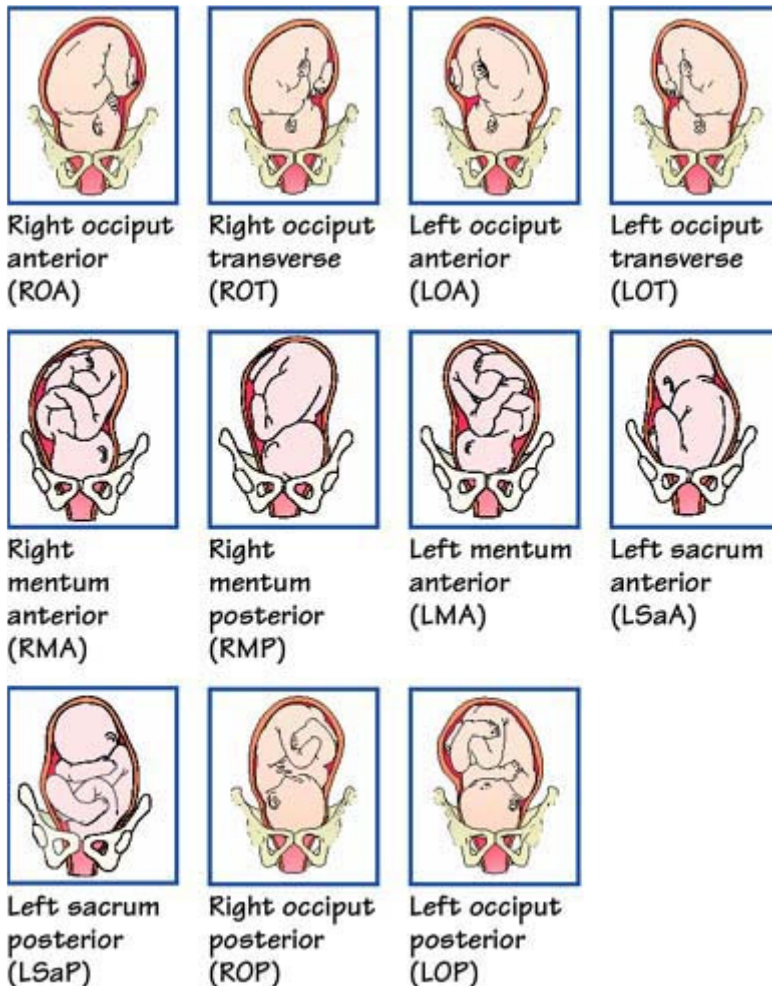
Face presentation (mentum)

LMA, left mentum anterior
LMP, left mentum posterior
LMT, left mentum transverse
RMA, right mentum anterior
RMP, right mentum posterior
RMT, right mentum transverse

Shoulder presentation (acromion process)

LAA, left scapuloanterior
LAP, left scapuloposterior
RAA, right scapuloanterior
RAP, right scapuloposterior

Fetal positions



Fetal attitude

Fetal attitude refers to the relationship of fetal body parts to one another. It denotes whether presenting parts are in flexion or extension.

Complete flexion

- Most common
- Neck is completely flexed, with the head tucked down to the chest and the chin touching the sternum
- Arms are folded over the chest, with the elbows flexed
- Lower legs are crossed and the thighs are drawn up onto the abdomen, with the calf of each leg pressed against the thigh of the opposite leg

Moderate flexion

- Second most common
- Commonly known as the *military position* because the head's straightness makes the fetus appear to be "at attention"
- Involves sinciput (forehead) presentation through the birth canal
- Neck is slightly flexed
- Head is held straight but the chin doesn't touch the chest
- Many fetuses assume this attitude early in labor but convert to a complete flexion (vertex presentation) as

labor progresses

- Birth usually isn't difficult because the second smallest anteroposterior diameter of the skull is presented through the pelvis during delivery

Partial extension

- Uncommon
- Involves brow presentation through the birth canal
- Neck is extended
- Head is moved backward slightly so that the brow is the first part of the fetus to pass through the pelvis during delivery
- Can cause a difficult delivery because the anteroposterior diameter of the skull may be equal to or larger than the opening in the pelvis

Complete extension

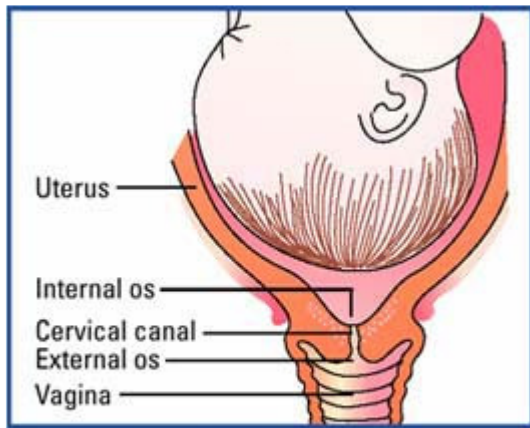
- Rare; considered abnormal
- Can result from various factors:
 - oligohydramnios (less-than-normal amniotic fluid)
 - neurologic abnormalities
 - multiparity or a large abdomen with decreased uterine tone
 - nuchal cord with multiple coils around the neck
 - fetal malformation (found in as many as 60% of cases)
- Involves a face presentation through the birth canal
- Head and neck of the fetus are hyperextended, with the occiput touching the upper back
- Back is usually arched, increasing the degree of hyperextension
- Usually requires cesarean birth

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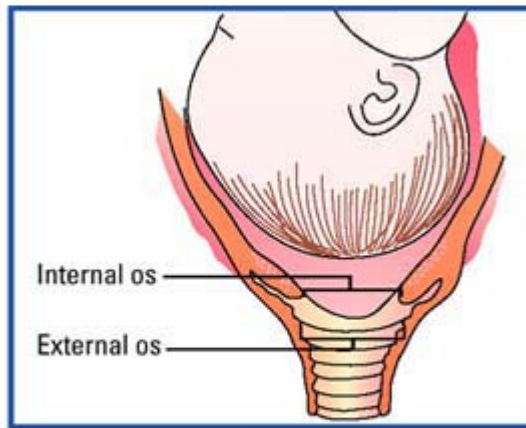
Cervical effacement and dilation

As labor advances, so do cervical effacement and dilation, which promote delivery. During effacement, the cervix shortens and its walls become thin, progressing from 0% effacement (palpable and thick) to 100% effacement (fully indistinct, or effaced, and paper thin). Full effacement obliterates the constrictive uterine neck to create a smooth, unobstructed passageway for the fetus.

At the same time, dilation occurs. This progressive widening of the cervical canal—from the upper internal cervical os to the lower external cervical os—advances from 0 to 10 cm. As the cervical canal opens, resistance decreases; this further eases fetal descent.



**Beginning effacement;
no dilation**



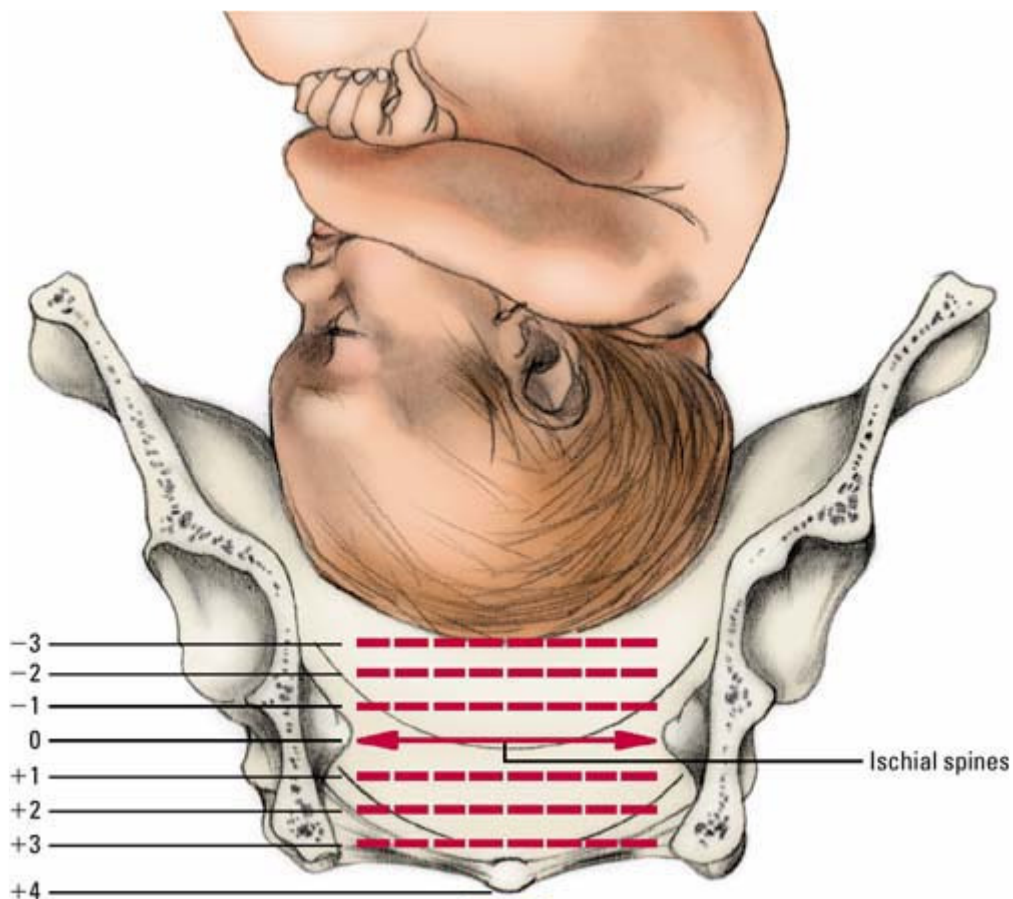
**Full effacement and
dilation**

Assessing fetal engagement and station

During a cervical examination, you'll assess the extent of the fetal presenting part into the pelvis. This is referred to as *fetal engagement*.

After you have determined fetal engagement, palpate the presenting part and grade the fetal station (where the presenting part lies in relation to the ischial spines of the maternal pelvis). If the presenting part isn't fully engaged into the pelvis, you can't assess station.

Station grades range from -3 (3 cm above the maternal ischial spines) to +4 (4 cm below the maternal ischial spines, causing the perineum to bulge). A 0 grade indicates that the presenting part lies level with the ischial spines.



Systemic changes in the active phase of labor

System	Change
Cardiovascular	<ul style="list-style-type: none">● Increased blood pressure● Increased cardiac output● Supine hypotension
Respiratory	<ul style="list-style-type: none">● Increased oxygen consumption● Increased rate● Possible hyperventilation leading to respiratory alkalosis, hypoxia, and hypercapnia (if breathing isn't controlled)
Renal	<ul style="list-style-type: none">● Difficulty voiding● Proteinuria (1+ normal)
Musculoskeletal	<ul style="list-style-type: none">● Diaphoresis● Fatigue● Backache● Joint pain● Leg cramps
Neurologic	<ul style="list-style-type: none">● Increased pain threshold and sedation caused by endogenous endorphins● Anesthetized perineal tissues caused by constant intense pressure on nerve endings
GI	<ul style="list-style-type: none">● Dehydration● Decreased GI motility● Slow absorption of solid food● Nausea● Diarrhea
Endocrine	<ul style="list-style-type: none">● Decreased progesterone level● Increased estrogen level● Increased prostaglandin level● Increased oxytocin level● Increased meta-bolism● Decreased blood glucose level

Performing external fetal monitoring

When performing external fetal monitoring, follow these steps:

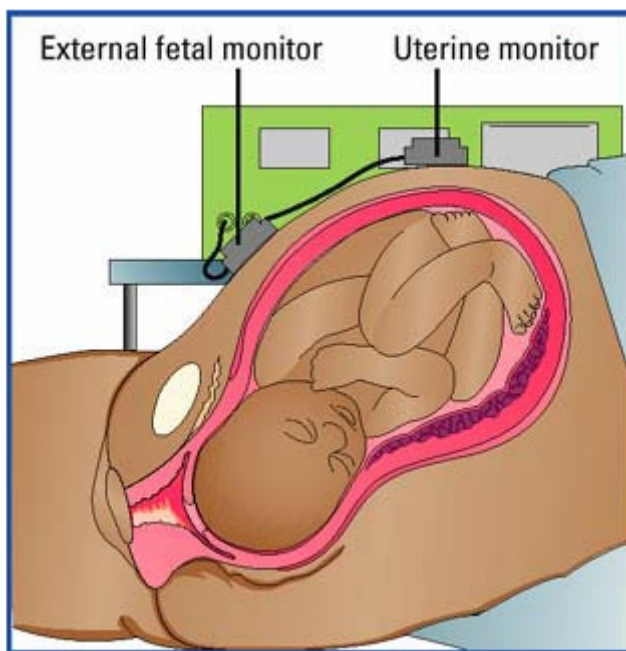
- Explain the procedure to the patient, and make sure she has signed a consent form, if required by the facility.
- Label the monitor strip with the patient's identification number or birth date and name, the date, maternal vital signs and position, the paper speed, and the number of the strip paper.
- Assist the patient to the semi-Fowler or left-lateral position with her abdomen exposed and palpate the abdomen to locate the *fundus*—the area of greatest muscle density in the uterus.
- Then, using transducer straps, secure the tocotransducer over the fundus. Adjust the pen set tracer controls so that the baseline values read between 5 and 15 mm Hg on the monitor strip or as indicated by the model.
- Apply conduction gel to the ultrasound transducer crystals, and use Leopold's maneuvers to palpate the fetal back, through which FHTs resound most audibly.
- Palpate the maternal radial pulse to differentiate between FHR and maternal heart rate.
- Start the monitor, and apply the ultrasound transducer directly over the site having the strongest heart tones.
- Activate the control that begins the printout.
- Observe the tracings to identify the frequency and duration of uterine contractions, but palpate the uterus to

determine intensity of contractions.

- Note the baseline FHR and assess periodic accelerations or decelerations from the baseline. Compare the FHR patterns with those of the uterine contractions.
- Move the tocotransducer and the ultrasound transducer to accommodate changes in maternal or fetal position. Readjust both transducers every hour, and assess the patient's skin for reddened areas caused by the strap pressure.

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- Clean the ultrasound transducer periodically with a damp cloth to remove dried conduction gel and apply fresh gel as necessary. After using the ultrasound transducer, place the cover over it.
- If the patient reports discomfort in the position that provides the clearest signal, try to obtain a satisfactory 5- or 10-minute tracing with the patient in this position before assisting her to a more comfortable position.



Performing internal fetal monitoring

To perform internal fetal monitoring, follow these steps:

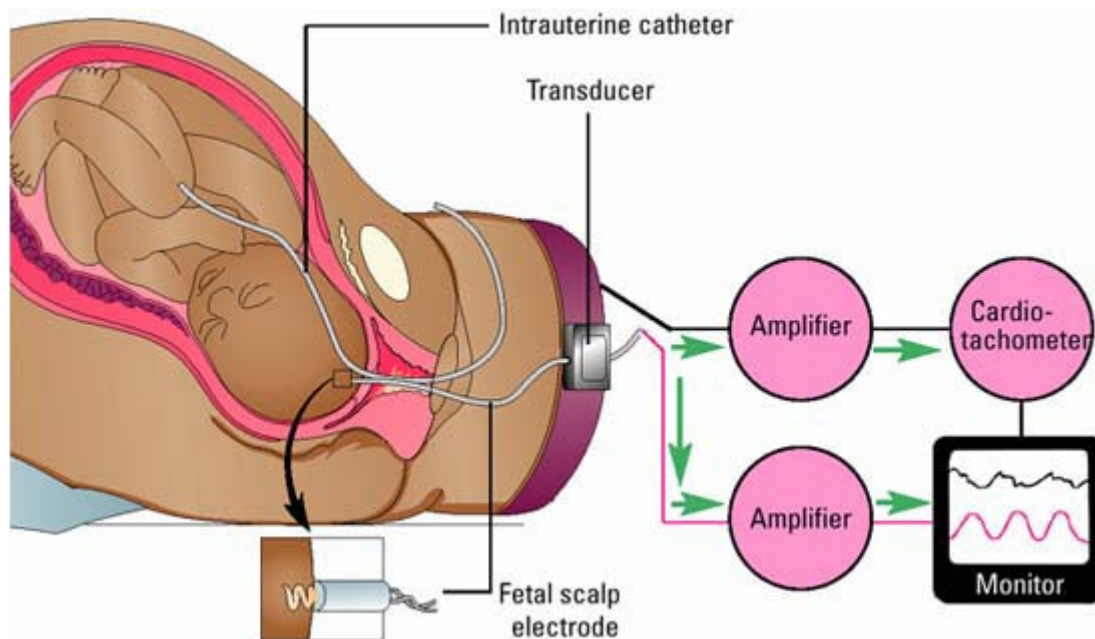
- Explain the procedure to the patient.
- Label the printout paper with the patient's identification number or name and birth date, the date, the paper speed, and the number on the monitor strip.
- Help the patient into the lithotomy position for a cervical examination.
- Attach the connection cable to the outlet on the monitor marked UA (uterine activity); connect the cable to the intrauterine catheter, and then zero the catheter with a gauge on the distal end of the catheter.
- Cover the patient's perineum with a sterile drape and clean the perineum according to facility policy.
- Assist the practitioner in performing a cervical examination to insert the catheter into the uterine cavity until it's advanced to the black line; ensure that the catheter is taped to the inner thigh with hypoallergenic tape.
- Observe the monitoring strip to verify proper placement and a clear tracing.
- Periodically evaluate the strip to determine amount of pressure exerted with each contraction. Note all such data on the strip and the patient's medical record.
- To monitor the FHR, apply conduction gel to the leg plate and secure to the patient's inner thigh with Velcro straps or 2" tape; connect the leg plate cable to the ECG outlet on the monitor.
- Assist with continued examination to identify fetal presenting part and level of descent. The health care

provider will place the spiral electrode in a drive tube and advance it through the

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vagina to the presenting part; expect mild pressure to be applied and the drive tube turned clockwise 360 degrees to secure it.

- Connect the color-coded electrode wires to the corresponding color-coded leg plate posts after the electrode is in place and the drive tube has been removed.
- Turn on the recorder and note the time on the printout paper.
- Help the patient to a comfortable position and evaluate the strip to verify proper placement and a clear FHR tracing.



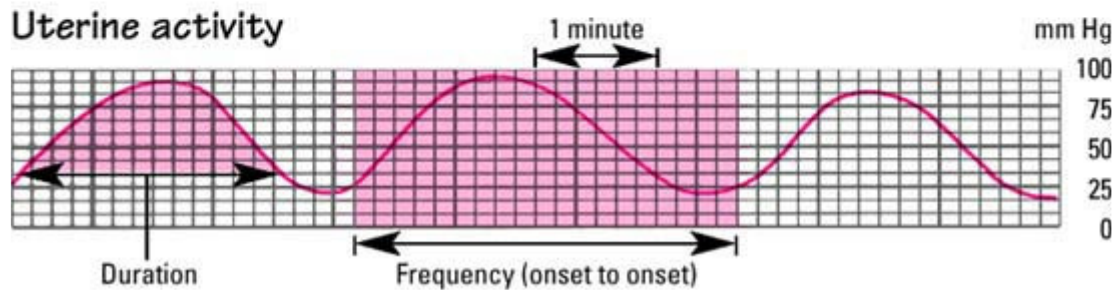
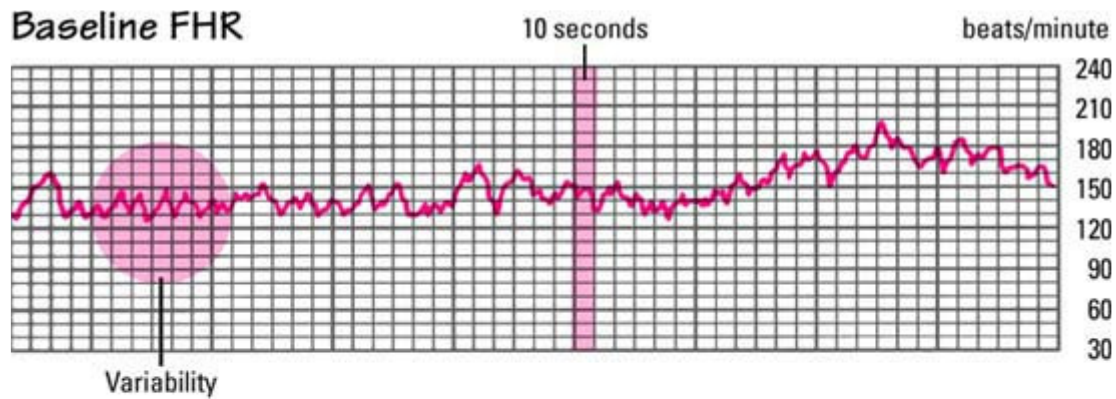
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Reading a fetal monitor strip

Presented in two parallel recordings, the fetal monitor strip records the FHR in beats per minute in the top recording and uterine activity (UA) in millimeters of mercury (mm Hg) in the bottom recording. You can obtain information on fetal status and labor progress by reading the strips horizontally and vertically.

Reading horizontally on the FHR or the UA strip, each small block represents 10 seconds. Six consecutive small blocks, separated by a dark vertical line, represent 1 minute. Reading vertically on the FHR strip, each block represents an amplitude of 10 beats/minute. Reading vertically on the UA strip, each block represents 5 mm Hg of pressure.

Assess the baseline FHR (the "resting" heart rate) between uterine contractions when fetal movement diminishes. This baseline FHR (typically 110 to 160 beats/minute) pattern serves as a reference for subsequent FHR tracings produced during contractions.



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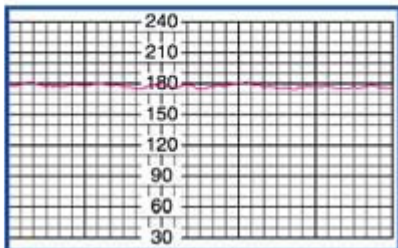
Identifying baseline FHR irregularities

When monitoring FHR, you need to be familiar with irregularities that may occur and their possible causes. Here's a guide to these irregularities.

Irregularity

Tachycardia

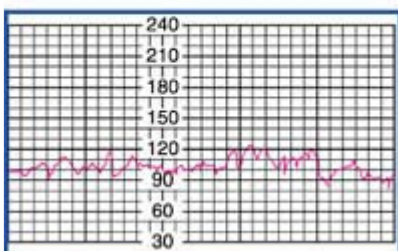
Baseline FHR > 160 beats/minute



Possible causes: Early fetal hypoxia; maternal fever; parasympathetic agents, such as atropine and scopolamine; beta-adrenergics such as terbutaline; amnionitis; maternal hyperthyroidism; fetal anemia; fetal heart failure; fetal arrhythmias

Bradycardia

Baseline FHR < 110 beats/minute

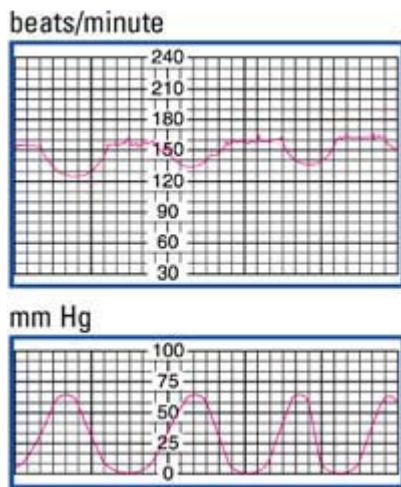


Possible causes: Late fetal hypoxia; beta-adrenergic blockers, such as propranolol and anes-thetics; maternal hypotension; prolonged umbilical cord compression; fetal congenital heart block

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Early decelerations

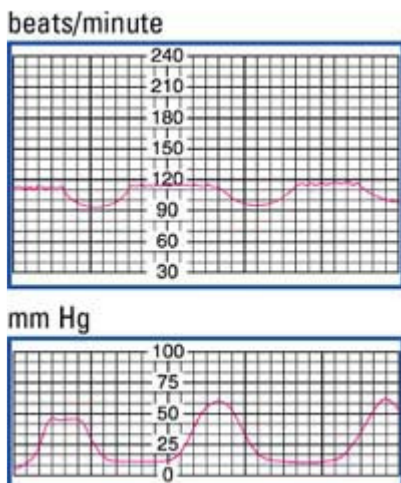
Gradual decrease and return to baseline FHR associated with a contraction and the nadir of the early occurrence appears exactly with the contraction's peak



Possible causes: Fetal head compression

Late decelerations

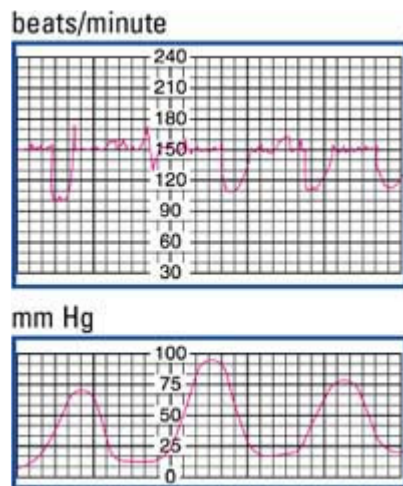
Gradual decrease and return to baseline FHR associated with a uterine contraction



Possible causes: Placental hypoperfusion during contractions or a structural placental defect such as abruptio placentae, uterine hyperactivity caused by excessive oxytocin infusion, maternal hypotension, maternal supine hypotension

Variable decelerations

Abrupt decrease in FHR below baseline; decrease is ≥ 15 beats/ minute, lasting ≥ 15 seconds, and < 2 minutes from onset to return to baseline



Possible causes: Umbilical cord compression causing decreased fetal oxygen perfusion

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FHR baseline variability

Short-term and long-term FHR variability is now termed as one, using one of these four categories.

Absent

- Undetectable (previously referred to as *decreased* or *minimal*)

Minimal

- Less than undetectable to ≤ 5 beats/minute (previously referred to as *decreased* or *minimal*)

Moderate

- 6 to 25 beats/minute (previously referred to as *average* or *within normal limits*)

Marked

- > 25 beats/minute (previously referred to as *marked* or *saltatory*)

Categorizing FHR patterns

FHR patterns may be categorized as periodic or episodic, depending on their occurrence with uterine contractions.

Periodic

- FHR patterns that are associated with uterine contractions

Episodic

- FHR patterns that are *not* associated with uterine contractions

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Facts about oxytocin

- Synthetic oxytocin (Pitocin) is used to:
 - induce or augment labor
 - evaluate for fetal distress after 31 weeks' gestation

- control bleeding and enhance uterine contractions after the placenta is delivered.
- It may be used in patients with:
 - gestational hypertension
 - prolonged gestation
 - maternal diabetes
 - Rh sensitization
 - premature or prolonged rupture of membranes
 - incomplete or inevitable abortion.
- Always administered by I.V. with an infusion pump.

Oxytocin administration

- Start a primary I.V. line.
- Insert the tubing of the administration set through the infusion pump.
- Set the drip rate at a starting infusion rate of 0.5 to 1.0 milliunit/minute. The maximum dosage of oxytocin is 20 to 40 milliunits/minute.
- Typically, the recommended labor-starting dosage is 10 units of oxytocin in 100 ml isotonic solution.
- The oxytocin solution is then piggybacked to the primary I.V. line.
- If a problem occurs, such as decelerations of FHR or fetal distress, stop the piggyback infusion immediately and resume the primary line.
- Monitor uterine contractions immediately.
- Increase the oxytocin dosage as ordered but never increase the dose more than 1 to 2 milliunits/minute once every 15 to 60 minutes.
- Before each increase, assess:
 - contractions
 - maternal vital signs
 - fetal heart rhythm and rate.
- If you're using an external fetal monitor:
 - uterine activity strip or grid should show contractions occurring every 2 to 3 minutes, lasting for about 60 seconds, and followed by uterine relaxation.
- If you're using an internal fetal monitor:
 - look for an optimal baseline value of 5 to 15 mm Hg.
 - verify uterine relaxation between contractions.
- To manage hyperstimulation, discontinue the infusion and administer oxygen.

Complications of oxytocin administration

Uterine hyperstimulation

- It may progress to tetanic contractions that last longer than 2 minutes.

- Signs of hyperstimulation include:
 - contractions that are less than 2 minutes apart and last 90 seconds or longer
 - uterine pressure that doesn't return to baseline between contractions
 - intrauterine pressure that rises above 75 mm Hg.

Other potential complications

- Fetal distress
- Abruptio placentae
- Uterine rupture
- Water intoxication

Stop signs

Watch for the following signs of oxytocin administration complications. If indications of potential complications exist, stop the oxytocin administration, administer oxygen via face mask, and notify the doctor immediately.

Fetal distress

Signs of fetal distress include:

- late decelerations
- bradycardia.

Abruptio placentae

Signs of abruptio placentae include:

- sharp, stabbing uterine pain
- pain over and above the uterine contraction pain
- heavy bleeding
- hard, boardlike uterus.

Also watch for signs of shock, including a rapid, weak pulse; falling blood pressure; cold and clammy skin; and dilation of the nostrils.

Uterine rupture

Signs of uterine rupture include:

- sudden, severe pain during a contraction
- tearing sensation
- absent fetal heart sounds.

Also watch for signs of shock.

Water intoxication

Signs of water intoxication include:

- headache and vomiting (usually seen first)
- hypertension

- peripheral edema
- shallow or labored breathing
- dyspnea
- tachypnea
- lethargy
- confusion
- change in level of consciousness.

Comfort measures in labor

Nonpharmacologic ways to relieve pain

- Relaxation techniques—exercises to focus attention away from pain
- Focusing—concentration on an object
- Imagery—visualization of an object
- Effleurage—light abdominal massage
- Lamaze—patterns of controlled breathing
- Hypnosis—alteration in state of consciousness
- Acupuncture and acupressure—stimulation of trigger points with needles or pressure
- Yoga—deep-breathing exercises, body-stretching postures, and meditation to promote relaxation

Three key Lamaze techniques

- Slow breathing—inhaling through the nose and exhaling through the mouth or nose six to nine times per minute
- Accelerated-decelerated breathing—inhaling through the nose and exhaling through the mouth as contractions become more intense
- Pant-blow breathing—performing rapid, shallow breathing through the mouth only throughout contractions, particularly during the transitional phase

How certain cultures handle pain

Cultural and familial influences play a role in how a woman expresses or represses pain. These influences also determine whether she uses pharmacologic methods of pain relief. If her family views childbirth as a natural process or function for the female in the family unit, the woman is less likely to outwardly react to labor pains or require pharmacologic methods of pain relief.

Culture	Actions during pain
Middle-Eastern women	<ul style="list-style-type: none"> ● Are verbally expressive during labor ● Often cry out and scream loudly ● May refuse pain medication
Samoan women	<ul style="list-style-type: none"> ● Believe they shouldn't express pain verbally ● Believe the pain must simply be endured ● May refuse pain medication

Filipino women	<ul style="list-style-type: none"> ● Lie quietly during labor
Guatemalan women	<ul style="list-style-type: none"> ● Express pain verbally
Vietnamese, Laotian, and other women of Southeast Asian descent	<ul style="list-style-type: none"> ● Believe that crying out during labor is shameful ● Believe that pain during labor must be endured
Hispanic women	<ul style="list-style-type: none"> ● Are taught by their <i>parteras</i> (midwives) to endure pain and to keep their mouths closed during labor ● Believe that to cry out would cause the uterus to rise, retarding labor

Primary indications for cesarean birth

Maternal

- Cephalopelvic disproportion
- Active genital herpes or papilloma
- Previous cesarean birth by classic incision
- Disabling condition, such as severe gestational hypertension or heart disease, that prevents pushing to accomplish the pelvic division of labor

Placental

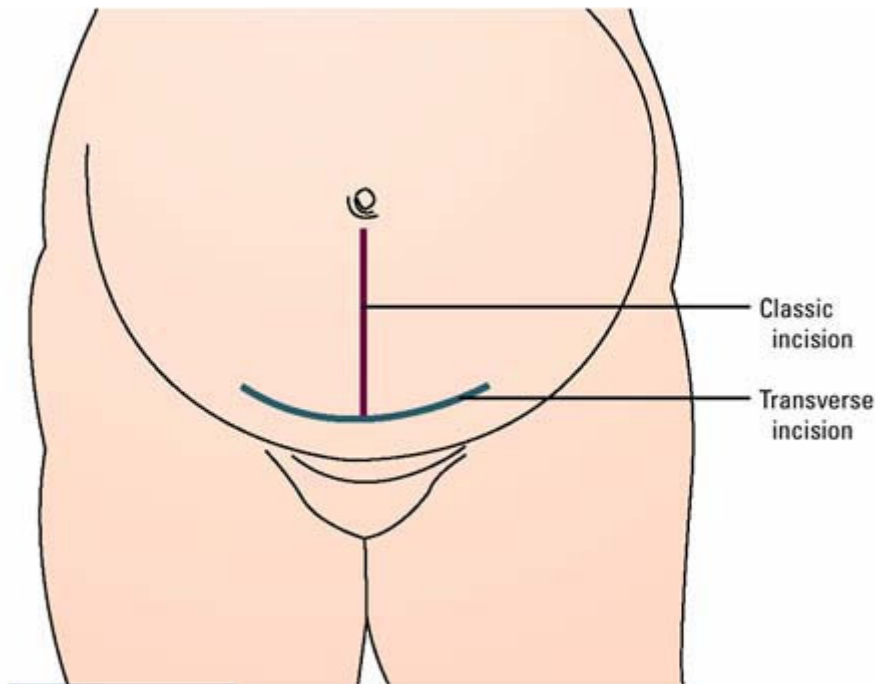
- Complete or partial placenta previa
- Premature separation of the placenta

Fetal

- Transverse fetal lie
- Extremely low fetal size
- Fetal distress
- Compound conditions, such as macrosomic fetus in a breech lie

Types of cesarean incisions

Cesarean birth incisions can be performed in one of two ways.



Administering terbutaline

I.V. terbutaline may be ordered for a woman in premature labor. When administering this drug, follow these steps.

General

- Obtain baseline maternal vital signs, FHR, and laboratory studies, including serum glucose and electrolyte levels and hematocrit.
- Institute external monitoring of uterine contractions and FHR.
- Prepare the drug with lactated Ringer's solution instead of dextrose and water to prevent additional glucose load and possible hyperglycemia.
- Administer the drug as an I.V. piggyback infusion into a main I.V. solution so that the drug can be discontinued immediately if the patient experiences adverse reactions.
- Use microdrip tubing and infusion pump to ensure an accurate flow rate.
- Expect to adjust infusion flow rate every 10 minutes until contractions cease or adverse reactions become problematic.
- Monitor maternal vital signs every 15 minutes while infusion rate is being increased and then every 30 minutes until contractions cease; monitor FHR every 15 to 30 minutes.
- Auscultate breath sounds for evidence of crackles or changes; monitor the patient for complaints of dyspnea and chest pain.

Alert!

- Be alert for maternal pulse rate greater than 120 beats/minute, BP less than 90/60 mm Hg, persistent tachycardia or tachypnea, chest pain, dyspnea, or abnormal breath sounds because these signs and symptoms could indicate developing pulmonary edema. Notify the doctor immediately.
- Watch for fetal tachycardia or late or variable decelerations in FHR pattern because they could indicate uterine bleeding or fetal distress necessitating an emergency birth.

Other

- Monitor I&O closely, every hour during the infusion and every 4 hours after the infusion.
- Expect to continue the infusion for 12 to 24 hours after contractions have ceased and then switch to oral therapy.
- Administer the first dose of oral therapy 30 minutes before discontinuing the I.V. infusion.
- Instruct the patient on how to take the oral therapy. Tell her therapy will continue until 37 weeks' gestation or until fetal lung maturity has been confirmed

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by amniocentesis; alternatively, if the patient is prescribed subcutaneous terbutaline via a continuous pump, teach the patient how to use the pump.

- Teach the patient how to measure her pulse rate before each dose of oral terbutaline, or at the recommended times with subcutaneous therapy; instruct the patient to call the doctor if her pulse rate exceeds 120 beats/minute or if she experiences palpitations or severe nervousness.

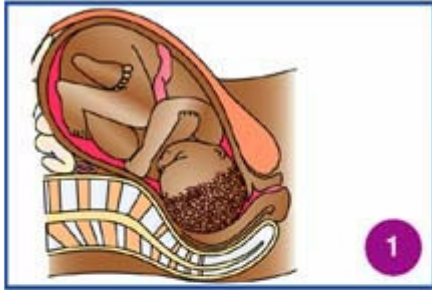
Understanding lacerations

Lacerations are tears in the perineum, vagina, or cervix that occur from stretching of tissues during delivery. Perineal lacerations are classified as first, second, third, or fourth degree.

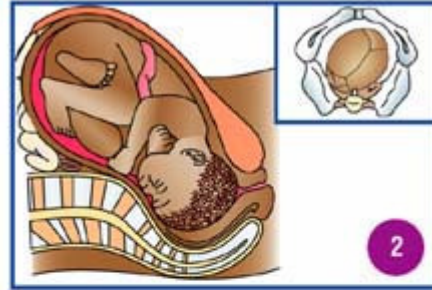
- A first-degree laceration involves the vaginal mucosa and the skin of the perineum to the fourchette.
- A second-degree laceration involves the vagina, perineal skin, fascia, levator ani muscle, and perineal body.
- A third-degree laceration involves the entire perineum and the external anal sphincter.
- A fourth-degree laceration involves the entire perineum, rectal sphincter, and portions of the rectal mucous membrane.

Cardinal movements of labor

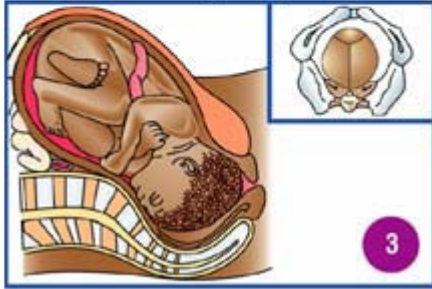
Engagement, descent, flexion



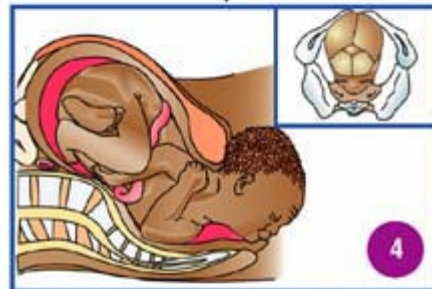
Internal rotation



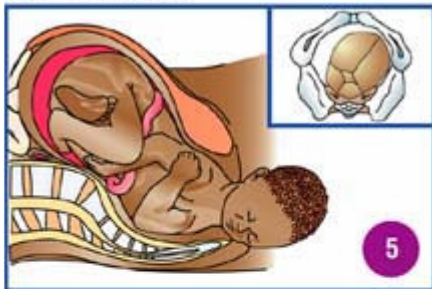
Extension beginning (rotation complete)



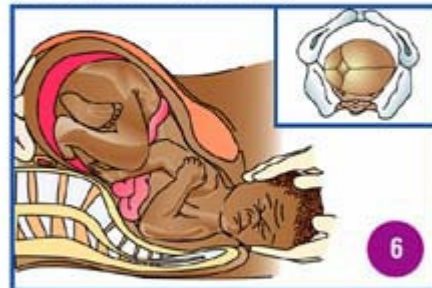
Extension complete



External rotation (restitution)



External rotation (shoulder rotation)



Expulsion



Umbilical cord prolapse

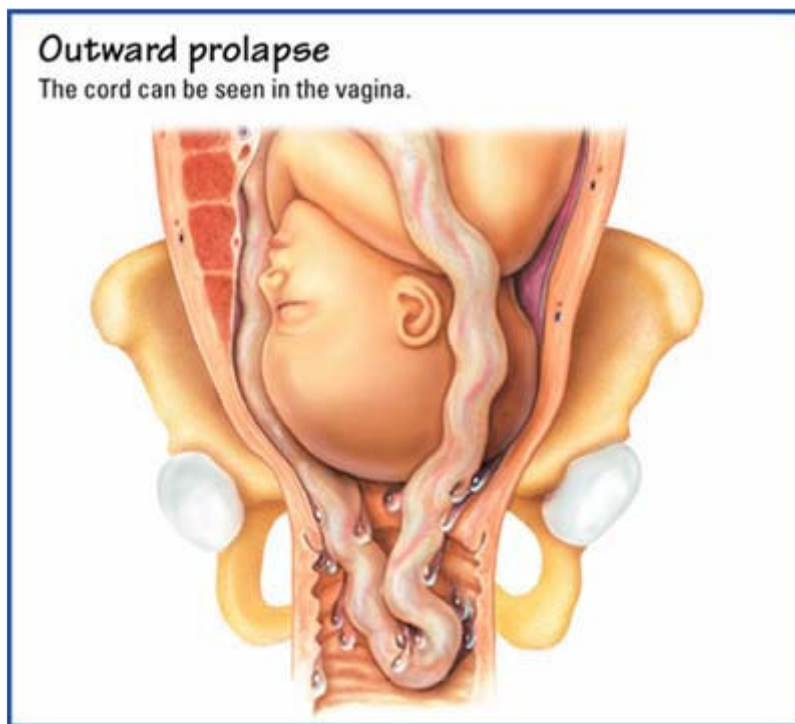
In umbilical cord prolapse, a loop of the umbilical cord slips down in front of the presenting fetal part. This prolapse may occur at any time after the membranes rupture, especially if the presenting part isn't fitted firmly into the cervix. Prolapse occurs in 1 out of 200 pregnancies. In a hidden prolapse, the cord remains within the uterus but is prolapsed.

Causes

Prolapse tends to occur more commonly with these conditions:

- PROM

- fetal presentation other than cephalic
- placenta previa
- intrauterine tumors that prevent the presenting part from engaging
- small fetus
- cephalopelvic disproportion that prevents firm engagement
- hydramnios
- multiple gestation.



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Safety with magnesium

If your patient requires I.V. magnesium therapy, be cautious when administering the drug. Follow these guidelines to ensure safety during administration.

The basics

- Always administer the drug as a piggyback infusion so that if the patient develops signs and symptoms of toxicity, the drug can be discontinued immediately.
- Obtain a baseline serum magnesium level before initiating therapy and monitor the magnesium level frequently thereafter.
- Keep in mind that in order for I.V. magnesium to be effective as an anticonvulsant, the serum magnesium level should be between 5 and 8 mg/dl. Levels above 8 mg/dl indicate toxicity and place the patient at risk for respiratory depression, cardiac arrhythmias, and cardiac arrest.

Always assess

- Assess the patient's deep-tendon reflexes—ideally by testing the patellar reflex. However, if the patient has received epidural anesthesia, test the biceps or triceps reflex. Diminished or hypoactive reflexes suggest magnesium toxicity.
- Assess for ankle clonus by rapidly dorsiflexing the patient's ankle three times in succession and then removing your hand, observing foot movement. If no further motion is noted, ankle clonus is absent; if the foot

continues to move voluntarily, clonus is present. Moderate (3 to 5) or severe (6 or more) movements may suggest magnesium toxicity.

Preventing problems

- Have calcium gluconate readily available at the patient's bedside. Anticipate administering this antidote for magnesium I.V. toxicity.

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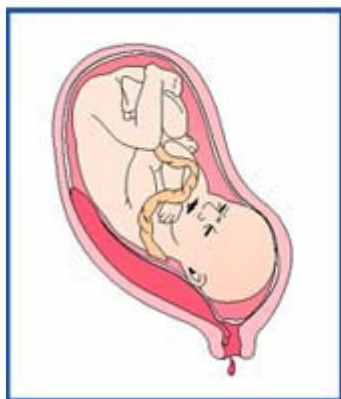
Placenta previa

Placenta previa occurs when the placenta implants in the lower uterine segment where it encroaches on the internal cervical os.

Type

Low implantation

The placenta implants in the lower uterine segment.



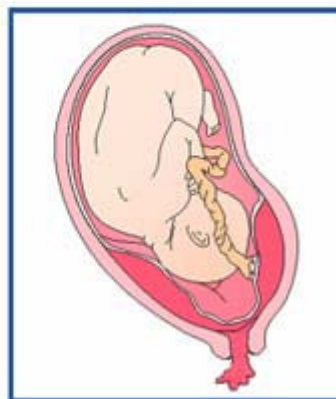
Partial placenta previa

The placenta occludes the cervical os partially.



Total placenta previa

The placenta occludes the cervical os totally.



Cause

The specific cause is unknown. Factors that may affect the site of the placenta's attachment to the uterine wall include:

- defective vascularization of the decidua
- multiple pregnancy (the placenta requires a larger surface for attachment)
- previous uterine surgery
- multiparity
- advanced maternal age.

Signs and symptoms

- Painless, bright red vaginal bleeding appears after the 20th week of pregnancy.
- Bleeding begins before the onset of labor and tends to be episodic; it starts without warning, stops spontaneously, and resumes later.
- Uterus is soft and nontender.
- The fetus remains active, with good FHTs audible on auscultation.
- Malpresentations may be present because the placenta's abnormal location has interfered with descent of the

fetal head.



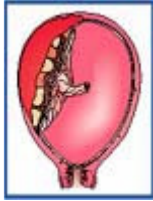
- Minimal descent of the fetal presenting part may indicate placenta previa.
- About 7% of patients with placenta previa are asymptomatic.

Abruptio placentae

Abruptio placentae is the premature separation of the normally implanted placenta from the uterine wall. This condition usually occurs after 20 weeks of pregnancy but may occur as late as the first or second stage of labor.

Factors contributing to abruptio placentae include:

- multiple gestations
- hydramnios
- cocaine use
- decreased blood flow to the placenta
- trauma to the abdomen
- low serum folic acid level
- vascular or renal disease
- gestational hypertension.

Type	Signs and symptoms
<p>Mild separation Begins with small areas of separation and internal bleeding (concealed hemorrhage) between the placenta and uterine wall</p> 	<ul style="list-style-type: none">● Gradual onset● Mild to moderate bleeding● Vague lower abdominal discomfort● Mild to moderate abdominal tenderness and uterine irritability● Strong and regular FHTs
<p>Moderate separation May develop abruptly or progress from mild to extensive separation with external hemorrhage</p> 	<ul style="list-style-type: none">● Gradual or abrupt onset● Moderate, dark red vaginal bleeding● Continuous abdominal pain● Tender uterus that remains firm between contractions● Barely audible or irregular and bradycardic FHTs● Possible signs of shock
<p>Severe separation External hemorrhage occurs, along with shock and possible fetal cardiac distress</p> 	<ul style="list-style-type: none">● Abrupt onset of agonizing, unremitting uterine pain● Moderate vaginal bleeding● Boardlike, tender uterus● Absence of FHTs● Rapidly progressive shock

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Title: *Maternal-Neonatal Facts Made Incredibly Quick!, 2nd Edition*

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Postpartum

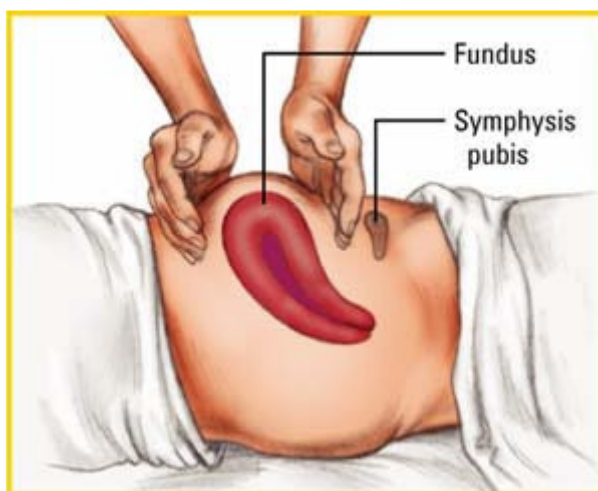
Highlighting the phases of the postpartum period

This chart summarizes the three phases of the postpartum period as identified by Reva Rubin.

Phase	Maternal behavior and tasks
<i>Taking in</i> (1 to 2 days after delivery)	<ul style="list-style-type: none">● Reflective time● Assumption of passive role and dependence on others for care● Verbalization about labor and birth● Sense of wonderment when looking at neonate
<i>Taking hold</i> (2 to 7 days after delivery)	<ul style="list-style-type: none">● Action-oriented time of increasing independence in care● Strong interest in caring for neonate; commonly accompanied by feelings of insecurity about ability to care for neonate
<i>Letting go</i> (7 days after delivery)	<ul style="list-style-type: none">● Ability to redefine new role● Acceptance of neonate's real image rather than fantasized image● Recognition of neonate as separate from herself● Assumption of responsibility for dependent neonate

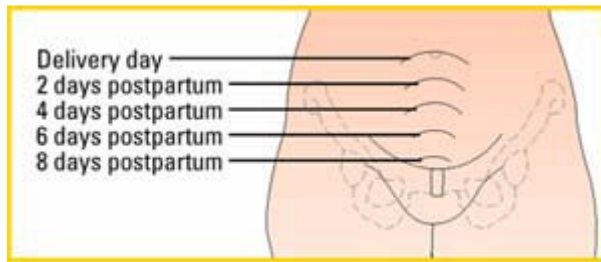
Palpating the fundus

A full-term pregnancy stretches the ligaments supporting the uterus, placing it at risk for inversion during palpation and massage. To guard against this, place one hand against the patient's abdomen at the symphysis pubis level, as shown at right. This steadies the fundus and prevents downward displacement. Then place the other hand at the top of the fundus, cupping it, as shown.



Uterine involution

After delivery, the uterus begins its descent back into the pelvic cavity. It continues to descend about 1 cm/day until it isn't palpable above the symphysis at about 9 days after delivery.



Assessing lochia flow

Character

Lochia typically is described as lochia rubra, serosa, or alba, depending on the color of the discharge. Lochia should always be present during the first 3 weeks postpartum. The patient who has had a cesarean birth may have a scant amount of lochia; however, lochia is never absent.

Amount

Although it varies, the amount can be compared to that of a menstrual flow. Saturating a perineal pad in less than 1 hour is considered excessive; the doctor should be notified. Expect women who are breast-feeding to have less lochia. Lochia flow also increases with activity—for example, when the patient gets out of bed the first few times (due to pooled lochia being released) or when the patient engages in strenuous exercise, such as lifting a heavy object or walking up stairs (due to an actual increase in amount).

Color

Depending on the postpartum day, lochia typically ranges from red to pinkish brown to creamy white or colorless. A sudden change in the color of lochia—for example, to bright red after having been pink—suggests new bleeding or retained placental fragments.

Odor

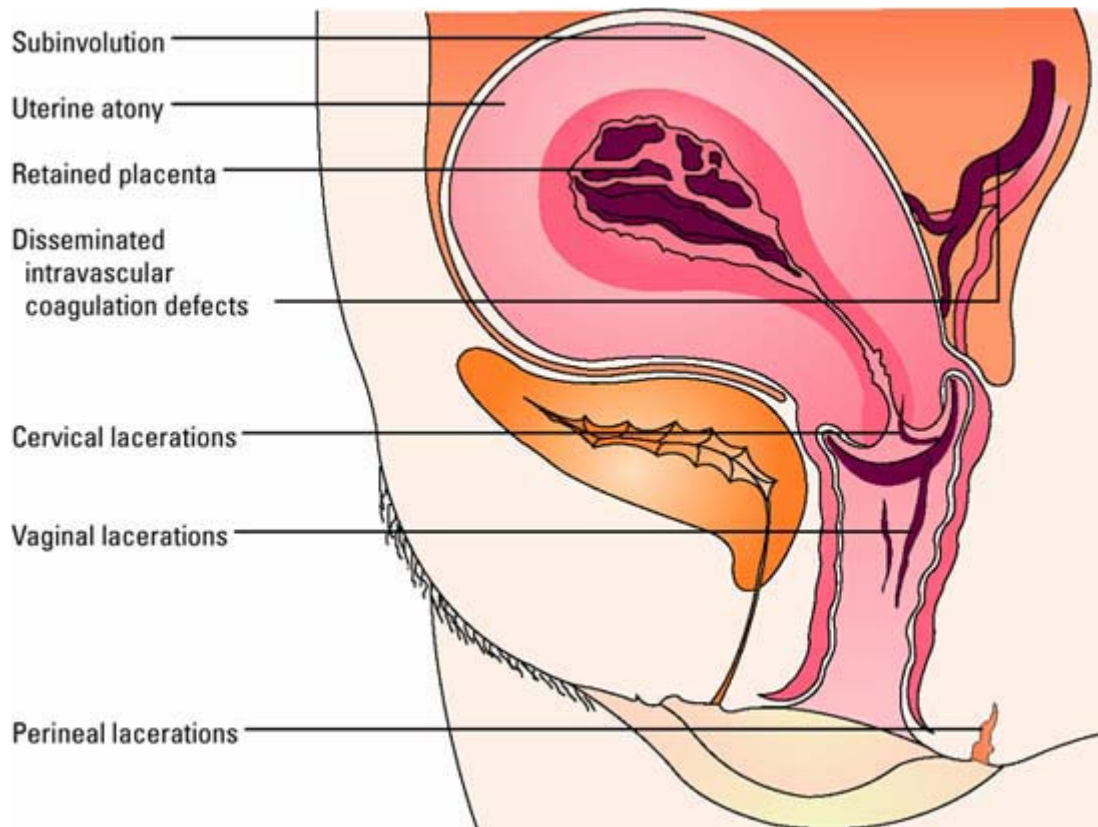
Lochia has an odor similar to that of menstrual flow. Foul or offensive odor suggests infection.

Consistency

Lochia should have minimal or small clots, if any. Evidence of large or numerous clots indicates poor uterine contraction, which requires intervention.

Common causes of postpartal hemorrhage

This illustration highlights the common causes of postpartal hemorrhage.



Risks factors for developing postpartal hemorrhage

Cervical or uterine lacerations

- Operative birth (episiotomy, forceps application)
- Rapid birth

Inadequate blood coagulation

- Fetal death
- Disseminated intravascular coagulation

Placental problems

- Placenta previa
- Placenta accreta
- Premature separation of the placenta
- Retained placental fragments

Uterine distention

- Multiple gestation
- Hydramnios (excessive amniotic fluid)
- Large fetus (> 9 pounds)
- Uterine myomas (fibroid tumors)

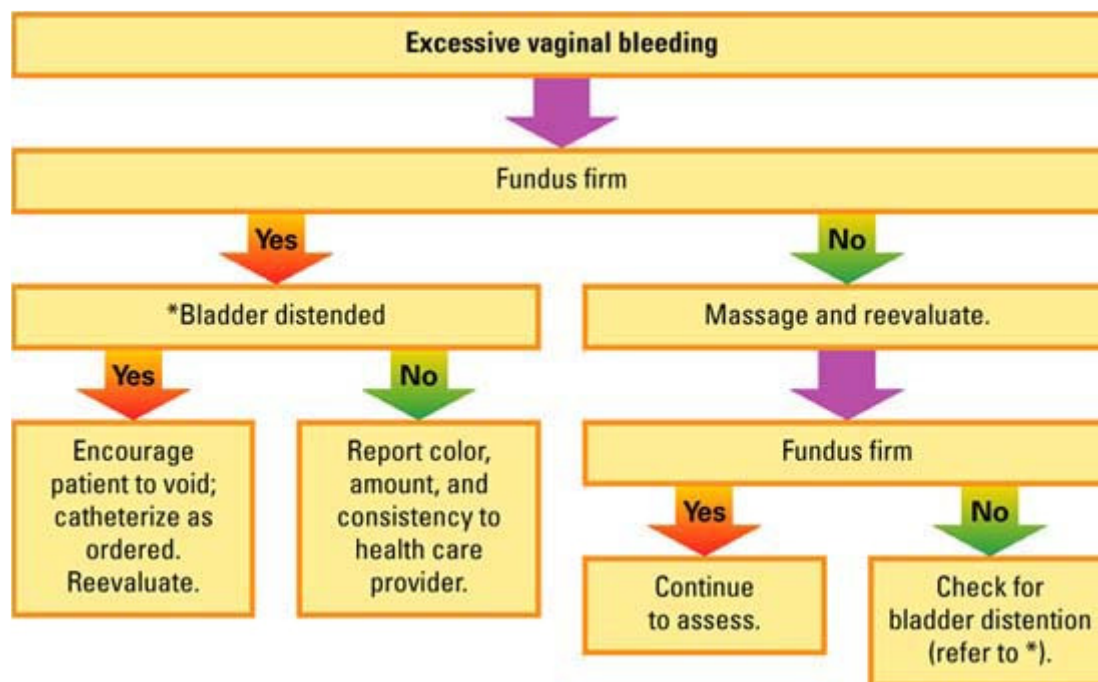
Uterine incontractability

- Deep anesthesia or analgesia
- Previous history of postpartum hemorrhage
- Secondary maternal illness such as anemia
- Endometritis
- Prolonged and difficult labor
- Labor augmentation or initiation by oxytocin (Pitocin)
- Possible chorioamnionitis
- High parity
- Maternal age > 30
- Prolonged use of magnesium sulfate or other tocolytic drugs
- Previous uterine surgery

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Assessing excessive vaginal bleeding

Use this flowchart to help guide your interventions when you determine that your patient has excessive vaginal bleeding.



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Assessing puerperal infection

Localized perineal infection

- Pain
- Elevated temperature
- Edema
- Redness, firmness, and tenderness at the site of the wound

- Sensation of heat
- Burning on urination
- Discharge from the wound

Endometritis

- Heavy, sometimes foul-smelling lochia
- Tender, enlarged uterus
- Backache
- Severe uterine contractions persisting after childbirth

Parametritis (pelvic cellulitis)

- Vaginal tenderness
- Abdominal pain and tenderness (pain may become more intense as infection spreads)
- Inflammation may remain localized, may lead to abscess formation, or may spread through the blood or lymphatic system

Septic pelvic thrombophlebitis

- Caused by widespread inflammation
- Severe, repeated chills and dramatic swings in body temperature
- Lower abdominal or flank pain
- Possible palpable tender mass over the affected area, usually developing near the second postpartum week

Peritonitis

- Caused by widespread inflammation
- Rigid, boardlike abdomen with guarding (commonly the first manifestation)
- Elevated body temperature accompanied by tachycardia (heart rate greater than 140 beats/minute), weak pulse, hiccups, nausea, vomiting, and diarrhea
- Constant and possibly excruciating abdominal pain

Comparing femoral and pelvic deep vein thrombosis (DVT)

	Femoral DVT	Pelvic DVT
Vessels affected	<ul style="list-style-type: none"> ● Femoral ● Saphenous ● Popliteal 	<ul style="list-style-type: none"> ● Ovarian ● Uterine ● Hypogastric
Onset	<ul style="list-style-type: none"> ● Around 10th day postpartum 	<ul style="list-style-type: none"> ● Around 14th to 15th day postpartum
Assessment findings	<ul style="list-style-type: none"> ● Associated arterial spasm making leg appear milky white or drained ● Edema ● Fever ● Chills ● Pain 	<ul style="list-style-type: none"> ● Extremely high fever ● Chills ● General malaise ● Possible pelvic abscess ● Tachycardia ● Abdominal and flank pain

- Redness of affected leg
- Shiny white skin on extremity

Treatment

- | | |
|--|---|
| <ul style="list-style-type: none"> ● Bed rest ● Elevation of affected extremity ● Anticoagulants ● Moist heat applications ● Analgesics | <ul style="list-style-type: none"> ● Bed rest ● Anticoagulants ● Antibiotics ● Incision and drainage of abscess (if develops) |
|--|---|

Dealing with pulmonary embolism

A woman with deep vein thrombosis is at high risk for developing a pulmonary embolism. Be alert for the classic signs and symptoms of pulmonary embolism and know what interventions to take.

Signs and symptoms

- Chest pain
- Dyspnea
- Tachypnea
- Tachycardia
- Hemoptysis
- Sudden changes in mental status
- Hypotension

Also, carefully observe for these problems, which may accompany the classic signs and symptoms:

- chills
- fever
- abdominal pain
- signs and symptoms of respiratory distress, including tachypnea, tachycardia, restlessness, cold and clammy skin, cyanosis, and retractions.

Interventions

A pulmonary embolism is a life-threatening event that can lead to cardiovascular collapse and death. Intervene immediately if pulmonary embolism is suspected.

Follow these steps:

- Elevate the head of the bed to improve the work of breathing.
- Administer oxygen via face mask at 8 to 10 L/minute, as ordered.
- Begin I.V. fluid administration, as ordered.
- Monitor oxygen saturation rates continuously via pulse oximetry.
- Obtain ABG values, as ordered, to evaluate gas exchange.
- Assess vital signs frequently, as often as every 15 minutes.
- Anticipate the need for continuous cardiac monitoring to evaluate for arrhythmias secondary to hypoxemia and for insertion of a pulmonary artery catheter to evaluate hemodynamic status and gas exchange.
- Administer emergency drugs, such as dopamine (Intropin) for pressure support and morphine (Duramorph) for

analgesia, as ordered.

- Expect the patient to be transferred to the critical care unit.
- Administer analgesics without aspirin for pain relief.
- Administer anticoagulants or thrombolytics, as ordered.

Psychiatric disorders in the postpartum period

Disorder	Assessment findings	Treatment
Depression (most common)	<ul style="list-style-type: none">● Commonly occurring within 4 to 6 weeks, with symptoms possibly lasting several months● Suicidal thinking● Feelings of failure● Exhaustion	<ul style="list-style-type: none">● Psychotherapy● Drug therapy such as antidepressants
Mania	<ul style="list-style-type: none">● Occurring 1 to 2 weeks after delivery, possibly after a brief period of depression● Agitation● Excitement possibly lasting 1 to 3 weeks	<ul style="list-style-type: none">● Psychotherapy● Antimanic drugs
Schizophrenia	<ul style="list-style-type: none">● Possibly occurring by the 10th postpartum day● Delusional thinking● Gross distortion of reality● Flight of ideas● Possible rejection of the father, neonate, or both	<ul style="list-style-type: none">● Antipsychotic drugs● Psychotherapy● Possible hospitalization
Psychosis	<ul style="list-style-type: none">● Possibly appearing from 2 weeks to 12 months after delivery; more commonly seen within first month after delivery● Sleep disturbances● Restlessness● Depression● Indecisiveness progressing to bewilderment, perplexity, a dreamy state, impaired memory, confusion, and somatic delusion	<ul style="list-style-type: none">● Antipsychotic drugs● Psychotherapy● Hospitalization

Battling the baby blues

For most women, having a baby is a joyous experience. However, childbirth leaves some women feeling sad, depressed, angry, anxious, and afraid. Commonly called *postpartum blues*, or *baby blues*, these feelings affect about 70% to 80% of women after childbirth. In most cases, they occur within the first few days postpartum and then disappear on their own within several days.

Patient teaching

To help your patient with postpartum blues, tell her to:

- get plenty of rest
- ask for help from family and friends
- take special care of herself
- spend time with her partner
- call her practitioner if her mood doesn't improve after a few weeks and she has trouble coping (this may be a sign of a more severe depression).

Be sure to explain to the patient that many new mothers feel sadness, fear, anger, and anxiety after having a baby. These feelings don't mean she's a failure as a woman or as a mother.

Postpartum depression

Unfortunately, about 10% of women experience a more profound problem called *postpartum depression*. In these cases, maternal feelings of depression and despair last longer than a few weeks and interfere with the woman's daily activities. Post-partum depression can occur after any pregnancy. It commonly requires counseling and/or medication to resolve.

Causes

- Doubt about the pregnancy
- Recent stress, such as loss of a loved one or a recent move
- Lack of a support system
- Unplanned cesarean birth
- Breast-feeding problems, especially if a new mother can't breast-feed or decides to stop
- Sharp drop in estrogen and progesterone levels after childbirth, possibly triggering depression in the same way that much smaller changes in hormone levels can trigger mood swings and tension before menstrual periods
- Early birth of neonate (may cause women to feel unprepared)
- Unresolved issues of not being the "perfect mother"
- Disappointment about gender of neonate or other characteristics

Blues vs. depression

Women who are experiencing postpartum depression should seek medical help immediately.

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Watch for signs that indicate postpartum blues may be developing into postpartum depression, including:

- worsening of insomnia
- changes in appetite or poor food intake
- poor interaction with neonate or viewing neonate as a burden or problem
- suicidal thoughts or thoughts of harming the neonate
- feelings of isolation from social contacts or her support system
- inability to care for herself or the neonate due to a lack of energy or desire to do so.

Postpartum maternal self-care

When teaching your patient about self-care for the postpartum period, make sure you include these topic areas and instructions.

Personal hygiene

- Change perineal pads frequently, removing them from the front to the back and disposing of them in a plastic bag.
- Perform perineal care each time that you urinate or move your bowels.
- Monitor your vaginal discharge; it should change from red to pinkish brown to clear white before stopping altogether.
- Notify your doctor if the discharge returns to a previous color, becomes bright red or yellowish green, suddenly increases in amount, or develops an offensive odor.

- Follow your doctor's instructions about using sitz baths or applying heat to your perineum.
- Shower daily.

Breasts

- Regardless of whether you're breast-feeding, wear a firm, supportive bra.
- If nipple leakage occurs, use clean gauze pads or nursing pads inside your bra to absorb the moisture.
- Inspect your nipples for cracking, fissures, or soreness, and report areas of redness, tenderness, or swelling.
- Wash your breasts daily with clear water when showering; dry with a soft towel or allow to air dry.
- Don't use soap on your breasts or nipples because soap is drying.

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- If you're breast-feeding and your breasts become engorged, feed your baby more frequently, use warm compresses, or stand under a warm shower for relief.
- If you aren't breast-feeding, apply cool compresses several times per day.
- If the baby can't latch on to the breast due to breast engorgement, using a breast pump should help.

Activity and exercise

- Balance rest periods with activity, get as much sleep as possible at night, and take frequent rest periods or naps during the day.
- Check with your doctor about when you can begin exercising.
- If your vaginal discharge increases with activity, elevate your legs for about 30 minutes. If the discharge doesn't decrease with rest, call your doctor.

Nutrition

- Increase your intake of protein and calories.
- Drink plenty of fluids throughout the day, including before and after breast-feeding.

Elimination

- If you have the urge to urinate or move your bowels, don't delay in doing so.
- Urinate at least every 2 to 3 hours. This helps keep the uterus contracted and decreases the risk of excessive bleeding.
- Report difficulty urinating, burning, or pain to your doctor.
- Drink plenty of liquids and eat high-fiber foods to prevent constipation.
- Follow your doctor's instructions about the use of stool soft-eners or laxatives.

Sexual activity and contraception

- Remember that breast-feeding isn't a reliable method of contraception.
- Discuss birth control options with your doctor.
- Ask your doctor when you can resume sexual activity and contraceptive measures. Most couples can resume having sex within 3 to 4 weeks after delivery, or possibly as soon as lochia ceases.
- Use a water-based lubricant if necessary.

- Expect a decrease in intensity and rapidity of sexual response for about 3 months after delivery.
- Perform Kegel exercises to help strengthen your pelvic floor muscles. To do this, squeeze your pelvic muscles as if trying to stop urine flow, and then release them.

Preventing mastitis

If your patient is breast-feeding, make sure you include these instructions about breast care and preventing mastitis in your teaching plan.

- Wash your hands after using the bathroom, before touching your breasts, and before and after every breast-feeding.
- If necessary, apply a warm compress or take a warm shower to help facilitate milk flow.
- Position the neonate properly at the breast, and make sure that he grasps the nipple and entire areola area when feeding.
- Empty your breasts as completely as possible at feedings.
- Alternate feeding positions and rotate pressure areas.
- Release the neonate's grasp on the nipple before removing him from the breast.
- Expose your nipples to the air for part of each day.
- Drink plenty of fluids, eat a balanced diet, and get sufficient rest to enhance the breast-feeding experience.
- Don't wait too long between feedings or wean the infant abruptly.

Preventing DVT

Incorporate these instructions in your teaching plan to reduce a woman's risk of developing deep vein thrombosis (DVT).

- If you must use the lithotomy position, ask a health care pro-vider to pad the stirrups so you put less pressure on your calves.
- Change positions frequently if on bed rest.
- Avoid deeply flexing your legs at the groin or sharply flexing your knees.
- Don't stand in one place for too long or sit with your knees bent or legs crossed. Elevate your legs to improve venous return.
- Don't wear garters or constrictive clothing.
- Wiggle your toes and perform leg lifts while in bed to minimize venous pooling and help increase venous return.
- Walk as soon as possible after delivery.
- Wear antiembolism or support stockings, as ordered. Put them on before getting out of bed in the morning.

A closer look at lactation

After delivery of the placenta, the drop in progesterone and estrogen levels stimulates the production of prolactin. This hormone stimulates milk production by the acinar cells in the mammary glands.

Milk flow

Milk flows from the acinar cells through small tubules to the lactiferous sinuses (small reservoirs located behind the nipple). This milk, called *foremilk*, is thin, bluish, and sugary and is constantly forming. It quenches the

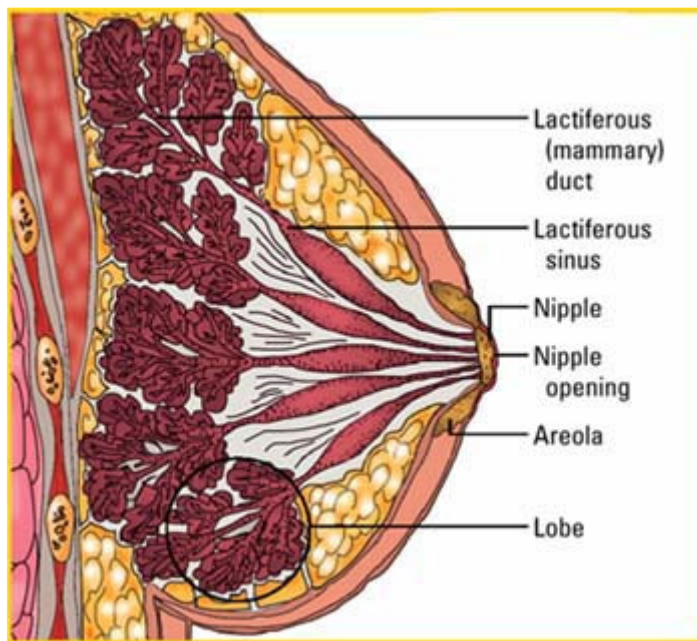
neonate's thirst but contains little fat and protein.

When the neonate sucks at the breast, oxytocin is released, causing the sinuses to contract. Contraction pushes the milk forward through the nipple to the neonate. In addition, release of oxytocin causes the smooth muscles of the uterus to contract.

Let-down

Movement of the milk forward through the nipple is termed the *let-down reflex* and may be triggered by things other than the neonate sucking at the breast. For example, women have reported that hearing their baby cry or thinking about him causes this reflex.

Once the let-down reflex occurs and the neonate has fed for 10 to 15 minutes, new milk—called *hind milk*—is formed. This milk is thicker, whiter, and contains higher concentrations of fat and protein. Hind milk contains the calories and fat necessary for the neonate to gain weight, build brain tissue, and be more content and satisfied between feedings.



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Breast-feeding positions

A breast-feeding position should be comfortable and efficient. By changing positions periodically, the woman can alter the neonate's grasp on the nipple, thereby avoiding contact friction on the same area. As appropriate, suggest these three typical positions.

Cradle position

The mother cradles the neonate's head in the crook of her arm.



Side-lying position

The mother lies on her side with her stomach facing the neonate's. As the neonate's mouth opens, she pulls him

toward the nipple.



Football position

Sitting with a pillow under her arm, the mother places her hand under the neonate's head. As the neonate's mouth opens, she pulls the neonate's head near her breast. This position may be helpful for the woman who has had a cesarean birth.



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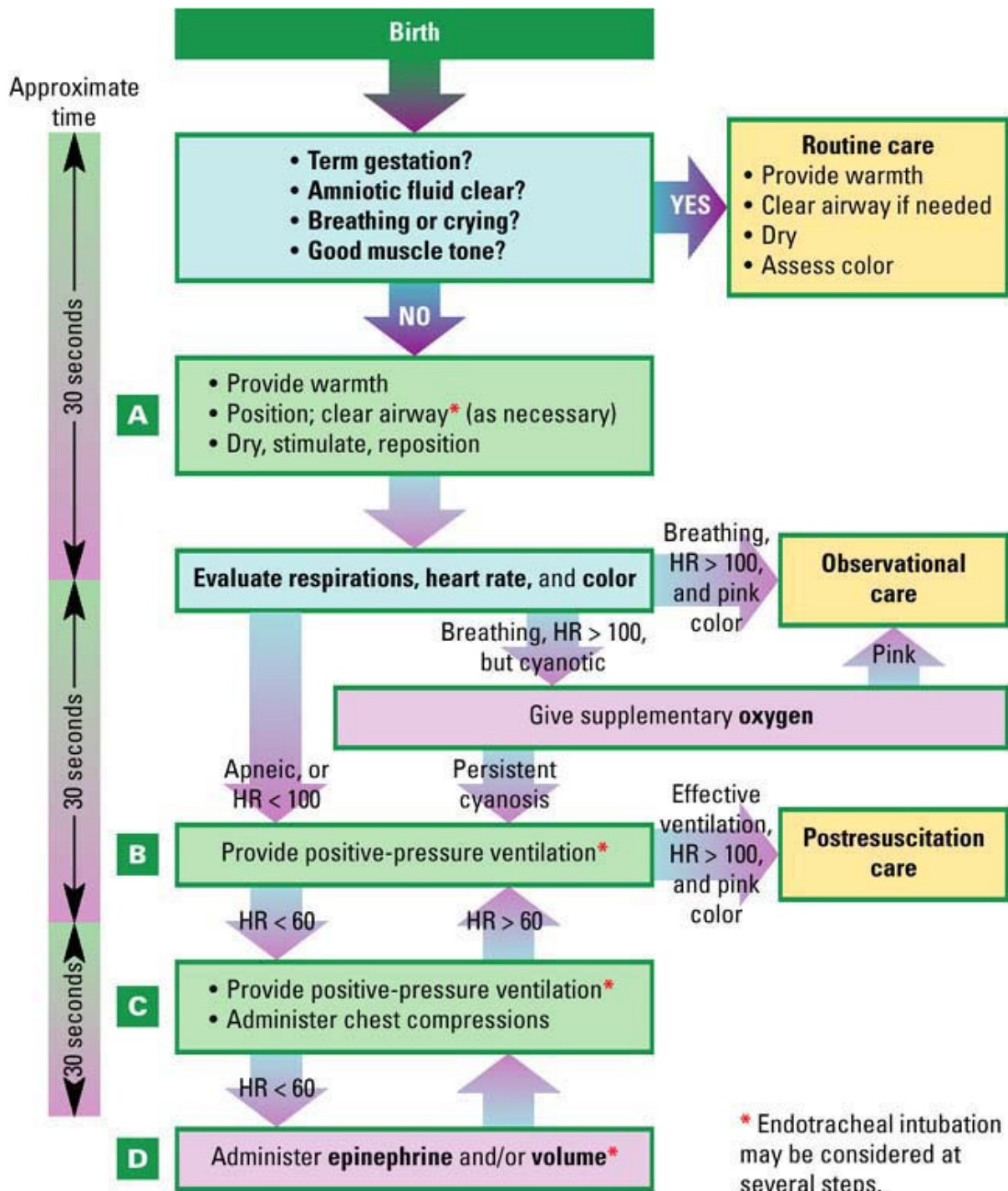
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Neonatal

Neonatal flow algorithm



KEY:

A

Initial steps in stabilization

- Provide warmth under radiant heat source
- Position the head in a "sniffing" position
- Clear the airway with a bulb syringe or suction catheter
- Dry the infant
- Stimulate breathing

B

Ventilation

- PPV ventilation at 40 to 60 breaths/minute
- Observe chest rise

C

Chest compressions

- 90 compressions coordinated with 30 breaths/minute
- Compress $\frac{1}{3}$ the anterior-posterior diameter of the chest

D

Drugs

- See *Medications for neonatal resuscitation* below.

Medications for neonatal resuscitation

The American Heart Association and the American Academy of Pediatrics recommend you refer to this chart before giving medications for resuscitating neonates.

Medication	Concentration to administer	Dosage and route	Rate and precautions
Epinephrine	<ul style="list-style-type: none"> ● 1:10,000 (0.1 mg/ml) for I.V. or ET route 	<ul style="list-style-type: none"> ● 0.01 to 0.03 mg/ kg (0.1 up to 0.3 ml/kg) ● I.V. route is preferred 	<ul style="list-style-type: none"> ● Give rapidly ● Up to 0.1 mg/kg through ET tube may be given but only while I.V. access is being obtained.
Volume expanders	<ul style="list-style-type: none"> ● Lactated Ringer's solution (isotonic crystalloid) 	<ul style="list-style-type: none"> ● 10 ml/kg ● I.V. 	<ul style="list-style-type: none"> ● Avoid giving too rapidly to a preterm neonate (may be associated with intraventricular hemorrhage)

Physiology of the neonate

Body system	Physiology after birth
Cardiovascular	<ul style="list-style-type: none"> ● Functional closure of fetal shunts occurs. ● Transition from fetal to postnatal circulation occurs.
Respiratory	<ul style="list-style-type: none"> ● Onset of breathing occurs as air replaces the fluid that filled the lungs before birth.
Renal	<ul style="list-style-type: none"> ● System doesn't mature fully until after the first year of life; fluid imbalances may occur.
GI	<ul style="list-style-type: none"> ● System continues to develop. ● Uncoordinated peristalsis of the esophagus occurs. ● The neonate has a limited ability to digest fats.
Thermogenic	<ul style="list-style-type: none"> ● The neonate is susceptible to rapid heat loss because of acute change in environment and thin layer of subcutaneous fat. ● Nonshivering thermogenesis occurs. ● The presence of brown fat (more in mature neonate; less in preterm neonate) warms the neonate by increasing heat production.
Immune	<ul style="list-style-type: none"> ● The inflammatory response of the tissues to localize infection is immature.
Hematopoietic	<ul style="list-style-type: none"> ● Coagulation time is prolonged.
Neurologic	<ul style="list-style-type: none"> ● Presence of primitive reflexes and time in which they appear and disappear indicate the maturity of the developing nervous system.
Hepatic	<ul style="list-style-type: none"> ● The neonate may demonstrate jaundice.
Integumentary	<ul style="list-style-type: none"> ● The epidermis and dermis are thin and bound loosely to each other. ● Sebaceous glands are active.
Musculoskeletal	<ul style="list-style-type: none"> ● More cartilage is present than ossified bone.
Reproductive	<ul style="list-style-type: none"> ● Females may have a mucoid vaginal discharge and pseudomenstruation due to maternal estrogen levels. ● Small, white, firm cysts called <i>epithelial pearls</i> may be visible at the tip of the prepuce. ● The scrotum may be edematous if the neonate is presented in the breech position.

Neonatal assessment

Initial neonatal assessment

- Ensure a proper airway via suctioning.
- Administer oxygen as needed.

- Dry the neonate under the warmer.
- Keep the neonate's head lower than his trunk to promote drainage of secretions.
- Help determine the Apgar score.
- Apply a cord clamp and monitor the neonate for abnormal bleeding from the cord.
- Analyze the umbilical cord. (Two arteries and one vein should be apparent.)
- Observe the neonate for voiding and meconium.
- Assess the neonate for gross abnormalities and signs of suspected abnormalities.
- Continue to assess the neonate by using the Apgar score criteria, even after the 5-minute score is received.
- Obtain clear footprints and fingerprints.
- Apply identification bands with matching numbers to the mother (one band) and neonate (two bands) before they leave the delivery room.
- Promote bonding between the mother and neonate.
- Review maternal prenatal and intrapartal data to determine factors that might impact neonatal well-being.

Ongoing assessment

- Assess the neonate's vital signs.
- Measure and record blood pressure.
- Measure and record the neonate's size and weight.
- Complete a gestational age assessment, if indicated.

Categorizing gestational age

- Preterm neonate—Less than 37 weeks' gestation
- Term neonate—37 to 42 weeks' gestation
- Postterm neonate—Greater than or equal to 42 weeks' gestation

Recording the Apgar score

Use this chart to determine the neonatal Apgar score after birth. For each category listed, assign a score of 0 to 2, as shown. A total score of 7 or higher indicates that the neonate is in good condition; 4 to 6, fair condition (the neonate may have moderate central nervous system depression, muscle flaccidity, cyanosis, and poor respirations); 0 to 3, danger (the neonate needs immediate resuscitation, as ordered). Each component should be assessed at 1, 5, 10, 15, and 20 minutes after delivery, as necessary.

Sign	Apgar score		
	0	1	2
Heart rate	Absent	Less than 100 beats/minute	More than 100 beats/minute
Respiratory effort	Absent	Slow, irregular	Good crying
Muscle tone	Flaccid	Some flexion and resistance to extension of extremities	Active motion
Reflex irritability	No response	Grimace or weak cry	Vigorous cry
Color	Pallor, cyanosis	Pink body, blue extremities	Completely pink

Normal neonatal vital signs

Respiration

- 30 to 50 breaths/minute

Temperature

- Rectal: 96° to 99.5° F (35.6° to 37.5° C)
- Axillary: 97.5° to 99° F (36.4° to 37.2° C)

Heart rate (apical)

- 110 to 160 beats/minute

Blood pressure

- Systolic: 60 to 80 mm Hg
- Diastolic: 40 to 50 mm Hg

Counting neonatal respirations

- Observe abdominal excursions rather than chest excursions.
- Auscultate the chest.
- Place the stethoscope in front of the mouth and nares.

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Average neonatal size and weight

Size

Average initial anthropometric ranges are:

- head circumference—13" to 14" (33 to 35.5 cm)
- chest circumference—12" to 13" (30.5 to 33 cm)
- head to heel—18" to 21" (46 to 53 cm)
- weight—2,500 to 4,000 g (5 lb, 8 oz to 8 lb, 13 oz).

Birth weight

- Normal birth weight: 2,500 g (5 lb, 8 oz) or greater
- Low birth weight: Between 1,500 g (3 lb, 5 oz) and 2,499 g
- Very low birth weight: Between 1,000 g (2 lb, 3 oz) and 1,499 g
- Extremely low birth weight: Less than 1,000 g

Preventing heat loss

Follow these steps to prevent heat loss in the neonate.

Conduction

- Preheat the radiant warmer bed and linen.
- Warm stethoscopes and other instruments before use.
- Before weighing the neonate, pad the scale with a paper towel or a preweighed, warmed sheet.

Convection

- Place the neonate's bed out of a direct line with an open window, fan, or air-conditioning vent.

Evaporation

- Dry the neonate immediately after delivery.
- When bathing, expose only one body part at a time; wash each part thoroughly, and then dry it immediately.

Radiation

- Keep the neonate and examining tables away from outside windows and air conditioners.

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Neurologic assessment

Normal neonates display various reflexes. Abnormalities are indicated by absence, asymmetry, persistence, or weakness in these reflexes:

- *sucking*—begins when a nipple is placed in the neonate's mouth
- *Moro's reflex*—when the neo-nate is lifted above the bassinet and suddenly lowered, his arms and legs symmetrically extend and then abduct while his thumb and forefinger spread to form a "C"
- *rooting*—when the neonate's cheek is stroked, he turns his head in the direction of the stroke
- *tonic neck (fencing position)*— when the neonate's head is turned while he's lying in a supine position, his extremities on the same side straighten and those on the opposite side flex
- *Babinski's reflex*—when the sole on the side of the neonate's small toe is stroked, toes fan upward
- *grasping*—when a finger is placed in each of the neonate's hands, his fingers grasp tightly enough that he can be pulled to a sitting position
- *stepping*—when the neonate is held upright with his feet touching a flat surface, he responds with dancing or stepping movements.

Common skin findings

The term neonate has beefy red skin for a few hours after birth before it turns its normal color. Other findings include:

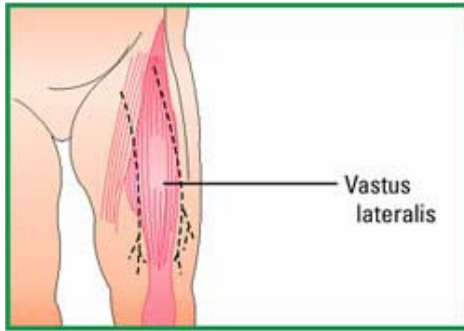
- acrocyanosis (caused by vasomotor instability, capillary stasis, and high hemoglobin level) for the first 24 hours
- milia (clogged sebaceous glands) on the nose or chin
- lanugo (fine, downy hair) after 20 weeks' gestation on the entire body (except on palms and soles)
- vernix caseosa (a white, cheesy protective coating of desquamated epithelial cells and sebum)
- erythema toxicum neonatorum (a transient, maculopapular rash)
- telangiectasia (flat, reddened vascular areas) on neck, eyelid, or lip
- sudamina or miliaria (distended sweat glands) that cause minute vesicles on the skin surface, especially on the face
- Mongolian spots (bluish black areas of pigmentation more commonly noted on the back and buttocks of dark-skinned neonates).

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Administering vitamin K

Vitamin K (AquaMEPHYTON) is administered prophylactically to prevent a transient deficiency of coagulation factors II, VII, IX, and X.

- Dosage is 0.5 to 1 mg I.M. up to 1 hour after birth.
- Administer in a large leg muscle such as the vastus lateralis (as shown).



Erythromycin treatment

Description

- Involves instilling 0.5% erythromycin ointment into the neo-nate's eyes.
- Prevents gonorrheal conjunctivitis caused by *Neisseria gonorrhoeae*, which the neonate may have acquired from the mother as he passed through the birth canal. (Erythromycin is also effective against chlamydial infection.)
- Required by law in all 50 states.
- May be administered in the birthing room.
- Can be delayed for up to 1 hour to allow initial parent-child bonding.
- May not be effective if the infection was acquired in utero from PROM.

Procedure

- Wash your hands and put on gloves.
- Using your nondominant hand, gently raise the neonate's upper eyelid with your index finger.
- Pull down the lower lid with your thumb.
- Using your dominant hand, apply the ointment in a line along the lower conjunctival sac (as shown below).
- Close the eye to allow ointment to spread across the conjunctiva.
- Repeat the procedure for the other eye.

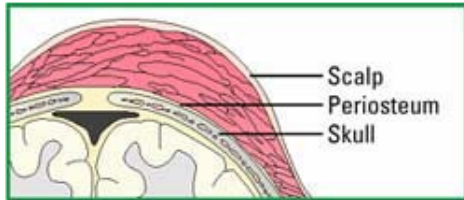


Assessing the neonate's head

The neonate's head may appear misshapen or asymmetrical. Caput succedaneum usually disappears in about 3 days. A cephalhematoma may take several weeks to resolve.

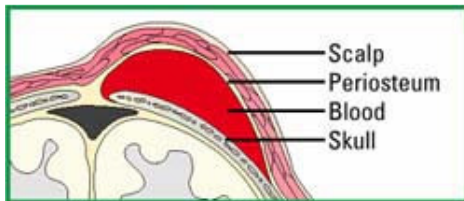
Caput succedaneum

- Swelling occurs below the scalp.
- Swelling can extend past the suture line.
- It usually disappears in about 3 days.



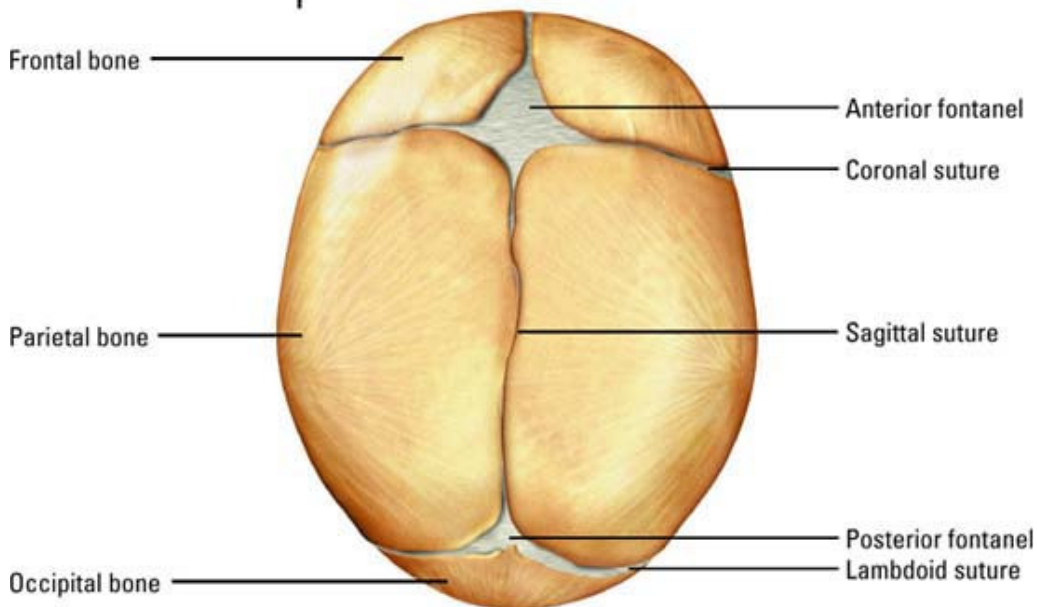
Cephalhematoma

- Swelling results from blood collecting under the periosteum of the skull bone.
- Swelling doesn't cross the suture line.
- It may take several weeks to resolve.



Neonatal sutures and fontanel

Neonatal skull superior view



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Assessing hip abduction

Assessing hip abduction helps identify whether the neo-nate's hip joint, including the acetabulum, is properly formed. Follow these steps:

- Place the neonate in the supine position on a bed or examination table.
- Flex the neonate's knees to 90 degrees at the hip.
- Apply upward pressure over the greater trochanter area while abducting the hips; typically, the hips should abduct to about 180 degrees, almost touching the surface of the bed or examination table.
- Listen for any sounds; normally this motion should produce no sound; evidence of a clicking or clunking sound de-notes the femoral head hitting the acetabulum as it slips back into it. This sound is considered a positive *Ortolani's sign*, suggesting hip subluxation.

- Then flex the neo-nate's knees and hips to 90 degrees.
- Apply pressure down and laterally while adducting the hips.
- Feel for any slipping of the femoral head out of the hip socket. Evidence of slipping denotes a positive *Barlow's sign*, suggesting hip instability and possible developmental dysplasia of the hip.



Infection

Description and implications

Toxoplasmosis

- Toxoplasmosis is transmitted to the fetus primarily via the mother's contact with contaminated cat box filler.
- Effects include increased frequency of stillbirths, neonatal deaths, severe congenital anomalies, deafness, retinochoroiditis, seizures, and coma.
- A therapeutic abortion is recommended if the diagnosis is made before the 20th week of gestation.
- Maternal treatment involves anti-infective therapy—for example, with a sulfa or clindamycin.

Rubella

- Rubella, a chronic viral infection, lasts from the first trimester to months after delivery.
- The greatest risk occurs within the first trimester.
- Effects include congenital heart disease, intrauterine growth retardation, cataracts, mental retardation, and hearing impairment.
- Management includes therapeutic abortion if the disease occurs during the first trimester, and emotional support for parents.
- Women of childbearing age should be tested for immunity and vaccinated if necessary.
- The neonate may persistently shed the virus for up to 1 year.

Cytomegalovirus (CMV)

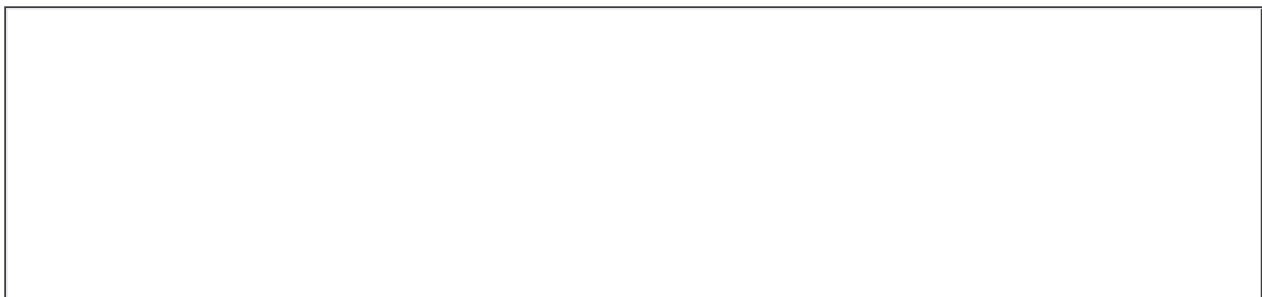
- CMV is a herpesvirus that can be transmitted from an asymptomatic mother transplacentally to the fetus or via the cervix to the neonate at delivery.
- It's the most common cause of viral infections in fetuses.
- Principal sites of damage are the brain, liver, and blood.
- CMV is a common cause of mental retardation.
- Other effects include auditory difficulties and a birth weight that's small for gestational age.
- The neonate may also demonstrate a characteristic pattern of petechiae called *blueberry muffin syndrome*.
- Antiviral drugs can't prevent CMV and aren't effective in treating the neonate.
















Herpesvirus type II

- The fetus can be exposed to the herpesvirus through indirect contact with infected genitals or via direct contact with those tissues during delivery.
- Affected neonates may be asymptomatic for 2 to 12 days but then may develop jaundice, seizures, increased temperature, and characteristic vesicular lesions.
- A cesarean birth can protect the fetus from infection.
- Pharmacologic treatment may include acyclovir and vidarabine I.V. after exposure.

Silverman-Anderson index

Used to evaluate the neonate's respiratory status, the Silverman-Anderson index assesses five areas: upper chest, lower chest, xiphoid retractions, nares dilation, and expiratory grunt. Each area is graded 0 (no respiratory difficulty), 1 (moderate difficulty), or 2 (maximum difficulty), with a total score ranging from 0 (no respiratory difficulty) to 10 (maximal respiratory difficulty).



	Grade 0	Grade 1	Grade 2
Upper chest	Synchronized 	Lag on inspiration 	Seesaw 
Lower chest	No retractions 	Just visible 	Marked 
Xiphoid retractions	None 	Just visible 	Marked 
Nares dilation	None 	Minimal 	Marked 
Expiratory grunt	None 	Audible with stethoscope 	Audible to naked ear 

Adapted with permission from Silverman, W.A., and Anderson, D.H. "A Controlled Clinical Trial of Effects of Water Mist on Obstructive Respiratory Signs, Death Rate, and Necropsy Findings Among Premature Infants." *Pediatrics* 17 (1):1-10, 1956.

Signs and symptoms of opiate withdrawal

CNS signs and symptoms

- Seizures
- Tremors
- Irritability
- Sleep disturbances (decreased sleep)
- High-pitched cry
- Increased muscle tone
- Increased deep tendon reflexes
- Increased Moro's reflex
- Increased yawning
- Increased sneezing
- Rapid changes in mood
- Hypersensitivity to noise and external stimuli

GI signs and symptoms

- Poor feeding
- Uncoordinated and constant sucking
- Vomiting
- Diarrhea
- Dehydration
- Poor weight gain

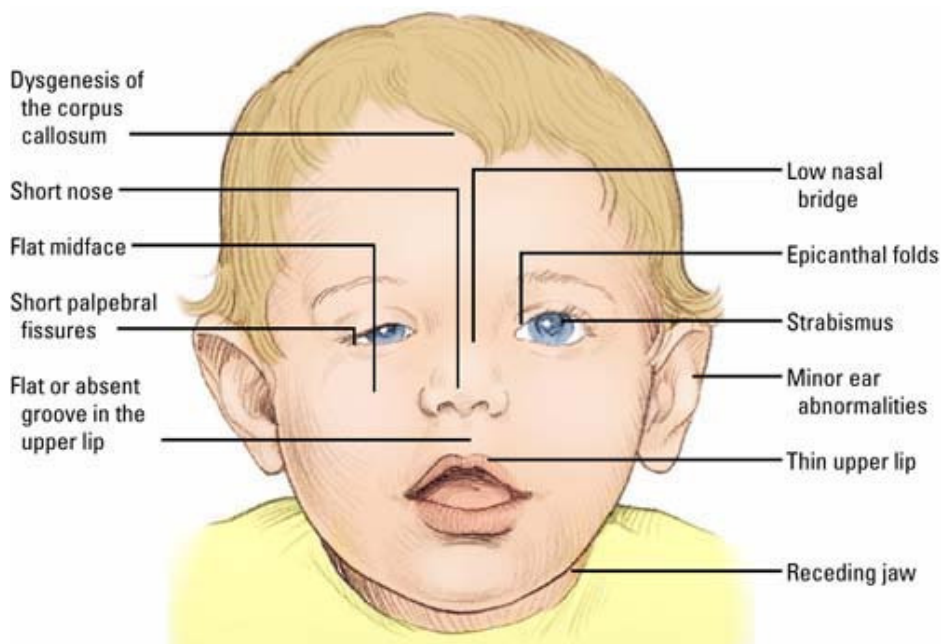
Autonomic signs and symptoms

- Nasal stuffiness
- Fever
- Mottling
- Temperature instability
- Increased respiratory rate
- Increased heart rate

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Common facial characteristics of FAS

This illustration shows the distinct cranio-facial features associated with fetal alcohol syndrome (FAS).



Risk factors for perinatal transmission of HIV

Neonatal factors

- Bacterial infection
- Being the first-born twin
- Breast-feeding
- Prematurity

Maternal factors

- Chorioamnionitis
- Low CD4⁺ count
- High CD8⁺ count
- High viral load
- New onset of disease
- Ongoing drug abuse
- Prolonged or complicated labor

A close look at necrotizing enterocolitis

Necrotizing enterocolitis is an inflammatory disease of the GI mucosa that occurs most commonly in preterm neonates, usually within the first 10 days of life. It can be life-threatening, especially if a necrotized area ruptures, resulting in peritonitis. Here are its causes, pathophysiology, signs and symptoms, tests used to diagnose it, and ways in which it's treated.

Causes

- Uncertain
- Appears to occur in neonates whose GI tract has suffered vascular compromise

How it happens

- Blood flow to gastric mucosa is decreased due to shunting of blood to vital organs.
- Mucosal cells lining the bowel wall die.
- Protective, lubricating mucus isn't secreted.
- Bowel wall is attacked by proteolytic enzymes.
- Bowel wall breaks down.

Signs

- Distended abdomen
- Gastric retention
- Blood in stool or gastric contents
- Lethargy
- Poor feeding
- Hypotension
- Apnea
- Vomiting

Diagnostic tests

- Radiographic studies show intestinal distention and free air in the abdomen (indicating perforation).
- Laboratory studies show anemia, leukopenia, leukocytosis, and electrolyte imbalance.

Treatment

- Prevention; may be accomplished by delaying feeding in premature neonates for several days or feeding the premature

neonate breast milk rather than formula

- Discontinuance of enteral feedings
- Nasogastric suction
- Administration of I.V. antibiotics
- Administration of parenteral fluids
- Surgery

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Hazards of oxygen therapy

No matter which system delivers the oxygen, oxygen therapy is potentially hazardous to a neonate. The gas must be warmed and humidified to prevent hypothermia and dehydration. Given in high concentrations over prolonged periods, oxygen can cause retrolental fibroplasia, leading to blindness. With low oxygen concentration, hypoxia and central nervous system damage may occur. Also, depending on how it's delivered, oxygen can contribute to bronchopulmonary dysplasia.

Other worries

- Infection or “drowning”—can result from overhumidification (overhumidification allows water to collect in tubing, providing a growth medium for bacteria or suffocating the neonate)
- Hypothermia—increased oxygen consumption can result from administering cool (as opposed to warm) oxygen, which causes the neonate to become hypothermic
- Metabolic and respiratory acidosis—may follow inadequate ventilation
- Pressure ulcers—may develop on the neonate's head, face, and around the nose during prolonged oxygen therapy
- Pulmonary air leak (pneumothorax, pneumomediastinum, pneumopericardium, interstitial emphysema)—may arise spontaneously with respiratory distress or result from forced ventilation
- Decreased cardiac output—may result from excessive continuous positive airway pressure

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Caring for a neonate exposed to HIV

When teaching a woman and her family about caring for a neonate exposed to HIV, emphasize the need for:

- frequent follow-up
- testing to determine infection status
- zidovudine administration to decrease the risk of infection
- prophylaxis for *Pneumocystis carinii* pneumonia
- taking precautions to prevent the spread of HIV infection.

Patient education should also include signs of possible HIV infection in the neonate, including:

- recurrent infections
- unusual infections
- failure to thrive
- hematologic manifestations
- renal disease
- neurologic manifestations.

Teaching parents of a preterm neonate

To help the parents of a preterm neonate cope with this difficult situation, follow these guidelines.

- Orient them to the neonatal intensive care unit environment and introduce them to all caregivers.
- Orient them to the machinery and monitors that may be attached to their neonate.
- Reassure them that the staff is alert to alarms as well as to the cues of their neonate.
- Tell them what to expect.
- Teach them the characteristics of a preterm neonate.
- Teach them how to handle their neonate.
- Instruct them on feeding, whether it's through gavage, breast, or bottle.
- Inform them of potential complications.
- Offer discharge planning.
- Make appropriate referrals.

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Teaching parents about PKU

PKU is an inborn error of metabolism characterized by the inability of the body to metabolize the essential amino acid phenylalanine. Teach parents how to limit phenylalanine intake by:

- providing a basic understanding of the disorder.
- offering practical suggestions for meal planning.
- instructing the family on how to:
 - eliminate or restrict foods high in phenylalanine
 - determine if foods are low in phenylalanine by reading food labels
 - avoid using artificial sweeteners containing aspartame (such as NutraSweet).

Teaching proper care of a circumcision

Make sure to show parents the circumcision before discharge so that they can ask questions. Teach them these tips for proper care of a circumcision.

- Reapply fresh petrolatum gauze after each diaper change, if applicable.
- Don't use premoistened towelettes to clean the penis because they contain alcohol, which can delay healing and cause discomfort.
- Don't attempt to remove exudate that forms around the penis; doing so can cause bleeding.
- Change the neonate's diaper at least every 4 hours to prevent it from sticking to the penis.
- Check to make sure that the neonate urinates after being circumcised. He should have 6 to 10 wet diapers in a 24-hour period. If he doesn't, notify the doctor.
- Wash the penis with warm water to remove urine or feces until the circumcision is healed. Soap can be used after the circumcision has healed.
- Notify the doctor if redness, swelling, or discharge is present on the penis. These signs may indicate infection. Note that the penis is normally dark red after circumcision and then becomes covered with a yellow exudate in 24 hours.

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Performing phototherapy

To perform phototherapy, follow these steps:

- Set up the phototherapy unit about 18" (46 cm) above the neonate's bassinet and verify placement of the lightbulb shield. If the neonate is in an incubator, place the phototherapy unit at least 3" (7.6 cm) above the incubator and turn on the lights. Place a photometer probe in the middle of the bassinet to measure the energy emitted by the lights.
- Explain the procedure to the parents.

- Record the neonate's initial bilirubin level and his axillary temperature.
- Place the opaque eye mask over the neonate's closed eyes and fasten securely.
- Undress the neonate and place a diaper under him. Cover male genitalia with a surgical mask or small diaper to catch urine and prevent possible testicular damage from the heat and light waves.
- Take the neonate's axillary temperature every 2 hours and provide additional warmth by adjusting the warming unit's thermostat.
- Monitor elimination and weigh the neonate twice daily. Watch for signs of dehydration (dry skin, poor turgor, depressed fontanel) and check urine specific gravity with a urinometer to gauge hydration status.
- Take the neonate out of the bassinet, turn off the phototherapy lights, and unmask his eyes at least every 3 to 4 hours with feedings. Assess his eyes for inflammation or injury.
- Reposition the neonate every 2 hours to expose all body surfaces to the light and to prevent head molding and skin breakdown from pressure.

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Normal neonatal laboratory values

This chart shows laboratory tests that may be ordered for neonates, including the normal ranges for full-term neonates. Note that ranges may vary among institutions. Because test results for preterm neonates usually reflect weight and gestational age, ranges for preterm neonates vary.

Test	Normal range
<i>Blood</i>	
Acid phosphatase	7.4 to 19.4 units/L
Albumin	3.6 to 5.4 g/dl
Alkaline phosphatase	40 to 300 units/L (1 week)
Alpha fetoprotein	Up to 10 mg/L, with none detected after 21 days
Ammonia	90 to 150 mcg/dl
Amylase	0 to 1,000 IU/hour
Bicarbonate	20 to 26 mmol/L
Bilirubin, direct	< 0.5 mg/dl
Bilirubin, total	< 2.8 mg/dl (cord blood)
0 to 1 day	2.6 mg/dl (peripheral blood)
1 to 2 days	6 to 7 mg/dl (peripheral blood)
3 to 5 days	4 to 6 mg/dl (peripheral blood)
Bleeding time	2 minutes
<i>ABGs</i>	
pH	7.35 to 7.45
PaCO ₂	35 to 45 mm Hg
PaO ₂	50 to 90 mm Hg

Venous blood gases

pH	7.35 to 7.45
PCO ₂	41 to 51 mm Hg
PO ₂	20 to 49 mm Hg
Calcium, ionized	2.5 to 5 mg/dl
Calcium, total	7 to 12 mg/dl
Chloride	95 to 110 mEq/L
Clotting time (2 tube)	5 to 8 minutes
Creatine kinase	10 to 300 IU/L
Creatinine	0.3 to 1 mg/dl
Digoxin level	> 2 ng/ml possible; > 30 ng/ml probable
Fibrinogen	0.18 to 0.38 g/dl
Glucose	30 to 125 mg/dl
Glutamyltransferase	14 to 331 units/L
Hematocrit	52% to 58% 53% (cord blood)
Hemoglobin	17 to 18.4 g/dl 16.8 g/dl (cord blood)
Immunoglobulins, total	660 to 1,439 mg/dl
IgG	398 to 1,244 mg/dl
IgM	5 to 30 mg/dl
IgA	0 to 2.2 mg/dl
Iron	100 to 250 mcg/dl
Iron-binding capacity	100 to 400 mcg/dl
Lactate dehydrogenase	357 to 953 IU/L
Magnesium	1.5 to 2.5 mEq/L
Osmolality	270 to 294 mOsm/kg H ₂ O
Phenobarbital level	15 to 40 mcg/dl
Phosphorus	5 to 7.8 mg/dl (birth) 4.9 to 8.9 mg/dl (7 days)
Platelets	100,000 to 300,000/μl
Potassium	4.5 to 6.8 mEq/L
Protein, total	4.6 to 7.4 g/dl
PT	12 to 21 seconds

PTT	40 to 80 seconds
Red blood cell count	5.1 to 5.8 (1,000,000/ μ l)
Reticulocytes	3% to 7% (cord blood)
Sodium	136 to 143 mEq/L
Theophylline level	5 to 10 mcg/ml
Thyroid-stimulating hormone	< 7 microunits/ml
Thyroxine (T ₄)	10.2 to 19 mcg/dl
<i>Transaminase</i>	
glutamic-oxaloacetic (aspartate)	24 to 81 units/L
glutamic-pyruvic (alanine)	10 to 33 units/L
Triglycerides	36 to 233 mg/dl
Urea nitrogen	5 to 25 mg/dl
WBC count	18,000/ μ l
eosinophils-basophils	3%
immature WBCs	10%
lymphocytes	30%
monocytes	5%
neutrophils	45%
<i>Urine</i>	
Casts, WBCs	Present first 2 to 4 days
Osmolality	50 to 600 mOsm/kg
pH	5 to 7
PKU	No color change
Protein	Present first 2 to 4 days
Specific gravity	1.006 to 1.008
<i>Cerebrospinal fluid</i>	
Calcium	4.2 to 5.4 mg/dl
Cell count	0 to 15 WBCs/ μ l 0 to 500 RBCs/ μ l
Chloride	110 to 120 mg/L
Glucose	32 to 62 mg/dl
pH	7.33 to 7.42
Pressure	50 to 80 mm Hg

Protein	32 to 148 mg/dl
Sodium	130 to 165 mg/L
Specific gravity	1.007 to 1.009

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Ecg

Normal sinus rhythm



Rhythm	regular
Rate	60 to 100 beats/minute
P wave	normal; upright
PR interval	0.12 to 0.20 second
QRS complex	0.06 to 0.10 second

Sinus bradycardia



Rhythm	regular
Rate	< 60 beats/minute
P wave	normal
PR interval	0.12 to 0.20 second
QRS complex	0.06 to 0.10 second

Sinus tachycardia



Rhythm	regular
Rate	100 to 160 beats/minute
P wave	normal
PR interval	0.12 to 0.20 second
QRS complex	0.06 to 0.10 second

Premature atrial contractions (PACs)



Rhythm	irregular
Rate	varies with underlying rhythm
P wave	premature and abnormally shaped with PACs
PR interval	usually within normal limits; varies depending on ectopic focus
QRS complex	0.06 to 0.10 second

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Atrial tachycardia



Rhythm	regular
Rate	atrial—150 to 250 beats/minute ventricular—depends on AV conduction ratio
P wave	hidden in the preceding T wave
PR interval	not visible
QRS complex	0.06 to 0.10 second

Atrial flutter



Rhythm	atrial—regular ventricular—typically irregular
Rate	atrial—250 to 400 beats/minute ventricular—usually 60 to 100 beats/minute; depends on degree of AV block
P wave	classic sawtooth appearance
PR interval	unmeasurable
QRS complex	0.06 to 0.10 second

Atrial fibrillation



Rhythm	irregularly irregular
Rate	atrial—usually > 400 beats/minute ventricular—varies
P wave	absent; replaced by fine fibrillatory waves, or f waves
PR interval	indiscernible
QRS complex	0.06 to 0.10 second

Junctional escape rhythm



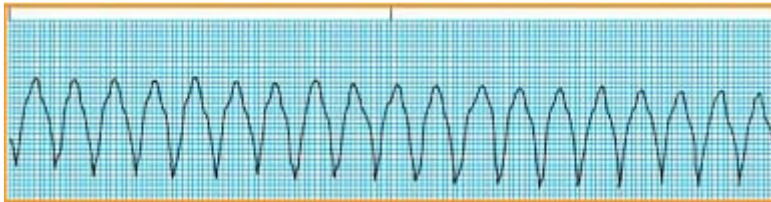
Rhythm	regular
Rate	40 to 60 beats/minute
P wave	usually inverted and may occur before or after each QRS complex or be hidden within it
PR interval	< 0.12 second if P wave precedes QRS; otherwise unmeasurable
QRS complex	0.10 second

Premature ventricular contractions (PVCs)



Rhythm	irregular
Rate	reflects the underlying rhythm
P wave	none with PVC, but P wave present with other QRS complexes
PR interval	unmeasurable except in underlying rhythm
QRS complex	early, with bizarre configuration and duration of > 0.12 second; QRS complexes are normal in underlying rhythm

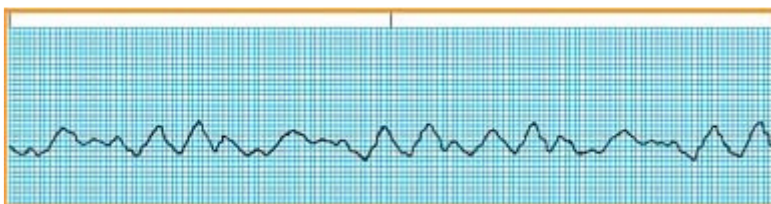
Ventricular tachycardia



Rhythm	regular
Rate	atrial—can't be determined ventricular—100 to 250 beats/minute
P wave	absent
PR interval	unmeasurable
QRS complex	> 0.12 second; wide and bizarre

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Ventricular fibrillation



Rhythm	chaotic
Rate	can't be determined
P wave	absent
PR interval	unmeasurable
QRS complex	indiscernible

Asystole



Rhythm	atrial—usually indiscernible ventricular—no rhythm
Rate	atrial—usually indiscernible ventricular—no rate
P wave	may be present
PR interval	unmeasurable
QRS complex	absent or occasional escape beats

First-degree atrioventricular block



Rhythm	regular
Rate	within normal limits
P wave	normal
PR interval	> 0.20 second (see shaded area) but constant
QRS complex	0.06 to 0.10 second

Type I second-degree atrioventricular block



Rhythm	atrial—regular ventricular—irregular
Rate	atrial—exceeds ventricular rate; both remain within normal limits
P wave	normal
PR interval	progressively prolonged (see shaded areas) until a P wave appears without a QRS complex
QRS complex	0.06 to 0.10 second

Type II second-degree atrioventricular block



Rhythm	atrial—regular ventricular—irregular
Rate	atrial—within normal limits ventricular—slower than atrial but may be within normal limits
P wave	normal
PR interval	constant for the conducted beats
QRS complex	within normal limits; absent for dropped beat

Third-degree atrioventricular block



Rhythm	regular
Rate	atria and ventricles beat independently atrial—60 to 100 beats/minute ventricular—40 to 60 beats/minute if intranodal block; < 40 beats/minute if infranodal block
P wave	normal
PR interval	varied; not applicable or measurable
QRS complex	normal or widened

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Essentials

CPR

Before beginning basic life support, CPR, or rescue breathing, activate the appropriate code team.

Adult or adolescent

<i>Check for unresponsiveness</i>	Gently shake and shout, "Are you okay?"
<i>Call for help/call 911</i>	Immediately call 911 for help. If a second rescuer is available, send him to get help or an AED and initiate CPR if indicated. If asphyxial arrest is likely, perform 5 cycles (about 2 min) of CPR before activating EMS.
<i>Position patient</i>	Place patient in supine position on hard, flat surface.
<i>Open airway</i>	Use head-tilt, chin-lift maneuver unless contraindicated by trauma.
<i>If you suspect trauma</i>	Open airway using jaw-thrust method if trauma is suspected.
<i>Check for adequate breathing</i>	Look, listen, and feel for 10 sec.
<i>Perform ventilations</i>	Do two breaths initially that make the chest rise at 1 second/breath; then one every 5 to 6 sec.
<i>If chest doesn't rise</i>	Reposition and reattempt ventilation. Several attempts may be necessary.
<i>Check pulse</i>	Palpate the carotid for no more than 10 sec.
<i>Start compressions</i>	
Placement	Place both hands, one atop the other, on lower half of sternum between the nipples, with elbows locked; use straight up-and-down motion without losing contact with chest.
Depth	One-third depth of chest or 1½" to 2"
Rate	100/min
Comp-to-vent ratio	30:2 (if intubated, continuous chest compressions at a rate of 100/min without pauses for ventilation; ventilation at 8 to 10 breaths/min)
<i>Check pulse</i>	Check after 2 min of CPR and as appropriate thereafter. Minimize interruptions in chest compressions.
<i>Use AED</i>	Apply as soon as available and follow prompts. Provide 2 min of CPR after first shock is delivered before activating AED to reanalyze rhythm and attempt another shock.

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Child (1 year to onset of adolescence or puberty)

<i>Check for unresponsiveness</i>	Gently shake and shout, "Are you okay?"
<i>Call for help/call 911</i>	Call after 2 min of CPR. Call immediately for witnessed collapse.
<i>Position patient</i>	Place patient in a supine position on a hard, flat surface.
<i>Open airway</i>	Use head-tilt, chin-lift maneuver unless contraindicated by trauma.

If you suspect trauma	Open airway using jaw-thrust method if trauma is suspected.
Check breathing	Look, listen, and feel for 10 sec.
Perform ventilations	Do two breaths initially that make the chest rise at 1 sec/breath; then one every 3 to 5 sec.
If chest doesn't rise	Reposition and reattempt ventilation. Several attempts may be necessary.
Check pulse	Palpate the carotid or femoral for no more than 10 sec.
Start compressions	
Placement	Place heel of one hand or place both hands, one atop the other, with elbows locked, on lower half of sternum between the nipples.
Depth	1/3 to ½ depth of the chest
Rate	100/min
Comp:Vent ratio	30:2 (if intubated, continuous chest compressions at a rate of 100/min without pauses for ventilation; ventilation at 8 to 10 breaths/min)
Check pulse	Check after 2 min of CPR and as appropriate thereafter. Minimize interruptions in chest compressions.
AED	Use as soon as available and follow prompts. Use child pads and child system for child age 1 to 8 years. Provide 2 min of CPR after first shock is delivered before activating AED to reanalyze rhythm and attempt another shock.

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Infant (0 to 1 year)

Check for unresponsiveness	Gently shake and flick bottom of foot and call out name.
Call for help/call 911	Call after 2 minutes of CPR; call immediately for witnessed collapse.
Position patient	Place patient in a supine position on a hard, flat surface.
Open airway	Use head-tilt, chin-lift maneuver unless contraindicated by trauma. Don't hyperextend the infant's neck.
If you suspect trauma	Open airway using jaw-thrust method if trauma is suspected.
Check breathing	Look, listen, and feel for 10 seconds.
Perform ventilations	Do two breaths at 1 second/breath initially; then one every 3 to 5 seconds.
If chest doesn't rise	Reposition and reattempt ventilation. Several attempts may be necessary.
Check pulse	Palpate brachial or femoral pulse for no more than 10 seconds.
Start compressions	
Placement	Place two fingers 1 fingerwidth below nipples.
Depth	1/3 to ½ depth of the chest
Rate	100/minute
Comp:Vent ratio	30:2 (If intubated, continuous chest compression at a rate of 100/min. without pauses for ventilation; ventilation at 8 to 10 breaths/min.)
Check pulse	Check after 2 minutes of CPR and as appropriate thereafter. Minimize interruptions in chest compressions.

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Choking

Adult or child (older than 1 year)

Symptoms

- Grabbing the throat with the hand
- Inability to speak
- Weak, ineffective coughing
- High-pitched sounds while inhaling

Interventions

1. Shout, "Are you choking? Can you speak?" Assess for airway obstruction. Don't intervene if the person is coughing forcefully and able to speak; a strong cough can dislodge the object.
2. Stand behind the person and wrap your arms around the person's waist (if pregnant or obese, wrap arms around chest).
3. Make a fist with one hand; place the thumbside of your fist just above the person's navel and well below the sternum.
4. Grasp your fist with your other hand.
5. Use quick, upward and inward thrusts with your fist (perform chest thrusts for pregnant or obese victims).
6. Continue thrusts until the object is dislodged or the victim loses consciousness. If the latter occurs, activate the emergency response number and provide CPR. Each time you open the airway to deliver rescue breaths, look in the mouth and remove any object you see. Never perform a blind finger-sweep.

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Infant (younger than 1 year)

Symptoms

- Inability to cry or make significant sound
- Weak, ineffective coughing
- Soft or high-pitched sounds while inhaling
- Bluish skin color

Interventions

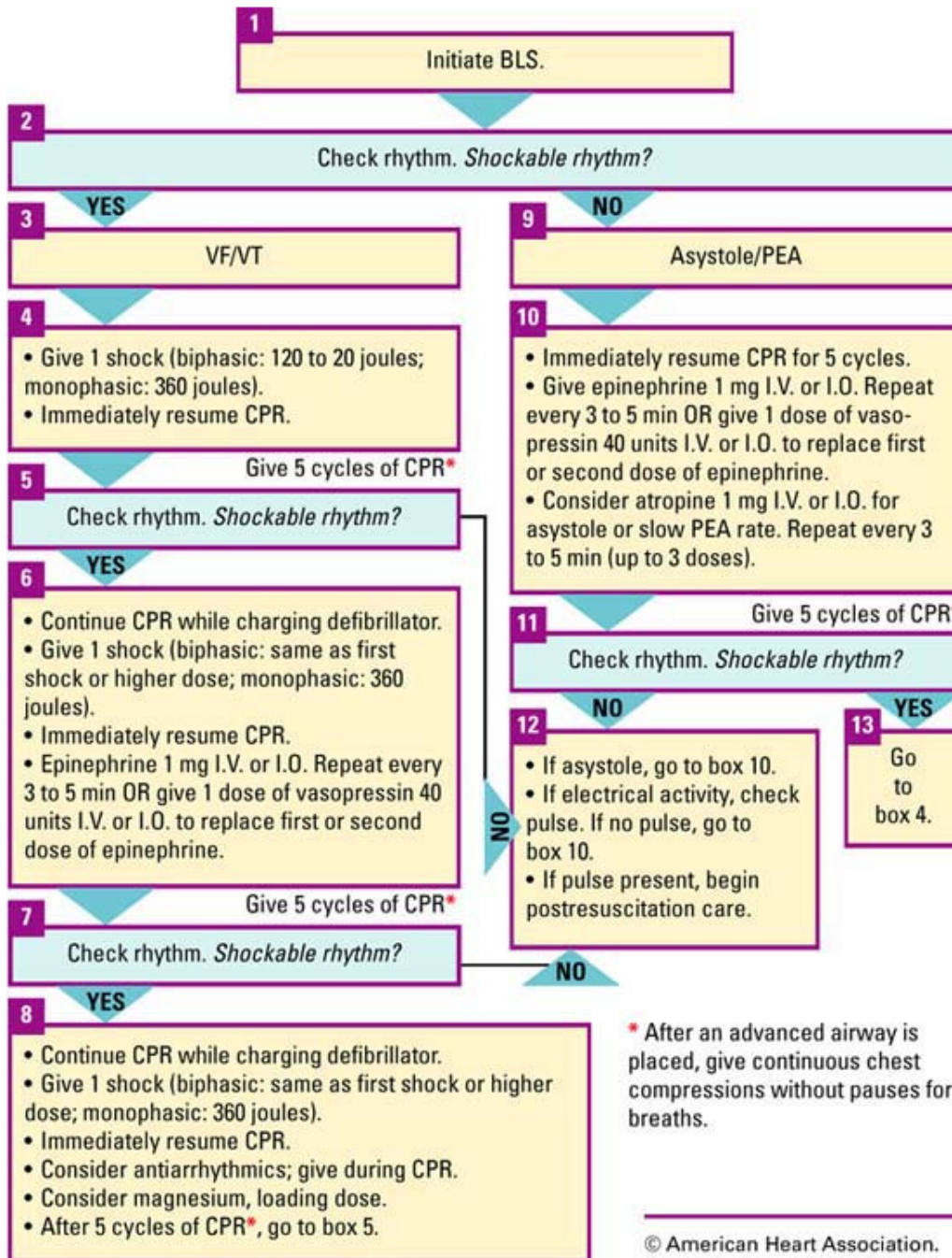
1. Assess that airway is obstructed. *Don't* perform the next two steps if infant is coughing forcefully or has a strong cry.
2. Lay infant face down along your forearm. Hold infant's chest in your hand and his jaw with your fingers. Point the infant's head downward, lower than the body. Use your thigh or lap for support.
3. Give five quick, forceful blows between the infant's shoulder blades using the heel of your free hand.

After five blows

1. Turn the infant face up.
2. Place two fingers on the middle of infant's sternum just below the nipples.
3. Give five quick thrusts down, compressing the chest at 1/3 to 1/2 the depth of the chest or 1/2" to 1" (2 to 2.5 cm).
4. Continue five back blows and five chest thrusts until the object is dislodged or the infant loses consciousness. If the latter occurs, perform CPR. Each time you open the airway to deliver rescue breaths, look in the mouth and remove any object you see. Never perform a blind finger-sweep.

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Pulseless arrest algorithm



Calculating drip rates

When calculating the flow rate of I.V. solutions, remember that the number of drops required to deliver 1 ml varies with the type of administration set. To calculate the drip rate, you must know the calibration of the drip rate for each specific manufacturer's product. As a quick guide, refer to the chart below. Use this formula to calculate specific drip rates:

$$\frac{\text{volume of infusion (in ml)}}{\text{time of infusion (in minutes)}} \times \text{drip factor (in drops/ml)} = \text{drops/minute}$$

Ordered volume

500 ml/24 hr or 21 ml/hr	1,000 ml/24 hr or 42 ml/hr	1,000 ml/20 hr or 50 ml/hr	1,000 ml/10 hr or 100 ml/hr	1,000 ml/8 hr or 125 ml/hr	1,000 ml/6 hr or 167 ml/hr
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Drops/ml Drops/minute to infuse

Macro drip

10 4 7 8 17 21 28

15 5 11 13 25 31 42

20 7 14 17 33 42 56

Microdrip

60 21 42 50 100 125 167

Blood products

Blood component	Indications
Packed RBCs Same RBC mass as whole blood but with 80% of the plasma removed <i>Volume:</i> 250 ml	<ul style="list-style-type: none">● Inadequate circulating red cell mass● Symptomatic deficiency of oxygen-carrying capacity● Symptomatic chronic anemia● Sickle cell disease (red cell exchange)
Platelets Platelet sediment from RBCs or plasma <i>Volume:</i> 35 to 50 ml/unit	<ul style="list-style-type: none">● Bleeding due to critically decreased circulating or functionally abnormal platelets● Prevention of bleeding due to thrombocytopenia
Fresh frozen plasma (FFP) Uncoagulated plasma separated from RBCs and rich in coagulation factors V, VIII, and IX <i>Volume:</i> 180 to 300 ml	<ul style="list-style-type: none">● Coagulation factor deficiency● Warfarin reversal● Thrombotic thrombocytopenic purpura
Albumin 5% (buffered saline); albumin 25% (salt poor) A small plasma protein prepared by fractionating pooled plasma <i>Volume:</i> 5% = 12.5 g/250 ml; 25% = 12.5 g/50 ml	<ul style="list-style-type: none">● Volume loss because of shock from burns, trauma, surgery, or infections● Hypoproteinemia
Cryoprecipitate Insoluble portion of plasma recovered from FFP <i>Volume:</i> approximately 30 ml (freeze-dried)	<ul style="list-style-type: none">● Bleeding associated with factor XIII and fibrogen deficiencies

Transfusion reactions

Reaction and causes	Signs and symptoms
Allergic <ul style="list-style-type: none">● Allergen in donor blood● Donor blood hypersensitive to certain drugs	Anaphylaxis (chills, facial swelling, laryngeal edema, pruritus, urticaria, wheezing), fever, nausea, and vomiting
Bacterial contamination <ul style="list-style-type: none">● Organisms that can survive cold, such as <i>Pseudomonas</i> and <i>Staphylococcus</i>	Chills, fever, vomiting, abdominal cramping, diarrhea, shock, signs of renal failure
Febrile <ul style="list-style-type: none">● Bacterial lipopolysaccharides● Antileukocyte recipient antibodies directed against donor WBCs	Temperature up to 104° F (40° C), chills, headache, facial flushing, palpitations, cough, chest tightness, increased pulse rate, flank pain
Hemolytic <ul style="list-style-type: none">● ABO or Rh incompatibility● Intradonor incompatibility● Improper crossmatching● Improperly stored blood	Chest pain, dyspnea, facial flushing, fever, chills, shaking, hypotension, flank pain, hemoglobinuria, oliguria, bloody oozing at the infusion site or surgical incision site, burning sensation along vein receiving blood, shock, renal failure
Plasma protein incompatibility <ul style="list-style-type: none">● Immunoglobulin-A incompatibility	Abdominal pain, diarrhea, dyspnea, chills, fever, flushing, hypotension

Nursing interventions

- Stop transfusion.

- Assess patient.
- Notify doctor.
- Follow facility policy.

Common terms

acme: the peak of a contraction

amnion: the inner of the two fetal membranes that forms the amniotic sac and houses the fetus and the fluid that surrounds it in utero

amniotic: relating to or pertaining to the amnion

amniotic fluid: fluid surrounding the fetus, derived primarily from maternal serum and fetal urine

amniotic sac: membrane that contains the fetus and fluid during gestation

artificial insemination: mechanical deposition of a partner's or donor's spermatozoa at the cervical os

basal body temperature: body temperature when the body is at complete rest; can be used as a sign that ovulation has occurred

chorion: the fetal membrane closest to the uterine wall; gives rise to the placenta and is the outer membrane surrounding the amnion

conduction: loss of body heat to a solid, cooler object through direct contact

congenital disorder: disorder present at birth that may be caused by genetic or environmental factors

convection: loss of body heat to cooler ambient air

corpus luteum: yellow structure formed from a ruptured graafian follicle that secretes progesterone during the second half of the menstrual cycle; if pregnancy occurs, the corpus luteum continues to produce progesterone until the placenta assumes that function

cotyledon: one of the rounded segments on the maternal side of the placenta, consisting of villi, fetal vessels, and an intervillous space

cryptorchidism: undescended testes

cul-de-sac: pouch formed by a fold of the peritoneum between the anterior wall of the rectum and the posterior wall of the uterus; also known as *Douglas' cul-de-sac*

decidua: mucous membrane lining of the uterus during pregnancy that's shed after birth

dilation: widening of the external cervical os

dizygotic: pertaining to or derived from two fertilized ova, or *zygotes* (as in dizygotic twins)

doll's eye sign: movement of a neonate's eyes in a direction opposite to which the head is turned; this reflex typically disappears after 10 days of extrauterine life

Down syndrome: abnormality involving the occurrence of a third chromosome, instead of the normal pair (trisomy 21), that characteristically results in mental retardation and altered physical appearance

dystocia: difficult labor

effleurage: gentle massage to the abdomen during labor for the purpose of relaxation and distraction

effacement: thinning and shortening of the cervix

embryo: conceptus from the time of implantation to 8 weeks

endometrium: inner mucosal lining of the uterus

engagement: descent of the fetal presenting part to at least the level of the ischial spines

Epstein's pearls: small, white, firm epithelial cysts on the neonate's hard palate

evaporation: loss of body heat that occurs as fluid on the body surface changes to a vapor

fetus: conceptus from 8 weeks until term

follicle-stimulating hormone: hormone produced by the anterior pituitary gland that stimulates the development of the graafian follicle

fontanel: space at the junction of the sutures connecting fetal skull bones

gene: factor on a chromosome responsible for the hereditary characteristics of the offspring

Homans' sign: calf pain on leg extension and foot dorsiflexion that's an early sign of thrombo-phlebitis

human chorionic gonadotropin: hormone produced by the chorionic villi that serves as the biological marker in pregnancy tests

hypoxia: reduced oxygen availability to tissues or fetus

increment: period of increasing strength of a uterine contraction

intensity: the strength of a uterine contraction (if measured with an intrauterine pressure device, measure and record in millimeters of mercury [mm Hg]; if measured externally, use a relative measurement)

interval: period between the end of one uterine contraction and the beginning of the next uterine contraction

intervillous space: irregularly shaped areas in the maternal portion of the placenta that are filled with blood and serve as the site for maternal-fetal gas, nutrient, and waste exchange

involution: reduction of uterine size after delivery; may take up to 6 weeks

lanugo: downy, fine hair that covers the fetus between 20 weeks of gestation and birth

lecithin: a phospholipid surfactant that reduces surface tension and increases pulmonary tissue elasticity; presence in amniotic fluid is used to determine fetal lung maturity

leukorrhea: white or yellow vaginal discharge

lie: relationship of the long axis of the fetus to the long axis of the pregnant patient

lochia: discharge after delivery from sloughing of the uterine decidua

luteinizing hormone: hormone produced by the anterior pituitary gland that stimulates ovulation and the development of the corpus luteum

molding: shaping of the fetal head caused by shifting of sutures in response to pressure exerted by the maternal pelvis and birth canal during labor and delivery

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myometrium: middle muscular layer of the uterus that's made up of three layers of smooth, involuntary muscles

neonate: an infant between birth and the 28th day of life

oligohydramnios: severely reduced and highly concentrated amniotic fluid

perimetrium: outer serosal layer of the uterus

polyhydramnios: abnormally large amount (more than 2,000 ml) of amniotic fluid in the uterus

puerperium: interval between delivery and 6 weeks after delivery

radiation: loss of body heat to a solid cold object without direct contact

ripening: softening and thinning of the cervix in preparation for active labor

rugae: folds in the vaginal mucosa and scrotum

sphingomyelin: a general membrane phospholipid that isn't directly related to lung maturity but is compared with lecithin to determine fetal lung maturity; levels remain constant during pregnancy

station: relationship of the presenting part to the ischial spines

subinvolution: failure of the uterus to return to normal size after delivery

sutures: narrow areas of flexible tissue on the fetal scalp that allow for slight adjustment during descent through the birth canal

tocolytic agent: medication that stops premature contractions

tocotransducer: an external mechanical device that translates one physical quantity to another, most often seen in capturing fetal heart rates and transmitting and recording the value onto a fetal monitor

Wharton's jelly: whitish, gelatinous material that surrounds the umbilical vessels within the cord

Dangerous abbreviations

The Joint Commission has approved the following “minimum list” of dangerous abbreviations, acronyms, and symbols. Using this list should help protect patients from the effects of miscommunication in clinical documentation.

Abbreviation	Potential problem	Preferred term
U (for unit)	Mistaken as zero, four, or cc	Write “unit”
IU (for international unit)	Mistaken as IV (intravenous) or 10 (ten)	Write “international unit”
Q.D., QD, q.d., qd (daily) Q.O.D., QOD, q.o.d., qod (every other day)	Mistaken for each other; the period after the Q can be mistaken for an “I”; the “O” can also be mistaken for an “l”	Write “daily” or “every other day”
Trailing zero (X.0 mg) (<i>Note:</i> Prohibited only for medication-related notations), lack of leading zero (.X mg)	Decimal point is missed	Never write a zero by itself after a decimal point (X mg), and always use a zero before a decimal point (0.X mg)
MS, MSO ₄ , MgSO ₄	Confused for one another; can mean morphine sulfate or magnesium sulfate	Write “morphine sulfate” or “magnesium sulfate”

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Neonate weight conversion

Use this table to convert from pounds and ounces to grams when weighing neonates.

	Pounds				Ounces											
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	—	28	57	85	113	142	170	198	227	255	283	312	340	369	397	425
1	454	484	510	539	567	595	624	652	680	709	737	765	794	822	850	879
2	907	936	964	992	1021	1049	1077	1106	1134	1162	1191	1219	1247	1276	1304	1332
3	1361	1389	1417	1446	1474	1503	1531	1559	1588	1616	1644	1673	1701	1729	1758	1786
4	1814	1843	1871	1899	1928	1956	1984	2013	2041	2070	2098	2126	2155	2183	2211	2240
5	2268	2296	2325	2353	2381	2410	2438	2466	2495	2523	2551	2580	2608	2637	2665	2693
6	2722	2750	2778	2807	2835	2863	2892	2920	2948	2977	3005	3033	3062	3090	3118	3147
7	3175	3203	3232	3260	3289	3317	3345	3374	3402	3430	3459	3487	3515	3544	3572	3600
8	3629	3657	3685	3714	3742	3770	3799	3827	3856	3884	3912	3941	3969	3997	4026	4054
9	4082	4111	4139	4167	4196	4224	4252	4281	4309	4337	4366	4394	4423	4451	4479	4508
10	4536	4564	4593	4621	4649	4678	4706	4734	4763	4791	4819	4848	4876	4904	4933	4961
11	4990	5018	5046	5075	5103	5131	5160	5188	5216	5245	5273	5301	5330	5358	5386	5415
12	5443	5471	5500	5528	5557	5585	5613	5642	5670	5698	5727	5755	5783	5812	5840	5868
13	5897	5925	5953	5982	6010	6038	6067	6095	6123	6152	6180	6209	6237	6265	6294	6322

14	6350	6379	6407	6435	6464	6492	6520	6549	6577	6605	6634	6662	6690	6719	6747	6776
15	6804	6832	6860	6889	6917	6945	6973	7002	7030	7059	7087	7115	7144	7172	7201	7228

English-Spanish medical words and phrases

Pregnancy history

How many times have you been pregnant?	¿Cuántas veces ha estado embarazada?
How many children do you have?	¿Cuántos hijos tiene?
Did you breast-feed them?	¿Los amamantó?
Have you ever had a baby that was:	¿Ha tenido algún bebé:
small?	pequeño?
large?	grande?
premature?	prematuro?
born cesarian?	nacido con cesárea?
born feet first?	que haya nacido pies primero?
Have you had multiple births?	¿Ha tenido partos múltiples?
Twins?	¿Mellizos?
More than two?	¿Más de dos?
Have you had a child born dead?	¿Algún hijo suyo nació sin vida?
Have you had a miscarriage?	¿Ha tenido algún aborto espontáneo?
Have you had an abortion?	¿Ha tenido algún aborto provocado?
Have you had problems with a pregnancy such as:	¿Ha tenido problemas en el embarazo, tales como:
diabetes?	diabetes?
high blood pressure?	presión sanguínea alta?
How much did each of your children weigh at birth?	¿Cuánto pesó cada uno de sus hijos al nacer?

Present pregnancy

What is the date of your last menstrual period?	¿En qué fecha fue su último periodo menstrual?
How many weeks pregnant are you?	¿Cuántas semanas de embarazo tiene?
What is the due date for the baby?	¿Cuál es la fecha prevista para el nacimiento de su hijo?
Do you want to breast-feed this child?	¿Desea usted amamantar a este bebé?
Are you taking medications now?	¿Está tomando medicamentos actualmente?
Is the baby moving normally?	¿El bebé se mueve normalmente?
When did the contractions begin?	¿Cuándo comenzaron las contracciones?

How close are your contractions?	¿Con qué frecuencia ocurren las contracciones?
How long do they last?	¿Cuánto duran?
Did your water break?	¿Rompió aguas?
What time did it break?	¿A qué hora rompió aguas?
Was the fluid clear?	¿El líquido era transparente?
Green?	¿Verde?
Bloody?	¿Sanguinolento?
Do you need to urinate?	¿Necesita orinar?
Do you want something for the pain?	¿Desea algo para el dolor?
Do you want an epidural?	¿Desea una epidural?
This will monitor the baby's heart rate.	Esto controlará el ritmo cardíaco del bebé.
This will monitor your contractions.	Esto controlará sus contracciones.

Instructions

Breathe slowly through your mouth.	Respire lentamente por la boca.
Pant.	Jadee.
Push only when you are told.	Empuje solo cuando se le diga que lo haga.
Push.	Empuje.
Turn on your side.	Póngase de costado.
Breathe this oxygen.	Respire este oxígeno.

Other phrases

Your baby is having a problem.	Su bebé está teniendo un problema.
You will need general anesthesia.	Usted necesitará anestesia general.
You need an emergency cesarean birth.	Usted necesitará una cesárea de emergencia.
It is a:	Es:
boy.	un niño.
girl.	una niña.
Your baby is healthy.	Su bebé es saludable.
Your baby weighs ____ pounds and ____ ounces.	Su bebé pesa ____ libras y ____ onzas.

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