OB/GYN Peds Notes
Nurse’s Clinical Pocket Guide

Brenda Walters Holloway
Cheryl Moredich

Includes...
✓ Latest Screening Guidelines for Women
✓ Updated Prenatal and Postpartum Care
✓ Expanded Contraceptive Information
✓ Updated CPR Guidelines and Nutrition Information for Children
✓ Updated Growth and BMI Charts for Children

and much more!
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjuvant therapy</td>
<td>Complementary cancer treatment intended to impede the growth of micrometastatic disease</td>
</tr>
<tr>
<td>Amenorrhea (primary)</td>
<td>Absence of menarche by age 16 or absence of secondary sexual characteristics by age 14</td>
</tr>
<tr>
<td>Amenorrhea (secondary)</td>
<td>Absence of menses after history of established menstruation</td>
</tr>
<tr>
<td>Cervical dysplasia</td>
<td>Abnormal cervical cellular changes</td>
</tr>
<tr>
<td>Climacteric</td>
<td>Decline in female reproductive ability before menopause</td>
</tr>
<tr>
<td>Colporrhaphy</td>
<td>Surgical repair of weakened vaginal wall; used for treatment of rectocele (posterior)/cystocele (anterior)</td>
</tr>
<tr>
<td>Colposcope</td>
<td>Magnifying instrument used to closely examine cervical tissue and aid in biopsy if indicated</td>
</tr>
<tr>
<td>Corpus luteum</td>
<td>Term given to the follicle after ovulation; produces estrogen and progesterone in luteal phase of the menstrual cycle</td>
</tr>
<tr>
<td>Cryosurgery</td>
<td>Application of extremely cold cervical probe to the cervix intended to destroy and treat abnormal cervical cells</td>
</tr>
<tr>
<td>Cystocele</td>
<td>Protrusion of the bladder into the vagina</td>
</tr>
<tr>
<td>Dysmenorrhea</td>
<td>Painful menstruation</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>Pain experienced during intercourse</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>Endometrial tissue located outside of the uterus</td>
</tr>
<tr>
<td>GnRH</td>
<td>Gonadotropin-releasing hormone</td>
</tr>
<tr>
<td>HPV</td>
<td>Human papillomavirus</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>Surgical excision of the uterus</td>
</tr>
<tr>
<td>Hysterosalpingography</td>
<td>Radiographic visualization of the uterus and fallopian tubes with insertion of a contrast medium; may be therapeutic by opening tube</td>
</tr>
</tbody>
</table>

*Continued*
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteroscopy</td>
<td>Examination of the uterus using a specialized instrument</td>
</tr>
<tr>
<td>Kegel exercises</td>
<td>Exercises performed by a woman to strengthen the pelvic floor and decrease incidence of stress incontinence</td>
</tr>
<tr>
<td>LEEP</td>
<td>Loop electrosurgical excision procedure; used in the treatment of cervical dysplasia</td>
</tr>
<tr>
<td>Lymphedema</td>
<td>Abnormal accumulation of lymph fluid in the interstitial spaces; may occur after excision of lymph nodes</td>
</tr>
<tr>
<td>Mastectomy</td>
<td>Surgical removal of the breast</td>
</tr>
<tr>
<td>Menarche</td>
<td>Launch of menses in the young female</td>
</tr>
<tr>
<td>Menopause</td>
<td>Permanent cessation of menses marking the end of reproductive ability; average age in U.S. women, 52 years</td>
</tr>
<tr>
<td>Menorrhagia</td>
<td>Menstrual flow that is excessive in amount or number of days</td>
</tr>
<tr>
<td>Metrorrhagia</td>
<td>Bleeding between expected menstrual periods</td>
</tr>
<tr>
<td>Myomectomy</td>
<td>Surgical excision of a uterine fibroid</td>
</tr>
<tr>
<td>OC</td>
<td>Oral contraceptive</td>
</tr>
<tr>
<td>OCP</td>
<td>Oral contraceptive pill</td>
</tr>
<tr>
<td>Oligomenorrhea</td>
<td>Scanty or infrequent menstrual flow</td>
</tr>
<tr>
<td>Oophorectomy</td>
<td>Surgical excision of the ovary</td>
</tr>
<tr>
<td>Ovulation</td>
<td>Cyclic release of an ovum from graafian follicle; occurs 14 days before menses</td>
</tr>
<tr>
<td>PCOS</td>
<td>Polycystic ovarian syndrome</td>
</tr>
<tr>
<td>Pessary</td>
<td>Medical device used to support the pelvic floor and reduce symptoms associated with uterine prolapse, cystocele, and rectocele</td>
</tr>
<tr>
<td>Rectocele</td>
<td>Protrusion of the rectum into the vagina</td>
</tr>
</tbody>
</table>
### Common Gynecological Terms/Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salpingectomy</td>
<td>Surgical excision of the fallopian tube</td>
</tr>
<tr>
<td>Sentinel node</td>
<td>First lymph node that receives lymphatic drainage from a tumor</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually transmitted disease</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually transmitted infection</td>
</tr>
<tr>
<td>TAH-BSO</td>
<td>Total abdominal hysterectomy with bilateral salpingo-oophorectomy</td>
</tr>
<tr>
<td>Uterine artery embolization</td>
<td>Procedure performed to decrease the blood supply to uterine fibroids, with the intention of shrinking them</td>
</tr>
<tr>
<td>Uterine fibroid</td>
<td>Encapsulated, connective tissue tumor of the uterus</td>
</tr>
<tr>
<td>Uterine prolapse</td>
<td>Protrusion of the uterus into the vagina</td>
</tr>
</tbody>
</table>

### Ways That Nurses Have an Impact on Women’s Health

Nurses have an impact on women’s health through the following:
- Educating women about healthy lifestyle choices
- Role-modeling healthy behavior and promoting wellness
- Describing the role of prevention and early detection
- Informing women about disease treatment and progression
- Being an advocate and resource for community referrals

### Patient Education—Normal Menstrual Cycle

#### Average Menstrual Cycle

- Every 28 days; 14 days after ovulation; duration 5 days
- Approximate blood loss 50 mL
Controlled by the following feedback mechanisms:
- Hypothalamic-pituitary cycle
- Ovarian cycle
- Endometrial cycle

**Blood levels: Gonadotropins**
- Follicle-stimulating hormone (FSH)
- Luteinizing hormone (LH)

**Blood levels: Ovarian hormones**
- Estrogen
- Progesterone

**Ovarian cycle**
- Primary follicle
- Mature follicle
- Ovulation
- Corpus luteum
- Degenerating corpus luteum

**Endometrial cycle**
- Menstrual phase
- Proliferative phase
- Secretory phase
- Ischemic phase
Hypothalamic-Pituitary Cycle

- ↓ Estrogen and progesterone stimulate the hypothalamus to secrete gonadotropin-releasing hormone (GnRH)
- ↑ GnRH stimulates the anterior pituitary to secrete follicle-stimulating hormone (FSH)
- ↑ Levels of FSH stimulate development of the ovarian graafian follicles, which ↑ ovarian production of estrogen
- Midcycle, a slight ↓ estrogen triggers GnRH to stimulate the anterior pituitary to secrete luteinizing hormone (LH)
- A surge of LH and small ↑ in estrogen stimulate the graafian follicle to release an ovum (ovulation), changing the follicle into the corpus luteum. If fertilization does not occur, levels of estrogen and progesterone decrease and the corpus luteum regresses

Ovarian Cycle

- Follicular phase
  - Before ovulation 1–30 follicles begin to develop under the influence of FSH and estrogen
  - Under the influence of LH, one oocyte completes maturation and is released from the follicle
- Luteal phase
  - Begins after ovulation and ends with menstruation
  - Corpus luteum secretes estrogen/progesterone, peaks on day 8
  - Corpus luteum regresses without conception

Endometrial Cycle

- Menstrual phase (day 1–5)
  - Shedding of the functional 2/3 of endometrium
- Proliferative phase (day 5–ovulation)
  - Rapid endometrial growth, influenced by estrogen
- Secretory phase (ovulation to 3 days before menses)
  - Endometrium thickens with ↑ blood and glandular secretions influenced by progesterone
- Ischemic phase
  - Spasm and necrosis of the functional layer of the endometrium
Gynecological Health

American Congress for Obstetricians and Gynecologists (ACOG) Guidelines for Cervical Cancer Screening
- Method: Liquid-based or conventional fixed-slide method of collecting exfoliated cervical cells from the cervical transformation zone with or without human papillomavirus (HPV) screen

Guidelines for average-risk women:
- Initial cervical screening should begin at age 21 years
- Women 21–29 years of age
  - Cervical cytology every 3 years
- Women 30–65 years of age
  - Cervical cytology with HPV test every 5 years (preferred), or
  - Cervical cytology alone every 3 years (adequate)
- Women 65 years or older. Stop screening if:
  - No history of cervical dysplasia
  - Three negative cytology results in a row
  - Two negative co-tests in a row in the past 10 years (most recent negative test performed in the last 5 years)
  - Annual health promotion gynecologist visits

Sexual Health

Nurses can promote risk reduction measures intended to decrease the incidence of sexually transmitted infection (STI):
- Encourage the reduction of the number of sexual partners and mutually monogamous sexual relationships
- Encourage consistent and proper use of female and male condoms
- Encourage open discussion about sexual history and STI history with sexual partners
- Encourage screening and prompt treatment for STIs
- Discourage sexual activity until treatment is completed
- Encourage pre-exposure vaccination for vaccine-preventable STIs
**GYN BASICS**

**Age Group**

- **Covered by the Vaccine Injury Compensation Program**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Recommended doses based on indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoster</td>
<td>1 or 3 doses depending on indication</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)*</td>
<td>2 or 3 doses depending on indication</td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Female*</td>
<td>1 or 2 doses depending on indication</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)*</td>
<td>1 or 3 doses depending on indication</td>
</tr>
<tr>
<td>Pneumococcal 13-valent (PCV13)*</td>
<td>1 or 2 doses depending on indication</td>
</tr>
<tr>
<td>Pneumococcal 23-valent polysaccharide (PPSV23)</td>
<td>3 doses</td>
</tr>
<tr>
<td>Meningococcal 4-valent conjugate (MenACWY) or polysaccharide (MPSV4)</td>
<td>2 or 3 doses depending on indication</td>
</tr>
<tr>
<td>Meningococcal B (MenB)</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis A*</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis B*</td>
<td>1 dose</td>
</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)*</td>
<td>1 dose</td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Male*</td>
<td>1 dose</td>
</tr>
<tr>
<td>Varicella*</td>
<td>1 dose</td>
</tr>
</tbody>
</table>

**Recommended for all persons who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection; zoster vaccine is recommended regardless of past episode of zoster**

**Recommended for persons with a risk factor (medical, occupational, lifestyle, or other indication)**

**No recommendation**

**Notes:**

- The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), the American College of Obstetricians and Gynecologists (ACOG) and the American College of Nurse-Midwives (ACNM).

- Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

- Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccinations is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday-Friday, excluding holidays.

- Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 202-625-4000. Goods or services obtained through a Vaccine Injury Compensation Program decision are the Vaccine Vaccine Exemption System (VAXES). Reporting forms and instructions on filing a VAXES report are covered by the Vaccine Injury Compensation Program.

- Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

**CDC 2016 Adult Immunization Table**

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms</th>
<th>Detection</th>
<th>Pregnancy Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chlamydia</strong></td>
<td>Often asymptomatic</td>
<td>Endocervical culture</td>
<td>Screening recommended for women &lt;25 years of age and older women at increased risk</td>
</tr>
<tr>
<td></td>
<td>• Mucopurulent discharge</td>
<td>• Urine test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Postcoital bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dyspareunia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Abdominal pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dysuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gonorrhea</strong></td>
<td>Often asymptomatic</td>
<td>Endocervical culture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Purulent vaginal discharge</td>
<td>• Urine test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dyspareunia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Abdominal pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dysuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neonatal Concerns</strong></td>
<td></td>
<td></td>
<td>Ophthalmia neonatorum (conjunctivitis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Postpartum endometritis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Premature rupture of membranes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Premature labor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Neonatal pneumonia</td>
</tr>
<tr>
<td><strong>Maternal Concerns</strong></td>
<td>Avoid doxycycline in pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test of cure 3-4 weeks after treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Preterm birth</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Septicemia, subsequent arthritis, meningitis</td>
</tr>
</tbody>
</table>

### Hepatitis B

**Incubation period:** 6 weeks to 6 months

**Symptoms**
- Fatigue
- Nausea/anorexia
- Dark urine
- Clay-colored stool
- Jaundice/abdominal pain
- Clay-colored stool
- Dark urine
- Nausea/vomiting
- Fatigue

**Detection**
- Serological testing
- With acute infection:
  - **Test** | **Result**
  - Anti-HBs | Negative
  - IgM anti-HBc | Positive
  - Total anti-HBc | Positive
  - HBsAg | Positive
  - Anti-HBs | Negative

- Screen all pregnant women

**Neonatal Concerns**
- CDC recommends administration of hepatitis B immunization to all newborns with birth weight >2000 g before hospital discharge
- Infants born to HBsAg-positive mothers should have postexposure prophylaxis
- CDC recommends administration of hepatitis B immunization to all pregnant women

### Common Sexually Transmitted Infections—cont'd

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms/Detection</th>
<th>Pregnancy Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>With acute infection:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serological testing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jaundice/abdominal pain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay-colored stool</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark urine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nausea/vomiting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incubation period: 6 weeks</td>
<td></td>
</tr>
</tbody>
</table>
### Herpes Simplex Virus (HSV)

**Incubation period:** 2–10 days

**Symptoms:**
- Recurrent, painful vesicular lesions
- Fever, malaise
- Enlarged lymph nodes

**Detection:**
- Cell culture and PCR
- Enzyme-linked immunosorbent assay (ELISA)
- Western blot

**Maternal Considerations:**
- Transmission to newborn greatest with primary infection
- Cesarean birth recommended if active lesion in labor

**Neonatal Considerations:**
- Disseminated infections
- CNS involvement
- Localized infections of skin, eye, mouth

### HIV

**Incubation period:** 2 weeks to 6 months

**Symptoms:**
- Fever
- Malaise
- Lymphadenopathy
- Skin rash
- Night sweats
- Rapid weight loss

**Detection:**
- Antibody immunoassay
- Serum screen
- Positive screen must be confirmed by more specific test

**Maternal-neonatal transmission routes:**
- Transplacentally
- Birth secretions
- Breast milk
- Transmission to newborn generally greater with primary infection

**Pregnancy Considerations:**
- Screen all pregnant women
- Monitor and counsel importance of breastfeeding
- Cesarean birth recommended if any involvement

**Infections/Transmission of HIV in Pregnancy:***
- Cesarean
- Breastfeeding
- Birth secretions

**Transmission rate:**
- Approximately 30% without treatment
- 5%–8% with antiretroviral therapy
- 2% with antiretroviral therapy + scheduled cesarean birth + avoidance of breastfeeding

**Screen all pregnant women**
- Notify and counsel importance of testing in pregnancy

---

### Common Sexually Transmitted Infections—cont'd

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms/Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>Fever</td>
</tr>
<tr>
<td>HSV</td>
<td>Fever, malaise</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms/Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>Fever</td>
</tr>
<tr>
<td>HSV</td>
<td>Fever, malaise</td>
</tr>
</tbody>
</table>

---

**Continued**
### Human Papillomavirus (HPV)

- HPV serotypes 16 and 18 have oncogenic potential and are linked to cervical cancer.
- Incubation period: 3 weeks to 3 years.

#### Symptoms
- Often asymptomatic.
- Visible wart-like growths in genital area.
- Associated HPV serotypes: 6 and 11.

#### Detection
- Physical examination.
- HPV-DNA test.

#### Maternal Considerations
- Decreased immunity may exacerbate viral infections.
- Genital warts may proliferate and become friable in pregnancy.
- Cesarean birth not routinely recommended solely for genital warts unless pelvic outlet is obstructed or increased risk for bleeding.

#### Neonatal Concerns
- May be linked with juvenile-onset respiratory papillomatosis.

---

### Syphilis

- Systemic disease caused by Treponema Pallidum.
- Incubation period: 10–90 days.

#### Symptoms
- Primary syphilis: Chancre.
- Secondary syphilis: Skin rash, lymphadenopathy.
- Tertiary syphilis: Cardiac, ophthalmic, auditory involvement.

#### Maternal Considerations
- Uteroplacental transmission up to 95%.
- Jarisch-Herxheimer reaction may occur following treatment.
- May be linked to cervical cancer.
- Could precipitate premature labor.

#### Neonatal Concerns
- May be linked with respiratory papillomatosis.

---

### Common Sexually Transmitted Infections—cont’d

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms/Detection</th>
<th>Pregnancy Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>HPv-DNA test, Physical examination.</td>
<td>Uteroplacental transmission up to 95%, Jarisch-Herxheimer reaction may occur following treatment.</td>
</tr>
<tr>
<td>Syphilis</td>
<td>HPv-DNA test, Physical examination.</td>
<td>Uteroplacental transmission up to 95%, Jarisch-Herxheimer reaction may occur following treatment.</td>
</tr>
<tr>
<td>Human Papillomavirus (HPv)</td>
<td>HPv-DNA test, Physical examination.</td>
<td>Uteroplacental transmission up to 95%, Jarisch-Herxheimer reaction may occur following treatment.</td>
</tr>
<tr>
<td>Common Sexually Transmitted Infections—cont’d</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Syphilis**

- **Detection**
  - Nontreponemal test (RPR/VDRL)
    - False-positive possible
  - Treponemal (FTA-ABS)
    - Specific for syphilis
    - Recorded as positive or negative

- **Symptoms**
  - Acute febrile reaction
  - Headache
  - Myalgia
  - Vaginal itching/irritation
  - Dyspareunia
  - Discharge

- **Neonatal Considerations**
  - Stillbirth
  - Congenital syphilis: Hepatosplenomegaly, jaundice, rhinitis, maculopapular rash, failure to thrive, chorioretinitis

---

**Trichomoniasis**

- **Incubation period**: 4–28 days

- **Symptoms**
  - Frothy malodorous vaginal discharge
  - Dyspareunia
  - Vaginal itching/irritation
  - Dysuria

**Common Sexually Transmitted Infections—cont’d**

<table>
<thead>
<tr>
<th>Infection</th>
<th>Symptoms/Detection</th>
<th>Pregnancy Considerations</th>
<th>Neonatal Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>Recurred as positive or negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specific for syphilis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treponemal (FTA-ABS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treponemal success</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>False-positive possible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VDRL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonrecombinant test (RPR)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GYN BASICS**
Breast Health Screening

Method: Mammogram, Clinical Breast Exam, Breast Self-Awareness/Breast Self-Exam

ACOG guidelines for average-risk women:
- Annual mammogram starting at age 40 years
- Clinical breast exam by a health professional
  - Every 3 years from 20–39 years of age
  - Annual after age 40 years
- Discuss the benefits and limitations of breast self-awareness (BSA) and breast self-exam (BSE)

American Cancer Society guidelines for average-risk women (Revised 2015):
- Women aged 40–44 years should have the choice to start annual mammography
- Annual mammogram from age 45–54 years
- After age 55 years, a woman may choose to have mammography every 2 years

Instructions for Breast Self-Awareness (BSA) or Breast Self-Exam (BSE)
- BSA promotes a familiarity with how the breasts normally look and feel; women should notify their health-care provider if they notice:
  - Mass or thickening of the breast or axillary area
  - Edema, erythema, or warmth in the breast
  - Dimpling or scaly rash on the skin of the breast
  - Nipple discharge in a nonlactating woman
  - Sudden change in nipple or breast size or symmetry
  - Breast pain
- BSE is a systematic approach to examining the breast on a regular schedule

Instructions for Breast Self-Examination (BSE)

Step 1: Inspection
1. Visually inspect the breasts, looking for dimpling, lumps, skin irregularities, symmetry, or nipple discharge
2. Visually inspect in several positions; may accentuate an abnormality
   - Hands at the side
   - Hands above the head
   - Hands pressed onto hips
   - Leaning over
Step 2: Palpation
1. Feel the breast tissue and lymph node chain for lumps or thickening by using three finger pads while exerting light, medium, and deep pressure in a systematic fashion.
2. Begin by lying down on a flat surface with arm raised and a folded towel under the back on the side of the breast being examined.
3. After examining breast tissue, bring arm toward body and feel the axilla and the skin above as well as below the collarbone.
4. Repeat technique on the other breast.
5. Report lumps, thickening, nipple discharge, or any suspicious findings to health-care provider.

Preconception Counseling
Preconception counseling promotes healthy pregnancy and should be included for all women of childbearing age. The focus should be on factors that have an impact on organogenesis.
- Discuss effects of ↑ maternal age on chromosomal abnormalities
- Discuss the adverse effects of obesity on pregnancy outcome and make a plan for maintaining optimal weight
- Encourage 400 mcg of folic acid daily to prevent neural tube defects
Encourage intake of foods rich in folic acid
- Enriched grain products
- Fortified cereals
- Leafy green vegetables
- Beans
- Discourage use of alcohol, smoking, and drugs
- Teach about protection from sexually transmitted infections
- Update adult immunizations and investigate titers
- Review exposure to environmental risk factors
- Discuss control of chronic medical conditions
- Review safety of prescribed and over-the-counter (OTC) medications and herbs

Family Planning

Promote family planning:
- Educate women on available family planning methods, discussing the risks, benefits, and efficacy of each method
- Efficacy influenced by correct and consistent use, user preparedness, motivation, dexterity, and comorbidities

Sexual Abstinence

Refraining from sexual activity is the only 100% effective way to prevent pregnancy.

Fertility Awareness Methods

- Teach familiarity with body to recognize signs of fertility
- Are used to avoid or achieve pregnancy and to monitor gynecological health
- Advise couples to abstain during recognized period of fertility to avoid pregnancy

Evaluation of Cervical Mucus

- Amount and character of cervical mucus changes throughout the menstrual cycle in response to hormones
- At ovulation, cervical mucus becomes more abundant, slippery, clear, and stretchable in response to estrogen (known as “spinnbarkeit”)
At ovulation, cervical mucus promotes sperm motility and ↑ probability of pregnancy with unprotected intercourse

After ovulation, cervical mucus is scant, thick, cloudy, and no longer stretchable

Women are taught to evaluate and chart cervical mucus daily

**Basal Body Temperature (BBT)**
- Monitor and graph BBT daily before rising
- Before ovulation, BBT decreases slightly in response to estrogen
- After ovulation, a surge of progesterone increases BBT by 0.5°–1.0°F
- BBT remains high with conception, but falls without conception, before menses
- Certain activities may alter BBT: smoking, use of electric blanket or heated waterbed, restless sleep, illness

**Calendar Method**
- Based on assumption that ovulation occurs 14 days before the onset of menses
- Record menstrual cycles for 6–8 months
- Calculate fertile period
  - Subtract 18 from the shortest menstrual cycle (28 – 18 = 10)
  - Subtract 11 from the longest menstrual cycle (32 – 11 = 21)
  - Days 10–21 fertile time; abstain from intercourse

**Lactation Amenorrhea Method (LAM)**
- Prolactin suppresses follicle-stimulating hormone (FSH), and therefore suppresses ovulation
- Postpartum women who exclusively breastfeed during the first 6 months after childbirth, including at least one night feeding, may postpone ovulation
- Instruct patients that ovulation and return of fertility may occur before first menses with a risk for unintended pregnancy

**Barrier Methods**

Barrier methods prevent conception by blocking entry of sperm into the cervix.

**Diaphragm**
- Dome-shaped rubber cup with a flexible ring that fits over the cervix; regularly examine integrity of rubber
Inserting a diaphragm involves:
- Applied spermicide to dome before intercourse and left in place for at least 6 hours after intercourse.
- Should not be left in place more than 24 hours because of toxic shock syndrome risk.
- Additional spermicide can be added with diaphragm still in place for repeated intercourse.
- Diaphragm is custom fitted and must be refitted with 20-lb weight change and after a vaginal birth.
- Urinary tract infections (UTIs) are more common with diaphragm use; teach to report symptoms of UTI.
- Wash with soap and water after each use; inspect integrity of rubber by holding up to light to inspect for holes.

**Male Condom**
- Thin latex sheath that covers the erect penis during sexual intercourse.
- Condoms made of synthetic materials provide some protection from STIs.
- Space should be left at the end of the condom for ejaculate.
- Hold condom at base of the penis upon withdrawal to prevent spillage.
- Only water-soluble gel should be used for lubrication to prevent degradation of the latex.
- New condom should be used with each act of intercourse.
- Store in unopened package in cool, dry place.

**Female Condom**
- Prelubricated polyurethane sheath with two flexible rings.
- Inner ring helps with insertion and covers the cervix.
- Outer ring rests on vulva.
- Water- or oil-based lubricant and spermicide may be used.
- Can be stored at any temperature; 5-year shelf life.
- Remove before standing by twisting the outer ring to contain semen and pull out.
- Material degradation could occur if both male and female condoms are used simultaneously.

**Hormonal Methods**

Hormonal contraceptives alter the normal menstrual cycle, inhibiting ovulation, altering the endometrial lining, and thickening cervical mucus.
Hormonal Contraceptives

**Effects of Estrogen**
- Ovulation inhibited by suppression of follicle-stimulating hormone (FSH) and luteinizing hormone (LH)
- Endometrial lining altered, making the endometrium less receptive to implantation

**Effects of Progestin**
- Cervical mucus thickened, hampering sperm transport
- Suppression of midcycle LH peak prevents ovulation
- Decreased cilia movement within the fallopian tube

**Advantages of Hormonal Contraceptives**
- ↓ Dysmenorrhea
- ↓ Menstrual blood loss
- ↓ Endometrial/ovarian cancer

**Disadvantages of Hormonal Contraceptives**
- Requires addition of condom for STI protection
- Side effects may include the following:
  - Nausea/vomiting
  - Breast tenderness
  - Breakthrough bleeding
  - Headaches
  - Mood changes
  - Decreased libido
- May cause serious health issues

**REPORT** symptoms of possible complications, remember ACHES:
- Abdominal pain
- Chest pain
- Headache
- Eye problems (blurred, double vision)
- Severe leg pain, redness, and swelling
- Shortness of breath
- Worsening depression
- Jaundice

**Contraindications to Hormonal Contraceptives**
- History of heart attack, stroke, blood clot; estrogen promotes blood clotting
- History of breast or female reproductive cancer; tumors may be hormonally provoked
- Diabetes with vascular involvement; estrogen promotes blood clotting
Impaired liver function; metabolized through the liver and use may adversely affect existing liver disease
Suspected or confirmed pregnancy
Uncontrolled hypertension; increased risk for cardiovascular complications
Smoker older than 35 years; increased risk for cardiovascular complications
History of migraine headaches (with aura); increased risk for stroke
Major surgery planned with immobilization; increased risk for deep vein thrombosis

Combination Hormonal Methods

Combination hormonal methods contain both an estrogen and progestin component.

Combination Oral Contraceptives (OCs)
- Most OCs are administered daily for 21 days, followed by 7 hormone-free days (either no pills taken or placebos taken for 7 days)
- Pill selection based on amount of estrogen, type of progestin, adrenergic effect, or symptoms presented
- Combined OCs may be monophasic (estrogen and progestin remain constant) or multiphasic (hormone dosing changes throughout the month)
- Extended-cycle OCs are taken consistently for 12 weeks, followed by 7 days of inert pills; withdrawal bleeding occurring only four times per year
- Combination hormonal contraceptives may decrease production of breast milk and should be avoided while breastfeeding
- Effectiveness of OCs are altered by certain medications; patients should report use of contraceptive agents to all health-care providers

Transdermal Patch
- Patch applied to skin weekly for 3 weeks; fourth week is patch free to allow withdrawal bleeding
- Acceptable application sites include abdomen, buttocks, upper outer arm, and upper torso (but not the breasts); site should vary weekly
- Application involves cleansing skin, avoiding lotion, and firmly applying patch, making sure all corners adhere to skin
- May engage in usual activities (bathing, swimming, exercising)
- Partial removal and skin reactions possible
- Decreased effectiveness noted in women who weigh more than 198 lb
According to the U.S. Food and Drug Administration (FDA), women who use this method of birth control may be at an increased risk for venous thromboembolism; careful screening and counseling, weighing risk/benefits, should precede use.

**Vaginal Ring**
- Small, flexible hormone-impregnated ring inserted and left in the vagina for 3 weeks; removed in fourth week to allow for withdrawal bleeding
- Ring should be kept inside unopened package before insertion; protect from sunlight and high temperatures
- Side effects include increase in vaginal discharge, vaginal irritation, or infection
- Expulsion may occur; if out for more than 3 hours, backup method of birth control needed for the next 7 days

**Progestin-Only Preparations**
- Progestin-only preparations are indicated for women who cannot use estrogen
- Alteration in menstrual cycle common with progestin-only methods
- May be used in lactation after breastfeeding is well established
- Side effects include weight gain, menstrual irregularities, and depression

**Oral Contraceptives “Minipill”**
- Compared with OCs that also contain estrogen, there is a greater risk for pregnancy if progestin-only pills are not taken at the same time each day
- Backup method of birth control needed with missed or late pills

**Injectable Progestin Contraception:**
**Depo-medroxyprogesterone (DMPA)**
- Injected by health-care provider intramuscularly (IM) every 3 months
- Return to fertility may be delayed
- Bone loss may be of concern with continued use; alternative birth control method may be recommended after 2 years of continuous use

**Implantable Progestins**
- Matchstick-sized flexible implant inserted under the skin of the upper arm
Protects against pregnancy for up to 3 years
Inserted and removed by a health-care provider using local anesthesia
Implant during the first 5 days of the menstrual cycle

**Intrauterine System (IUS)/Intrauterine Device (IUD)**

- Inhibits fertilization by altering fallopian tube transport of sperm and ova, in addition to producing cellular changes to the endometrial lining
- Inserted in office by qualified practitioner
- Increased incidence of pelvic inflammatory disease (PID)
- Uterine perforation and expulsion of device possible
- Attached to string that extends outside of the cervix; instruct patient to check for presence of string monthly
- Patient to REPORT signs of complications (remember PAINS):
  - **P**eriod late (pregnancy)
  - **A**bdominal pain (infection)
  - **I**nfection
  - **N**ot feeling well (infection)
  - **S**tring missing (IUD expelled)

**Types**

1. Hormone-releasing (levonorgesterol) device placed in the uterus to prevent pregnancy for 3–5 years, depending on type chosen
2. Copper IUD contains no hormones; continuous use for up to 10 years if no complications

**Emergency Contraception**

- Contraceptive agents used after unprotected intercourse intended for the prevention of pregnancy
- Available agents
  - Copper-T IUD
    -Inserted by health-care provider within 5 days of unprotected intercourse
  - Emergency oral contraceptive
    - Levonorgestrel oral contraceptives available OTC for women 17 years and older; state laws may vary
  - Ulipristal acetate (progesterone receptor modulator)
    - Best if used within 120 hours of unprotected intercourse
Permanent Birth Control Options for Women

- Prevent conception by mechanically blocking the fallopian tubes, preventing passage of ovum
- Low failure rate; however, if pregnancy occurs, may be ectopic

**Tubal Ligation (Incisional Method)**
- Performed in a hospital or outpatient surgical unit under general anesthesia
- Fallopian tubes cut, cauterized, and/or clipped
- Complications may include bleeding, infection, incomplete tube closure, injury to adjacent organs, or complications from anesthesia

**Transcervical Tubal Sterilization (Nonincisional Method)**
- Microinserts or tiny coils placed into the opening of the fallopian tubes, causing scar tissue to grow in approximately 3 months
- Performed in physician’s office with local anesthetic
- Follow-up hysterosalpingogram performed at 3 months to ensure both tubes have been blocked; alternative method of birth control used until tube status verified
- Complications may include incorrect placement requiring second or operative procedure, ectopic pregnancy, infection, perforation of the uterus

---

Menopause

Menopause is the cessation of menses with amenorrhea for 12 months.

**Symptoms**

**Vasomotor Symptoms**
- Hot flashes
- Night sweats

**Urogenital Symptoms**
- Thin, friable vaginal mucosa
- Vaginal dryness and irritation
- Dyspareunia

22
23

Other Systemic Symptoms
■ Sleep disturbance
■ Mood swings
■ Memory loss
■ Skin changes
■ Hair thinning

Hormone Replacement Therapy (HRT)
■ The decision of whether to use hormone replacement therapy should be made after careful medical evaluation and discussion with the primary health-care provider concerning the risk/benefit ratio for each woman
■ If HRT prescribed solely for vaginal/vulvar symptoms, local hormone therapy should be considered
■ Alternatives to HRT should be considered if HRT used for sole purpose of osteoporosis prevention

Prevention and Treatment of Osteoporosis
■ Risk factors for osteoporosis
  1. Menopause
  2. Low BMI
  3. Excessive caffeine use
  4. Smoking
  5. Sedentary lifestyle
  6. Family history
■ Screening
  1. Fracture Risk Assessment Tool (FRAX)
  2. Dual-energy x-ray absorptiometry (DXA) scan of the spine and hip
     • Women age 65 years at average risk
     • High-risk women younger than age 65 years
  3. T-Score

<table>
<thead>
<tr>
<th>Classification</th>
<th>T-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>≥ −1.0</td>
</tr>
<tr>
<td>Osteopenia</td>
<td>−1.0 to −2.5</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>≤ 2.5</td>
</tr>
</tbody>
</table>
GYN BASICS

Treatment
1. Lifestyle modification
   • Weight-bearing exercise
   • Postmenopausal intake of 1200 mg calcium daily
   • Vitamin D supplement
   • Smoking cessation
2. Biophosphonates commonly prescribed to prevent bone loss
   • Take on an empty stomach
   • Sit up after taking medicine prescribed amount of time
<table>
<thead>
<tr>
<th>Disorder</th>
<th>Presentation</th>
<th>Medical Treatment</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer, Breast</td>
<td>Breast mass, nipple discharge</td>
<td><strong>Dx:</strong> Biopsy, sentinel node biopsy</td>
<td>Early detection possible with mammography, clinical screening; discuss HPV immunization for prevention</td>
</tr>
<tr>
<td>Cancer, Cervical</td>
<td>Postcoital bleeding, friable cervix, abnormal Pap smear</td>
<td><strong>Dx:</strong> Colposcopy with biopsy</td>
<td>Early detection possible with cervical screening; discuss HPV immunization for prevention</td>
</tr>
</tbody>
</table>

**Medications**
- Lumpectomy
- Mastectomy with reconstruction
- Adjuvant therapy
- Chemotherapy
- Radiation
- Aromatase inhibitors
- Herceptin
- Selective estrogen receptor modulators
- Tamoxifen
- Raloxifene
- Nonpalpable mass
- Dimpling
- Nipple discharge
- Breast mass

**Prognosis**
- Dependent on:
  - **T:** Tumor (size)
  - **N:** Node (number involved)
  - **M:** Metastasis

**Lymphedema**
- May occur after lymph node excision
- Early detection possible with mammography
- Encourage use of hand for bathing, brushing hair
- Elevate limb
- No BP/IV venipuncture
- Pain
- Swelling
- Feeling of tightness
- Prevention of lymphedema
- Education

**Cancer, Cervical**
- May be asymptomatic in early disease
- Postcoital bleeding, friable cervix, abnormal Pap smear
- **Dx:** Colposcopy with biopsy
- **Treatment:** LEEP, cryosurgery, hysterectomy, chemotherapy, internal radiation

**Cancer, Breast**
- Breast mass, nipple discharge
- **Dx:** Biopsy, sentinel node biopsy
- **Treatment:** Lumpectomy, mastectomy with reconstruction, adjuvant therapy, chemotherapy, radiation, aromatase inhibitors, Herceptin, selective estrogen receptor modulators, tamoxifen, raloxifene
- Prognosis dependent on:
  - **T:** Tumor (size)
  - **N:** Node (number involved)
  - **M:** Metastasis

**Nursing Considerations**
- Early detection possible with mammography
- Encourage use of hand for bathing, brushing hair
- Elevate limb
- No BP/IV venipuncture
- Encourage use of hand for eating, brushing hair
- Prevention (affected side)
  - No BP/IV venipuncture
  - Elevate limb
  - Encourage use of hand for eating, brushing hair
### Common Female Reproductive Disorders—cont’d

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Presentation</th>
<th>Medical Treatment</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cancer, Endometrial</strong></td>
<td>May be asymptomatic in early disease</td>
<td>• Radiation</td>
<td>• Post-hysterectomy report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chemotherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radical hysterectomy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Surgical excision</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Diagnosis:</strong> Pelvic examination, biopsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Treatment:</strong></td>
<td>• Urinary frequency</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radical hysterectomy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pelviscopy with biopsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Post-hysterectomy discharge teaching:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Signs of menopause</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change in vaginal lubrication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid heavy lifting, tub baths, tampons</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Symptoms to report</td>
<td></td>
</tr>
<tr>
<td><strong>Cancer, Ovarian</strong></td>
<td>May be asymptomatic in early disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radiation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chemotherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radical hysterectomy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pelviscopy with biopsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Diagnosis:</strong> Pelvic examination, ultrasound, laparoscopy with biopsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Treatment:</strong></td>
<td>• Urinary frequency</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pelviscopy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radical hysterectomy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pelviscopy with biopsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Post-hysterectomy discharge teaching:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Signs of menopause</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change in vaginal lubrication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid heavy lifting, tub baths, tampons</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Symptoms to report</td>
<td></td>
</tr>
</tbody>
</table>
**Endometriosis**

- **Presentation**
  - Pain
  - Dysmenorrhea
  - Dyspareunia
  - Infertility

- **Dx:** Laparoscopy

- **Medical Treatment**
  - Surgical excision
  - Medications
    - Androgen derivatives: Side effects: masculinizing traits, weight gain, edema, decreased breast size
    - GnRH agonist: Side effects: hot flashes, vaginal dryness, and bone loss
    - Oral contraceptives
    - NSAIDs

- **Action of GnRH/androgen derivative agonists:**
  - Suppress ovulation
  - Shrink endometrial tissue
  - Prohibit further lesion development

---

**Common Female Reproductive Disorders—cont’d**

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Presentation</th>
<th>Medical Treatment</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endometriosis</td>
<td>Pain, Dysmenorrhea, Dyspareunia, Infertility</td>
<td>Surgical excision, Medications (Androgen derivatives, GnRH agonist, Oral contraceptives, NSAIDs)</td>
<td>Consider side effects: masculinizing traits, weight gain, edema, decreased breast size, hot flashes, vaginal dryness, and bone loss.</td>
</tr>
</tbody>
</table>
Pelvic Floor Dysfunction

- Uterine prolapse
- Rectocele
- Cystocele
- Stress incontinence
- Urgency
- Constipation
- Dyspareunia
- Bulge at introitus
- dragging sensation
- Perineum should be inspected for necrosis
- Teach to clean with soap and water
- Ensure that patient can insert/remove pessary
- Encourage Kegel exercises

Treatment

- Dependent on symptoms/grade of prolapse
- Pessary
- Surgical
- Colporrhaphy
- Vaginal hysterectomy
- Bladder/bowel retraining
- Behavioral modification
- Physical therapy

Dx:

Medical Treatment

- Bladder at incontinence
- Urinary retention
- Urinary infection
- Constipation
- Straining

Nursing Considerations

- Encourage pelvic floor muscle training
- Knee-chest positioning
- Encourage pelvic floor muscle training
- Bladder/bowel retraining
- Behavioral modification
- Physical therapy

Disorder Presentation

- Encourage pelvic floor muscle training
- Knee-chest positioning
- Encourage pelvic floor muscle training
- Bladder/bowel retraining
- Behavioral modification
- Physical therapy

Continued
### Polycystic Ovarian Syndrome (PCOS)

- Irregular menses
- Hirsutism
- Obesity
- Hyperinsulinemia
- Hyperlipidemia
- Hypertension
- Infertility
- Acne

**Dx:** Laboratory tests
- FBS, HBA1C, lipid panel
- Hormone level: testosterone, androgen, estrogen, prolactin, LH

**Treatment**
- Medications
  - Metformin
  - Oral contraceptives
- Lifestyle modifications
  - Weight reduction
  - Exercise routine
  - Regular meases
  - Lower cholesterol

**Nursing Considerations**
- Lab tests: Frequent
- Illness prevention measures

---

### Uterine Fibroids

- Menorrhagia
- Dysmenorrhea
- Pelvic/rectal pressure
- Dyspareunia
- Urinary urgency

**Dx:**
- Ultrasound
- Hysteroscopy

**Treatment**
- Medications
  - Oral contraceptives
  - Metformin
- Surgical
  - Uterine artery embolization
  - Myomectomy
  - Hysterectomy

**Postembolization care:**
- Pain relief
- Pain
  - Fever
  - Lethargy
  - Nausea
  - Vomiting
  - Cramping
  - Groin
  - Pedal pulse
  - Pain reliever

---

### Disorder Presentation Medical Treatment Nursing Considerations

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Presentation</th>
<th>Medical Treatment</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine Fibroids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term/Abbreviation</td>
<td>Definition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abortion (Ab)</td>
<td>Spontaneous or induced termination of pregnancy before 20 weeks’ gestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACOG</td>
<td>American Congress of Obstetricians and Gynecologists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFP</td>
<td>Protein secreted by the fetus and found in maternal blood; maternal serum sample drawn between 15 and 18 weeks’ gestation to detect babies with increased risk for neural tube defects or Down syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antepartum</td>
<td>Time of pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWHONN</td>
<td>Association of Women’s Health, Obstetric, and Neonatal Nurses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chadwick’s sign</td>
<td>Bluish hue of the cervix; probable sign of pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloasma</td>
<td>Deepening facial pigment resembling a mask related to increased estrogen levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colostrum</td>
<td>Breast fluid produced early in pregnancy and immediately after birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C/S</td>
<td>Cesarean section; operative abdominal birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dilation</td>
<td>Opening of the cervical os</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effacement</td>
<td>Thinning of the cervix represented by percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embryo</td>
<td>Human development in utero from day 15 until the 8th week of gestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferning</td>
<td>Microscopic picture of amniotic fluid; resembles fern plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetus</td>
<td>Developing baby in utero from 9 weeks’ gestation until delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHR</td>
<td>Fetal heart rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestation</td>
<td>Time from conception to birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td>Glucose intolerance that is first recognized in pregnancy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodell’s sign</td>
<td>Softening of the cervix; probable sign of pregnancy</td>
</tr>
<tr>
<td>Gravid</td>
<td>Pregnant</td>
</tr>
<tr>
<td>Gravida (G)</td>
<td>Term used when counting the number of pregnancies</td>
</tr>
<tr>
<td>hCG</td>
<td>Human chorionic gonadotropin</td>
</tr>
<tr>
<td>Hegar’s sign</td>
<td>Softening of the lower uterine segment; probable sign of pregnancy</td>
</tr>
<tr>
<td>Lightening</td>
<td>Descent of the fetus into the birth canal</td>
</tr>
<tr>
<td>Linea nigra</td>
<td>Line of darkened pigmentation from the symphysis pubis to the umbilicus in pregnancy</td>
</tr>
<tr>
<td>LNMP</td>
<td>Last normal menstrual period</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>Large infant, greater than 4000 g (8.8 lb)</td>
</tr>
<tr>
<td>Missed abortion</td>
<td>Fetal demise without symptoms of cramping, bleeding, or dilation</td>
</tr>
<tr>
<td>Multiparity</td>
<td>Giving birth on multiple occasions</td>
</tr>
<tr>
<td>Neonate</td>
<td>First 28 days in the life of a newborn</td>
</tr>
<tr>
<td>NST</td>
<td>Nonstress test</td>
</tr>
<tr>
<td>OTC</td>
<td>Over-the-counter medications</td>
</tr>
<tr>
<td>Para (P)</td>
<td>Pregnancies that carry a fetus beyond 20 weeks’ gestation</td>
</tr>
<tr>
<td>Placenta previa</td>
<td>Placenta that is implanted in the lower uterine segment, sometimes covering the cervical os</td>
</tr>
<tr>
<td>Postnatal</td>
<td>After birth</td>
</tr>
<tr>
<td>Prenatal</td>
<td>Before birth</td>
</tr>
<tr>
<td>Preterm labor</td>
<td>Initiation of labor between 20 0/7 and 36 6/7 weeks’ gestation</td>
</tr>
<tr>
<td>Quickening</td>
<td>Fetal movement perceived by the mother, expected by 16 weeks’ gestation</td>
</tr>
</tbody>
</table>

Continued
Common Obstetrical Terms and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round ligament pain</td>
<td>Occasional, sharp lower abdominal pain related to stretching of round ligament with uterine growth</td>
</tr>
<tr>
<td>Station</td>
<td>Relation of fetal presenting part with the maternal ischial spines</td>
</tr>
<tr>
<td>Striae</td>
<td>Stretch marks</td>
</tr>
<tr>
<td>Supine hypotension</td>
<td>Low blood pressure resulting from supine positioning in pregnancy; signs include pallor, nausea, diaphoresis, dizziness</td>
</tr>
<tr>
<td>Surfactant</td>
<td>A lipoprotein that maintains the stability of pulmonary tissue by reducing the surface tension</td>
</tr>
<tr>
<td>Teratogens</td>
<td>Substances that are harmful to the developing fetus; advise patient to avoid exposure</td>
</tr>
<tr>
<td>Term (T)</td>
<td>• Early term: 37 0/7 to 38 6/7 weeks’ gestation</td>
</tr>
<tr>
<td></td>
<td>• Full term: 39 0/7 to 40 6/7 weeks’ gestation</td>
</tr>
<tr>
<td></td>
<td>• Late term: 41 0/7 to 41 6/7 weeks’ gestation</td>
</tr>
<tr>
<td></td>
<td>• Postterm: ≥42 0/7 weeks’ gestation</td>
</tr>
<tr>
<td>Threatened abortion</td>
<td>Symptoms of cramping and slight bleeding without cervical dilation in early pregnancy</td>
</tr>
<tr>
<td>Tocolytic</td>
<td>Medication given in an attempt to stop preterm labor</td>
</tr>
</tbody>
</table>

Confirming Pregnancy

- Pregnancy may be assumed based on the presence of certain signs and symptoms. *Presumptive* signs are subjective and recorded under the history of present illness
- *Probable* signs of pregnancy are assessed by the examiner and recorded as physical assessment findings
- *Positive* signs of pregnancy are those that are attributed only in the presence of a fetus
ANTE-PARTUM

<table>
<thead>
<tr>
<th>Presumptive</th>
<th>Probable</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Amenorrhea</td>
<td>• Positive hCG</td>
<td>• FHR auscultated</td>
</tr>
<tr>
<td>• Breast tenderness</td>
<td>• Uterine enlargement</td>
<td>• Fetal movement palpated by health-care provider</td>
</tr>
<tr>
<td>• Quickening</td>
<td>• Hegar’s sign</td>
<td></td>
</tr>
<tr>
<td>• Nausea/vomiting</td>
<td>• Goodell’s sign</td>
<td></td>
</tr>
<tr>
<td>• Urinary frequency</td>
<td>• Chadwick’s sign</td>
<td>• Ultrasound of fetus</td>
</tr>
</tbody>
</table>

Urine Pregnancy Test

- Reacts with human chorionic gonadotropin (hCG)
- Performed on first voided urine sample of the day
- Positive results possible before the first day of a missed menstrual period

Serum Pregnancy Test

- Useful in monitoring expected pattern of progression of hCG
  - Qualitatively measures whether hCG is present
  - Quantitatively measures how much hCG is present
    - Should double every 48 hours in early pregnancy
    - Detects hCG as early as 9 days post-conception

Ultrasound

- Confirms presence of gestational sac, fetal pole, and fetal cardiac activity in early pregnancy
- Validates location of pregnancy (intrauterine versus ectopic)
- Ultrasound measurement during the first trimester is the most accurate method to establish estimated due date

Estimated Date of Delivery

- Establishing an accurate date of delivery is important to:
  - Determine timing of antenatal screening
  - Monitor growth of the fetus
  - Scrutinize timing of delivery
ANTEPARTUM

■ Common abbreviations denoting delivery date
  ■ EDD: Estimated date of delivery
  ■ EDC: Estimated date of confinement
  ■ EDB: Estimated date of birth

Naegele’s Rule

■ Formula used to estimate date of delivery
■ Count back 3 months and add 7 days to the last normal menstrual period (LNMP) reported by the patient
■ Example: The patient states that her LNMP was April 20th

\[
\frac{4\text{th month (April) 20th day}}{1\text{st month 27th day}} - 3\text{ months} + 7\text{ days}
\]

The baby is estimated to be due on January 27th of the following year.

Trimesters of Pregnancy

Normally, pregnancy continues for 40 weeks or 280 days
■ 1st trimester: Conception until 13 weeks’ gestation
■ 2nd trimester: 14 weeks until 26 weeks’ gestation
■ 3rd trimester: 27 weeks until 40 weeks’ gestation

Schedule of Prenatal Visits
(low-risk pregnancy)

■ Monthly until 28 weeks’ gestation
■ Biweekly from 28 weeks until 36 weeks
■ Weekly from 36 weeks until delivery

Gathering a Prenatal Health History

Performing a thorough health history in the prenatal period is essential to planning nursing care and identifying high-risk women.
■ Medical history
  ■ Chronic illness
  ■ Current and recent medication
  ■ Recent acute illness
  ■ Childhood illnesses
Surgical history
- Problems with anesthesia
- Previous surgeries
- Uterine/cervical surgeries

Obstetrical history
- Type of deliveries: vaginal/cesarean
- Complications with past pregnancies
- Infertility
- Five-digit documentation of obstetrical history:

<table>
<thead>
<tr>
<th>Descriptive Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravidity (G)</td>
<td>Number of pregnancies</td>
</tr>
<tr>
<td>Term (T)</td>
<td>Deliveries ≥37 completed weeks</td>
</tr>
<tr>
<td>Preterm (P)</td>
<td>Deliveries &gt;20 weeks but &lt;38 weeks</td>
</tr>
<tr>
<td>Abortion (Ab)</td>
<td>Deliveries &lt;20 weeks, spontaneous or induced</td>
</tr>
<tr>
<td>Living (L)</td>
<td>Number of living children</td>
</tr>
</tbody>
</table>

- **Documentation Example 1**: The prenatal client reports having three children at home. She states that her son was born on his due date, but her daughters were both born a month early. She reports that she lost a baby in her second month.
  - G: 5 (currently pregnant, 3 children at home, one abortion)
  - T: 1 (her son was born on his due date)
  - P: 2 (her daughters were each born a month early)
  - A: 1 (she lost a pregnancy at approximately 8 weeks)
  - L: 3 (reports three children at home)

Document as G5-1213

- Two-digit documentation of obstetrical history:
- **Documentation Example 2**: The same prenatal client may also be described as G5 (5 pregnancies) P3 (number of pregnancies that have reached 20 weeks); pregnancies ended before 20 weeks are not counted as “P” in this method.

Document as G5P3

Sexual history
- Number of sexual partners
- Sexually transmitted infections
- Sexual abuse
- Methods of contraception
- Condom use

Social history
- Use of recreational drugs
- Smoking
Hormonal Changes in Pregnancy

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen</td>
<td>Increases uterine muscle mass</td>
</tr>
<tr>
<td></td>
<td>Increases blood flow to uterus</td>
</tr>
<tr>
<td></td>
<td>Prepares breasts for lactation</td>
</tr>
<tr>
<td>Progesterone</td>
<td>Relaxes venous walls</td>
</tr>
<tr>
<td></td>
<td>Inhibits uterine contractions</td>
</tr>
<tr>
<td>hCG</td>
<td>Stimulates estrogen/progesterone production</td>
</tr>
<tr>
<td>Relaxin</td>
<td>Discourages uterine contraction</td>
</tr>
<tr>
<td></td>
<td>Remodeling of collagen</td>
</tr>
<tr>
<td>Prolactin</td>
<td>Maturation of breast ducts/alveoli</td>
</tr>
<tr>
<td></td>
<td>Stimulates lactation</td>
</tr>
<tr>
<td>Human placental lactogen</td>
<td>Insulin antagonist</td>
</tr>
<tr>
<td></td>
<td>Allows adequate glucose for fetal demand</td>
</tr>
</tbody>
</table>

Nursing Care During the First Prenatal Visit

- Determine EDD based on LNMP
- Document current gestational age
- Document baseline vital signs
- Document height and weight and calculate body mass index (BMI)
- Obtain urine specimen and test for presence of:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Expected Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>Negative/trace</td>
</tr>
<tr>
<td>Protein</td>
<td>Negative/trace</td>
</tr>
</tbody>
</table>
- Auscultate fetal heart tones
- Measure fundal height in centimeters
  - Measure from the symphysis pubis to the top of the fundus
  - Uterine size increases in pregnancy in a predictable pattern and is measured to gauge fetal growth
  - Fundal height that is lagging or greater than expected should be further investigated

<table>
<thead>
<tr>
<th>Gestational Age</th>
<th>Fundal Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Just above symphysis pubis</td>
</tr>
<tr>
<td>16</td>
<td>Halfway between symphysis pubis and the umbilicus</td>
</tr>
<tr>
<td>20</td>
<td>At the umbilicus</td>
</tr>
<tr>
<td>21–36</td>
<td>Fundal height generally matches weeks of gestation in centimeters until 36 weeks; after lightening occurs and the fetus drops into the pelvis, there is a ↓ in fundal height</td>
</tr>
</tbody>
</table>

**Example:** Fundal height at 28 weeks should be approximately 28 cm from the symphysis pubis

Fundal height.
Laboratory Tests

<table>
<thead>
<tr>
<th>Common Laboratory Tests</th>
<th>Expected Finding in Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV*</td>
<td>Negative</td>
</tr>
<tr>
<td>Blood type</td>
<td>A, B, AB, O</td>
</tr>
<tr>
<td>Rh factor</td>
<td>Negative or positive</td>
</tr>
<tr>
<td>Antibody screen</td>
<td>Negative</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>&gt;11.5 mg/dL</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>&gt;33%</td>
</tr>
<tr>
<td>Platelets</td>
<td>150,000–400,000 mm³</td>
</tr>
<tr>
<td>WBC</td>
<td>5,000–12,000 mm³</td>
</tr>
<tr>
<td>RPR</td>
<td>Negative</td>
</tr>
<tr>
<td>Hepatitis B antigen</td>
<td>Negative</td>
</tr>
<tr>
<td>Rubella titer</td>
<td>1:8 Immune</td>
</tr>
<tr>
<td>Hemoglobin electrophoresis</td>
<td>AA, unaffected</td>
</tr>
<tr>
<td>Chlamydia culture</td>
<td>Negative</td>
</tr>
<tr>
<td>Gonorrhea culture</td>
<td>Negative</td>
</tr>
<tr>
<td>Pap smear</td>
<td>Normal cytology</td>
</tr>
</tbody>
</table>

*ACOG recommends that all pregnant women be screened for HIV infection, as part of routine prenatal laboratory tests early in the pregnancy and repeated in the third trimester for women at high risk. Explanation of HIV infection, perinatal disease transmission, and benefits of treatment in pregnancy should be discussed.

Physiological Changes

- ↑ Heart rate
- ↑ Cardiac output
- ↑ Blood volume
- ↑ Glomerular filtration rate
- ↑ Urine output
- ↑ Basal metabolic rate
- Blood pressure (slight ↓ with return to baseline by 3rd trimester)
- Respiratory rate (no change)
- ↓ Systemic vascular resistance
- ↑ Stroke volume

↑ = Increase ↓ = Decrease
## Diagnostic Testing in Early Pregnancy

### Ultrasound

**Clinical Applications:**
- Confirm and date pregnancy
- Verify intrauterine pregnancy
- Detect fetal cardiac activity
- Measure fetal growth
- Detect fetal anomalies
- Measure amniotic fluid volume
- Determine fetal position
- Determine placental position
- Assess placental functioning
- Measure nuchal translucency
- Position to avoid supine hypotension: place rolled towel under right hip to move gravid uterus off inferior vena cava
- Position to avoid supine hypotension: place

**Nursing Considerations:**
- Monitor FHR
- Monitor bleeding
- Crying
- Assess post-procedure
- Administer Rh (D) immune globulin if indicated
- Blood type, Rh, and antibody status
- Position to avoid supine hypotension

### Chorionic Villi Sampling (CVS)

**Clinical Applications:**
- Chromosomal analysis
- 10-12 weeks' gestation

**Nursing Considerations:**
- Administer Rh (D) immune globulin if indicated
- Blood type, Rh, and antibody status
- Monitor fetal heart rate
- Assess post-procedure
- Cramping
- Bleeding
- Monitor fetal heart rate

---

**Ultrasound**

- 10-12 weeks’ gestation
- Chromosomal analysis
- Position to avoid supine hypotension: place rolled towel under right hip to move gravid uterus off inferior vena cava
- Position to avoid supine hypotension: place

**Chorionic Villi Sampling (CVS)**

- Administer Rh (D) immune globulin if indicated
- Blood type, Rh, and antibody status
- Monitor fetal heart rate
- Assess post-procedure
- Cramping
- Bleeding
- Monitor fetal heart rate
<table>
<thead>
<tr>
<th>Diagnostic Test</th>
<th>Nursing Considerations</th>
</tr>
</thead>
</table>
| **Antenatal** | Chromosomal abnormality biometrics to calculate fetal risk<br>Used in conjunction with maternal serum biomarkers for<br>Down syndrome
| **Labor** | Monitor FHR<br>Monitor bleeding<br>Assess post-procedure<br>Administer Rh (D) immune globulin if indicated<br>Blood type, Rh, and antibody status |
| **Fetal Nuchal Translucency** | L/S ratio of 2:1 and + PG indicative of fetal lung maturity<br>Surfactant production must be sufficient before<br>Monitor FHR<br>Monitor bleeding<br>Assess post-procedure<br>Administer Rh (D) immune globulin if indicated<br>Blood type, Rh, and antibody status |
| **Amniocentesis** | Phosphatidylglycerol (PG)<br>Lecithin/sphingomyelin (L/S)<br>Surfactant disease<br>Measure bilirubin level for fetal hemolytic disease<br>Directly measure AFP<br>Chromosomal analysis<br>Clinical Application: Ultrasound measurement of back of fetal neck |

**Clinical Applications:**
- Chromosomal analysis
- Directly measure AFP
- Measure bilirubin level for fetal hemolytic disease
- Determine lung maturity by measuring L/S ratio of 2:1 and + PG indicative of fetal lung maturity
- Phosphatidylglycerol (PG)
- Lecithin/sphingomyelin (L/S)
- Surfactant disease
- Measure bilirubin level for fetal hemolytic disease
- Directly measure AFP
- Chromosomal analysis

**Diagnostic Testing in Early Pregnancy—cont’d**

**Cont’d**
ANTE-PARTUM

<table>
<thead>
<tr>
<th>Diagnostic Test</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIS (Sequential Integrated Screening)</td>
<td>CVS and referal for genetic counseling</td>
</tr>
<tr>
<td></td>
<td>Diagnostic testing with other amniocenteses or only. A positive result suggests the need for</td>
</tr>
<tr>
<td></td>
<td>Interpreting results: This is a screening method</td>
</tr>
<tr>
<td></td>
<td>Multiple gestation</td>
</tr>
<tr>
<td></td>
<td>Presence of diabetes</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td>Race</td>
</tr>
<tr>
<td></td>
<td>Maternal age</td>
</tr>
<tr>
<td></td>
<td>Gestational age</td>
</tr>
<tr>
<td></td>
<td>Results are adjusted according to:</td>
</tr>
<tr>
<td></td>
<td>Recferred for invasive diagnostic testing</td>
</tr>
<tr>
<td></td>
<td>Decreasing the number of pregnant women by &gt;90%</td>
</tr>
<tr>
<td></td>
<td>SIS using multiple markers increases the neural tube defects/down syndrome risk</td>
</tr>
<tr>
<td></td>
<td>and second semesters to determine risk for</td>
</tr>
<tr>
<td></td>
<td>Combines the results of markers in both the first</td>
</tr>
<tr>
<td>Maternal Serum Triple/Quad Screen</td>
<td>Down syndrome</td>
</tr>
<tr>
<td></td>
<td>Maternal serum screen for neural tube defects/</td>
</tr>
<tr>
<td></td>
<td>Clinical Application:</td>
</tr>
<tr>
<td></td>
<td>Performed at 15-18 weeks</td>
</tr>
<tr>
<td></td>
<td>Measures AFP, hCG, estriol, Inhibin levels</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic Testing—cont'd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Education in the Early Prenatal Period

- Elevated estrogen and progesterone levels in early pregnancy generate changes in the body, causing pregnancy-associated discomforts; offer suggestions to lessen discomforts
- Provide appropriate education for gestational age
- Teach patient to report symptoms that may indicate a potential complication (in red)

<table>
<thead>
<tr>
<th>Discomfort</th>
<th>Patient Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast discomfort</td>
<td>Hormone-related breast development often first presumptive sign of pregnancy</td>
</tr>
<tr>
<td></td>
<td>• Encourage a supportive bra</td>
</tr>
<tr>
<td></td>
<td>• Colostrum may be expressed in pregnancy</td>
</tr>
<tr>
<td></td>
<td>• Introduce the value of breastfeeding</td>
</tr>
<tr>
<td></td>
<td>• Introduce/reinforce breast self-examination</td>
</tr>
<tr>
<td></td>
<td>Report any breast lump or unusual discharge</td>
</tr>
<tr>
<td>Emotional lability</td>
<td>Related to hormone changes</td>
</tr>
<tr>
<td></td>
<td>• Discuss normalcy of emotional changes with patient and partner</td>
</tr>
<tr>
<td></td>
<td>• Ambivalence normal in first trimester</td>
</tr>
<tr>
<td></td>
<td>Report constant crying, inability to care for self, suicidal thoughts</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Related to rapid hemodynamic and metabolic changes in the first trimester</td>
</tr>
<tr>
<td></td>
<td>• Encourage naps during the day</td>
</tr>
<tr>
<td></td>
<td>• Encourage prenatal vitamins</td>
</tr>
<tr>
<td></td>
<td>• Encourage healthy diet</td>
</tr>
<tr>
<td></td>
<td>Report syncope and vertigo</td>
</tr>
<tr>
<td>Leukorrhea</td>
<td>Related to vasocongestion of mucous membranes</td>
</tr>
<tr>
<td></td>
<td>• Avoid tampon use and douching</td>
</tr>
<tr>
<td></td>
<td>• Wear peri-pad to absorb discharge</td>
</tr>
<tr>
<td></td>
<td>• Encourage cotton underwear</td>
</tr>
<tr>
<td></td>
<td>Report vaginal discharge with an odor or color, vaginal bleeding, or leaking of amniotic fluid</td>
</tr>
</tbody>
</table>

*Continued*
<table>
<thead>
<tr>
<th>Discomfort</th>
<th>Patient Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal stuffiness</td>
<td>Related to vasocongestion of mucous membranes</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>• Increased humidity in home may help</td>
</tr>
<tr>
<td></td>
<td>• Warm compresses to sinus area</td>
</tr>
<tr>
<td></td>
<td>• Avoid OTC cold remedies unless prescribed</td>
</tr>
<tr>
<td></td>
<td>Report fever, green/yellow nasal discharge, or frequent nosebleeds</td>
</tr>
<tr>
<td>Nausea and</td>
<td>Related to elevated hormone levels</td>
</tr>
<tr>
<td>vomiting</td>
<td>• Encourage small, frequent meals</td>
</tr>
<tr>
<td></td>
<td>• Eat crackers before rising</td>
</tr>
<tr>
<td></td>
<td>• Avoid pungent odors, spicy or greasy food</td>
</tr>
<tr>
<td></td>
<td>• Discuss limited time frame for nausea</td>
</tr>
<tr>
<td></td>
<td>• Subsides at approximately 12 weeks’ gestation</td>
</tr>
<tr>
<td></td>
<td>Report excessive vomiting</td>
</tr>
<tr>
<td>Urinary frequency</td>
<td>Related to uterine position/weight</td>
</tr>
<tr>
<td></td>
<td>• Encourage frequent emptying of bladder</td>
</tr>
<tr>
<td></td>
<td>• Discourage limiting oral fluids</td>
</tr>
<tr>
<td></td>
<td>Report burning or pain with urination</td>
</tr>
</tbody>
</table>

- Teach patient to avoid teratogens

<table>
<thead>
<tr>
<th>Teratogen</th>
<th>Patient Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viruses</td>
<td>• Avoid contact with ill persons</td>
</tr>
<tr>
<td></td>
<td>Infections causing serious harm to fetus:</td>
</tr>
<tr>
<td></td>
<td>• Toxoplasmosis</td>
</tr>
<tr>
<td></td>
<td>• Other (hepatitis B)</td>
</tr>
<tr>
<td></td>
<td>• Rubella</td>
</tr>
<tr>
<td></td>
<td>• Cytomegalovirus</td>
</tr>
<tr>
<td></td>
<td>• Herpes simplex virus (HSV)</td>
</tr>
<tr>
<td></td>
<td>Report fever, rash, illness to primary health-care provider</td>
</tr>
<tr>
<td>Environmental</td>
<td>Avoid exposure to:</td>
</tr>
<tr>
<td></td>
<td>• Mercury</td>
</tr>
<tr>
<td></td>
<td>• Radiation</td>
</tr>
<tr>
<td></td>
<td>• Lead</td>
</tr>
<tr>
<td></td>
<td>• Other known environmental toxins</td>
</tr>
</tbody>
</table>

*Continued*
### Teratogen

#### Drugs and medications

- Illicit drugs
  - Assess use of alcohol, smoking, and illicit drugs
  - Discuss adverse effects to fetus
  - Encourage cessation of alcohol, smoking, and drugs
  - Refer to smoking cessation classes
  - Refer to addiction counselors, AA
  - Follow up on positive drug screens

- OTC/herbal
  - Caution patient to discuss use of all OTC/herbals with primary health-care provider

- Prescription
  - List name/dosage of all medications taken since LNMP
  - Investigate drug safety
  - Medications in pregnancy should be prescribed after carefully weighing risks/benefits to the mother and fetus
  - FDA 2015 new drug labeling rule requires manufacturers to include risk summary, clinical considerations, and data in the following categories:
    - Pregnancy risk
    - Lactation
    - Females and males of reproductive potential

### Health Maintenance

- Immunizations Recommended in Pregnancy (CDC Guidelines) Web link listed below
- Inactivated influenza vaccine (injectable)
- Tdap between 27 and 36 weeks’ gestation

Source: http://www.cdc.gov/vaccines/adults/rec-vac/pregnant.html

### Nutrition

- Inquire about dietary practices
- Gather 24-hour diet recall
Suggest an addition of 300 healthy calories per day
- Encourage daily prenatal vitamin with 400 mcg folic acid
- Foods rich in folic acid include:
  - Enriched grain products
  - Fortified cereals
  - Leafy green vegetables
  - Beans
- Teach food safety
  - Wash hands before and after food preparation
  - Thoroughly cook all eggs, meat, and seafood
    - Avoid unpasteurized dairy products and soft cheese
    - Avoid hot dogs and lunch meats unless heated until steaming hot
    - Avoid large fish (shark, swordfish, mackerel) known to contain high levels of mercury
- Suggest 6–8 glasses of water daily

### Weight Gain in Pregnancy

- Recommended weight gain depends on prepregnancy weight/BMI

<table>
<thead>
<tr>
<th>Prepregnant Weight</th>
<th>BMI</th>
<th>Recommended Total Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>28–40 pounds</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5–24.9</td>
<td>25–35 pounds</td>
</tr>
<tr>
<td>Overweight</td>
<td>25–29.9</td>
<td>15–25 pounds</td>
</tr>
<tr>
<td>Obese</td>
<td>&gt;30.0</td>
<td>11–20 pounds</td>
</tr>
</tbody>
</table>

- Assess and document the pattern of weight gain

<table>
<thead>
<tr>
<th>Trimester</th>
<th>Suggested Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>1–4 pounds total</td>
</tr>
<tr>
<td>2nd and 3rd</td>
<td>0.5–1 pound per week</td>
</tr>
</tbody>
</table>

### Exercise in Pregnancy

- Physical activity in pregnancy is recommended unless contraindicated by medical complications
ANTE-PARTUM

- Avoid sports with potential for abdominal trauma or falls
- Avoid overheating and supine positioning
- STOP exercise if experiencing:

<table>
<thead>
<tr>
<th>Vaginal bleeding</th>
<th>Headache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cramping</td>
<td>Chest pain</td>
</tr>
<tr>
<td>Leaking of amniotic fluid</td>
<td>Calf pain</td>
</tr>
<tr>
<td>Decreased fetal movement</td>
<td>Dyspnea</td>
</tr>
<tr>
<td>Dizziness</td>
<td></td>
</tr>
</tbody>
</table>

Sexuality in Pregnancy

- Sexual activity is not restricted in pregnancy unless risk factors exist for bleeding or preterm labor
- Discuss expected changes in sexuality
- Change in libido
- Body image changes
- Braxton-Hicks contractions with orgasm
- Comfortable positioning for intercourse

WARNING SIGNS DURING PREGNANCY

Patient should be instructed to notify primary health-care provider if experiencing any of the following symptoms:

<table>
<thead>
<tr>
<th>Warning Sign</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal bleeding</td>
<td>Abortion</td>
</tr>
<tr>
<td></td>
<td>Placenta previa</td>
</tr>
<tr>
<td></td>
<td>Abruptio placentae</td>
</tr>
<tr>
<td></td>
<td>Preterm labor</td>
</tr>
<tr>
<td>Leakage of vaginal fluid</td>
<td>Premature rupture of amniotic fluid</td>
</tr>
<tr>
<td></td>
<td>Incontinence of urine</td>
</tr>
<tr>
<td>Dysuria</td>
<td>Urinary tract infection</td>
</tr>
<tr>
<td>Headache</td>
<td>Pregnancy-induced hypertension (PIH)</td>
</tr>
</tbody>
</table>

Continued
**Warning Sign** | **Possible Cause**
--- | ---
Altered vision | Pregnancy-induced hypertension (PIH)
Blurred vision | 
Flashes of light | 
Abdominal cramping | Preterm labor
Severe epigastric pain | Pregnancy-induced hypertension (PIH)
Decreased fetal movement | Fetal demise
Elevated temperature | Infection
Persistent vomiting | Hyperemesis gravidarum

**Nursing Care for Return Prenatal Visits**

- Measure pulse and blood pressure (BP)
- Compare BP to initial reading
- Measure in same position at each visit
- Measure weight and compare to last reading
- Note total weight gain
- Note pattern of weight gain
- Obtain urine specimen and test for protein and glucose
- Measure fundal height
- Determine fetal position
- Perform Leopold’s maneuver
  - Palpate fetal body part in fundus (A)
  - Palpate for fetal back (B)
  - Palpate for presenting part (C)
  - Palpate for attitude of presenting part (D)

Leopold’s maneuver.
- Place Doppler on maternal abdomen over fetal back to monitor fetal heart rate
- Record presence of fetal movement
- Assess for presence of edema/deep tendon reflexes
- Record symptoms since last visit
- Discuss procedure for diagnostic testing

<table>
<thead>
<tr>
<th>Diagnostic Tests</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1-Hour Glucose Screen</strong></td>
<td>- Administer 50 g glucose load</td>
</tr>
<tr>
<td>• Performed on all pregnant women at 24–28 weeks</td>
<td>- Patient should not eat, drink, or smoke during the test</td>
</tr>
<tr>
<td>• Performed at first prenatal visit and repeated as needed at 24–28 weeks in women identified as high risk:</td>
<td>- Serum sample drawn in 1 hour</td>
</tr>
<tr>
<td>• BMI $\geq 30$</td>
<td>- <strong>Expected Result:</strong> $\leq 135–140$ mg/dL</td>
</tr>
<tr>
<td>• Hx of gestational diabetes in previous pregnancy</td>
<td></td>
</tr>
<tr>
<td>• Clinical Application: Detection of gestational diabetes</td>
<td></td>
</tr>
<tr>
<td><strong>Group B Vaginal Culture</strong></td>
<td>- Explain test to patient</td>
</tr>
<tr>
<td>• Performed between 35 and 37 weeks</td>
<td>- Collect vaginal/rectal specimen</td>
</tr>
<tr>
<td>• Clinical Application: Detects group B streptococcus in asymptomatic women</td>
<td>- Positive culture treated with intravenous antibiotics in labor to prevent transmission to the newborn</td>
</tr>
<tr>
<td><strong>Fetal Fibronectin (fFN)</strong></td>
<td>- <strong>Expected Result: Negative</strong></td>
</tr>
<tr>
<td>• Performed between 22 and 35 weeks in women at high risk for preterm labor</td>
<td>- NO intercourse for 24 hours before examination</td>
</tr>
<tr>
<td>• Clinical Application: Negative predictive value for preterm labor</td>
<td>- Cervical/posterior fornix fluid collection</td>
</tr>
<tr>
<td></td>
<td>- Result often combined with ultrasound measurement of cervical length</td>
</tr>
<tr>
<td></td>
<td>- <strong>Expected Result: Negative</strong></td>
</tr>
</tbody>
</table>

*Continued*
Antibody Screen
- Performed at 28 weeks in Rh-negative women
- Clinical Application: Detects presence of positive antibodies in serum of Rh-negative women

• Administer Rho (D) Immune Globulin at 28 weeks to prevent antibody formation if Rh negative and antibody screen negative

Expected Result: Negative

Fetal Kick Counts

- Count fetal movement daily
  - Find a comfortable position in a quiet place
  - Note the time started and count the number of fetal movements
  - Document time required for 10 movements
  - REPORT immediately if 10 movements are not achieved in 2 hours or if the pattern of fetal movement changes
- Discuss fetal growth and development
- Demonstrate palpation of the uterus for contractions
- Discuss symptoms of preterm labor
  - Lower backache
  - Increased vaginal discharge
  - Bloody show
  - Leaking amniotic fluid
  - Contractions
  - Pelvic pressure
- Differentiate between true and false labor:

<table>
<thead>
<tr>
<th>True Labor</th>
<th>False Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervix dilates</td>
<td>Cervix unchanged</td>
</tr>
<tr>
<td>Contractions ↑ intensity/ frequency</td>
<td>Contractions ↓ with position/activity change Irregular</td>
</tr>
<tr>
<td>Loss of amniotic fluid Bloody show</td>
<td>No change in vaginal discharge</td>
</tr>
</tbody>
</table>
- Encourage childbirth preparation class
- Discuss options for pain control in labor
- Cesarean preparation class, if indicated
- Epidural anesthesia class, if indicated
- Explore preparing for the newborn
  - Breastfeeding
  - Circumcision
  - Choosing a pediatrician
  - Car seat safety
- Discuss the discomforts and expected body changes associated with late pregnancy and teach reportable symptoms (in red)

<table>
<thead>
<tr>
<th>Discomfort</th>
<th>Patient Education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Backache</strong></td>
<td>Related to shift in posture due to gravid uterus</td>
</tr>
<tr>
<td></td>
<td>• Encourage low-heeled shoes</td>
</tr>
<tr>
<td></td>
<td>• Avoid standing for long periods</td>
</tr>
<tr>
<td></td>
<td>• Teach pelvic tilt exercises</td>
</tr>
<tr>
<td></td>
<td><strong>Report constant or rhythmic backache</strong></td>
</tr>
<tr>
<td><strong>Braxton-Hicks contractions</strong></td>
<td>Instruct patient how to palpate for contractions</td>
</tr>
<tr>
<td></td>
<td>• Labor symptoms should not be present until 39 weeks’ gestation</td>
</tr>
<tr>
<td></td>
<td>• Monitor for symptoms of labor</td>
</tr>
<tr>
<td></td>
<td><strong>Report signs of labor for prompt evaluation</strong></td>
</tr>
<tr>
<td><strong>Constipation, hemorrhoids</strong></td>
<td>Related to decreased gastric motility; iron supplement may worsen constipation</td>
</tr>
<tr>
<td></td>
<td>• Increase dietary fiber and water intake</td>
</tr>
<tr>
<td></td>
<td>• Encourage exercise</td>
</tr>
<tr>
<td></td>
<td>• Discourage enemas and laxatives</td>
</tr>
<tr>
<td></td>
<td><strong>Report painful or bleeding hemorrhoids</strong></td>
</tr>
<tr>
<td><strong>Faintness</strong></td>
<td>Related to hemodynamic changes</td>
</tr>
<tr>
<td></td>
<td>• Avoid sudden position change</td>
</tr>
<tr>
<td></td>
<td>• Avoid long periods without eating</td>
</tr>
<tr>
<td></td>
<td>• Avoid lying supine</td>
</tr>
<tr>
<td></td>
<td><strong>Report loss of consciousness</strong></td>
</tr>
<tr>
<td>Discomfort</td>
<td>Patient Education</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Heartburn               | Related to increased pressure on abdominal organs and sphincter relaxation  
  • Encourage small, frequent meals  
  • Avoid spicy foods  
  • Sit up after meals  
  Report persistent symptoms |
| Insomnia                | Related to fetal movement, nocturia  
  • Teach relaxation techniques  
  • Encourage side-lying with pillow support  
  • Warm milk/shower before sleep |
| Leg cramps              | Related to uterine pressure on the pelvic nerves or calcium imbalance  
  • Review daily calcium intake  
  • Teach signs of deep vein thrombosis  
  Report pain, redness, localized heat |
| Peripheral edema        | Related to venous return from pressure of the gravid uterus  
  • Rest in lateral recumbent position  
  • Elevate legs when sitting  
  • Continue with 6–8 glasses water daily  
  Report generalized edema |
| Pigmentation changes:   | Related to hormone changes in pregnancy  
  • Fade after pregnancy  
  • Moisturizers decrease itching, but will not prevent striae  
  Report body rashes |
| • Linea nigra           |                                                                                                                                                |
| • Chloasma              |                                                                                                                                                |
| • Striae                |                                                                                                                                                |
| Round ligament pain     | Related to stretching of the round ligament with uterine growth and rotation  
  • Change positions slowly  
  • Encourage good body mechanics  
  Report abdominal cramping, constant pain, or bleeding |

Continued
Discomfort | Patient Education
--- | ---
**Shortness of breath** | Related to upward diaphragmatic pressure exerted by the gravid uterus
- Allow more time for strenuous activities
- Eat small, frequent meals
- Lightening will lessen symptoms
Report unrelieved dyspnea with rest

**Varicose veins** | Caused by venous stasis related to pressure from the gravid uterus
- Wear pregnancy support hose
- Avoid lengthy standing
- Change positions frequently
Report pain, redness, localized heat to legs

---

**Fetal Surveillance in Pregnancy**

**Nonstress Test (NST)**

Procedure used to monitor fetal response to movement; FHR acceleration with fetal movement is reassuring and a sign of fetal well-being.

- Place patient in a Semi-Fowler’s or side-lying position
- Record vital signs and apply electronic fetal monitor
- Record baseline fetal heart rate and monitor pattern for minimum of 20 minutes (may take up to 40 minutes or longer to take into account the fetal sleep-wake cycle)
- NST may take longer with absence of accelerations; fetal movement may be stimulated vibroacoustically
- Report findings to primary health-care provider

**Expected Findings—Reactive**

Two accelerations of FHR within 20 minutes that are at least 15 BPM above the baseline rate and last for a minimum of 15 seconds each

**Contraction Stress Test (CST)**

Also called Oxytocin Challenge Test (OCT), the CST is a procedure used to determine fetal tolerance to the stress of uterine contractions.

- Calculate gestational age (should not be performed on preterm patients; test stimulates contractions)
Place patient in side-lying position
Record vital signs
Apply EFM and record baseline fetal heart rate for 20 minutes
Stimulate uterine contractions until three contractions occur within 10 minutes lasting 40 seconds each
Contractions can be stimulated with
- Nipple stimulation or
- IV Oxytocin per hospital protocol
Document FHR response to contractions

Expected Finding—Negative
Three contractions that last at least 40 seconds within 10 minutes without the presence of late or significant variable decelerations

Biophysical Profile (BPP)
Exam performed to assess fetal well-being
Test includes ultrasound, observing four specific fetal criteria + NST included as a fifth parameter
Scoring of Biophysical Profile (BPP):

<table>
<thead>
<tr>
<th>Parameter Measured</th>
<th>Expected Findings (within 30 minutes)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal tone</td>
<td>1+ episodes of active limb or hand flexion/extension</td>
<td>2</td>
</tr>
<tr>
<td>Fetal breathing</td>
<td>1+ episodes lasting 30 seconds</td>
<td>2</td>
</tr>
<tr>
<td>Gross fetal movement</td>
<td>3+ discrete movements</td>
<td>2</td>
</tr>
<tr>
<td>Amniotic fluid volume</td>
<td>Pocket of amniotic fluid that measures at least 2 cm</td>
<td>2</td>
</tr>
<tr>
<td>NST</td>
<td>Reactive</td>
<td>2</td>
</tr>
</tbody>
</table>

Expected Finding—
Score of at least 8/10

Pregnancy Complications
Vaginal Bleeding (Before 20 Weeks’ Gestation)
May be related to spontaneous abortion, ectopic pregnancy, or gestational trophoblastic disease.
Spontaneous Abortion
Loss of pregnancy before viability.

Clinical Findings
■ Vaginal spotting (may pass clots)
■ Abdominal cramping
■ Cervical effacement/dilation
■ Fetal heartbeat may be present or absent

Ectopic Pregnancy
Products of conception implant outside the uterus.

Clinical Findings
■ Vaginal spotting
■ hCG lower than expected for dates
■ Lower abdominal pain

Ultrasound Findings
■ Absence of intrauterine gestational sac

If Rupture Occurs
■ Positive Cullen’s sign (periumbilical bluish hue)
■ Shoulder pain
■ Signs of shock

Gestational Trophoblastic Disease
Abnormal proliferation of trophoblastic cells without viable fetus.

Clinical Findings
■ Vaginal spotting (dark brown)
■ Fundal height greater than expected for dates
■ hCG greater than expected for dates
■ Excessive nausea and vomiting
■ Absence of fetal heart tones

Ultrasound Findings
■ Snowflake-like clusters, absence of fetus

Nursing Care—Vaginal Bleeding in Early Pregnancy
■ Monitor amount, color of bleeding
■ Collect passed tissue/clots
■ Assess vital signs
■ Observe for signs of shock
■ Assess for fetal heart rate
■ Monitor patient comfort
■ Provide pain medications as ordered
Attend to patient’s emotional needs
View/report laboratory/ultrasound findings
Check blood type and Rh factor
  ■ Administer Rh(D) immunoglobulin if indicated
Monitor intake/output
Initiate IV fluids as ordered
Type and cross for blood products as ordered

Vaginal Bleeding After 20 Weeks’ Gestation

Placenta Previa
Low-lying position of placenta in the uterus that partially or completely covers the cervical os.

Clinical Findings
■ Painless bright red vaginal bleeding
■ Bleeding may be reported after intercourse
■ Uterine tone soft upon palpation

Nursing Interventions
Dependent on the following:
■ Amount of bleeding
■ Labor status
■ Gestational age
■ Fetal response
■ If labor active and os is completely covered, C/S indicated
■ If bleeding controlled and labor absent, conservative management

Conservative Management Teaching
■ Activity limitation
■ No tampon use
■ No sexual intercourse
■ Monitor and report bleeding
■ Patient instructed to report placenta placement when admitted to hospital
■ Cesarean preparation class
■ Count fetal movements
Complete placenta previa.

Partial placenta previa.

Marginal placenta previa.
Abruptio Placentae
Premature separation of the placenta; may be partial or complete.

Clinical Findings
- Abdominal pain (sudden onset, intense and localized)
- Fundus firm, boardlike, with little relaxation
- Vaginal bleeding
- Bleeding may be concealed within the uterine cavity
- Alteration in FHR pattern

Nursing Care With Vaginal Bleeding in Late Pregnancy
- Monitor amount of bleeding
- Check vital signs
- Observe for signs of shock
- Evaluate fetal heart tones
- Palpate uterine tone
- Apply electronic fetal monitor (EFM)
- REPORT category II and III FHR patterns
- REPORT tachysystole
- Do not attempt vaginal examination until placenta placement verified
- Initiate IV fluids
- Report laboratory and ultrasound findings
- Prepare staff for possible cesarean birth
- Attend to patient’s emotional needs
Hyperemesis Gravidarum

Intractable vomiting in pregnancy with resultant weight loss and dehydration; usually occurs in the first trimester.

**Clinical Findings**
- Inability to retain food and/or oral fluids
- Weight loss
- Fatigue

**Nursing Care**
- Assess vital signs
- Observe for signs of dehydration
- Review electrolytes
- Access IV site as ordered
- Record fetal heart rate pattern
- Record intake and output
- Record daily weight
- Check urine for ketones
- Administer antiemetics as ordered

---

Preterm Labor

Onset of labor before the 37th completed week of gestation.

**Clinical Findings**
- Rhythmic lower abdominal cramping
- Complaints of backache
- Increased vaginal discharge
- Downward pelvic pressure
- Leaking of amniotic fluid
- Vaginal spotting
- Cervical effacement/dilation
- Shortening cervical length

**Nursing Care**
- Determine gestational age
- Assess uterine tone and contraction status
- Auscultate fetal heart tones and apply EFM
- Assess for maternal infection
  - Obtain vaginal/urine cultures
  - Assess maternal temperature
  - Note color and odor of vaginal fluid
Assess for presence of amniotic fluid
- *Nitrazine paper:* Amniotic fluid has alkaline properties; nitrazine paper changes from yellow to blue
- *Microscopic analysis:* Amniotic fluid resembles fern plant “ferning pattern”
- *Speculum examination:* Assess for pooling of amniotic fluid
- Assess cervical dilation and effacement
- Position side-lying
- Initiate IV fluids as ordered
- Initiate corticosteroid as ordered
  - Accelerates fetal lung maturity
  - Greatest benefit 24-hours after administration
  - Given between 24–34 weeks’ gestation
- Initiate tocolytic therapy as ordered

<table>
<thead>
<tr>
<th>Tocolytic Medication</th>
<th>Nursing Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium Sulfate</td>
<td>• Monitor intake and output</td>
</tr>
<tr>
<td>ANTIDOTE: Calcium gluconate at bedside</td>
<td>• Assess pattern of fetal heart rate</td>
</tr>
<tr>
<td></td>
<td>• Monitor for contractions</td>
</tr>
<tr>
<td></td>
<td>• Auscultate lungs</td>
</tr>
<tr>
<td></td>
<td>• Report magnesium sulfate levels</td>
</tr>
<tr>
<td></td>
<td>• Watch for signs of toxicity:</td>
</tr>
<tr>
<td></td>
<td>• Absence of deep tendon reflexes</td>
</tr>
<tr>
<td></td>
<td>• Respiration depression</td>
</tr>
<tr>
<td></td>
<td>• Decreased level of consciousness</td>
</tr>
<tr>
<td></td>
<td>• Decreased urine output</td>
</tr>
<tr>
<td>β-Adrenergic Agonist Terbutaline</td>
<td>• Monitor for hypotension</td>
</tr>
<tr>
<td>Ritodrine</td>
<td>• Assess for tachycardia</td>
</tr>
<tr>
<td></td>
<td>• Assess patient for tremors</td>
</tr>
<tr>
<td></td>
<td>• Assess for pulmonary edema</td>
</tr>
<tr>
<td></td>
<td>• Screen glucose/potassium</td>
</tr>
<tr>
<td></td>
<td>• Assess for cardiac arrhythmias/chest pain</td>
</tr>
<tr>
<td></td>
<td>• Monitor pattern of fetal heart rate</td>
</tr>
<tr>
<td></td>
<td>• Monitor contractions</td>
</tr>
<tr>
<td>Prostaglandin Antagonist</td>
<td>• May lead to premature constriction of ductus arteriosus</td>
</tr>
<tr>
<td>Indomethacin</td>
<td></td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>• Monitor for hypotension</td>
</tr>
<tr>
<td>Nifedipine</td>
<td></td>
</tr>
</tbody>
</table>
Preeclampsia

Preeclampsia: Hypertension disorder of pregnancy recognized after 20 weeks’ gestation with multisystem involvement

Clinical Findings

- Hypertension
  - BP of 140/90 mm Hg or higher
- Proteinuria and renal involvement
  - Dipstick urine of 1+ or more
  - 300 mg of protein in a 24-hour urine collection
  - Elevated serum creatinine
- Blurred or altered vision
- Epigastric pain
- Headache
- Edema
- Hyperreflexia

Eclampsia

Eclampsia: Severe preeclampsia complicated with new-onset convulsion

- Can occur during pregnancy or in the postpartum period
- Worsening of symptoms of preeclampsia
- Seizure activity

HELLP Syndrome

Clinical Findings

- Worsening symptoms of preeclampsia
- Malaise
- Epigastric pain
- Nausea/vomiting

Laboratory Findings

- Hemolysis
- Elevated Liver enzymes
- Low Platelets

Nursing Care

- Closely monitor vital signs
- Report worsening of symptoms
- Assess deep tendon reflexes
  - Report worsening hyperreflexia and clonus
Monitor kidney function
- Monitor intake and output
- Collect 24-hour urine as ordered
- Report abnormal renal function laboratory findings

Assess for edema
- Assess for upper body edema
- Assess daily weight
- Record intake and output

Assess fetal status
- Evaluate fetal heart rate (FHR) tracing
- Report category II and category III FHR patterns

Palpate tone of fundus

Monitor patient comfort

Place patient in side-lying position

Keep environment quiet and dim

Institute seizure precautions
- Side rails up and padded
- Bed in low position
- Suction equipment available at bedside
- Oxygen available at bedside

Initiate IV fluids as ordered

Initiate medications as ordered

<table>
<thead>
<tr>
<th>Drug Therapy</th>
<th>Nursing Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium sulfate</td>
<td>See precautions listed under preterm labor for magnesium sulfate</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Administer slowly Closely monitor for hypotension</td>
</tr>
</tbody>
</table>

**Gestational Hypertension**

**Gestational Hypertension:** New-onset hypertension recognized after 20 weeks’ gestation without symptoms of preeclampsia

**Chronic Hypertension**

**Chronic Hypertension:** Hypertension that predates pregnancy identified before 20 weeks’ gestation
Gestational Diabetes

Clinical Findings
- Polyuria
- Polydipsia
- Polyphagia
- Fatigue
- Blurred vision
- Glucosuria
- Recurrent yeast infections
- Slow healing wounds

Abnormal glucose results:

<table>
<thead>
<tr>
<th>Glucose Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-hr glucose</td>
<td>≥135–140 mg/dL</td>
</tr>
</tbody>
</table>

Abnormal 3-hour glucose tolerance test if 2 of 4 of the following values are elevated:

<table>
<thead>
<tr>
<th>Glucose Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS</td>
<td>&lt;95 mg/dL</td>
</tr>
<tr>
<td>1-hr</td>
<td>&lt;180 mg/dL</td>
</tr>
<tr>
<td>2-hr</td>
<td>&lt;155 mg/dL</td>
</tr>
<tr>
<td>3-hr</td>
<td>&lt;140 mg/dL</td>
</tr>
</tbody>
</table>

Nursing Care
- Dietitian consult for ADA diet instructions
- Discuss pathophysiology of gestational diabetes with patient
- Demonstrate home glucose monitoring
- Review range for glycemic control
- Demonstrate logging of glucose results
- Discuss role of exercise in glycemic control
- Demonstrate urine ketone testing
- Demonstrate insulin administration
- Teach patient to count fetal movement
- Teach patient about fetal surveillance testing
  - Nonstress test
  - Biophysical profile
  - Ultrasound
- Women with gestational diabetes should be screened at 6–12 weeks’ postpartum for glucose impairment with a 75-g 2-hour OGTT
## Common Intrapartum Terms and Abbreviations

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active labor</td>
<td>Second phase in the 1st stage of labor characterized by cervical dilation of 4–7 cm</td>
</tr>
<tr>
<td>AFI</td>
<td>Amniotic fluid index</td>
</tr>
<tr>
<td>Amnioinfusion</td>
<td>Installation of normal saline into the uterine cavity during labor to decrease the occurrence of cord compression and associated variable decelerations</td>
</tr>
<tr>
<td>AROM</td>
<td>Artificial rupture of membranes</td>
</tr>
<tr>
<td>Attitude</td>
<td>Relation of the fetal body parts to one another</td>
</tr>
<tr>
<td>Bishop’s score</td>
<td>Set of criteria used to calculate cervical readiness for labor</td>
</tr>
<tr>
<td>BPP</td>
<td>Biophysical profile; fetal well-being assessment</td>
</tr>
<tr>
<td>Breech presentation</td>
<td>Fetus positioned so that the buttocks or feet are the presenting part</td>
</tr>
<tr>
<td>Cardinal movements</td>
<td>Movements of the fetus when traveling through the birth canal</td>
</tr>
<tr>
<td>Cephalic presentation</td>
<td>Fetus positioned so that the fetal head is the presenting part; most common fetal position in utero</td>
</tr>
<tr>
<td>Dilation</td>
<td>Opening of the cervix caused by rhythmic uterine contractions; starts closed and opens to 10 cm</td>
</tr>
<tr>
<td>EDD</td>
<td>Estimated day of delivery</td>
</tr>
<tr>
<td>Effacement</td>
<td>Shortening and thinning of the cervix</td>
</tr>
<tr>
<td>Effleurage</td>
<td>Rhythmic light stroking of the abdomen as a measure to decrease pain in labor</td>
</tr>
<tr>
<td>EFM</td>
<td>Electronic fetal monitoring</td>
</tr>
<tr>
<td>Engagement</td>
<td>Occurs when the fetal presenting part passes into the maternal true pelvis</td>
</tr>
<tr>
<td>FHR</td>
<td>Fetal heart rate</td>
</tr>
</tbody>
</table>

*Continued*
### Common Intrapartum Terms and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal attitude</td>
<td>Relation of the fetal body parts to each other; example: chin to chest (flexion)</td>
</tr>
<tr>
<td>Fetal lie</td>
<td>Relationship of the fetal spine to the maternal spine, most often longitudinal</td>
</tr>
<tr>
<td>Fetal presentation</td>
<td>The part of the fetus that is positioned closest to the cervix and is delivered first in a vaginal birth</td>
</tr>
<tr>
<td>Ferguson reflex</td>
<td>Maternal urge to push preceded by stretching of the posterior vagina and release of endogenous oxytocin</td>
</tr>
<tr>
<td>Friedman curve</td>
<td>Assessment tool that determines the normalcy of the progress of labor</td>
</tr>
<tr>
<td>Fundus</td>
<td>Uppermost portion of the uterus</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>Time of labor and birth</td>
</tr>
<tr>
<td>IUPC</td>
<td><strong>Intrauterine</strong> pressure catheter; internally measures uterine tone with contractions and rest</td>
</tr>
<tr>
<td>Kangaroo care</td>
<td>Skin-to-skin contact with mother and newborn</td>
</tr>
<tr>
<td>Latent labor</td>
<td>1st phase of the 1st stage of labor characterized by 0–3 cm cervical dilation</td>
</tr>
<tr>
<td>Leopold’s maneuvers</td>
<td>Systematic palpation of the gravid abdomen to determine fetal position and expedite location of FHR</td>
</tr>
<tr>
<td>Lightening</td>
<td>Descent of the fetal presenting part into the pelvic cavity often 2 weeks before labor begins in primiparas</td>
</tr>
<tr>
<td>LOA</td>
<td><strong>Left occiput anterior</strong>; referring to the relation of the fetal presenting part to the maternal pelvis</td>
</tr>
<tr>
<td>McRobert’s maneuver</td>
<td>Maternal positioning for pushing with shoulder dystocia; maternal legs flexed apart with knees placed onto abdomen</td>
</tr>
</tbody>
</table>

*Continued*
### Common Intrapartum Terms and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NST</td>
<td><strong>Nonstress test</strong></td>
</tr>
<tr>
<td>Para</td>
<td>Number of pregnancies that resulted in birth</td>
</tr>
<tr>
<td>Primipara</td>
<td>Woman who delivers one fetus to viability</td>
</tr>
<tr>
<td>PROM</td>
<td><strong>Premature rupture of membranes</strong></td>
</tr>
<tr>
<td>Station</td>
<td>Location of the presenting fetal part in relation to the maternal ischial spines</td>
</tr>
<tr>
<td>Tachysystole</td>
<td>&gt;5 contractions in 10 minutes</td>
</tr>
<tr>
<td>Tocolytic agent</td>
<td>Medication used to decrease uterine contractions in preterm labor</td>
</tr>
<tr>
<td>Transition</td>
<td>Last phase of the 1st stage of labor characterized by contractions every 2–3 minutes lasting 90 seconds with cervical dilation of 8–10 cm</td>
</tr>
<tr>
<td>Turtle sign</td>
<td>Upon pushing, regression instead of forward movement of fetal head with subsequent contractions</td>
</tr>
<tr>
<td>VBAC</td>
<td><strong>Vaginal birth after cesarean</strong></td>
</tr>
</tbody>
</table>

### Admission to Birthing Unit

Upon admission to labor and delivery, the nurse should:
- Determine reason for admission
- Gather patient history
- Review prenatal health record
- Perform a physical examination of mother and fetus

### Prenatal History

- Estimated date of delivery (EDD)
- Current gestational age
- Complications in pregnancy
Results of laboratory tests and ultrasounds
Medications used in pregnancy
Presence of vaginal discharge or bleeding
Amniotic fluid status
Presence of fetal movement
Onset and pattern of contractions

Obstetrical History

Length of labor
Birth complications
Neonatal outcomes
Type of birth
  Vaginal
    • Instrumentation
    • Episiotomy
  Cesarean
    • Reason for cesarean
    • Type of incision
      – Low transverse
      – Classical

Medical History

Chronic health problems
Current medications
Time and description of last oral intake
Allergies to food/medicine

Surgical History

Complications with anesthesia
Date/reason/type of surgery
Performing a Physical Examination

- Assess maternal vital signs
- Collect urine specimen for protein and glucose
- Assess for presence of edema
- Assess deep tendon reflexes
- Perform Leopold’s maneuver to determine fetal position (See Antepartum Tab, p. 47)
- Assess fetal heart rate (FHR)
- Measure fundal height (See Antepartum Tab, p. 37)
- Determine the frequency, duration, and intensity of contractions
- Determine the stage and phase of labor
  - Stage 1: Cervical dilation from 0–10 cm, divided into three phases
    - Latent phase: Cervix dilates 0–3 cm
    - Active phase: Cervix dilates 4–7 cm
    - Transition: Cervix dilates 8–10 cm
  - Stage 2: Complete cervical dilation until birth of the fetus
  - Stage 3: Birth of fetus until birth of placenta
  - Stage 4: First 2 hours of recovery after birth
- Assess cervical changes
  - Dilation (0–10 cm)
  - Effacement (0%–100%)
- Assess station

Station.
INTRA-PARTUM

- Note presence, color, and amount of bloody show
- Check status of amniotic membranes
  - Intact
  - Bulging
  - Ruptured (note color, amount, and odor)
    - Confirming rupture of membranes (ROM)
      - *Nitrazine paper:* Amniotic fluid has alkaline properties; Nitrazine paper changes from yellow to blue
      - *Microscopic analysis:* Amniotic fluid resembles fern plant “ferning pattern”
      - *Speculum examination:* Assess for pooling of amniotic fluid

Nursing Responsibility With Fetal Monitoring

- Position to avoid supine hypotension
  - Rolled towel under right hip to move gravid uterus off of inferior vena cava
  - Side-lying
  - Semi-Fowler’s
- Compare FHR to maternal pulse to ensure fetal assessment
- Review FHR pattern in conjunction with contraction pattern
- Determine whether FHR tracing is normal (category I), indeterminate (category II), or abnormal (category III)
- Implement nursing interventions and evaluate effectiveness for the identified category
- REPORT category II and category III FHR patterns to primary health-care provider
- Document findings and interventions using standardized descriptive terms
- Stay current with ongoing education and periodic competence validation
### Three-Tier FHR Pattern Interpretation

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Indication</th>
</tr>
</thead>
</table>
| I        | Normal     | Predictive of normal fetal acid-base balance  
May or may not exhibit early decelerations  
May or may not exhibit accelerations  
Predictive of normal fetal acid-base balance  
Routine follow-up to support labor |
|          | Indeterminate | Requires heightened surveillance  
Support normal contraction patterns  
Promote optimal fetal oxygenation  
Ensure proper maternal positioning  
Communicate changes to primary health-care provider |

Continued
Three-Tier FHR Pattern Interpretation—cont’d

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>III Abnormal</td>
<td>Absent variability plus: Recurrent late decelerations Recurrent variable decelerations Bradycardia Sinusoidal pattern</td>
<td>• Predictive of abnormal fetal acid-base balance Requires prompt evaluation and action • Intrauterine resuscitation • Expeditious birth as appropriate</td>
</tr>
</tbody>
</table>

Types of Fetal Monitoring

**Intermittent Auscultation**
Auscultate fetal heart tone (FHT) over fetal back with Doppler or fetoscope.

- Count FHR before and immediately after a contraction
- Note both FHR and rhythm
- Frequency of auscultation based on:
  - Phase/stage of labor
  - Hospital protocol
  - Risk status
  - Labor interventions
  - Physician orders
INTRA-PARTUM

<table>
<thead>
<tr>
<th>Stage/Phase of Labor</th>
<th>Frequency of FHR Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1: Latent phase</td>
<td>Every 30–60 minutes</td>
</tr>
<tr>
<td>Stage 1: Active phase</td>
<td>Every 15–30 minutes</td>
</tr>
<tr>
<td>Stage 1: Transition</td>
<td>Every 5–15 minutes</td>
</tr>
<tr>
<td>Stage 2: Pushing</td>
<td>Every 5–15 minutes</td>
</tr>
</tbody>
</table>

**Continuous Fetal Monitoring**
Monitored with external or internal fetal monitoring.

**External Fetal Monitoring (EFM)**
- Encourage patient to void before applying EFM
- Test internal circuitry of EFM
- Perform Leopold’s maneuver
  - Place ultrasound transducer over fetal back
  - Place toco transducer over uterine fundus

![External fetal monitor.](image)

External fetal monitor.
Internal Fetal Monitoring

- Indicated for more accurate FHR or contraction tracing
- May be implemented only after amniotic sac is ruptured
- FHR measured by spiral electrode attached to presenting part
- Uterine tone measured by intrauterine pressure catheter (IUPC)
  - Resting tone of uterus averages 15–20 mm Hg
  - Contraction tone of uterus averages 50–75 mm Hg

Internal fetal monitor.

Evaluating Fetal Heart Rate Patterns

- Evaluate FHR baseline
  - Normal baseline FHR is 110–160 bpm
  - Evaluated between contractions over 10 minutes
  - Documented by rounding to nearest 5 bpm
  - Does not include accelerations or decelerations
- Influences on FHR
  - Central nervous system
    - Fetal sleep ↓ variability of FHR
    - Fetal movement ↑ variability of FHR
  - Autonomic nervous system
    - Sympathetic branch (↑ FHR)
    - Parasympathetic branch (↓ FHR)
Baroreceptors
– Respond to ↓ blood pressure with subsequent ↓ FHR
Chemoreceptors
– Sense ↓ oxygenation and ↑ FHR

Evaluate variability

Variability

- Fluctuations in FHR baseline over time
- Important indicator of fetal well-being
- Sensitive to hypoxia and changes in pH
- Visually assessed noting peak and trough in beats per minute
  (Expected pattern highlighted in red)

<table>
<thead>
<tr>
<th>Variability</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent (undetectable)</td>
<td>Fetal acidemia</td>
</tr>
<tr>
<td>Minimal (≤5 bpm)</td>
<td>Maternal medication</td>
</tr>
<tr>
<td></td>
<td>Fetal sleep</td>
</tr>
<tr>
<td>Moderate (6–25 bpm)</td>
<td>Adequate fetal oxygenation</td>
</tr>
<tr>
<td>Marked (&gt;25 bpm)</td>
<td>May be an early sign of mild fetal hypoxia</td>
</tr>
</tbody>
</table>

Normal fetal heart rate. (Top, fetal heart rate; Bottom, contractions.)
Evaluating Changes to Baseline Fetal Heart Rate

**Tachycardia**
- FHR greater than 160 bpm for ≥10 minutes
- Possible cause:
  - Infection/hyperthermia
  - Maternal medications (e.g., terbutaline, albuterol)

**Bradycardia**
- FHR less than 110 bpm for ≥10 minutes
- Possible cause:
  - Vagal stimulation
  - Interruption of fetal blood flow/gas exchange
  - Maternal medications
- Determine presence of periodic or episodic changes to FHR
  - Periodic: Occurs with uterine contractions
  - Episodic: Not related to uterine contractions

**Accelerations**
- Sudden increase of fetal heart rate over baseline ≥15 bpm lasting ≥15 seconds
- Indication of fetal well-being
- Etiology: Sympathetic nervous system stimulation

Acceleration. (Top, fetal heart rate; Bottom, contractions.)
Decelerations (Early, Late, Variable)
- Recurrent decelerations: occur with $\geq 50\%$ of contractions
- Intermittent decelerations: occur with $\leq 50\%$ of contractions

Early Deceleration
- Decrease in FHR with contractions
- Mirrors the contraction
- Onset occurs before the contraction peak
- Recovery to baseline rate occurs by contraction end
- Usually benign finding; continue to monitor FHR pattern
- Etiology: Fetal head compression

Late Deceleration
- Decrease in FHR occurring with contractions
- Onset with or after the peak of contraction
- Recovery to baseline rate occurs after contraction ends
- Repetitive pattern
- Etiology: Decreased uteroplacental blood flow/oxygen delivery related to:
  - Hypertension
  - Tachysystole
  - Preeclampsia
INTRA-PARTUM

- Chronic maternal disease
- Placental decomposition
- Requires intervention

Late deceleration. (Top, fetal heart rate; Bottom, contractions.)

**Variable Deceleration**
- Decrease in FHR occurring without regard to contractions
- Can range from mild to severe
- May be persistent or occasional
- Shaped like a “V” or “W"
- **Onset variable**
- Variable decelerations that warrant closer monitoring and/or action
  - Repetitive and/or deep decrease in FHR
  - Associated with minimal variability
  - Prolonged with slow return to baseline FHR
- **Etiology:**
  - Cord prolapse
  - Umbilical cord compression
    - Amnioinfusion may relieve cord compression
Variable deceleration. (Top, fetal heart rate; Bottom, contractions.)

Nursing Interventions for Intrauterine Resuscitation

- Turn patient to side-lying position
  - Shifts weight of gravid uterus off of the inferior vena cava
  - Allows for improved uteroplacental blood flow
- O₂ via mask at 8–10 L/min
  - Improves oxygen delivery to fetus
- Discontinue IV oxytocin
  - Decreases uterine contractions, thus improving uteroplacental blood flow
- Hydrate patient with IV bolus (500 mL lactated Ringer’s [LR])
  - Corrects identified maternal hypotension
- Alter pushing efforts to provide more time for fetal recovery between pushes
- Notify primary health-care provider
- Document nursing interventions, effectiveness of interventions, and orders from primary health-care provider
Monitoring Contractions

**Frequency**

- Beginning of one contraction to the beginning of the next contraction
- Documented as range, for example, “every 2–5 minutes”
- Tachysystole is defined as >5 contractions in a 10-minute window, averaged over 30 minutes, and should be corrected

**Duration**

- Beginning of the one contraction to the end of the same contraction
- Documented as a range, for example, “lasting 60–90 seconds”

**Intensity**

- Palpate uterus both during and after contraction
- Resting tone palpated between contractions
- Document intensity of uterine contractions (findings subjective unless monitored with I UPC)

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Palpated by Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Fundus easily indented</td>
</tr>
<tr>
<td>Moderate</td>
<td>Requires more pressure to indent fundus</td>
</tr>
<tr>
<td>Strong</td>
<td>Unable to indent fundus</td>
</tr>
</tbody>
</table>

Intensity Palpated by Nurse

- Before contraction
- During contraction
Nursing Care of the Laboring Patient

First Stage of Labor: Dilation
- Divided into three phases: Latent, active, transition
- Five Ps of Labor: Nurses should assess and provide interventions to facilitate:
  - Passageway (birth canal)
  - Passenger (fetal attitude, lie, presentation)
  - Powers (contractions)
  - Position (maternal)
  - Psychological response

First Stage of Labor—Dilation

Stage 1—Latent Phase
- **Power**: Contractions palpate mild, every 5–10 minutes, lasting 30–45 seconds
- **Psyche**: Patient is usually excited about the start of labor
- **Measuring progress in labor**: Cervical dilation (0–3 cm)
- **Passageway**: Encourage frequent position changes that optimize fetal descent, rotation, and widen pelvic outlet
  - Ambulation (with intact amniotic sac)
  - Squatting
  - Hands and knees position
  - Rocking chair
  - Side-lying
INTRA-PARTUM

- Check bladder status and encourage patient to void every 2 hours
- Provide enema if appropriate/ordered
- Hydration
  - Oral fluids as ordered
  - Monitor intake and output

Nursing Considerations
- Monitor vital signs every 30–60 minutes
- Fetal heart tones every 30–60 minutes

Pain Management
- Pain medication usually avoided until in active labor
- Techniques for pain management
  - Hydrotherapy
    - Shower
    - Labor tub
  - Massage
    - Effleurage
    - Counter-pressure to back
  - Relaxation techniques
    - Progressive relaxation
    - Patterned breathing
    - Soft music and lighting
  - Distraction

Stage 1—Active Phase
- Power: Contractions palpate moderate to strong, every 2–5 minutes lasting 40–60 seconds
-Psyche: Patient may have greater difficulty coping with the pain of contractions
-Measuring progress in labor: Cervical dilation (4–7 cm)

Passageway
- Encourage frequent position changes
- Check bladder status and encourage patient to void every 2 hours

Nursing Considerations
- Monitor vital signs every 30 minutes
- Fetal heart tones every 15–30 minutes

Pain Management
- Continue with effective techniques used in latent phase
- Systemic medications to decrease pain perception
- Document and report maternal and fetal response to medications
- Neonatal side effects related to both dose and timing of administered medication
# Systemic Pain Medications in Labor

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Drug Action</th>
<th>Nursing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioid agonists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Meperidine (Demerol)</td>
<td>↓ Pain perception</td>
<td>• Side effect: Nausea and vomiting, sedation, dizziness, respiratory depression, transient changes to FHR</td>
</tr>
<tr>
<td>• Fentanyl (Sublimaze)</td>
<td></td>
<td>• Avoid dosing close to delivery to avoid neonatal sedation and respiratory depression</td>
</tr>
<tr>
<td>Opioid agonist-antagonist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Butorphanol (Stadol)</td>
<td>Reverses opioid-induced respiratory depression</td>
<td>• Monitor and report adverse changes to FHR</td>
</tr>
<tr>
<td>• Nalbuphine (Nubain)</td>
<td></td>
<td>• Causes maternal drowsiness; use safety precautions to prevent falls</td>
</tr>
<tr>
<td>Opioid antagonist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Narcan</td>
<td></td>
<td>• Do not give to women who are opioid dependent—may cause abrupt withdrawal</td>
</tr>
<tr>
<td>H1-receptor antagonist</td>
<td>↓ Nausea ↓ Anxiety</td>
<td></td>
</tr>
<tr>
<td>• Promethazine (Phenergan)</td>
<td></td>
<td>• Augments opioid analgesics</td>
</tr>
<tr>
<td>• Hydroxyzine (Vistaril)</td>
<td></td>
<td>• Monitor and report adverse changes to FHR</td>
</tr>
<tr>
<td>• Diphenhydramine (Benadryl)</td>
<td></td>
<td>• Causes maternal drowsiness; use safety precautions to prevent falls</td>
</tr>
<tr>
<td>Sedatives</td>
<td>↓ Anxiety</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promotes rest in early or prolonged latent phase</td>
<td>• Should not be used in active labor because of potential for prolonged depressant effect on neonate</td>
</tr>
</tbody>
</table>

## Stage 1—Transition
- **Power**: Contraction palpate strong, every 1.5–3 minutes, lasting 45–90 seconds
- **Psyche**: Patient may feel a loss of control; provide encouragement to patient
- Measuring progress in labor
  - Cervical dilation (8–10 cm)
  - Fetal descent (0/+1 station)
Physical changes common with transition
- Urge to push if presenting part is low
- Nausea/vomiting
- Trembling limbs
- Beads of sweat on upper lip
- Increased bloody show

Passageway: Activity more restricted; however, encourage positions that promote fetal rotation and descent
- Squatting
- Hands and knees position
- Side-lying

Nursing Considerations
- Encourage patient to void
- Monitor vital signs and fetal heart tones every 5–15 minutes

Pain Management
- Continue with effective techniques used in active phase
- If systemic medications are given, consider amount of time estimated until birth and potential for newborn effects (respiratory depression)
- Have naloxone hydrochloride (Narcan) available to reverse effects if needed
- Document maternal and fetal response to medications

Second Stage of Labor—Expulsion
- 10 cm dilated until the birth of the baby
- Power: Contractions palpate strong, every 2–3 minutes lasting 60–90 seconds
- Psyche: Patient may be eager or afraid to push
- Measuring progress in labor
  - Descent of fetus: from +1 station to crowning
    - Cardinal movements of labor
    - Engagement/Descent/Flexion
    - Internal rotation
    - Extension
    - External rotation
    - Expulsion
- Passageway
  - Wait for urge to bear down; “Ferguson reflex”
  - Discourage prolonged breath-holding
  - Encourage open glottis pushing
Position for pushing
■ Squatting
■ Side-lying
■ Modified lithotomy
■ Encourage patient to void
■ Patient may pass stool with pushing

Nursing Considerations
■ Monitor vital signs every 15–30 minutes
■ Fetal heart tones every 5–15 minutes

Pain Management per Primary Health-Care Provider
■ Pudendal block: Blocks pudendal nerve
  ■ Anesthetic effect to lower vagina and perineum for vaginal birth; useful with forceps delivery
■ Local anesthesia: Numbs perineum for episiotomy/laceration repair

Prepare for the Birth of the Baby
■ Cleanse the perineum
■ Ensure working order of suction equipment, oxygen, radiant warmer
■ Gather and prepare neonatal resuscitation equipment
■ Prepare delivery instruments
Note precise time of birth.

Immediate Care of the Newborn

General Guidelines
■ Any resuscitation equipment should be present, prepared, and in working order
■ Maternal history, including gestational age and status of amniotic fluid, should be reviewed to anticipate need for resuscitation
■ Notify nursery personnel when delivery eminent
■ The American Academy of Pediatrics (AAP) and the American Heart Association (AHA) have established Neonatal Resuscitation Guidelines; the nurse should attend required classes and obtain certification; visit www.pediatrics.org for the latest updates on these guidelines

Initial Steps
■ Assess airway and breathing effort
■ Place infant on prewarmed radiant warmer in “sniffing” position
- Remove excess secretions from infant’s mouth and then nose
- Provide tactile stimulation to infant by drying

**Next Steps**
- Simultaneously assess respirations, heart rate, color
  - Heart rate should remain >100 bpm
  - Color should be pink (may have acrocyanosis)
  - Breathing with vigorous cry
  - Fetal position flexed with active movement
- Determine need and provide resuscitation efforts per Neonatal Resuscitation Program (NRP) guidelines
- Protect thermal environment
  - Remove wet towels and lay infant on warm blankets
  - Place temperature probe on infant skin
  - Keep temperature of labor room warm
- After infant is stabilized, encourage kangaroo care
- Document Apgar score at 1 and 5 minutes

### Apgar Score

<table>
<thead>
<tr>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heart rate</strong></td>
<td>Absent</td>
<td>Low &lt;100</td>
<td>Normal &gt;100</td>
</tr>
<tr>
<td><strong>Respiratory effort</strong></td>
<td>Absent</td>
<td>Slow, irregular</td>
<td>Good; crying</td>
</tr>
<tr>
<td><strong>Muscle tone</strong></td>
<td>Limp</td>
<td>Some flexion of extremities</td>
<td>Active motion</td>
</tr>
<tr>
<td><strong>Reflex irritability</strong></td>
<td>No response</td>
<td>Grimace</td>
<td>Cough, sneeze, or vigorous cry</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Blue or pale</td>
<td>Body pink; extremities blue</td>
<td>Completely pink</td>
</tr>
</tbody>
</table>

Score of 10 possible; score of ≥8 desirable

- Assess for abnormalities that may need immediate attention (e.g., neural tube defects, open lesions, or birth injuries)
- Examine umbilical cord and count number of vessels
  - 2 arteries and 1 vein
  - Place plastic clamp on cord
85

- **Identification**
  - Fingerprint mother and footprint newborn
  - Apply identification bands to both mother and newborn before leaving birthing room

- **Administer medications**
  - Administer eye prophylaxis
    - Ophthalmic antibiotic ointment
  - Administer AquaMEPHYTON (vitamin K)
    - Administer IM in the vastus lateralis muscle
    - Boosts production of clotting factors in newborn

- **Weigh, measure, and plot findings on growth chart**
  - Assess head, chest, and abdominal circumference
  - Assess length
  - Assess skin for lacerations, bruising, or edema
  - Document passage of stool/urine

---

### Third Stage of Labor—Delivery of Placenta

- **Power:** Strong uterine contractions cause the placenta to detach from the uterine wall
- **Psyche:** Patient may be exhausted; encourage bonding with baby

- **Signs of placental separation**
  - Sudden gush or trickle of blood from vagina
  - Lengthening of visible umbilical cord at introitus
  - Contraction of the uterus

- **Nursing considerations**
  - Instruct patient to push when appropriate
  - Note time of placenta delivery

- **After placenta expelled**
  - Monitor amount of bleeding
  - Monitor vital signs
  - Assess fundus
    - Height
    - Location
    - Tone
  - Administer medications to contract uterus as ordered
    - Prevents hemorrhage
      - Oxytocin (Pitocin)
      - Methylergonovine maleate (Methergine)
      - Ergonovine maleate
      - Prostaglandin (Hemabate)
INTRA-PARTUM

- Cleanse and apply ice pack to the perineum
- Provide clean linen under patient
- Provide warm blanket: Patients often tremble/shiver immediately after the birth
- Assess level of consciousness/comfort
- Place newborn in arm of mother, encouraging skin-to-skin contact
- Assist with positioning for breastfeeding and bonding

Nursing Care With Intrapartum Procedures

Amniotomy

- Artificial rupture of amniotic sac performed by the primary healthcare provider during a vaginal examination to augment contraction frequency and intensity
- Nursing care
  - Pad bed to absorb amniotic fluid
  - Assess fetal heart tones before procedure
  - Note color, consistency, odor, and amount of amniotic fluid
  - Document time of amniotomy
  - Document fetal heart tones immediately after amniotomy
  - Document cervical dilation, effacement, station, and fetal presentation
  - If presenting part is not engaged, limit patient activity to prevent cord prolapse
  - After amniotic sac is ruptured, there is potential for infection
    - Monitor maternal temperature every 1–2 hours
    - Limit number of vaginal examinations

Amnioinfusion

Installation of fluid into the uterine cavity
- Decreases occurrence of cord compression associated with low amniotic fluid volume
- Attempt to correct variable decelerations

Before Procedure
- Consent is signed and placed on patient chart
- Warm fluid if fetus is preterm
During Procedure
The nurse assesses:
- Maternal vital signs
- FHR pattern
- Duration and intensity of uterine contractions
- Fundal height changes
- Monitor amount infused and amount returned
- Note color, odor of returning fluid

REPORT complications:
- Signs of infection
- Maternal or FHR changes
- Increased uterine tone
- Lack of fluid return

Cervical Ripening
- Facilitates cervical softening, effacement, and dilation
- Indicated when there is a medical need for induction of labor and cervix unfavorable
- Methods:
  - Laminaria tents (mechanical cervical dilator made from seaweed)
  - Prostaglandin E1-misoprostol (Cytotec)
  - Prostaglandin E2-dinoprostone (Cervidil Insert, Prepidil Gel)
- Nursing care
  - Monitor FHR and contraction status for 20–30 minutes before procedure
  - Encourage patient to void before insertion
  - Position side-lying position after procedure
    - Monitor maternal vital signs, contractions, and fetal status frequently (per hospital protocol)
    - Report adverse reactions to physician
      - Tachysystole
      - Category II or III FHR patterns
      - Nausea, vomiting, diarrhea
  - Assess pain and provide comfort measures
  - Ensure proper waiting period between cervical ripening and oxytocin administration
Cesarean Birth

- Indications for cesarean birth
  - Cephalopelvic disproportion (CPD)
  - Malpresentations
  - Placenta previa/abruption
  - Umbilical cord prolapse
  - Fetal intolerance to labor
  - Maternal medical conditions

- Preoperative care
  - Place signed consent on chart
  - Insert urinary catheter
  - Remove contact lenses, nail polish, jewelry, prosthetic device, dentures
  - Position wedge under right hip

- Assist significant other to prepare for observation of surgery
- Notify newborn nursing team of eminent delivery
- Administer preoperative medications
- Continue to monitor vital signs and FHR

- Postoperative care
  - Assess respiratory/cardiac status/O₂ saturation
  - Encourage patient to turn, cough, and deep breath
  - Assess level of pain and medication needs
  - Monitor intake and output
  - Assess bowel sounds
  - Assess incision
  - Assess effects of anesthesia
  - Monitor vaginal bleeding and provide pericare
  - Assess vital signs and level of consciousness
  - Assess extremities for circulation

Epidurals in Labor

**Before Procedure**
- Witness consent/place on patient chart
- Gather and assemble oxygen, suction equipment; place emergency medications at bedside
- Document maternal vital signs and FHR
- Document patient mobility, level of consciousness, and pain
Encourage patient to void
Administer IV bolus before epidural insertion to prevent maternal hypotension as ordered

**During Procedure**
- Position and support patient during insertion of epidural catheter
- Note maternal vital signs before and after test dose, then every 5 minutes with administration; thereafter, monitor vital signs and FHR per hospital protocol
- Frequently evaluate bladder status and encourage to void; catheterize if unable to void and bladder distended
- Assess for level of anesthesia and level of consciousness
- Monitor for comfort with contractions
- Monitor progress of labor (contraction status/cervical changes)
- Assist with position changes
- Report adverse effects
  - Hypotension
  - Pruritus (itching)
  - Pyrexia (fever)
  - Respiratory depression

**Induction of Labor**
- Artificial stimulation of uterine contractions to facilitate vaginal delivery
- Commonly performed in postterm pregnancy
- Before induction of labor, the nurse should note:
  - Indication for induction
  - Gestational age
  - Any contraindications for procedure
  - Bishop’s score
    - Assigned by primary health-care provider before induction of labor
    - Higher scores indicate ↑ likelihood of successful labor induction
    - Parameters of Bishop’s score
      - Degree of dilation (1–3 points)
      - Percent of effacement (0–3 points)
      - Station (0–2 points)
      - Consistency of cervix (0–2 points)
      - Cervical position (0–2 points)
**Oxytocin (Pitocin)**

Hormone that stimulates uterine contractions to induce or augment contractions.

- Assess mother and fetus 20–30 minutes before oxytocin administration
- Initiate oxytocin administration
  - Administer IV piggyback per electronic infusion pump
  - Started at small dose and gradually increased until contractions every 2–3 minutes (follow hospital protocol)
- Monitor maternal-fetal tolerance to procedure
  - Uterine resting tone
  - Contraction frequency, duration, and intensity
  - Intake and output
  - Fetal heart tones (baseline, variability, changes)
  - Cervical dilation and effacement
  - Vital signs
  - Patient comfort
- Monitor for complications of oxytocin (may become evident as dosage increases)
  - Tachysystole
  - Category II or III FHR patterns
- If complications become apparent
  - Change position to lateral side-lying
  - Discontinue IV oxytocin
  - Provide oxygen per mask at 8–10 L/min
  - Increase rate of nonadditive IV solution
  - Call primary health-care provider

**Vaginal Birth After Cesarean (VBAC)**

Women who have had a previous cesarean birth may be candidates for vaginal birth.

- Previous cesarean uterine incision documented as low transverse
- No contraindications noted to VBAC
- Physician and surgical team readily available for emergent cesarean birth
- Patient and physician agree that VBAC is desirable
- Risks of vaginal birth following cesarean must be explained, including:
  - Uterine rupture with possible loss of fetus or uterus
  - Unsuccessful trial of labor with subsequent cesarean
Location of previous uterine scar must be documented

Low Transverse  Low Vertical  Classic

Uterine scars.

**Nursing Care**
- Closely monitor uterine response to labor
- Monitor fetal response to labor
- Initiate IV access
- Monitor for signs of uterine rupture
  - Severe abdominal pain; “ripping” sensation
  - Category II or III FHR patterns
  - Cessation of uterine contractions
  - Ascending station of presenting part
  - Vaginal bleeding
  - Signs of maternal shock

**Complications in the Intrapartum Period**

**Prolapsed Umbilical Cord**

Umbilical cord slips below/wedges next to presenting part.
- May lead to fetal hypoxia due to cord compression
- Possible cause
  - Rupture of membranes without engaged presenting part
  - Noncephalic fetal presentation
- Symptoms
  - Prolonged variable deceleration
  - Pulsating cord palpated upon vaginal examination
  - Visible cord at introitus
INTRA-PARTUM

Nursing actions
- Stay with patient and call for assistance
- Apply sterile glove and hold pressure of presenting part off umbilical cord
- Place patient in Trendelenburg position
- Notify physician
- Monitor fetal heart tones
- Place sterile saline gauze over any exposed cord
- Notify obstetrical team; prepare for cesarean birth

Shoulder Dystocia

Difficulty with the fetal shoulder passing under the maternal pubic arch.

Clinical findings
- Turtle sign
- Delay in delivery of shoulders after delivery of head

Nursing interventions
- Assess bladder status; catheterize if necessary
- McRobert’s maneuver
- Suprapubic pressure
- Change in maternal position
  - Hands-knees
  - Squatting
  - Lateral recumbent
- After delivery
  - Careful assessment for postpartum hemorrhage
  - Careful assessment for newborn injury

Vaginal Bleeding After 20 Weeks’ Gestation

Placenta Previa
Low-lying position of placenta in the uterus that partially or completely covers the cervical os.

Clinical Findings
- Painless, bright red vaginal bleeding
- Bleeding may be reported after intercourse
- Uterine tone soft upon palpation
- Medical intervention dependent on:
  - Amount of bleeding
  - Labor status
93

- Gestational age
- Fetal response
- If labor is active and os is completely covered, C/S indicated
- If bleeding is controlled and labor absent, conservative management
  - Conservative management teaching
    - Activity limitations
    - No sexual intercourse or tampon use
    - Monitor and report bleeding
    - Patient instructed to report placenta placement when admitted to hospital
    - Cesarean preparation class
    - Count fetal movements

**Abruptio Placentae**
Premature separation of the placenta; may be partial or complete.

**Clinical Findings**
- Abdominal pain (sudden onset, intense and localized)
- Fundus firm, boardlike, with little relaxation
- Vaginal bleeding
  - Bleeding may be concealed within the uterine cavity
- Alteration in FHR pattern

Partial separation (concealed hemorrhage)  Partial separation (apparent hemorrhage)  Complete separation (concealed hemorrhage)

**Nursing Care With Vaginal Bleeding in Late Pregnancy**
- Monitor amount of bleeding
- Check vital signs
Observe for signs of shock
Evaluate fetal heart tones
Palpate uterine tone
Apply electronic fetal monitor (EFM)
**REPORT** category II and III FHR patterns
**REPORT** tachysystole
Do not attempt vaginal examination until placenta placement verified
Initiate IV fluids
Report laboratory and ultrasound findings
Prepare staff for possible cesarean birth
Attend to patient’s emotional needs
## Common Postpartum Terms and Abbreviations

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afterbirth cramps</td>
<td>Intense uterine contractions that occur in the postpartum period and with nursing; increased intensity with multiparity</td>
</tr>
<tr>
<td>Approximation</td>
<td>Closeness of the edges of a healing wound</td>
</tr>
<tr>
<td>Colostrum</td>
<td>Thin, yellow breast milk seen in late pregnancy and first 1–3 days postpartum</td>
</tr>
<tr>
<td>Coombs’, direct</td>
<td>Serum screen for presence of Rh+ antibodies in fetal cord blood</td>
</tr>
<tr>
<td>Coombs’, indirect</td>
<td>Serum screen for presence of Rh+ antibodies in maternal serum</td>
</tr>
<tr>
<td>Dorsal recumbent</td>
<td>Positioning of the patient supine with knees flexed and feet resting on the bed</td>
</tr>
<tr>
<td>Endometritis</td>
<td>Inflammation of the uterine lining</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>Surgical incision of perineum made to facilitate vaginal birth</td>
</tr>
<tr>
<td>Fundus</td>
<td>Upper, rounded portion of the uterus</td>
</tr>
<tr>
<td>Homans’ sign</td>
<td>Pain in calf upon dorsiflexion of foot</td>
</tr>
<tr>
<td>Kangaroo care</td>
<td>Positioning the newborn and mother skin-to-skin with blanket covering both mother and newborn for added warmth</td>
</tr>
<tr>
<td>Kegel exercise</td>
<td>Tightening of the perineal muscles performed to strengthen tone</td>
</tr>
<tr>
<td>Lochia</td>
<td>Postpartum vaginal discharge consisting of blood, mucus, and tissue</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>Newborn with excessive birth weight, usually &gt;4000 gram or &gt;90th percentile for gestational age</td>
</tr>
<tr>
<td>Mastitis</td>
<td>Inflammation and infection of the breast</td>
</tr>
<tr>
<td>Postpartum</td>
<td>Period of time after childbirth</td>
</tr>
<tr>
<td>Sitz bath</td>
<td>Device used to immerse the perineum in warm water that emits a gentle spray to promote healing/comfort</td>
</tr>
</tbody>
</table>

*Continued*
Common Postpartum Terms and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterine atony</td>
<td>Inability of the uterine muscles to contract after delivery</td>
</tr>
<tr>
<td>Uterine involution</td>
<td>Process by which the size of uterus decreases in a predictable pattern</td>
</tr>
</tbody>
</table>

Fourth Stage of Labor

First 1–2 hours after birth.

Immediate Nursing Care

- Assess height, location, and tone of the fundus
- Quantify amount of vaginal bleeding and presence of clots
  - 1 gm = 1 mL blood loss
- Assess condition of the perineum
  - Cleanse and apply ice pack
- Provide clean linen under patient
- Provide warm blanket: Patients often tremble/shiver immediately after the birth
- Assess vital signs
- Assess level of consciousness/comfort
- Encourage bonding of mother and infant using kangaroo care
- Assist with proper latch-on to initiate breastfeeding
- Maintain IV fluids
- Administer uterotonic medication
  - Promote uterine contractions
  - Decrease amount of vaginal blood loss

Nursing Assessment of the Postpartum Patient

- Assess every 15 minutes for the first hour
- Assess every 30 minutes for the second hour
Assess every 4 hours for the first 24 hours
- Uterine tone
- Bleeding
- Perineum
- Bladder status
- Vital signs
  - Blood pressure
  - Pulse
  - Respiration
  - Temperature every 1–4 hours
- Fluid balance
- Circulation to extremities
- Comfort/level of consciousness
- Newborn interaction

Postpartum Assessment and Nursing Care

Remember the acronym BUBBLE-HE.

Breasts
Uterus
Bowel
Bladder
Lochia
Episiotomy
Homans’ sign
Emotions

Breast Assessment

- Consistency: Soft, filling, or firm
- Nipple
  - Type: Inverted, flat, or everted
  - Integrity: Bleeding, cracked, intact
  - Redness
  - Comfort
- Breast care for the lactating patient
  - A supportive bra should be worn
  - Breast pads placed inside the bra will absorb leaking milk
  - Soap should not be used on breasts; Montgomery’s glands secrete oil to keep nipples supple
**POST-PARTUM**

- After feedings, leave colostrum/breast milk on nipples and expose the breasts to air
- If separated from newborn, initiate breast pump
- Breast care for the nonlactating patient
  - Supportive bra, breast binder, or sports bra
  - No nipple stimulation
  - Do not express breast milk
  - Ice packs/analgesics for engorgement
- Teach breast awareness

### Uterus

- Uterine involution
  - Assess the height, location, and tone of the uterus with the patient dorsal recumbent
  - Uterus returns to nonpregnant state in a predictable pattern
  - Fundal height decreases 1 cm per day in the 1st postpartum week
  - Fundal height is documented in centimeters above or below the umbilicus
  - Location of the fundus should be midline and not deviated to the left or right (suggestive of a full bladder)

<table>
<thead>
<tr>
<th>Postpartum Period</th>
<th>Level of the Fundus</th>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>After birth</td>
<td>At the umbilicus</td>
<td>U/U</td>
</tr>
<tr>
<td>12 hours after birth</td>
<td>1 cm above umbilicus</td>
<td>1/U</td>
</tr>
<tr>
<td>24 hours after birth</td>
<td>1 cm below the umbilicus</td>
<td>U/1</td>
</tr>
<tr>
<td>Day 2</td>
<td>2 cm below the umbilicus</td>
<td>U/2</td>
</tr>
<tr>
<td>Day 3</td>
<td>3 cm below the umbilicus</td>
<td>U/3</td>
</tr>
</tbody>
</table>

U = umbilicus
Uterine involution.

- Tone of the uterus should remain firm, not boggy, in the postpartum period
- If fundus is not firm, perform fundal massage
  - Support the lower uterine segment during massage to prevent inversion of the uterus
POST-PARTUM

- If fundus is boggy (not firm) after massage
  - Check bladder status and encourage voiding
  - Catheterize (as ordered) if unable to void
- Massage fundus after voiding and note tone and location of fundus
  - Report continued uterine atony to primary health-care provider

Measures that promote uterine involution
- Breastfeeding
- Voiding
- Fundal massage
- Uterotonic medications
  - Oxytocin (Pitocin)
  - Methylergonovine (Methergine)
    - If blood pressure elevated, notify primary care provider
  - Carboprost tromethamine (Hemabate)
  - Misoprostol (Cytotec)
  - Dinoprostone (Prostin E2)

Bladder Status

- Postpartum women may have difficulty voiding after birth as a result of the following:
- Decreased urethral sensation from pressure exerted by the passage of the fetus
- Side effects of local/epidural anesthesia
- Delivery trauma to the perineum
- Palpate for bladder distention; bladder should not be palpable above the symphysis pubis
- A distended bladder will displace the uterus and prevent uterine contractions
- Catheterization (as ordered) if unable to void or with urinary retention
- Track fluid balance: Intake and output
- Assess for periurethral edema/trauma
- Postpartum diuresis common
  - Rids the body of extracellular fluid
  - Causes the bladder to fill quickly
  - Starts within 12 hours of birth and continues for up to 5 days
  - Urine output may be 3000 mL/day
101

**Bowel**

- Auscultate for bowel sounds
- Assess for abdominal distention
- Document bowel movement
- Assess for presence/status of hemorrhoids
  - Encourage the use of sitz baths for comfort
  - Contact primary health-care provider if hemorrhoids present
  - Teach patient how to use prescribed medications
- Educate on prevention of constipation
  - Increase dietary fiber
  - Increase fluid intake
  - Temporary use of stool softeners as prescribed
  - Encourage ambulation

**Lochia**

Vaginal discharge after delivery is called lochia.

- Blood loss with vaginal birth approximately 500 mL
- Blood loss with cesarean birth approximately 1000 mL
- Note time of last perineal pad change
- Document amount of lochia on perineal pad:
- Weigh blood and clots on perineal pads, under buttocks drapes
- 1 gm = 1 mL of blood loss
- Visual estimation of blood loss is often an underestimation; weighing recommended for improved accuracy
  - Scant (1 inch/2.5 cm mark on pad)
  - Small (<4 inches/10 cm mark on pad)
  - Moderate (<6 inches/15 cm mark on pad)
  - Large (pad saturated ≤1 hour)
POST-PARTUM

Scant: Blood only on tissue when wiped or 1- to 2-inch stain
Light: 4-inch or less stain
Moderate: Less than 6-inch stain
Heavy: Saturated pad

Assess the color of lochia; progression of lochia:
- Lochia rubra (red): days 1–3
- Lochia serosa (brownish-pink): days 4–9
- Lochia alba (yellow-white): days 10–14
- Document number and size of blood clots
- Turn patient to assess blood loss under buttocks

Assessment of the Perineum (Episiotomy)

- Use a direct light source to view the perineum
- Position the patient side-lying with top leg forward
- Assess Episiotomy or laceration
  - Redness
  - Edema
  - Ecchymosis
  - Discharge color and consistency
  - Approximated edges
Lacerations described by degree of tissue involvement

<table>
<thead>
<tr>
<th>Degree</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Vaginal mucous membrane and skin of perineum</td>
</tr>
<tr>
<td>2nd</td>
<td>Subcutaneous tissue of the perineal body</td>
</tr>
<tr>
<td>3rd</td>
<td>Involves fibers of the external rectal sphincter</td>
</tr>
<tr>
<td>4th</td>
<td>Through rectal sphincter exposing the lumen of the rectum</td>
</tr>
</tbody>
</table>

- Avoid enemas or rectal suppositories with 3rd- and 4th-degree lacerations
- Assess for presence of hematoma; report to primary health-care provider

Extremities (Homans’ Sign)

- Assess circulation to lower extremities
  - Pedal pulse
  - Color, temperature, blanching
- Assess for signs of deep vein thrombosis
  - Pain
  - Swelling
  - Redness
  - Increased skin temperature
  - + Homans’ sign
    - Calf pain with dorsiflexion of the foot
- Prevention of thrombus
  - Encourage early ambulation
  - Keep legs uncrossed with pressure off the back of knee

Emotional Response

- Assess interaction with newborn
  - Makes eye contact with infant
  - Talks to infant
  - Holds infant close
  - Feeds infant
- Assess emotional status
  - Anxiety
  - Crying
  - Exhaustion
POST-PARTUM

- Assess for postpartum blues
- Common occurrence in the immediate postpartum period
- Period of vacillating emotions
- Related to physiological changes after birth; intensified with sleep deprivation/postpartum or newborn complications
- Resolves by 2 weeks postpartum
- Assess for postpartum depression

Vital Signs

Temperature
- Slight ↑ in temperature in first 24 hours common due to dehydration; encourage oral fluids
- If temperature >100.4°F call primary health-care provider

Pulse
- Assess rate, rhythm, and amplitude
- Tachycardia may indicate infection, hypovolemia, or pain

Blood Pressure
- Low blood pressure may indicate orthostatic hypotension or hypovolemia
- Be alert for orthostatic hypotension upon rising
- Dangle at bedside before rising
- Assist with ambulation in immediate postpartum period
- Elevated blood pressure may indicate preeclampsia

Respirations
- Note rate and depth
- Lungs should be clear on auscultation

Level of Comfort
- Ask patient about pain location and intensity
- Afterbirth cramps
- Incisional pain
- Hemorrhoid pain
- Educate patient that postpartum diaphoresis after birth is common (intense sweating that occurs in the early postpartum period ridding the body of excess fluid)
Effects of epidural anesthesia
- Leg movement/strength
- Presence of numbness and tingling
- Assist with ambulation

Nutrition

- Assess dietary needs and concerns
- Average weight loss 12 pounds at birth
- Encourage healthy food choices and ample fluids
- Continue prenatal vitamins while lactating and in the postpartum period

Laboratory Data

Compare postpartum laboratory findings to prenatal laboratory test:
- Hemoglobin/hematocrit
- White blood cell count
- Platelet count

The Rh-Negative Patient

- If mother is Rh− ✓ Rh status of infant
- If infant is Rh+ and maternal antibody status is negative, mother will require injection of Rho(D) immune globulin vaccine within 72 hours of birth

<table>
<thead>
<tr>
<th>Mother</th>
<th>Infant</th>
<th>Rho(D) Immune Globulin (300 mcg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>Negative</td>
<td>No treatment needed</td>
</tr>
<tr>
<td>Negative</td>
<td>Positive</td>
<td>Administer within 72 hours of birth</td>
</tr>
</tbody>
</table>
Post-Cesarean Birth

- Provide routine postpartum assessment along with following:
  - Effects of anesthesia
  - Level of consciousness
- Ability to hold and care for infant may be limited as a result of the following:
  - Comfort level
  - Limitation in movement
- Respiratory status
  - Pulse oximetry
- Patient-controlled anesthesia (PCA)
  - Determine effectiveness
  - Number of attempts/amount given
  - Side effects
- Abdominal assessment
  - Bowel sounds
  - Abdominal distention
  - Ability to pass flatus
- Incision/dressing
  - Circle drainage and mark with date and time
  - Assess incision with dressing change
    - Approximation
    - Redness
    - Drainage
    - Edema
    - Hematoma
    - Odor
- Nutrition
  - Intake and output
  - Nausea/vomiting
  - Presence of bowel sounds
  - Progression of diet
- Progression of activity
  - Turn/cough/deep breathe
  - Dangle at side of bed
  - Sit up in chair
  - Ambulate with assist
Complications in the Postpartum Period

Postpartum Hemorrhage

Risk Factors
- Uterine and maternal factors
  - Overdistention of the uterus
  - Macrosomia, twins, or polyhydramnios
  - Precipitous labor or prolonged labor
  - Grand parity
  - Chorioamnionitis
  - Maternal obesity
- Placental factors
  - Placenta abruptio
  - Placenta previa
  - Placenta accreta, increta, percreta
- Coagulation deficits
  - Thrombocytopenia
  - Anemia
  - Von Willebrand disease

Etiology
- Uterine atony
- Retained placental fragments
- Vaginal/cervical laceration
- Perineal hematoma

Clinical Findings
- Perineal pad saturated in <1 hour, with or without clots
- Continuous trickle of vaginal bleeding
- Firm, bruised area on perineum
- Tachycardia
- Hypotension
- Decreased O₂ saturation <95%
- Decreased urine output

Interventions
- Identify and correct source of bleeding
- Provide fundal massage until firm while supporting the uterus
- Quantify blood loss
  - Weigh blood-saturated pads
POST-PARTUM

- Check bladder status and monitor urine output
- Catheterize if needed
- Report low urine output
- Increase mainline intravenous fluids as ordered
- Administer uterotonic medication as ordered
  - Oxytocin (Pitocin)
  - Methylergonovine maleate (Methergine)
    - If blood pressure elevated, call primary care provider
  - Carboprost tromethamine (Hemabate)
  - Dinoprostone (Prostin E2)
  - Misoprostol (Cytotec)
- Closely monitor vital signs and level of consciousness
- Monitor for signs of hypovolemic shock
  - ↑ Pulse  ↓ blood pressure
  - Restlessness
  - Pale, clammy skin
  - Syncope
- Monitor and maintain oxygenation
  - Assess O₂ saturation
  - Administer oxygen as ordered
- Order and report laboratory findings
  - Type and cross-match
  - Complete blood count (CBC), disseminated intravascular coagulation (DIC) profile, comprehensive metabolic profile
- Stay with patient
  - Team member to call primary health-care provider
  - Notify surgical team as needed

Infection

Infections common in the postpartum patient:
- Endometritis
- Wound infection
- Urinary tract infection
- Mastitis

Nursing Considerations
- Encourage frequent hand washing of patient and staff
- Ensure thorough cleaning of equipment
- Obtain cultures as appropriate
Report abnormal laboratory findings and vital signs
- Temperature elevation >100.4°F
- ↑ White blood cell count
- Administer antibiotic therapy as ordered
- Consider medication safety for lactating patients
- Teach patient signs and symptoms of infection

Endometritis (Infection of the Uterus)
Risk Factors
- Operative birth
- Prolonged labor
- Internal monitoring
- Premature rupture of membranes
- Manual removal of placenta

Clinical Findings
- Enlarged uterus, tender to palpation
- Foul-smelling vaginal discharge
- Elevated temperature
- Lower abdominal cramping

Mastitis (Infection of the Breast)
Risk Factors
- Alteration in nipple integrity with entry of pathogen
- May be due to improper latch (review technique with patient)
- Delayed emptying of breast milk

Clinical Findings
- Unilateral breast pain, warmth and redness
- Malaise and flu-like symptoms
- Elevated temperature/chills

Nursing Considerations
- If antibiotics compatible, continue with breastfeeding
- Increase rest and fluid intake
- Analgesics, cool packs may help with breast discomfort

Wound infection
Risk Factors
- Operative delivery
- Laceration
- Episiotomy
**Clinical Findings**
- Incision not well approximated
- Incision red with purulent drainage
- Pain and heat to incision site
- Elevated temperature

**Urinary Tract Infection**
**Contributing Factors**
- Catheterization of bladder
- Retention of urine in bladder

**Clinical Findings**
- Dysuria
- Frequency of urination
- Flank pain

**Nursing Considerations**
- Teach patient to wipe from the front to back after urination
- Change perineal pads with each void
- Encourage oral fluids
- Encourage foods that ↑ acidity of urine (cranberry juice)

---

**Postpartum Depression**

**Risk Factors**
- History of depression or anxiety disorder
- Prenatal depression
- Inadequate social or partner support
- Large number of life stressors
- May occur 2 weeks postpartum to 12 months after birth

**Clinical Findings**
- Extreme or unswerving sadness
- Compulsive thoughts
- Feelings of inadequacy
- Loss of appetite
- Inability to care for infant and/or self
- Suicidal thoughts

**Interventions**
- Psychotherapy
- Medications
- Assistance with newborn care
Thrombophlebitis/Deep Vein Thrombosis

Risk Factors
- History of varicosities
- Advanced maternal age
- Obesity
- Long periods of bed rest
- Occupation that requires long periods of standing
- Clotting disorder

Etiology
- Increased clotting factors in postpartum period
- Infection in the vessel lining to which a clot attaches

Clinical Findings
- + Homans’ sign
- Affected site warm to touch
- Swelling, redness, and pain to affected leg

Nursing Considerations
- Interventions dependent on severity of findings
- Administer anticoagulants as ordered
- Monitor coagulation profile
- Compression stockings
- Apply warm, moist heat
- Rest
- Observe for symptoms of pulmonary embolism
  - Dyspnea
  - Chest pain
  - Hemothysis
  - Patient fearful

Postpartum Education
- Education of the postpartum family is an essential role of the postpartum nurse
- New skills should be discussed, demonstrated, and reinforced
- Document education and patient return demonstration of skills
REPORTABLE SYMPTOMS
Teach the patient to report the following signs and symptoms to the primary health-care provider

■ **Signs of infection**
  ■ Elevated temperature
  ■ Localized redness or pain to either breast
  ■ Persistent abdominal tenderness
  ■ Persistent pain to perineum
  ■ Burning, frequency, or urgency of urination
  ■ Foul odor to lochia
  ■ Redness, pain, or discharge at incision

■ **Signs of uterine subinvolution**
  ■ Increased amount of lochia
  ■ Resumption of bright red color
  ■ Presence of clots

■ **Signs of thrombophlebitis/deep vein thrombosis**
  ■ Pain, redness, and heat to lower extremities

■ **Signs of postpartum depression**
  ■ Extreme or unswerving sadness
  ■ Compulsive thoughts
  ■ Feelings of inadequacy
  ■ Inability to care for infant and/or self
  ■ Suicidal thoughts

---

**Breastfeeding**

**Advantages of Breastfeeding**
■ Optimal nutrition for infant
■ Monetary savings
■ Convenience for mother
■ Promotes uterine involution
■ Immunoglobulins passed to newborn via breast milk
■ Protects the infant from infection
■ Decreased incidence of infant:
  ■ Allergies
  ■ Otitis media
  ■ Upper respiratory infections

**Positioning**
■ The infant’s body should face the breast, with the ear, shoulder, and hip aligned
113

- Position pillows to support the weight of the infant
- “C-hold” of the mother’s breast assists the latch-on
- Encourage frequent nursing (8–12 feedings in 24 hours)
- Demonstrate positioning of infant for increased comfort
  - Mother should vary positions with subsequent feeding
    - Side-lying
    - Football hold
    - Cradle hold

Latch-On

- Proper latch-on is important for maternal comfort, maintaining nipple integrity and the newborn’s ability to suckle effectively
- Elicit the rooting reflex by stroking the infant’s lower lip
- As the infant’s mouth opens wide, bring the infant to the breast, ensuring both the nipple and part of the areola are in the infant’s mouth
Correct latch-on: Infant’s jaws will rhythmically move with an audible swallow; mother will express comfort
Incorrect latch-on: Clicking noise as infant sucks with nipple pain expressed by mother; break suction by placing one finger by the infant’s mouth and re-latch

Feeding Schedule
- The newborn should be fed on demand
- Prolactin releases in response to suckling
- Stimulates the alveolar cells of the breast to produce the appropriate amount of milk to meet the infant’s needs
- The mother should initiate breastfeeding when the infant demonstrates hunger cues
- Increased alertness or activity
- Smacking of the lips
- Suckling motion
- Moving of the head in search of the breast
- Continue to feed until the infant detaches spontaneously, burp the infant, and continue feeding on the other breast
- Hind milk present later in feeding, rich in fat content
- Start breastfeeding on the breast ended with the last feeding
- Newborns should feed 8 to 12 times per day
- Sleepy newborns should be awakened for feeding by:
  - Changing the diaper
  - Undressing

REPORT breastfeeding concerns to the primary health-care provider:
- Feedings that are consistently short with the infant appearing hungry after feedings and the breasts remaining full
- Swallowing is inaudible once milk is established
- The infant is not gaining the expected amount of weight
The infant has fewer than six wet diapers a day; urine is amber-colored
Nipple pain or cracking is present

**Engorgement**
- Occurs on postpartum day 3–5 as the volume of breast milk ↑
- Subsequent engorgement can be prevented through the following:
  - Frequent feedings
  - Not skipping feedings
- Treatment
  - Express small amount of breast milk manually or with a breast pump so that the breasts will soften and the baby can latch
  - Apply cold packs to breasts intermittently
  - Apply cleaned, cooled cabbage leaves to breasts until warm/wilted
  - Take a warm shower or use warm compress right before feeding

**Nutrition**
- Add 500 calories more than nonpregnant diet
- Continue prenatal vitamins while lactating
- Stay well hydrated
- Avoid alcohol, smoking, or recreational drugs
- Consult with pediatrician before using any over-the-counter or prescription medication

**Pumping and Storing**
- Demonstrate use of breast pump
- Store milk in clean glass or hard plastic containers without bisphenol (BPA) in amounts that coincide with newborn intake; plastic bags indicated for breast milk storage should be sturdy and well sealed
- Thaw frozen milk in refrigerator or by running under warm water; do not refreeze
- Write date of expression on storage container and use oldest milk first
- Length of storage dependent on location

<table>
<thead>
<tr>
<th>Storage Location</th>
<th>Temperature</th>
<th>Guidelines (Optimal Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room temperature</td>
<td>16°C–29°C (60°F–85°F)</td>
<td>3–4 hours</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>4°C (39°F) or lower</td>
<td>72 hours</td>
</tr>
<tr>
<td>Freezer</td>
<td>Less than –4°C (24°F)</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Weaning
- Gradual weaning decreases the likelihood of engorgement
- Remove one feeding at a time
- If infant is younger than 1 year, infant formula, instead of cow’s milk, must be given

Breast Care
- Oxytocin release promotes the let-down reflex; moves breast milk forward toward the nipple
  - Causes the uterus to contract producing “afterbirth” pains
  - Can occur when baby cries or with thoughts of the baby
  - Breast pads inside a supportive bra will collect leaking breast milk
- Soap should not be used on breasts; Montgomery’s glands secrete oil to keep nipples supple
- After feedings, leave colostrum/breast milk on nipples and expose the breasts to air
- Breast self-examination should be performed after feeding on a chosen day of the month until menses returns
  - Report breast mass, redness, pain, rash, edema, or cracked/painful nipples to primary care provider

Community Resources
Lactation consultant
La Leche League
Primary health-care provider

Uterine/Vaginal Changes

The uterine fundus lowers 1 cm below the umbilicus each day until returning to pelvis on day 10–14.

Normal Progression of Lochia
Lochia progresses from bright red to brown to light pink, also decreasing in amount
- REPORT abnormal findings
- Lochia returns to bright red or increases in amount
- Persistent bright red lochia
- Lochia with a foul odor
- Saturating one pad ≤1 hour or passing golf ball–sized clots
Return of the Menstrual Cycle
- Dependent on method of infant feeding
  - If breastfeeding, lactation amenorrhea while exclusively breastfeeding infant (first 6 months)
  - If bottle feeding, menses usually returns 6–8 weeks after delivery
  - Remind patient that ovulation returns before menses

Sexuality
- Sexual intercourse may be resumed after lochia has ceased and the episiotomy has healed to prevent infection, trauma, or pain
- Usually recommended after 6-week postpartum checkup
- Vaginal lubrication may be diminished; use water-soluble gel
- Female superior or side-lying position may assist in comfort
- Discuss family planning methods; ovulation returns before menses

Perineal Hygiene
- Stress importance of hand washing before and after perineal care
- Demonstrate use of perineal cleansing bottle
  - Fill bottle with warm water
  - After void, rinse perineum with water
  - Pat area dry from front to back
  - Apply new perineal pad
- Keep perineal pad/underwear from touching floor

Comfort Measures
- Apply perineal ice packs intermittently for the first 24 hours
- Warm water sitz baths may be ordered after 24 hours, usually two or three times a day, for 20 minutes to promote healing and comfort
  - Tighten perineal muscles upon entering sitz bath
- Apply creams, sprays, and ointments to perineum as ordered
- Discuss bowel habits and steps to avoid constipation

Kegel Exercises
- Encourage patient to perform Kegel exercises throughout the day to strengthen perineal muscle tone
  - To locate muscle, tighten perineal muscles as though stopping the flow of urine (this technique is only used to locate the muscles, not to perform the exercise)
  - Hold contraction for several seconds, release, and repeat 10–15 times; discourage breath-holding
Emotions

Postpartum Blues
- Symptoms of postpartum blues include tearfulness, insomnia, and moodiness
- Postpartum blues common in the early postpartum period
- Duration less than 2 weeks
- Possible cause
  - Physical and hormonal changes after birth
  - Exhaustion
- Encourage patient to discuss feelings
- Encourage private time when baby naps
- Discuss the difference between “blues” and depression

REPORT symptoms of postpartum depression
- Extreme or unswerving sadness
- Compulsive thoughts
- Feelings of inadequacy
- Loss of appetite
- Inability to care for infant and/or self
- Suicidal thoughts

Activity Level
- Frequent rest periods will help healing of body and mind
- Patient should nap when baby sleeps
- Avoid lifting anything heavier than the baby
- Limit activities to care of newborn/self
- Ask for assistance with housework/shopping
## Common Newborn Terms and Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation/Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrocyanosis</td>
<td>Cyanotic appearance of the newborn hands and feet in the immediate newborn period</td>
</tr>
<tr>
<td>AGA</td>
<td>Refers to the newborn: Appropriate for gestational age</td>
</tr>
<tr>
<td>Babinski’s reflex</td>
<td>Elicited by stroking the plantar surface of the newborn foot from heel upward and across the ball to the great toe; expected response: toes fan and hyperextend with dorsiflexion of the great toe</td>
</tr>
<tr>
<td>Ballard tool</td>
<td>Physical/neurological assessment of the newborn; used to determine accuracy of gestational age</td>
</tr>
<tr>
<td>Barlow’s test</td>
<td>Assessment of the newborn hips in which the hip is flexed and the thigh is abducted as it is pushed posteriorly to the line of the femur’s shaft; used to detect hip dysplasia</td>
</tr>
<tr>
<td>Caput succedaneum</td>
<td>Edematous area on the newborn skull; most often evident on the occiput after vaginal delivery</td>
</tr>
<tr>
<td>Cephalohematoma</td>
<td>Unilateral swelling of the newborn head present within the first 3 days of life caused by a collection of blood between the skull bone and the periosteum</td>
</tr>
<tr>
<td>Colostrum</td>
<td>Thin, yellow breast milk seen in late pregnancy and first 1–3 days postpartum</td>
</tr>
<tr>
<td>Epispadias</td>
<td>Abnormal positioning of the urinary meatus on the dorsal (upper) side of the penis</td>
</tr>
<tr>
<td>Erythema toxicum</td>
<td>Newborn rash, often on the face and trunk, characterized by pustules with red base; usually resolves spontaneously</td>
</tr>
<tr>
<td>Extrusion reflex</td>
<td>Outward protrusion of the newborn’s tongue when touched</td>
</tr>
<tr>
<td>Hydrocephalus</td>
<td>Abnormal accumulation of cerebrospinal fluid in the brain</td>
</tr>
</tbody>
</table>

*Continued*
<table>
<thead>
<tr>
<th>Abbreviation/Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperbilirubinemia</td>
<td>Excess of serum bilirubin resulting from breakdown of red blood cells, leading to jaundice</td>
</tr>
<tr>
<td>Hypospadias</td>
<td>Abnormal positioning of the urinary meatus on the ventral (under) side of the penis</td>
</tr>
<tr>
<td>Imperforate anus</td>
<td>Congenital defect in which the opening to the anus is missing or forms a blind pouch</td>
</tr>
<tr>
<td>Kangaroo care</td>
<td>Positioning the newborn and mother skin-to-skin for added warmth</td>
</tr>
<tr>
<td>Kernicterus</td>
<td>Deposits of unconjugated bilirubin in brain cells</td>
</tr>
<tr>
<td>Lanugo</td>
<td>Downy hair on arms, back, face of the newborn</td>
</tr>
<tr>
<td>LGA</td>
<td>Large for gestational age</td>
</tr>
<tr>
<td>Mastitis</td>
<td>Inflammation and infection of the breast</td>
</tr>
<tr>
<td>Meconium</td>
<td>First newborn bowel movement; greenish-black and tarry</td>
</tr>
<tr>
<td>Milia</td>
<td>Small white spots on the newborn nose caused by unopened sebaceous glands; disappear spontaneously</td>
</tr>
<tr>
<td>Molding</td>
<td>Elongated shape of the newborn skull resulting from overriding cranial bones to facilitate passage through the birth canal</td>
</tr>
<tr>
<td>Mongolian spot</td>
<td>Dark bluish spot that appears most commonly on the buttocks of dark-skinned newborns that gradually fade; may be mistaken for bruise</td>
</tr>
<tr>
<td>Moro reflex (startle reflex)</td>
<td>Newborn symmetrically abducts arms with fingers spread to form “C” before returning to flexed position; asymmetrical response may indicate clavicle or brachial plexus injury</td>
</tr>
<tr>
<td>Palmer grasp reflex</td>
<td>Newborn fingers curl around examiner’s finger when placed in the palm of the newborn’s hand</td>
</tr>
</tbody>
</table>

Continued
Plantar grasp reflex: Newborn toes curl downward when examiner’s finger is placed at the base of the toes.

Polydactyly: Extra digit on hand or foot.

RDS: Respiratory distress syndrome; due to immaturity of lungs and usually lack of surfactant.

Rooting reflex: Newborn’s turning of head and opening of the mouth elicited by stroking the lower lip or cheek.

SGA: Small for gestational age.

Surfactant fluid: Secreted by alveoli of lungs; reduces surface tension of lung fluids, making them more mobile; premature babies often have deficiency.

Syndactyly: Webbing between the fingers or toes.

Telangiectatic nevi: Flat, deep-pink, easily blanched area of capillary dilation of the skin found on the face or nape of the neck; may fade by second year of life.

Tonic neck reflex: Infant’s head turned to left, arm/leg on that side extend; same is true when head turned to right.

Trunk incurvation reflex: With the infant in prone position, stroke along one side of the spine; infant will curve body toward that side.

Common Newborn Terms and Abbreviations—cont’d

Nursery Care of the Newborn

- Keep infant warm during all care and procedures
- Assess and record daily weight
- Role-model back positioning
- Keep bulb syringe at bedside
- Check identification bands at each encounter with parents
NEWBORN CARE

Physical Assessment of the Newborn

Vital Signs

Reportable findings in red.

- Axillary temperature 97.7°–98.6°F
  - Decreased or increased body temperature (may be a sign of sepsis)
- Auscultate apical pulse for 1 full minute
  - 110–160 beats per minute
  - Sustained resting heart rate below 100 or above 160
- Respirations counted for 1 full minute
  - 30–60 per minute
  - Sustained resting respiratory rate below 30 or above 60

Extremities/Activity

- Newborn posture flexed
- Extremities equal length with full range of spontaneous motion
- Gluteal folds even
- Ten fingers and 10 toes without syndactyly or polydactyly
- Reflexes intact with expected response
  - Moro (startle) reflex: clap your hands loudly or gently bump crib to elicit symmetrical “embrace” movement of infant’s arms
  - Babinski: firmly stroke sole of foot to elicit upward movement of great toe and fanning out of other toes
  - Tonic neck: turn infant’s face to one side to observe extension of arm on same side and flexion of opposite arm; known as “fencing position”
  - Palmar grasp: place your finger in the infant’s palm to elicit curling of his or her fingers around your finger
- Femoral pulse intact and equal in strength/rate compared with brachial pulse

REPORT:

- Poor muscle tone or asymmetry of muscle tone
- Failure to spontaneously move all extremities
- Decreased range of motion
- Chewing-like mouth movements combined with noticeable changes in eye and/or body movements (may represent neonatal seizures)
123

- Unequal knee height, leg length, or asymmetrical gluteal folds (suggestive of hip dysplasia)
- Unexpected response when testing reflexes
- Jitteriness of the extremities (may indicate conditions such as hypoglycemia, hypocalcemia, or drug withdrawal or may be a transient idiopathic finding)

Skin

- Color uniformly pink
- Normal variations
  - Acrocyanosis
  - Milia
  - Lanugo
  - Mongolian spot
  - Telangiectatic nevi “stork bites”
  - Erythema toxicum
- REPORT:
  - Central or circumoral cyanosis (bluish color of mucous membranes mouth; indicates systemic lack of oxygen)
  - Skin lesions, bruises, abrasions
  - Jaundice
    - Routinely assess all newborns for signs of jaundice
      - Blanch skin; if jaundiced, will appear yellow after pressure is released
      - Use bilirubinometer if available
      - Progresses in a cephalocaudal direction (from top to bottom)
    - If jaundice is present, notify primary health-care provider
      - Report serum bilirubin laboratory findings
      - Initiate phototherapy if ordered
      - Have eye shields and diaper in place
      - √ Vital signs, including temperature per hospital protocol
      - Ensure adequate hydration
      - Monitor and report repeat laboratory tests

Head and Neck

- Head round with slight molding or caput succedaneum (soft tissue swelling over large presenting area of skull)
Anterior and posterior fontanels soft and flat (bulging fontanel normal with crying)
- Anterior fontanel is diamond-shaped
- Posterior fontanel is triangle-shaped
- Head held midline with ease of movement
- Trachea midline
- Head circumference > chest circumference

**REPORT:**
- Sunken or bulging fontanels when infant is at rest (bulging fontanel may indicate hydrocephaly; sunken fontanel may indicate dehydration)
- Cephalhematoma (bulging of head that usually does not cross skull suture line and, because it is filled with blood, is more firm than caput succedaneum)
- Abrasion
- Restricted neck movement

**Face**
- Face symmetrical with rest and crying
- **Eyes** are symmetrical in size and shape; pupils equal; red reflex and corneal reflex intact
- **Nose** is midline with nares patent; √ patency by occluding one nare at a time while assessing breathing
- **Ears** have top of pinna aligned with inner canthus of eyes; pinna well-formed and hearing intact
- **Mouth**
  - Oral mucosa pink and moist; tongue mobile
  - Hard and soft palate intact
  - Strong suck; able to coordinate suck and swallow
  - Tongue freely movable
- Reflexes present
  - Rooting (infant turns head toward side of face that is stimulated)
  - Sucking
  - Gag
  - Extrusion (infant pushes tongue outward when it is touched)

**REPORT:**
- Absence of red reflex
- Purulent discharge of eyes immediately after birth
- Low-set ears
- Lack of response to sound
Newborn Care

- Nasal flaring
- Cleft lip or palate
- Large, protruding tongue (possible Down syndrome)
- White patches in mouth (candidiasis)
- Absent rooting, suck, gag, or extrusion reflex
- Severe drooling and/or coughing or gagging (do not feed until condition is assessed)

Chest

- Respirations unlabored
- Chest rises and falls symmetrically
- Lung sounds clear bilaterally
- Clavicles intact
- Breast buds present with nipples prominent and symmetrical
- **REPORT:**
  - Nasal flaring, chest retractions, or expiratory grunting
  - Asymmetrical or adventitious breath sounds
  - Chest circumference greater than head circumference
  - Loud cardiac murmur with thrill/lift
  - Asymmetrical Moro reflex

Abdomen/Genitals

- Abdomen round and soft without palpable masses
- Three-vessel umbilical cord with drying base
- Bowel sounds present
- First void within 24 hours
  - May be rust-stained from uric acid crystals
- Meconium stool passed within 24 hours
- Female genitalia
  - Labia majora covers minora
  - May have mucoid vaginal discharge or pseudomenses
- Male genitalia
  - Urinary meatus at tip of penis
  - Testes descended with rugae present
- **REPORT:**
  - Drainage of urine or feces from umbilicus
  - Liver more than 3 cm below right costal margin
  - Abdomen markedly distended
  - Palpable abdominal mass
NEWBORN CARE

- Visible peristaltic waves
- Poor feeding or excessive spitting/vomiting
- Failure to urinate or pass meconium within 24 hours
- Hypospadias or epispadias (urinary meatus on ventral or dorsal side of penis)
- Mass in scrotal or inguinal area
- Imperforate anus

**Back**

- Spine midline and straight, intact, and easily flexed
- Incurvation reflex intact
- **REPORT:**
  - Arched back
  - Sinus or nevus with tuft of hair
  - Meningocele/myelomeningocele

**Procedures in the Nursery**

**Blood Sample via Heel Stick**

To obtain a blood sample via heel stick:
- Wash hands and apply gloves
- Apply heel warmer to promote vasodilation 5–10 minutes before procedure
- Choose an area on the lateral aspects of the newborn’s foot to avoid the median nerve
- Cleanse the skin, use lancet device to puncture skin, obtain sample
- Apply pressure with gauze dressing; after bleeding has stopped, apply bandage
- Provide comfort to the newborn
- Document procedure performed and puncture site
**Neonatal Screen**

- Blood test performed on the newborn approximately 24 hours after birth, after feeding has been established
- Tests for a variety of genetic and metabolic disorders
- Infants who are discharged early may need to be brought back for newborn screen

**Newborn Intramuscular Injection**

To perform a newborn intramuscular injection:

- Check written order
  - AquaMEPHYTON (vitamin K)
  - Hepatitis B vaccine
- Obtain parental consent as indicated
- √ Medication is appropriate pediatric dose
- √ Newborn identification
- Choose 25-gauge, ⅝-inch needle
- Choose appropriate site: Vastus lateralis
- Don gloves, cleanse site
- Stabilize the leg; grasp injection site
- Insert needle and administer medication into the vastus lateralis muscle
- Due to lack of large blood vessels in recommended injections site, aspiration, after needle insertion is not mandatory with immunizations and may increase injection related pain
NEWBORN CARE

- Withdraw needle, apply bandage to site
- Provide comfort to baby
- Document date, time, location, and name and amount of medication
- Assess site for bleeding
- Provide parents with immunization record of vaccines given

Hearing Screen

- Hearing screens are mandated in most states before hospital discharge for early identification of hearing deficits
- Newborns who do not pass the hearing screen should have the screen repeated; referral to audiologist with repeated hearing screen failure
- Report findings to health-care provider/parents

Teaching the Parents of the Newborn

- Education of the postpartum family is an essential role of the postpartum nurse
- New skills should be discussed and demonstrated with appropriate return from parents
- Document education and validate knowledge through verbalization and/or return demonstration
- REPORTABLE SYMPTOMS:
  - Parents should be encouraged to call the pediatrician immediately if they are concerned about their newborn’s physical condition or behavior
  - Discharge teaching should include name, phone number, and office address of pediatrician, along with appointment date/time of 1st visit

REPORTABLE SIGNS OF ILLNESS
Parents should be taught to REPORT the following signs to the pediatrician:

- Respiratory distress
  - Nasal flaring
  - Grunting
  - Retractions
  - Rate >60 breaths/minute
129

- Circumoral cyanosis
- Coughing, choking
- **Abdominal distention**
  - Vomiting, diarrhea, constipation
- **Elevated or decreased temperature**
  - Teach parents how to take an axillary temperature
  - Place thermometer deep into the exposed axilla
  - Gently hold the infant’s arm against the chest until digital thermometer beeps
- **Behavior changes**
  - Excessive crying
  - Difficulty arousing
  - Disinterest in feeding
- **Skin changes**
  - Cyanosis
  - Jaundice
  - Rash
  - Redness, swelling, discharge from circumcision site or cord
  - Discharge from eyes
  - Bleeding/discharge/foul odor from cord or circumcision site
- **Signs of dehydration**
  - Sunken fontanels
  - Decrease in number of wet diapers
  - Dry mucous membranes

---

### Normal Newborn Behavior

#### Pattern of Sleep

- Newborns sleep for short periods; approximately 15–17 hours per day
- Never leave baby unattended on household furniture other than crib
- Reduce the risk for sudden infant death syndrome (SIDS)
  - Back sleeping recommended
  - No smoking around baby
  - Dress baby for comfort; do not overheat
  - Infants should have a close but separate sleeping space
  - Cribs should have slats that are <2½ inches apart
  - Choose a firm mattress; should fit snugly in the crib
  - Avoid bumper pads, pillows, stuffed toys, or blankets in the crib
Communication
- Crying is a means of communication and a late sign of hunger
- Teach parents hunger cues
  - Increased alertness or activity
  - Smacking of the lips
  - Suckling motion
  - Moving of the head in search of the breast
- Teach techniques for comforting the fed newborn
  - Swaddling
  - Burping
  - Massage
  - Soft music
  - Diaper change
  - Gentle rocking
- Encourage parents to talk, sing, and hold newborn close

REPORT:
- Constant crying
- Difficulty awakening baby

Newborn Skin Care

Bathing
- Daily bathing of newborns not necessary; keep diaper area clean with each diaper change
- Keep newborn warm by bathing in a warm room free from drafts, keeping bath time short, and wrapping immediately following the bath
- Use only soap recommended for newborn skin with neutral pH
- Stay with baby and hold securely at all times when bathing
- All supplies should be within easy reach
- Test bath water to prevent burns
- No soap is needed on the face
- The eye area should be cleansed with wet cotton balls from the inner to outer canthus
- Dry the baby quickly and cover body to avoid chilling
- Wash hair last to avoid heat loss
Diapering

- After feeding is established expect:
  - ≥6 wet diapers/day
  - Stool that is soft/formed; should not be loose/watery
- Encourage frequent diaper changes
  - Cleanse genital area with mild soap (neutral pH) and water
  - If using disposable wipes, choose those without alcohol or fragrance
  - Cleanse the female genitalia from front to back
  - Do not forcibly retract the foreskin of uncircumcised boys
  - Fanfold diaper to expose umbilical stump to air
- REPORT:
  - Rash or excoriated diaper area
  - Diarrhea/constipation
  - Decreased number of voids

Jaundice

- All newborns should be examined for a yellowish hue to skin and sclera called jaundice
- Jaundice results from elevated bilirubin levels in the newborn
- Requires prompt recognition and treatment to avoid complications, including kernicterus
- Seen initially in the face, progressing to the trunk and extremities
- Promptly REPORT jaundice in newborn skin/eyes so that appropriate laboratory tests and treatment can begin

Umbilical Cord Care

- The cord will fall off spontaneously in 10–14 days
- Do not tug at cord
- Keep area clean, dry, and exposed to air
- Cleanse cord insertion site with water at diaper changes
- Fanfold diaper to expose cord to air
- REPORT redness, drainage, bleeding, foul odor from cord

Circumcision

- Site may be covered with petroleum gauze dressing; tell parents when to remove dressing
- Clean area with warm water for diaper change
NEWBORN CARE

- Apply petroleum jelly to head of penis to decrease friction with diaper
- A yellow exudate forms on the head of the penis on day 2–3; this is part of the healing process and removal should not be attempted
- **REPORT:**
  - Difficulty urinating
  - Persistent bleeding from the site
  - Pus oozing from the site
  - Redness or swelling

**Bottle Feeding**

Breastfeeding is discussed in the *Postpartum Tab*.

**Types of Formula**

Directions for dilution of formula on the container must be followed exactly to ensure adequate infant health and nutrition.

**Ready-to-Feed Liquid**

- Most expensive, but most convenient
- Use without dilution
- Opened cans can be stored in the refrigerator for 48 hours

**Liquid Concentrate**

- Dilute with equal parts of water
- Prepare enough bottles for the day
- Prepared bottles can be stored in refrigerator for 48 hours

**Powdered**

- Least expensive
- Add prescribed amount of water for every scoop of powder per manufacturer’s instructions
- Shake well to distribute powder

**Formula Preparation**

- Wash hands
- Clean off can with soap and water before opening
- Mix infant formula with safe water source as defined by local and state health departments
- If concerned about water safety, use bottled nursery water, or if directed, parents can boil tap water for 1 minute and allow to cool completely before mixing with formula
- Prepared bottles can be fed at room temperature
Refrigerated bottles can be warmed by placing them under warm water to bring to room temperature
Avoid use of microwave for heating formula

**Bottle Preparation**
- Bottles should be washed with a brush and soapy water and rinsed thoroughly; nipples can be disinfected by placing in boiling water for 5 minutes and allowed to air dry
- Choose nipples that allow a steady flow of formula but not so large as to cause choking

**Technique for Feeding**
- Hold close and talk to the infant during feedings
- Parents should avoid propping the bottle (could cause choking)
- Watch baby for hunger cues (usually every 3–4 hours)
  - Increased alertness or activity
  - Smacking of the lips
  - Suckling motion
  - Moving of the head in search of the breast
- Newborns generally drink about 0.5–2 ounces of formula per feeding for the first several days of life
- Elicit the rooting reflex to initiate feeding
- Keep bottle tipped to ensure the nipple remains full of formula
- Burp every 0.5–2 ounces
- The type, amount, and pattern of feedings should be discussed with the pediatrician before hospital discharge
- Formula remaining in the bottle must be discarded
- Demonstrate proper use of bulb syringe in case of choking

**REPORT:**
- Vomiting after feeding
- Lack of interest in eating
- Crying after feeding

**Safety**
- Properly install car seats with belt secured for every trip
  - Infant car seats must be placed in the back seat with the child rear-facing
  - Do not leave child unattended in the car
- Babies should sleep on their backs to decrease the risk for sudden infant death syndrome (SIDS)
- Never microwave a bottle (hot spots may cause burns)
NEWBORN CARE

- Protect newborn’s skin from excessive sunlight
- Have emergency telephone numbers readily available
- Keep small objects out of reach to prevent choking
- Avoid placing crib near blinds or curtain cords
- Frequently wash hands to prevent spread of infection
- Never leave infant alone on bed, couch, or other elevated surface
- Supervise pets around the newborn
- Be gentle with the baby; DO NOT shake or swing the baby in the air
- Learn infant cardiopulmonary resuscitation (CPR)

Immunizations

- Discuss importance of immunizations for disease prevention
- Provide current schedule of recommended childhood immunizations
- Provide documentation of any immunization given in the hospital
## Common Pediatric Terminology and Abbreviations

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAP</td>
<td><strong>American Academy of Pediatrics</strong></td>
</tr>
<tr>
<td>ABGs</td>
<td><strong>Arterial blood gases</strong>; used to measure pH, oxygenation, and carbon dioxide in blood</td>
</tr>
<tr>
<td>Abuse</td>
<td>Injurious or potentially injurious treatment of another person; abuse may be verbal, physical, or sexual</td>
</tr>
<tr>
<td>Acute abdomen</td>
<td>Sudden severe abdominal pain, in children usually caused by inflammation or obstruction and often requiring surgical intervention</td>
</tr>
<tr>
<td>ADD/ADHD</td>
<td><strong>Attention deficit disorder/attention-deficit hyperactive disorder</strong>; conditions characterized by distractibility and difficulty focusing attention; ADHD includes excessive motor activity</td>
</tr>
<tr>
<td>Adolescence</td>
<td>Period that begins at puberty and lasts until maturity; age is not exact; see definition of puberty</td>
</tr>
<tr>
<td>Anemia</td>
<td>Decrease in number or in oxygen binding capacity of red blood cells (RBCs)</td>
</tr>
<tr>
<td>AOM</td>
<td><strong>Acute otitis media</strong>; middle ear infection caused by bacteria or a virus; common causative organisms are respiratory syncytial virus (RSV), <em>Streptococcus pneumoniae</em>, <em>Haemophilus influenzae</em>, and <em>Moraxella catarrhalis</em></td>
</tr>
<tr>
<td>ASD</td>
<td><strong>Atrial septal defect</strong>; an abnormal opening between the atria of the heart</td>
</tr>
<tr>
<td>Asthma</td>
<td>Narrowing and inflammation of airways caused by increased responsiveness</td>
</tr>
<tr>
<td>Autosomal dominant</td>
<td>Only one parent must carry the abnormal gene for the child to have the abnormality</td>
</tr>
<tr>
<td>Autosomal recessive</td>
<td>Both parents must be carriers of the abnormal gene for the child to have the abnormality</td>
</tr>
</tbody>
</table>

*Continued*
### Common Pediatric Terminology and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayley</td>
<td>Bayley Scales of Infant Development—standardized tests used to assess development in children ages 2 to 42 mo</td>
</tr>
</tbody>
</table>
| BMI               | **Body mass index**; a number calculated from measurements of ht and wt  
  - BMI is an indicator of fatness but does not directly measure body fat. In growing children, body fat normally varies according to age and gender; therefore, after calculating a child’s BMI, the BMI is compared with a chart that is based on age and gender  
  - **BMI Formula**: Multiply ht in inches by ht in inches then divide the product by wt in lb. Finally, multiply the quotient (answer) by 703. For children, the calculated BMI must be compared with an age- and gender-appropriate CDC chart  
  - For additional information, see [http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html](http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html) |
| BPD               | Bronchopulmonary dysplasia; inflammation and scarring of the lungs that occurs most often in premature infants, especially in those who have been on mechanical ventilators |
| BRAT diet         | Bananas, rice, applesauce, toast; a diet that is sometimes ordered when a child has diarrhea |
| Bronchiolitis     | Inflammation of bronchioles; most common cause is RSV |
| Bronchospasm      | Spasm resulting in narrowing and partial obstruction of bronchi |
| Burette           | A small fluid volume control container that hangs beneath a larger container of IV fluid; example of brand name is Buretrol |

*Continued*
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention; a federal agency of the Department of Health and Human Services</td>
</tr>
<tr>
<td>Celsius or Centigrade (temperature)</td>
<td>Refers to temperature scale. Abbr. = C°; to convert C° to Fahrenheit (F°) multiply degrees in C° by 1.8 and add 32; to convert F° to C° subtract 32 from degrees in F° and multiply by 0.555. For web-based temperature converter tool see: <a href="http://www.celsius-fahrenheit.com/">http://www.celsius-fahrenheit.com/</a></td>
</tr>
<tr>
<td>Cephalocaudal</td>
<td>Head-to-toe direction in which development of motor (movement) skills occurs</td>
</tr>
<tr>
<td>Colic (infantile)</td>
<td>Characterized by daily or nightly hours of crying. Cause unclear but may be caused by intestinal spasm and pain</td>
</tr>
<tr>
<td>Congenital</td>
<td>Present at birth</td>
</tr>
<tr>
<td>CP</td>
<td>Cerebral palsy; damage to motor control center in brain that results in impaired movement and coordination</td>
</tr>
<tr>
<td>Cradle cap</td>
<td>Seborrheic dermatitis of the scalp</td>
</tr>
<tr>
<td>Critical period</td>
<td>Time during which child is optimally ready for growth or development; failure to progress during this time may impair future growth or development</td>
</tr>
<tr>
<td>Croup</td>
<td>Laryngotraceobronchitis; infection-induced (usually viral) inflammation and spasm of the larynx, trachea, and bronchi</td>
</tr>
<tr>
<td>Cystic fibrosis (CF)</td>
<td>(Also called mucoviscidosis). Hereditary disease (autosomal recessive) characterized by thick mucus secretions that result in chronic obstructive pulmonary disease (COPD), frequent respiratory infections, pancreatic enzyme deficiency, and poor nutrient absorption. There are abnormal electrolyte concentrations in sweat</td>
</tr>
</tbody>
</table>
# Common Pediatric Terminology and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehydration</td>
<td>Body deficiency of fluids; in children, it is usually caused by diarrhea and/or vomiting</td>
</tr>
<tr>
<td>DDST, DDST-R, DDST II</td>
<td>Denver Developmental Screening Test or Denver Developmental Screening Test Revised also known as Denver II; used to screen for developmental problems in children from birth to 6 years of age; examiners should be trained by an instructor who has been trained by Denver faculty</td>
</tr>
</tbody>
</table>
| Development       | Growth to maturity; may refer to physical, social and emotional, communicative, or cognitive progress  
Note that development most often refers to progress in skill and complexity of functioning (see definition of Growth) |
| Developmental delay | Failure to attain developmental milestones by the expected age |
| Diarrhea          | Passage of unformed stools |
| Down syndrome     | Genetic disorder in which child has 47 rather than 46 chromosomes; mental retardation and other anomalies are common; also known as trisomy 21 |
| Eczema            | General term for an itchy red rash that oozes serous fluid and becomes crusty; may be caused by allergy, irritation, drugs, or sun exposure |
| Emancipated minor | A child who has been granted adult legal status |
| EMLA              | A topical anesthetic |
| Encephalitis      | Inflammation of white and gray matter of the brain; usually caused by a virus and associated with meningitis |
| Eosinophil        | White blood cell (WBC) that is elevated in patient with allergies or parasitic infestation |

*Continued*
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epiglottitis</td>
<td>Inflammation of the epiglottis caused by infection; a pediatric emergency that may occlude airway</td>
</tr>
<tr>
<td>Erikson</td>
<td>Theorist who proposed eight psychosocial developmental stages from birth to late adulthood (see p 146)</td>
</tr>
<tr>
<td>Failure to thrive (FTT)</td>
<td>Weight below 5th percentile on CDC growth charts; may be associated with developmental delays</td>
</tr>
<tr>
<td>Fine motor skills</td>
<td>Tasks performed with the small muscles of the hands</td>
</tr>
<tr>
<td>Fragile X syndrome</td>
<td>Chromosomal disorder in which there is an abnormality of the X chromosome; a common cause of inherited mental retardation</td>
</tr>
<tr>
<td>Freud</td>
<td>Theorist who proposed a psychosexual developmental theory (see p 147)</td>
</tr>
<tr>
<td>FOC</td>
<td>Frontal-occipital circumference; also known as head circumference or HC</td>
</tr>
<tr>
<td>FUO</td>
<td>Fever of undetermined origin</td>
</tr>
<tr>
<td>G&amp;D</td>
<td>Growth and development</td>
</tr>
<tr>
<td>Gross motor</td>
<td>Tasks performed using large muscles; examples are sitting up, rolling over, walking, lifting</td>
</tr>
<tr>
<td>Growth</td>
<td>Usually refers to physical maturation of child</td>
</tr>
<tr>
<td>HC</td>
<td>Head circumference, which is measured at largest circumference</td>
</tr>
<tr>
<td>KVO</td>
<td>Keep vein open; abbreviation used to indicate that IV fluids should be delivered as slowly as possible to avoid clotting of the IV needle and line; used when supplemental fluids are not needed but continuous IV access is needed for medication delivery</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>White blood cell (WBC) that increases in viral or chronic infection; normally high in young children</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maturation</strong></td>
<td>Physical or behavioral change predisposed by genetics and attained by aging and/or environmental influence</td>
</tr>
<tr>
<td><strong>Meningitis</strong></td>
<td>Inflammation of covering (meninges) of brain and spinal cord; usually caused by infection</td>
</tr>
<tr>
<td><strong>Microdrop</strong></td>
<td>IV drop factor for which 60 gtts equal 1.0 mL of fluid and the rate for mL/hr is the same as the rate of gtts/min (Example: 40 mL/hr = an IV rate of 40 gtts/min)</td>
</tr>
<tr>
<td><strong>Mononucleosis</strong></td>
<td>Infection caused by Epstein-Barr virus; most common in teens and young adults; also known as the kissing disease</td>
</tr>
</tbody>
</table>
| **Murmur**       | Blowing heart sound (similar to a breath sound)  
|                  | • **Functional** murmurs do not indicate heart disease and generally disappear upon return to health; heard in children with conditions such as hypertension  
|                  | • **Innocent** murmurs are caused by vibration associated with increased blood flow such as occurs in a child with fever  
|                  | • **Organic** murmurs are caused by structural changes in the heart or blood vessels |
| **Neonate**      | Infant in the first 28 days of life |
| **Newborn (NB)** | Infant less than 28 days old |
| **N/V/D**        | Nausea, vomiting, diarrhea |
| **OME**          | Otitis media with effusion (also known as serous otitis media [SOM]) |
| **ORS**          | Oral rehydration solutions |
| **PDA**          | Patent ductus arteriosus; a congenital condition in which there is failure of the ductus arteriosus to close after birth of the infant; in utero, the ductus arteriosus allows fetal blood to bypass the lungs |
### Common Pediatric Terminology and Abbreviations—cont’d

<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentile</td>
<td>Percentiles on standardized growth charts indicate the percentage of children who are the same age as and who are smaller (wt or ht) or larger than the child being measured, e.g., a child whose ht is plotted on the 45th percentile line of a standardized CDC growth chart is taller than 45% of children of the same age and gender and is shorter than 55% of the same age and gender (CDC charts are based on measurements of a specific group of children and are not globally applicable)</td>
</tr>
<tr>
<td>Pertussis</td>
<td>Whooping cough; a disease of the mucous membranes, caused by <em>Bordetella pertussis</em></td>
</tr>
<tr>
<td>PKU</td>
<td>Phenylketonuria; congenital autosomal recessive disorder in which there is a failure to metabolize phenylalanine to tyrosine; if untreated, it results in neurological deficits</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>Phenylalanine (required for growth and must be obtained from food) is an essential amino acid; amino acids are building blocks of protein and the end product of protein digestion</td>
</tr>
<tr>
<td>Piaget</td>
<td>Theorist who proposed stages of cognitive development (see p 147)</td>
</tr>
<tr>
<td>PNP</td>
<td>Pediatric nurse practitioner; an advanced practice nurse</td>
</tr>
<tr>
<td>Preschooler</td>
<td>Period that begins at the end of the toddler stage and ends at school age; usually refers to ages 3 through 6 years</td>
</tr>
<tr>
<td>Proximodistal</td>
<td>Center to outward direction in which physical development takes place</td>
</tr>
<tr>
<td>Puberty</td>
<td>Stage at which person becomes capable of reproduction; in females, usually between 9 and 16 years of age; in males usually between 13 and 15 years of age</td>
</tr>
</tbody>
</table>

*Continued*
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactive airway disease (RAD)</td>
<td>Reversible bronchospasm; asthma</td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td>Inflammatory autoimmune condition that may follow untreated or poorly treated group A strep pharyngitis; signs and symptoms include fever, joint pain and redness, uncontrollable movements (Sydenham’s chorea), fatigue and painless nodules under the skin; may result in permanent heart damage</td>
</tr>
<tr>
<td>Roseola</td>
<td>Viral illness that is most common in infants; usually begins with 3–5 days of high fever followed by a rash</td>
</tr>
<tr>
<td>RSV</td>
<td>Respiratory syncytial virus; virus that commonly causes cold-like symptoms and may cause serious illness in infants</td>
</tr>
<tr>
<td>Rubella</td>
<td>Viral illness that causes rash and fever for 2–3 days; also known as 3-day or German measles; may cause birth defects if acquired by pregnant woman</td>
</tr>
<tr>
<td>Rubeola</td>
<td>Measles, which is a viral illness</td>
</tr>
<tr>
<td>Scarlet fever</td>
<td>Punctate rash caused by a toxin produced by group A strep; usually follows strep pharyngitis, also known as scarlatina</td>
</tr>
<tr>
<td>Shaken baby syndrome</td>
<td>Brain injury caused by shaking baby; brain becomes swollen; bleeding may occur in brain or retina of eyes; may cause permanent damage</td>
</tr>
<tr>
<td>Shift to the left</td>
<td>Increased number of immature polymorphonuclear neutrophils, which are WBCs known as stabs or bands; usually increased in acute infection</td>
</tr>
<tr>
<td>SOM</td>
<td>Serous otitis media; fluid collection in middle ear; common with allergies and after an episode of AOM; also known as OME</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Term/Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanner stage</td>
<td>Physical developmental periods based on development of primary and secondary sex characteristics</td>
</tr>
</tbody>
</table>
| Tetralogy of Fallot (TOF) | Congenital heart disorder in which there are four congenital abnormalities:  
1. Ventricular septal defect (VSD)  
2. Pulmonary valve stenosis  
3. Right ventricular hypertrophy  
4. Overriding aorta—the aorta is positioned over the VSD |
| Thrush               | Candida (yeast) infection of mouth mucosa, most common in children with immunosuppression or in whom antibiotics or corticosteroids are being used |
| Toddler              | Usually child aged 12 to 36 months                                                                                                        |
| Turner syndrome      | Chromosomal disorder that affects girls; all or part of one X chromosome is missing; signs are short stature and a webbed neck; other comorbidities are common |
| Varicella            | A viral illness; also known as chickenpox                                                                                                  |
| Viral exanthem       | Any of various skin rashes caused by a virus                                                                                                 |
| VSD                  | Ventricular septal defect                                                                                                                   |
| X chromosome         | Females normally have two X chromosomes, whereas males normally have one X and one Y chromosome                                             |

**Cultural Competency in Child Health Care**

“**Culture**” refers to shared attitudes, beliefs, customs, ideas, language, and moral conduct.

“**Cultural competency**” is indicated by sensitivity to and acceptance of religious, cultural, philosophical, and social preferences of people from
socioeconomic, ethnic, and/or national backgrounds that are different from one’s own. Cultural competence facilitates optimal patient care.

**Nursing Actions**

Nursing actions that demonstrate cultural competency:
- Respect family dynamics, beliefs, and communication style of different cultures
- Determine beliefs of patients and families regarding illness and appropriate health care
- Avoid criticism of nonharmful folk beliefs or folk remedies
  - When possible, incorporate nonharmful folk remedies into the health-care plan
- Allow all family and support group visits and interactions with the patient that do not jeopardize health care
- Be sensitive to implications of body language and personal space
- Ask permission before touching and examining the child
- Have routine hospital forms and instruction handouts available in languages that are common in the geographical area
- Obtain the services of an interpreter when needed
- Determine whether the family can afford to buy prescribed medications; if not, consult the prescriber to determine whether there is a less expensive alternative or refer for social services support
- Be aware of specific customs and preferences of groups who use the health-care services

**Specific Cultural Characteristics**

*Key Point:* Understand common cultural differences, but be aware that there is diversity within cultural groups and that all family members, including children, should be regarded and treated as individuals.

**Gender**

Some cultures may view gender as a determinate of personal value.
- Arabic and Asian cultures may value a male child more than a female child
- Some cultures believe that the health-care provider should be the same gender as the patient
- Refer to *Interaction With the Health-Care Provider*
Language Barriers
When language is a barrier, patients and families may indicate that they agree with or give consent for whatever is being said to avoid losing face, to prevent social unpleasantries, or to avoid being embarrassed.
■ It is very important for some Chinese people to avoid “losing face”

Eye Contact
Eye contact or prolonged eye contact is considered disrespectful in some cultures.
■ Vietnamese and some Native American cultures may have specific negative beliefs about eye contact or prolonged eye contact

Body Language
Body language may differ in cultures and may be as important as verbal communication.
■ Latinos and other cultures may consider pointing with a finger to be disrespectful; if using a hand signal to indicate that a patient or family should follow you or enter the examination area, use a downward motion of all fingers on one hand rather than holding one finger upward
■ Native Americans may consider a prolonged or firm handshake to be hostile

Response to Pain
Response to pain may differ with culture. Pain may be seen as something to be endured without complaining, or it may be seen as something that should be avoided.
■ Native Americans or Vietnamese may believe that pain is to be endured
■ Cubans may be very expressive about pain

Beliefs About Illness
■ Cultural beliefs may affect the way parents and children view illness
  ■ Chinese families may view illness as affecting the child’s future
■ An illness may be believed to have a supernatural origin, such as Voodoo, or it may be believed to be divine punishment
  ■ Belief of some religious groups and some blacks
  ■ Navajo Indians may believe that illness represents spiritual and other types of disharmony
■ Some cultures fear that strangers may cause supernatural harm to their children
  ■ Latinos may believe that if a stranger admires a child but does not touch the child, the child may develop “mal ojo” or symptoms of
evil eye, a hex that includes symptoms such as fever, diarrhea, and fussiness

- Illness may also be viewed as an imbalance of “hot and cold” humors (fluids); therefore, each illness is described as “hot” or “cold,” and desirable therapies are described as “hot” or “cold.” Balance should be restored to the patient by using therapies that are the opposite humor of the disease
- Belief is common in Latino cultures
- Members of some cultures may carry objects or wear objects around the neck that are believed to guard against witchcraft and/or illness
- May be important to Native Americans, blacks, and the elderly from various cultures

**Interaction With the Health-Care Provider**

- Culture may dictate that the parent of one gender or an adult in a particular family position is the person who interacts with the health-care provider
  - In the Hispanic culture, the father is usually the official head of the household and will make decisions regarding treatment of the child
  - In Vietnamese families, the father is the head of the household and interacts with the health-care provider
  - In Native American households, an elder or grandparent may have authority over health-care decisions
- Families from various cultures may consider it disrespectful to question health-care providers

**Hospital Visits**

Some cultures see office visits or hospitalization as a family affair with a large number of extended family members accompanying the patient to an office visit or to the hospital.

- Important in some Amish religious groups or Romani (Gypsy) families

---

**Development Theories**

**Erikson—Psychosocial Development**

In each stage, there is conflict between a psychosocial task and an opposing ego threat.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Psychosocial Task versus Ego Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 1 year</td>
<td>Trust versus Mistrust</td>
</tr>
<tr>
<td>2 to 3 years</td>
<td>Autonomy versus Shame and Doubt</td>
</tr>
<tr>
<td>4 to 5 years</td>
<td>Initiative versus Guilt</td>
</tr>
<tr>
<td>6 to 12 years</td>
<td>Industry versus Inferiority</td>
</tr>
<tr>
<td>13 to 18 years</td>
<td>Identity versus Role Confusion</td>
</tr>
<tr>
<td>Young adult</td>
<td>Intimacy versus Isolation</td>
</tr>
<tr>
<td>Middle-aged adult</td>
<td>Generativity versus Self Absorption</td>
</tr>
<tr>
<td>Elderly adult</td>
<td>Ego Integrity versus Despair</td>
</tr>
</tbody>
</table>

**Freud—Psychosexual Development**

In each stage, personality conflict may arise as the individual seeks sensual pleasure through a specific body region.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 1 year: Oral Stage</td>
<td>Gratification through activities such as sucking, biting, and vocalizing are a major source of pleasure</td>
</tr>
<tr>
<td>1 to 3 years: Anal Stage</td>
<td>Activities related to bowel control may affect personality</td>
</tr>
<tr>
<td>3 to 6 years: Phallic or Oedipal Stage</td>
<td>The genitals become a focus of attention; penis envy or castration anxiety may occur</td>
</tr>
<tr>
<td>6 to 12 years: Latency Period</td>
<td>Further development of previously learned skills occurs</td>
</tr>
<tr>
<td>Age 12 years and older: Genital Stage</td>
<td>The genital organs are a major source of pleasure</td>
</tr>
</tbody>
</table>

**Piaget—Cognitive (Mental) Development**

In each stage, behavior and adaptation to the environment occur through development of intelligence.
### Stage Description

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensorimotor</strong></td>
<td>Birth to 2 years</td>
</tr>
<tr>
<td></td>
<td>Child develops awareness of object permanence; child understands that an object exists even when it has disappeared from view</td>
</tr>
<tr>
<td><strong>Preoperational</strong></td>
<td>2 to 7 years</td>
</tr>
<tr>
<td></td>
<td>Child is egocentric or unable to see another’s point of view</td>
</tr>
<tr>
<td><strong>Concrete Operations</strong></td>
<td>7 to 11 years</td>
</tr>
<tr>
<td></td>
<td>Child is able to problem-solve by sorting and classifying facts and can think abstractly; reasoning is inductive</td>
</tr>
<tr>
<td><strong>Formal Operations</strong></td>
<td>11 to 15 years</td>
</tr>
<tr>
<td></td>
<td>Adolescent’s thinking becomes more abstract and flexible</td>
</tr>
</tbody>
</table>

### Growth/Development Tasks

There is an approximate age range for normal development of each skill. Failure to master a skill at a certain age does not necessarily indicate pathology, but it indicates the need for further assessment and/or referral for further evaluation.

<table>
<thead>
<tr>
<th>Age</th>
<th>Growth</th>
<th>Skills (Milestones)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1 mo</td>
<td>• Ht ↑ 1 in./mo • Wt ↑ 3–5 oz wk • HC ↑ 0.5 in./mo</td>
<td>• Reflex activities—lacks purposeful movement • Lies in flexed position • Regards a person’s face</td>
</tr>
<tr>
<td>2 mo</td>
<td>• Ht ↑ 1 in./mo • Wt ↑ 3–5 oz wk • HC ↑ 0.5 in./mo</td>
<td>• Lifts head for short periods when prone • Visually tracks moving objects 180 degrees • Smiles and frowns • Coos</td>
</tr>
<tr>
<td>3 mo</td>
<td>• Ht ↑ 1 in./mo • Wt ↑ 3–5 oz wk • HC ↑ 0.5 in./mo</td>
<td>• Rolls from back to side • Sits with support • Focuses on own hands • Recognizes parent • Demonstrates pleasure by squealing</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Age</th>
<th>Growth</th>
<th>Skills (Milestones)</th>
</tr>
</thead>
</table>
| 4 mo | • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk  
    • HC ↑ 0.5 in./mo | • Turns from back to prone position  
    • Holds head erect while in sitting position  
    • Reaches for objects with both hands  
    • Carries objects to mouth  
    • Laughs aloud  
    • Makes consonant sounds |
| 5 mo | • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk  
    • HC ↑ 0.5 in./mo | • Turns from abdomen to back  
    • Grasps objects intentionally  
    • Holds object with one hand  
    • Plays with feet |
| 6 mo | • Birth wt has doubled  
    • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk  
    • HC ↑ 0.5 in./mo | • Imitates sounds  
    • Stranger anxiety begins |
| 7 mo | Teething begins at 5–7 mos | • Crawls  
    • Bears wt on feet when placed on surface  
    • Transfers object from hand to hand |
| 8 mo | • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk | • Sits alone with support  
    • Pulls to standing position  
    • Uses pincer grasp  
    • Marked stranger anxiety  
    • Says “dada” without meaning |
| 9 mo | • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk | • Walks while holding on  
    • Bangs 2 blocks together  
    • Drinks from cup  
    • Attempts to feed self  
    • Searches for hidden object |
| 10 mo | • Ht ↑ 1 in./mo  
    • Wt ↑ 3–5 oz wk | • May begin to walk and climb  
    • Neat pincer grasp  
    • Demonstrates one-hand dominance  
    • Plays pat-a-cake and peek-a-boo  
    • May say a few words with meaning |

*Continued*
### Age Growth Skills (Milestones)

<table>
<thead>
<tr>
<th>Age</th>
<th>Growth</th>
<th>Skills (Milestones)</th>
</tr>
</thead>
</table>
| 11 mo| • Ht ↑ 1 in./mo  
• Wt ↑ 3–5 oz wk                                              | • Cooperates with dressing self  
• Attempts to feed self with spoon  
• Can follow one-step commands  
• Understands meaning of “no”  
• Shakes head to indicate “no” |
| 12 mo| • Birth wt has tripled  
• Birth length has increased by 50%  
• Head and chest circumference are equal | • May walk independently or with hand held  
• Says “mama” and “dada” with meaning  
• Points for desired object |
| 15 mo| • Walks unassisted  
• Pulls or pushes toys  
• Builds tower of 2 blocks  
• Scribbles with crayon or pencil |                                                                                                                                 |
| 18 mo| • Throws ball overhanded  
• Builds tower of 3–4 blocks  
• May be able to control urinary and anal sphincters  
• Says about 10 words |                                                                                                                                 |
| 24 mo| • Weighs about 4 times birth wt  
• Average wt gain 4–6 lb/yr during years 2–6 | • Jumps in place with both feet  
• Runs with wide stance  
• Climbs steps by placing both feet on each step  
• Builds tower of 6–7 blocks  
• Names familiar objects  
• Speaks in short phrases |
| 30 mo| • Walks backward  
• May hop on one foot  
• Copies a crude circle  
• Holds crayon with fist |                                                                                                                                 |

*Continued*
<table>
<thead>
<tr>
<th>Age</th>
<th>Growth</th>
<th>Skills (Milestones)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 yr</td>
<td>All 20 deciduous teeth have erupted</td>
<td>• Rides tricycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Climbs stairs by alternating feet on steps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Turns doorknobs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dresses self</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Builds tower of 9–10 blocks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Holds crayon with fingers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Copies circle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speaks in short sentences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Attains bladder and bowel control</td>
</tr>
<tr>
<td>4 yr</td>
<td></td>
<td>• Hops on one foot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognizes colors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Buttons and unbuttons</td>
</tr>
<tr>
<td>5 yr</td>
<td></td>
<td>• Catches ball</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Skips and jumps rope</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Balances with eyes closed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sentences contain all parts of speech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Has vocabulary of about 2100 words</td>
</tr>
</tbody>
</table>
| 6–12 yr | Ht 2–3 in./yr  
Wt 4.5–6.5 lb/yr  
Primary teeth are lost and replaced by permanent teeth | • Skips  
• May learn to swim, ride a bicycle, and roller skate  
• Learns to read  
• Language, math, and reasoning skills increase  
• Peer group becomes increasingly important |
| 12–18 yr | Continued physical growth  
Physical changes of puberty | • Belonging to and acceptance by a group is important  
• Individual identity and independence are evolving  
• Sex role identity develops  
• Thinking is increasingly abstract |
Stages of Play

Children normally engage in different types of play during specific periods of development.

- **Solitary play** is the norm before 2 years of age; the child plays alone and resists sharing.
- **Parallel play** occurs from ages 2 years until about 5 years; children play along side each other, but without sharing and taking turns with other children.
- **Cooperative play** that becomes more organized as the child develops is common in school-aged children; children take turns and enjoy activities that involve participation with other children.

Health Promotion/Disease Prevention/Anticipatory Guidance

**Infant**

**Do**

- Wash hands before caring for infant
- Begin immunizations as advised by CDC
- Place infant in crib with rails no more than 2⅜ inches apart
- Use a crib mattress that fits snugly in crib to prevent entrapment and suffocation
- Keep crib side rails up when hand is not on infant
- Burp baby during and after feeding
- Place infant on back to sleep
- Cover electrical outlets as soon as baby becomes mobile
- Keep electrical and other cords, such as those on window coverings, out of reach
- Keep small objects out of infant’s reach; child explores by putting all objects into mouth
- Keep plants and chemicals out of reach
- Watch siblings and other children when they are near infant
- Use gates at the top and bottom of stairs as soon as infant is mobile
- Use baby monitor system in the home; place monitors in all rooms where infant may be left alone
- Avoid direct sunlight for the first 6 months
Follow most current age/size car seat guidelines; access online guidelines by typing “CDC car seat safety” into Internet search engine

Begin tooth brushing with soft brush soon after eruption of first tooth

Caregivers should be certified in most current guidelines for CPR life support and emergency first aid for children; search for current guidelines online by entering current year followed by “AHA CPR guidelines”

Recommend that parents attend a newborn/child CPR course

Keep all available local, state, and national emergency phone numbers (such as police and poison control centers) near the phone or program them into the phone

Note applicable safety advice for toddlers after infant becomes mobile

Do Not

Place pillows, stuffed toys, or other objects that might cause suffocation in infant’s bed

Use loose linens that may suffocate or strangle infant

Use plastic coverings on bedding

Place crib near window coverings with hanging cords

Leave crib side rails down while infant is in bed

Leave infant unattended on changing table or other elevated surface

Allow infant to hold skin care products while diapers are being changed (products may be ingested, or lids or caps may be swallowed or aspirated)

Place infant on abdomen (prone) to sleep

Prop baby’s bottle

Give solid food that may become lodged in airway; hard and/or round foods such as grapes, hotdogs, and nuts pose a risk for choking

Leave infant alone in bath water

Leave infant alone in a high chair, swing, or infant seat

Place infant in the front seat of a car with an airbag

Use mobile infant walkers that may tip over

---

Toddler

Do

Continue immunizations as advised by CDC

Schedule dental visit by 2½ years of age
Keep medications, knives, scissors, pins, and needles out of reach or in a locked container; remember that toddlers may climb to reach stored objects.

- Remove draw strings from clothing
- Use nonskid backing on area rugs
- Keep furniture and objects with sharp corners out of living area
- Use securely fastened screens in windows
- Turn pot handles toward back of stove
- Keep toilet lid closed when not in use
- Keep guns and ammunition in separate locked areas
- Set temperature of hot water heater to 120°F or lower
- Avoid hanging tablecloths
- Anchor appliances and furniture to prevent them tipping forward onto child who may pull or climb
- Keep doors fastened closed with childproof latches
- Lock pool fences
- Follow most current age/size car seat guidelines; access online guidelines by typing “CDC car seat safety” into Internet search engine
- Talk to children about interactions with strangers
- See Infant Safety for other applicable safety tips

**Do Not**

- Leave mop water, bathtub water, or other containers of water unattended
- Leave child unattended
- Leave child alone with animals
- Leave windows or outside doors open when child is unattended

---

**Preschooler**

**Do**

- Tell child what to do if lost
- Teach child to call for help and to dial 911
- Consider swimming lessons
- Follow most current age/size car seat guidelines; access online guidelines by typing “CDC car seat safety” into Internet search engine
- Encourage healthy eating habits (see My Plate and Five Food Groups, p 161)
- Encourage regular physical exercise
- Limit screen time (TV, computer, video games) to no more than 2 hours a day
Encourage all caregivers to set similar and realistic limits on child’s behavior
Plan appropriate disciplinary actions
See Toddler Safety for other applicable safety tips

Do Not
Leave child unattended for long periods of time
Make meal time a battle of wills
Feed child a diet high in fats and refined carbohydrates

School Age

Do
Follow most current age/size car seat guidelines; access online guidelines by typing “CDC car seat safety” into Internet search engine
Encourage healthy eating habits and teach child the basics of nutrition
Encourage regular physical exercise
Limit screen time (TV, computer, video games) to no more than 2 hours a day
Teach pedestrian safety
Encourage use of bicycle helmet
Discuss tobacco and substance abuse
Know and assess for signs of substance abuse
Discuss normal changes related to sexuality and risk for sexually transmitted infections and pregnancy
Speak to both child and parent, when appropriate
Assess for signs and symptoms of depression
Assess for signs of anorexia and bulimia

Adolescent

Do
Speak directly to adolescents about their health-care concerns
Assess sexual practices and safety
Discuss safe sex and assess need for contraception
Encourage healthy eating habits
Assess diet, in particular for anorexia/bulimia as well as for excess fat and/or calorie intake
Encourage regular physical exercise
Assess for depression
Address need for physical exercise
Discuss and assess for substance use/abuse
Counsel regarding seat belt use

### Nutrition

#### Breast Milk and Formula

**Breast Milk**
- American Academy of Pediatrics recommends (2012) breastfeeding for children birth to at least 12 months of age with the addition of complementary foods at about 6 months of age.
- Breast milk is easily digestible, so most breastfed infants feed every 2–3 hours.

**Formula**
- Homemade formulas are not recommended.
- Regular cow’s milk is not recommended for children younger than 12 months of age; this includes canned milk and refrigerated milk.
- Commercial infant formulas are used as substitutes for human milk.
- Formula-fed infants usually feed every 3–4 hours.
- Forms of infant formulas include the following:
  - Liquid, ready-to-use (most expensive of formulas)
  - Liquid, concentrated
  - Powder (least expensive of formulas)
- It is very important to read and follow formula manufacturer’s directions carefully; adding water to ready-to-use formula or adding too much water to powder formula or concentrate may cause water intoxication, whereas failure to add enough water to liquid concentrate or powder may lead to diarrhea, dehydration, and kidney failure.
- Total formula intake should not exceed 32 oz per day.
- Heating formula in a microwave is not recommended, but if a microwave is used, the bottle should be gently shaken, several times, to ensure that the temperature of the milk is even throughout the bottle.
- The following table describes uses of infant formulas for infants who are not breastfed; products that are only available for hospitalized neonates are not included.

---

156
### Formulas

(Brand names are subject to changes/additions/deletions. This list includes brand name examples and is not intended to be comprehensive.)

<table>
<thead>
<tr>
<th>Formula Type and Uses</th>
<th>Formulation Characteristics and Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type:</strong> Standard formula&lt;br&gt;<strong>Use:</strong> Normal, healthy, full-term infants</td>
<td><strong>Characteristics:</strong>&lt;br&gt;- Cow’s milk–based&lt;br&gt;- Lactose is the carbohydrate&lt;br&gt;- Contains 20 cal/oz&lt;br&gt;- Butter fat is removed&lt;br&gt;- Vegetable oils and carbohydrates are added&lt;br&gt;- Vitamins, iron, and other nutrients are added&lt;br&gt;<strong>Examples of brands:</strong>&lt;br&gt;- Similac&lt;br&gt;- Enfamil&lt;br&gt;- Good Start&lt;br&gt;- Generic store brands</td>
</tr>
<tr>
<td><strong>Type:</strong> Extra calories&lt;br&gt;<strong>Uses:</strong>&lt;br&gt;- Premature infants weighing more than 1800 gm&lt;br&gt;- BPD</td>
<td><strong>Characteristics:</strong>&lt;br&gt;- Cow’s milk–based&lt;br&gt;- 22 cal/oz&lt;br&gt;<strong>Examples of brands:</strong>&lt;br&gt;- Enfamil EnfaCare LIPIL (LIPIL is Enfamil’s formulation of DHA and ARA)&lt;br&gt;- DHA and ARA are long-chain fatty acids that may be beneficial to premature infants; they are found in breast milk and are thought to be needed for optimal brain and eye development&lt;br&gt;- Similac NeoSure DHA and ARA</td>
</tr>
</tbody>
</table>

*Continued*
### Formulas—cont’d

<table>
<thead>
<tr>
<th>Formula Type and Uses</th>
<th>Formulation Characteristics and Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type:</strong> Soy formula</td>
<td><strong>Characteristics:</strong></td>
</tr>
<tr>
<td><strong>Uses:</strong> Milk allergy, Galactosemia, Lactose intolerance,</td>
<td>• Soy product (most contain no lactose)</td>
</tr>
<tr>
<td>Lactase deficiency, Strict vegetarian diet</td>
<td>• Corn syrup and/or sucrose as carbohydrate</td>
</tr>
<tr>
<td>The American Academy of Pediatrics does NOT recommend soy</td>
<td>• 20 cal/oz</td>
</tr>
<tr>
<td>formulas for low-birth-weight or preterm infants nor for the</td>
<td>• Lactose-free</td>
</tr>
<tr>
<td>prevention of colic</td>
<td>• Vitamin D, iron, and other nutrients added</td>
</tr>
<tr>
<td></td>
<td><strong>Examples of brands:</strong></td>
</tr>
<tr>
<td></td>
<td>• Isomil</td>
</tr>
<tr>
<td></td>
<td>• ProSobee</td>
</tr>
<tr>
<td></td>
<td>• Alsoy</td>
</tr>
<tr>
<td><strong>Type:</strong> Protein hydrolysate or casein hydrolysate</td>
<td><strong>Characteristics:</strong></td>
</tr>
<tr>
<td><strong>Uses:</strong> Allergy to cow’s milk protein and soy protein</td>
<td>• Contains cow’s milk and soy</td>
</tr>
<tr>
<td>(the immune system does not recognize the predigested</td>
<td>• Predigested protein formula (hydrolyzed casein to reduce the possibility of allergy)</td>
</tr>
<tr>
<td>protein compound as an allergen)</td>
<td>• All except Nutramigen contain MCT oil (medium-chain triglycerides), which requires fewer enzymes for</td>
</tr>
<tr>
<td></td>
<td>• Useful for patients with cystic fibrosis</td>
</tr>
<tr>
<td></td>
<td>• Nutramigen does NOT contain MCT oil</td>
</tr>
<tr>
<td></td>
<td><strong>Examples of brands:</strong></td>
</tr>
<tr>
<td></td>
<td>• Alimentum</td>
</tr>
<tr>
<td></td>
<td>• Nutramigen LIPIL</td>
</tr>
<tr>
<td></td>
<td>• Pregestimil LIPIL</td>
</tr>
</tbody>
</table>

*Continued*
<table>
<thead>
<tr>
<th>Formula Type and Uses</th>
<th>Formulation Characteristics and Brands</th>
</tr>
</thead>
</table>
| **Type:** Lactose-free formula | **Characteristics:**  
• Cow’s milk–based or soy product  
• Contains corn syrup and/or sucrose as carbohydrate source  
**Examples of brands:**  
• Similac Sensitive  
• Enfamil Lactofree LIPIL  
• ProSobee LIPIL |
| **Uses:**  
• Lactose intolerance  
• Galactosemia  
• Temporary use during recovery from infectious diarrhea or gastroenteritis; may decrease cramps and diarrhea |

| **Type:** Amino acid elemental based formulas (AABFs) | **Characteristics:**  
• Not derived from a traditional food source but from free amino acids  
• Maximal nutrient breakdown  
• Dairy-free, gluten-free, hypoallergenic  
• Amino acid–based  
• Enfamil PurAmino advertised to be nutritionally complete until 6 months of age and major source of nutrition through 24 months  
**Example of brands:**  
• Elecare  
• PurAmino  
• Neocate |
| **Uses:**  
• Treatment of conditions that do not provide 100% free amino acids as the protein source (such as Alimentum and Pregestimil)  
• Severe allergies to cow’s milk protein  
• Eosinophilia-related GI conditions such as eosinophilic gastroenteritis  
• Cystic fibrosis |

| **Type:** Low mineral formula | **Characteristics:**  
• Cow’s milk based  
• Mineral levels close to that of breast milk  
**Example of brands:**  
• PM 60/40 Low Iron (additional iron should be supplied from other sources, and one or more minerals may need to be supplemented) |
| **Uses:**  
• Impaired renal function  
• Serum calcium disorders, both hypocalcemia and hypercalcemia due to hyperphosphatemia |

*Continued*
### Formulas—cont’d

<table>
<thead>
<tr>
<th>Formula Type and Uses</th>
<th>Formulation Characteristics and Brands</th>
</tr>
</thead>
</table>
| **Type:** Phenylalanine-free or low-content  
**Uses:** Phenylketonuria | **Characteristics:**  
- Cow’s milk–based  
- Amino acids do not include phenylalanine (or content is low)  
**Example of brands:**  
- Lofenalac  
- Alimentum and Pregestimil are low in phenylalanine |
| **Type:** Thickened  
**Uses:** Gastroesophageal reflux | **Characteristics:**  
- Nonfat cow’s milk–based  
- Contains rice starch that thickens in stomach acid  
**Example of brands:**  
- Enfamil A.R. LIPIL |
| **Type:** Short-term use  
**Uses:** Shortens the duration of diarrhea | **Characteristics:**  
- Milk-free  
- Lactose-free  
**Examples of brands:**  
- Isomil DF |

### Introduction of Solid Foods

- Solid foods are not recommended before 4–6 months of age
- Allow at least 2–3 days between introductions of new foods so that sensitivity to particular foods can be determined
- Traditionally, iron-fortified infant cereal is the first solid that is offered; after that, fruits and vegetables are added. Some pediatricians suggest that waiting until after 1 year of age to offer eggs and meats may decrease the risk for developing food allergy; however, according to the AAP, there is no solid evidence that offering these foods as early as 4–6 months increases the risk for food allergies
- Feed solids with a small, rounded spoon, not by adding food to a bottle
Honey should be avoided because it has been associated with botulism.

Avoid or limit juices because high sugar content may cause diarrhea and add excessive calories to intake.

Well toddlers with normal growth and development may be given whole commercial cow’s milk or special toddler formulas.

Toddlers should not be given low-fat milk because the fat in whole milk is needed for brain development.

Children who do not need special diets should have diets based on the recommendations from The United States Department of Agriculture Food and Nutrition Service MyPlate. Related 2015 recommendations and printable resources may be accessed at http://www.choosemyplate.gov/ and at http://www.fns.usda.gov/tn/myplate.

THE FIVE FOOD GROUPS
Childhood Immunizations

Always check the CDC Web site for immunization schedule updates. For links to up-to-date CDC recommendations for childhood immunizations and state guidelines, visit: http://www.cdc.gov/vaccines/ Type “immunizations” into Search bar.

Remember the slogan: “Never miss an opportunity to immunize.” This may mean administering immunizations to afebrile children who are in the clinic for episodic health-care visits.

### Common Conversions

<table>
<thead>
<tr>
<th>To Convert This</th>
<th>To This</th>
<th>Do This</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centigrade or C°</td>
<td>Fahrenheit or F°</td>
<td>Multiply degrees in C° by 1.8 and add 32</td>
</tr>
<tr>
<td>Centimeters (cm)</td>
<td>Millimeters (mm)</td>
<td>Multiply by 10</td>
</tr>
<tr>
<td>Centimeters (cm)</td>
<td>Inches (in)</td>
<td>Multiply by 0.394</td>
</tr>
<tr>
<td>Cups (c)</td>
<td>Milliliters (mL)</td>
<td>Multiply by 240</td>
</tr>
<tr>
<td>Fahrenheit or F°</td>
<td>Centigrade or C°</td>
<td>Subtract 32 from degrees in F° and multiply by 0.555</td>
</tr>
<tr>
<td>Milliliters (mL) of IV fluid per hour</td>
<td>Drops (gtts) per minutes</td>
<td>Milliliters per hour is the same as gtts per minute only when using a microdrop set with a drop factor of 60</td>
</tr>
<tr>
<td>Inches (in)</td>
<td>Centimeters (cm)</td>
<td>Divide by 2.54</td>
</tr>
<tr>
<td>Pounds</td>
<td>Kilograms</td>
<td>Multiply by 0.454</td>
</tr>
<tr>
<td>Kilograms (kg)</td>
<td>Pounds (lb)</td>
<td>Multiply by 2.2</td>
</tr>
<tr>
<td>Kilograms (kg)</td>
<td>Grams (g or gm)</td>
<td>Multiply by 1000</td>
</tr>
<tr>
<td>Grams (g or gm)</td>
<td>Milligrams</td>
<td>Multiply by 1000</td>
</tr>
<tr>
<td>Pounds (lb)</td>
<td>Grams (g or gm)</td>
<td>Multiply by .454</td>
</tr>
<tr>
<td>Milliliters (mL)</td>
<td>Teaspoons (tsp)</td>
<td>Divide by 5</td>
</tr>
<tr>
<td>Liters (L)</td>
<td>Milliliters</td>
<td>Multiply by 1000</td>
</tr>
</tbody>
</table>
## Normal Pediatric Lab Values

<table>
<thead>
<tr>
<th>Test</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong> Normal values may vary from one laboratory to another and depend on specific test</td>
<td></td>
</tr>
<tr>
<td><strong>Arterial Blood Gases</strong></td>
<td></td>
</tr>
<tr>
<td>(\text{Pao}_2)</td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>60–90 mm Hg</td>
</tr>
<tr>
<td>• Child</td>
<td>75–100 mm Hg</td>
</tr>
<tr>
<td>(\text{Paco}_2)</td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>27–40 mm Hg</td>
</tr>
<tr>
<td>• Child</td>
<td>35–45 mm Hg</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td></td>
</tr>
<tr>
<td>• 1 day old</td>
<td>7.29–7.45</td>
</tr>
<tr>
<td>• Child</td>
<td>7.35–7.45</td>
</tr>
<tr>
<td><strong>BUN</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>3–19</td>
</tr>
<tr>
<td>• Child</td>
<td>6–18</td>
</tr>
<tr>
<td><strong>Calcium</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>7.6–11.3 mg/dL</td>
</tr>
<tr>
<td>• Child</td>
<td>8.8–10.1 mg/dL</td>
</tr>
<tr>
<td><strong>Chloride</strong></td>
<td>95–107 mg/dL</td>
</tr>
<tr>
<td><strong>Erythrocyte Sedimentation Rate (ESR or sed rate)</strong></td>
<td>Up to 10 mm/h</td>
</tr>
<tr>
<td><strong>Hematocrit and Hemoglobin</strong></td>
<td></td>
</tr>
<tr>
<td><strong>HCT</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>42%–70%</td>
</tr>
<tr>
<td>• Child</td>
<td>35%–41%</td>
</tr>
<tr>
<td><strong>HGB</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>13–33 g/dL</td>
</tr>
<tr>
<td>• Child</td>
<td>11.0–16.0 g/dL</td>
</tr>
</tbody>
</table>

Continued
### Normal Pediatric Lab Values—cont’d

<table>
<thead>
<tr>
<th>Test</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lipids</strong></td>
<td></td>
</tr>
<tr>
<td>• Total cholesterol</td>
<td>Less than 170 mg/dL</td>
</tr>
<tr>
<td>• HDL</td>
<td>Greater than 45 mg/dL</td>
</tr>
<tr>
<td>• LDL</td>
<td>Less than 110 mg/dL</td>
</tr>
<tr>
<td>• Triglycerides</td>
<td>Less than 150 mg/dL</td>
</tr>
<tr>
<td><strong>Platelets</strong></td>
<td>150,000–450,000/mm³</td>
</tr>
<tr>
<td><strong>Potassium (K⁺)</strong></td>
<td></td>
</tr>
<tr>
<td>• Infant</td>
<td>4.1–5.3 mEq/L</td>
</tr>
<tr>
<td>• Child</td>
<td>3.4–4.7 mEq/L</td>
</tr>
<tr>
<td><strong>RBC</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>Up to 7.1 million/mm³</td>
</tr>
<tr>
<td>• Child</td>
<td>4.2–6.2 million/mm³</td>
</tr>
<tr>
<td><strong>Sodium</strong></td>
<td></td>
</tr>
<tr>
<td>• Infant</td>
<td>134–150 mEq/L³</td>
</tr>
<tr>
<td>• Child</td>
<td>135–145 mEq/L³</td>
</tr>
<tr>
<td><strong>Thyroid-Stimulating Hormone (TSH)</strong></td>
<td>Below 10 mIU/L</td>
</tr>
<tr>
<td><strong>WBC</strong></td>
<td></td>
</tr>
<tr>
<td>• Newborn</td>
<td>9,000–30,000</td>
</tr>
<tr>
<td>• 6 mo old</td>
<td>6,000–16,000</td>
</tr>
<tr>
<td>• 1–10 yr old</td>
<td>5,000–13,000</td>
</tr>
<tr>
<td><strong>WBC differential</strong></td>
<td></td>
</tr>
<tr>
<td>• Neutrophils (aka granulocytes, PMNs, polys or segs)</td>
<td>54%–75% (lower up to age 2 yr)</td>
</tr>
<tr>
<td>• Bands (stabs)</td>
<td>0–5%</td>
</tr>
<tr>
<td>• Eosinophils</td>
<td>1%–4%</td>
</tr>
<tr>
<td>• Basophils</td>
<td>0–1%</td>
</tr>
<tr>
<td>• Lymphocytes</td>
<td>25%–40% (higher up to age 2 yr)</td>
</tr>
<tr>
<td>• Monocytes</td>
<td>2%–8%</td>
</tr>
</tbody>
</table>
165

Well Child Assessment

Note: These physical examination techniques and findings generally apply to young children. Children older than 12 years can usually be assessed according to adult standards.

General Guidelines for Communication With and Assessment of a Child

Allow parent or caregiver to stay in the room; parents may be asked to leave the room during portions of health assessment of the adolescent.

Subjective Data (Questions)
- Sit at the child’s eye level when talking to the child or parent
- Assess health history including immunization history and allergies
  - Include prenatal and birth history with APGAR
- Assess family history
- Assess social history; include the following:
  - Relationships with friends and family
  - Home type and people and pets in household
  - Preschool or school achievement
  - Development milestones achieved
  - Sleep habits
  - Behavior problems
  - Type of discipline used and child’s response
  - Usual type and amount of exercise
  - Screen time (amount of time spent watching TV or using a computer or playing video games)
  - Diet
  - Substance use/abuse
  - Vehicle restraint use
- Perform review of systems (subjective data related to each body system); speak directly to the child if age appropriate

Objective Data (Physical Examination)
- Approach the child near eye level; sit when possible
- Examine child in the parent’s lap if necessary
- Speak in soft, calm voice
- Explain procedures
- Allow the parent or child to remove clothing when necessary
- Weigh children who are younger than 1 year without clothing or diaper
Allow the child to handle safe equipment such as otoscope
Consider demonstrating techniques on a doll
Use play when possible; example: “open your mouth like a big lion”
Allow choices when possible—do not offer choices when there are none
Assessment does NOT need to be in “head-to-toe” order. Perform invasive, embarrassing, or potentially painful procedures last
Example: Otoscopic examination of ears, examination of pharynx, or genital examination can be performed at the end of the assessment
Praise the child for efforts

Assessments and Findings

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed techniques are used if age appropriate</td>
<td>Normal or expected findings are in black Abnormal findings and possible associated conditions are in red</td>
</tr>
</tbody>
</table>

General

Assess vital signs
• Vital signs within normal limits for age and gender
  • See Heart and Respiratory Rate for Age Category table on p 185
  • See Blood Pressure for Age and Gender on pp 187–194
  • Elevated temperature may indicate an internal cause such as infection or may be caused by environmental heat such as sitting or riding in an unairconditioned car during hot weather
  • Subnormal temperature may be due to illness or environment; note that newborns commonly have subnormal temperatures in response to infection or sepsis
  • Elevation or decrease of other vital signs may indicate organ malfunction or may occur in response to fever or hypothermia

Continued
### Neurological

Assess cranial nerves (CNs)

- CNs: Motor and sensory functions intact

<table>
<thead>
<tr>
<th>Cranial Nerve</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Olfactory</td>
<td>Smell</td>
</tr>
<tr>
<td>II Optic</td>
<td>Visual acuity, Peripheral vision, Color vision, Optic disc</td>
</tr>
<tr>
<td>III Oculomotor</td>
<td>Six cardinal positions of gaze and pupil constriction</td>
</tr>
<tr>
<td>IV Trochlear</td>
<td>Gaze downward and inward</td>
</tr>
<tr>
<td>V Trigeminal</td>
<td>Bite down and open mouth, Awareness of light touch in mandibular and maxillary area, Corneal, also known as “blink” reflex</td>
</tr>
<tr>
<td>VI Abducens</td>
<td>Gaze toward temporal side</td>
</tr>
<tr>
<td>VII Facial</td>
<td>Smile, Make faces, Show teeth, Identify sweet or salty taste</td>
</tr>
<tr>
<td>VIII Acoustic</td>
<td>Hearing, Balance</td>
</tr>
<tr>
<td>IX Glossopharyngeal</td>
<td>Gag reflex, Sour and bitter taste</td>
</tr>
<tr>
<td>X Vagus</td>
<td>Gag reflex, Uvula, Phonation</td>
</tr>
</tbody>
</table>

*Continued*
Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| XI Accessory                    | Shrug shoulders  
                                    | Turn head side to side |
| XII Hypoglossal                 | Protrude and move tongue  
                                    | in all directions  
                                    | Push with tongue |

Note that some CNs have both sensory (detect sensation or taste) and motor (movement) functions; when possible, both should be assessed.

Assess deep tendon reflexes (DTRs)

<table>
<thead>
<tr>
<th></th>
<th>DTRs brisk</th>
</tr>
</thead>
</table>

**Newborns:**
Assess primitive reflexes such as Moro (startle), tonic neck, rooting, suck, and palmar grasp

|                   | Newborn reflexes within normal limits  
                                    | Moro reflex limbs form symmetrical embrace when startled  
                                    | Moro reflex asymmetrical  
                                    | Tonic neck—extends arm and leg on side to which supine infant is turned  
                                    | Roots or searches for nipple when cheek is stroked  
                                    | Grasps finger or object that is placed into hand |

Evaluate achievement of developmental milestones

|                   | Age-appropriate developmental milestones attained; see Developmental Milestones on pp 148–151 |

Evaluate child using the Denver Developmental Screening Test–Revised (DDST-R) or Bayley Scales of Infant Development, if indicated

|                   | Findings within normal limits as determined by testing standards |

Continued
Observe all of skin, including lower back and genital area for children in diapers

- Clean and intact, without lesions or parasites
- Redness may indicate infection or burn
- Pallor (paleness) may indicate anemia or poor arterial blood supply
- Lesions may indicate local or systemic disease
- Dimpling or sinus tract at lower spine may indicate underlying spinal disorder or risk for future pilonidal cyst
- Scabies is a mite that lives under the skin; it may cause pruritic (itching) punctate lesions on the dorsal side of the finger webs and may cause linear “burrows” under the skin on other parts of the body; in teenagers, scabies may occur in the genital area
- Note: A velvety dark color of skin in the axilla or on the back of the neck (acanthosis nigracans) may indicate insulin resistance and that further assessment is needed

<table>
<thead>
<tr>
<th>Name of Skin Lesion</th>
<th>Description</th>
<th>Common Causes</th>
</tr>
</thead>
</table>
| Cyst                | Elevated mass with palpable borders; contains liquid or semi-solid material | • Cystic acne  
                     |                                   | • Sebaceous cyst                |
| Fissure             | Linear break in skin                             | • Cheilitis  
                     |                                   | • Athlete’s foot                |
| Papule              | Elevated; palpable                               | • Raised mole  
                     |                                   | • Insect bite                   |
### Skin Lesion Table—cont’d

<table>
<thead>
<tr>
<th>Name of Skin Lesion</th>
<th>Description</th>
<th>Common Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macule</td>
<td>Flat; nonpalpable</td>
<td>• Mongolian spot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Port wine stain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Freckle</td>
</tr>
<tr>
<td>Vesicle</td>
<td>Fluid filled; size less than 1 cm</td>
<td>• Small blister</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Contact dermatitis</td>
</tr>
<tr>
<td>Bullae</td>
<td>Serous fluid filled; size greater than 1 cm</td>
<td>• Blister</td>
</tr>
<tr>
<td>Pustule</td>
<td>Pus filled</td>
<td>• Acne vulgaris</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Impetigo</td>
</tr>
<tr>
<td>Plaque</td>
<td>Elevated lesion with rough, flat top, size less than 1 cm</td>
<td>• Psoriasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Seborrhoeic keratosis</td>
</tr>
<tr>
<td>Nodule</td>
<td>Solid mass; size less than 2 cm</td>
<td>• Lipoma</td>
</tr>
</tbody>
</table>

### Nails

- **Observe color and capillary refill**
  - Nail beds pink; capillary refill brisk after blanching
  - Pale nail beds may indicate anemia or response to cold stimuli
  - Bluish nail beds indicate cyanosis
  - Slow capillary refill indicates decreased peripheral circulation (due to pathology or cold)

*Continued*
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe angle of nail attachment to finger | • Base of nail plate forms angle of 130° to 160° at attachment to finger, when viewed from the side  
• Increase of nail plate angle occurs in clubbing and may indicate chronic respiratory or cardiac problems |
| Hair | |
| Observe for infestations | • Clean and free of nits and parasites  
• Small particles that seem stuck to hair may indicate pediculosis (lice); lice may attach on neck at base of hairline |
| Observe hair pattern | • Symmetrical distribution of hair with no bald patches on head  
• Asymmetry of hair distribution or bald areas may indicate hereditary characteristic, abuse, hair pulling, tinea capitis (“ringworm”—not a worm but a fungal infection) that usually manifests as a circular patch of hair loss |
| Observe hair color | • Hair color is appropriate for race  
• Unusually pale hair color may indicate albinism  
• Protein malnutrition may cause brown hair to turn a reddish color |
| Observe hair texture | • Hair is soft in texture  
• Coarse or dry hair may indicate hypothyroidism |
| Head | |
| Observe head symmetry | • Head symmetrical  
• During first few days of life, head may be slightly asymmetrical due to molding in infants delivered via vaginal birth  
• Infants who are placed on their backs to sleep (as recommended) may appear to have flattening of the occiput  
• Marked asymmetry of head |

*Continued*
Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Measure head circumference (HC) in children birth to 36 mo of age; measure with a paper tape because cloth tape may be inaccurate due to stretching (See HC growth charts at pp 200–201) | • HC measured at largest circumference; size between 5th and 95th percentile on standardized Centers for Disease Control and Prevention (CDC) growth chart for age and gender  
  • In newborn, HC exceeds chest circumference by 2–3 cm  
  • At 1–2 yr, HC equals chest circumference  
  • In older child, chest circumference exceeds HC by 5–7 cm  
  • HC below 5th may indicate lack of expected brain growth  
  • HC above 95th percentile may indicate hydrocephaly or increased intracranial pressure |
| Assess fontanels | • Anterior fontanel: 3–4 cm in length, 2–3 cm in width until 9–12 mo of age; closes at 9–18 mo  
  • Posterior fontanel: 0.5–1 cm across; may seem to be closed at birth or by 3 mo of age  
  • Fontanels normally soft and flat; may normally bulge during crying  
  • Abnormally large fontanels or delayed closure may indicate hydrocephaly  
  • Bulging or taunt fontanels in a quiet child may be associated with increased intracranial pressure that occurs with hydrocephaly or meningitis  
  • Premature closure of anterior fontanel may restrict head/brain growth but is sometimes seen in normal children; children with early fontanel closure are monitored closely for abnormal neurological signs |
| Ears | • Inner canthus of eyes in alignment with tops of ear pinna; note that outer canthus of eyes may appear higher than top of ears as a result of genetic or racial variation in the slant of the eyes |

Continued
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper tip of ear pinna located below inner canthus of eye may be associated with intellectual disability or genetic syndrome</td>
<td></td>
</tr>
</tbody>
</table>

**Assess hearing**

- Newborn infant startles to unexpected sound (Moro reflex or startle reflex)
- Older infant turns head in attempt to localize (find) sound
- Older child demonstrates intact hearing by repeating or responding appropriately to spoken words or may be assessed using whisper test
- Failure to respond to sound
  - Conductive hearing loss
  - Example is hearing loss caused by cerumen impaction
  - Sensorineural hearing loss
  - Example is hearing loss caused by nerve damage or structural abnormalities

**Otoscopic examination**

- No drainage or foreign body in ear canal
- Purulent drainage in ear canal may indicate otitis externa or ruptured tympanic membrane (TM) caused by acute otitis media (AOM)
- Impacted cerumen may obstruct hearing and view of TM. Note: Do NOT irrigate ear canals unless the TM is visible and intact
- TMs and expected bony landmarks visible without redness, retraction, or bulging of TM; redness of TMs is normal in a crying child
- Retracted TM and/or air bubbles or air-fluid line behind TM may indicate serous otitis media; also known as otitis media with effusion
- Red or bulging TM in quiet child may indicate AOM; viral or bacterial

*Continued*
## Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eyes</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Observe red reflex               | • Red reflex observed bilaterally  
                                  | • Lack of red reflex indicates abnormality in the globe of the eye |
| Observe corneal light reflex (light reflection in eyes) | • Corneal light reflex is symmetrical; transient asymmetry of corneal light reflex or crossing of eyes may be normal in newborns  
                                  | • Asymmetry of corneal light reflex may indicate strabismus |
| Observe conjunctiva color and moisture | • Conjunctiva pink without excess tearing  
                                  | • Conjunctival redness (injection) may indicate allergy or infection  
                                  | • Infant: Excess tearing in infant may indicate congenital blocked tear passage (dacryocystitis), irritation, or infection |
| Assess vision                    | • **Infant:** Eyes of newborn track bright objects held near face; older infant reaches for toy or has a “social smile” in response to caregiver’s smile  
                                  | • **Young child:** Child plays appropriately with toys, observes television without moving close to screen, or names objects on special eye chart with simple recognizable shapes (such as a house or heart)  
                                  | • **Preschooler:** Child identifies direction on a blackbird or Snellen E chart  
                                  | • **School age and older:** Child identifies letters on Snellen chart  
                                  | • Failure to respond appropriately to vision testing should be reported |
| **Nose**                         |          |
| Observe color of mucous membranes | • Mucous membranes pink  
                                  | • Redness of mucous membranes may indicate infection  
                                  | • Paleness may indicate allergy or anemia  
                                  | • Bluish tint may indicate allergy or cyanosis |

*Continued*
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe structure and inspect for lesions inside the nose                                   | • No visible deviated or enlarged structures or polyps  
• Deviated septum may indicate congenital malformation or history of fracture  
• Enlarged structures may indicate irritation or infection  
• Nasal polyps may be associated with allergies, chronic sinusitis, or cystic fibrosis and may result in obstructed nares, mouth breathing, and post-nasal drip |
| Assess patency of each naris (nostril) by occluding one naris (nostril) at a time            | • Child breathes through both nares  
• Inability to breathe through one naris may indicate congestion or choanal atresia; inability to breathe through both nares usually indicates congestion  
• Note: Infants are considered to be obligate nose breathers; nasal congestion may compromise oxygenation |
| Mouth                                                                                       |                                                                                                                                          |
| Observe lips                                                                                | • Lips moist and free of cracking and fissures  
• Cracking of lips may indicate mouth breathing due to nasal congestion or air hunger  
• Fissures in corners of mouth may indicate vitamin deficiency, fungal infection, or irritation |
| Observe oral mucosa                                                                         | • Oral mucosa moist, pink, and free of lesions and white plaques  
• Dry mucosa may indicate dehydration  
• Red mucosa may indicate irritation or infection (viral or bacterial)  
• Pale mucosa may indicate anemia or allergy  
• Mucosal ulcers may indicate autoimmune disorder, stress, viral or bacterial infection  
• White plaques on mucosa may indicate *Candida* (thrush) infection |

*Continued*
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe hard and soft oral palates (roof of mouth)  | • Hard and soft palates intact without lesions  
• Cleft (fissure) may congenitally occur in upper lip, hard palate, and/or soft palate of mouth  
• In infants: Epstein pearls or cysts are benign white or yellow epithelial nodules that occur on the gums or hard palate |
| Assess dentition (teeth)                            | • Dentition appropriate for age (see figure on p 209)  
• Failure of tooth or teeth to erupt  
• Eruption of permanent tooth before loss of primary tooth  
• No dental caries  
• Dental caries |
| Assess position of uvula                            | • Uvula midline  
• Slightly deviated uvula may be normal  
• Deviated uvula may indicate vagus nerve (CN X) lesion or infection including peritonsillar abscess, or may accompany scoliosis |
| Assess tonsils                                      | Tonsils within tonsillar fossa and pink                                                                                                                                                                |

#### Grading of Tonsils

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Tonsils entirely within tonsillar fossa</td>
</tr>
<tr>
<td>1+</td>
<td>Tonsils occupy less than 25% of the area between the anterior tonsillar pillars</td>
</tr>
<tr>
<td>2+</td>
<td>Tonsils occupy less than 50% of oropharynx</td>
</tr>
<tr>
<td>3+</td>
<td>Tonsils occupy less than 75% of oropharynx</td>
</tr>
<tr>
<td>4+</td>
<td>Tonsils occupy 75% or more of oropharynx</td>
</tr>
</tbody>
</table>

• In toddler, tonsils may normally be enlarged but not red or infected

*Continued*
## Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| • In older child, tonsils may be atrophic and appear absent  
• Red, infected, or enlarged tonsils may impair ability to swallow, which may result in dehydration  
• Peritonsillar abscess may result in generalized edema and pus collection around one or both tonsils and may impair breathing  
• Cryptic or scarred tonsils appear to have pits or pockets that may trap food particles or bacteria and may cause chronic sore throat | Assess tongue and frenulum  
• Tongue extends over lower gum line  
• Tongue that does not extend over lower gum line appears “heart” shaped and may indicate ankyloglossia (tongue-tie due to short lingual frenulum) |
| Assess tongue and frenulum                         |                                                                                                                                 |
| No webbing  
Webbing of neck may indicate Turner’s syndrome    |                                                                                                                                 |
| No palpable lymph nodes  
• Shotty nodes (shotty refers to buckshot or BB-sized nodes) are expected in children; they may signify past infection  
• Nodes 1 cm or larger; if tender and mobile, often signify infection  
• Nontender and immobile nodes may signify underlying tumor (attachment to tumor limits mobility)  
• Unilateral nontender cervical lymph node may signify Kawasaki disease | Palpate for lymph nodes  
Use circular finger motion to palpate nodes |
| No thyromegaly; thyroid may be nonpalpable or detected as a small soft mass on both sides of the trachea  
Thyroid mass or enlargement palpable | Palpate thyroid |

Continued
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Assess neck range of motion (ROM) | • Full ROM  
• Nuchal rigidity demonstrated by limited flexion (chin toward chest) or nuchal rigidity with meningitis  
• Involuntary muscle contractions manifest as torticollis or wryneck and may be caused by infection or trauma, including birth injury or malpositioning in utero |
| Auscultate with bell of stethoscope over each carotid artery | • No bruit (pronounced “broo-ee”)  
• Bruit—a blowing sound—indicates arterial obstruction |

**Cardiovascular**

- **Observe point of maximum heart impulse (PMI)**
- **Observe and palpate for lift and heave (sustained outward thrust of the precordium)**
  - • Point of maximum cardiac impulse (PMI) at the 3rd or 4th intercostal space (depending on age) at the left midclavicular line  
  - • No lift or heave  
  - • Lift or heave may indicate heart failure

- **Inspect lips and nail beds for color and capillary refill**
  - • Lips and nail beds pink with brisk capillary refill of nails  
  - • Newborns may normally have cyanosis of extremities; called *acrocyanosis*  
  - • Central cyanosis (lips) may indicate cardiac or respiratory problem

- **Assess for peripheral and facial edema**
  - • No edema  
  - • Edema may indicate heart failure or fluid overload; facial edema may indicate renal disorder

*Continued*
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Palpate over precordium for thrill | - No thrill (palpable vibratory sensation caused by a heart murmur)  
- A thrill indicates that a heart murmur is at least a grade IV–VI |
| Palpate peripheral pulses bilaterally and simultaneously | - Pulses strong and equal (see illustration of peripheral pulse locations on p 195)  
- Decreased amplitude of femoral pulses may indicate coarctation of the aorta |
| Auscultate heart over aortic, pulmonic, tricuspid, and mitral areas | - Heart rate within normal limits for age; see Heart and Respiratory Rate by Age Category table on p 185  
- Regular rhythm  
- Heart rate may vary markedly as respiratory rate changes (known as sinus arrhythmia)  
- Audible splitting of $S_1$ and $S_2$ is common in young children and those with thin chest walls  
- No murmurs  
- Febrile or anemic children may have transient murmurs  
  - Note whether murmurs are systolic or diastolic  
  - Murmurs are graded on a I–VI scale according to intensity (volume)  
  - Note for murmurs:  
    - Location: Aortic, pulmonic, tricuspid, or mitral area  
    - Radiation: Location of sound  
    - Timing: Early, mid, or late systole or diastole  
    - Character: Crescendo—gradual increase in volume; decrescendo—gradual decrease in volume  
    - Quality: Harsh, blowing, or rumbling  
    - Pitch: High, medium, or low  
    - Variance: With position change or respirations |
### Murmur Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Barely audible</td>
</tr>
<tr>
<td>II</td>
<td>Faint but easily heard</td>
</tr>
<tr>
<td>III</td>
<td>Soft to moderately loud without palpable thrill</td>
</tr>
<tr>
<td>IV</td>
<td>Moderate to loud with thrill (Note that murmur must be at least grade IV to cause a thrill)</td>
</tr>
<tr>
<td>V</td>
<td>Loud with thrill; heard with stethoscope partly off the chest</td>
</tr>
<tr>
<td>VI</td>
<td>Loud with thrill; heard with stethoscope off chest</td>
</tr>
</tbody>
</table>

### Respiratory/Chest

- **Assess blood pressure**
  - Use cuff that is at least 2/3 as wide as the upper arm

- **Findings**
  - Blood pressure between 5th and 95th percentile for height, age, and gender; see table pp 187–194
  - Elevated blood pressure in children is most often due to a renal disorder or to obesity
  - To be accurately diagnosed with hypertension, a child must have systolic or diastolic blood pressure equal to or greater than the 95th percentile on three separate occasions

- **Observe shape of chest**
  - Anterior-posterior (AP)–lateral view of a young child’s chest appears rounded; as child grows, the AP–lateral view is about 2:3
  - Chest may remain rounded (barrel shaped) in child with chronic respiratory disease such as chronic obstructive pulmonary disease (COPD)
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe and listen to child’s breathing | *Respiratory rate regular and unlabored; rate varies by age: see Heart and Respiratory Rate by Age Category table on p 185*  
  *Periodic breathing (apnea up to 20 seconds is normal in newborns)*  
  *Infants and young children are abdominal breathers* |
| Auscultate lungs, all lobes—right middle lobe is auscultated in the right axilla. Auscultate all anterior and posterior lung fields | **Bronchial sounds** are loud and high-pitched hollow sounds that are heard over the upper anterior chest  
  **Bronchovesicular sounds** are softer tubular sounds heard in the anterior central chest and between the scapula in the posterior chest  
  **Vesicular sounds** are soft blowing sounds heard throughout peripheral lung fields  
  *Adventitious sounds heard with auscultation may indicate foreign body or mucus in airway, bronchiolitis, asthma, pneumonia, or other pathology*  
  *Rales have a crackling sound and are common in pneumonia*  
  *Rhonchi are coarse sounds that often clear with coughing*  
  *Wheezeing, musical, or sibilant rales are whistling sounds that are common with asthma and bronchiolitis* |
| Abdomen | *Abdomen is slightly rounded*  
  *Young children are abdominal breathers; abdomen is expected to move with respiratory effort*  
  *No visible peristalsis*  
  *No masses or bulges*  
  *Young children with a palpable abdominal mass should be assessed for tumor, including Wilms’ tumor, a tumor of the kidney*  
  *Visible peristalsis may indicate bowel obstruction* |

*Continued*
<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
|                                  |  • A reducible transient umbilical hernia may exist in infants and young children; most resolve without treatment as muscles strengthen  
  • Nonreducible hernia (report immediately because blood supply may be impaired)  
  • The lower edge of liver may be palpated and percussed about 1–3 cm below the right costal margin (RCM)  
  • Liver that is more than 3 cm below the RCM may indicate heart failure  
  • The tip of the spleen may be palpated and percussed below the left costal margin (LCM)  
  • Palpation of a large area of the spleen may accompany sickle cell disease or infectious mononucleosis |
| Musculoskeletal                  |  • All structures are symmetrical in form, movement, and strength; one foot, hand, ear, etc. may normally be slightly larger than the other  
  • Marked asymmetry of structures, movement, or strength may be due to congenital malformation or injury |
| Assess extremities for symmetry in form, movement, and strength |  • Length (measured supine) or stature (height measured standing) between the 5th and 95th percentile for age and gender (CDC growth charts availability p 197)  
  • Weight between the 5th and 95th percentile for age and gender  
  • Weight or length/stature measurements that are below the 5th percentile or above the 95th percentile on CDC growth charts require further assessment |
| Assess length or stature and weight and compare with CDC growth charts |  |

*Continued*
## Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe body mass index (BMI) if 2 years of age or older and compare to charts | • BMI between 5th and 84th percentiles for age and gender (see charts on pp 206–207)  
• Children whose BMI for age and gender is at or above the 84th percentile but below the 95th percentile are termed “overweight”  
• Children whose BMI for age and gender is at or above the 95th percentile are termed “obese” |
| Observe spine with child bending forward  
For best view, observe while standing in FRONT of the child | • Spine midline  
• **Kyphosis**: Exaggerated convex curvature of thoracic spine  
• **Lordosis**: Exaggerated concave curvature of lumbar spine  
• **Scoliosis**: Lateral curvature of spine; most frequent in females and during adolescent growth spurt; uneven shoulder height or uneven hip height may indicate scoliosis |
| Observe upper extremity structure and range of motion | Moves upper extremities symmetrically, through full range of motion |
| Observe structure of lower extremities | • Genu varum (bowleggedness) is normal until age 2 years  
• Bowing of one leg or worsening of this variation beyond 2 years of age may indicate rickets or Blount’s disease  
• Genu valgum (knock-knees) is common in preschoolers  
• Toes point forward and plantar aspect (bottom) of feet touch level surface when standing  
• Metatarsus adductus or varus (toeing inward or pigeon toes) is normal in young children  
• Talipes equinovarus (clubfoot): Plantar aspect of foot turns inward and downward and is not flexible |
Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Scissoring of lower extremities may indicate cerebral palsy</td>
</tr>
<tr>
<td></td>
<td>• Flatfeet (arches touch floor when standing) are normal in infancy and early childhood; arch develops during childhood</td>
</tr>
<tr>
<td>Observe lower extremity range of motion</td>
<td>• Moves lower extremities symmetrically, through full range of motion</td>
</tr>
<tr>
<td></td>
<td>• Toe-walking is common in young toddlers</td>
</tr>
<tr>
<td><strong>Male Genitalia and Rectal Area</strong></td>
<td></td>
</tr>
<tr>
<td>Observe skin</td>
<td>• Skin intact without lesions</td>
</tr>
<tr>
<td></td>
<td>• Lesions may indicate diaper dermatitis, candidal infection, or sexually transmitted disease (STD) or infection</td>
</tr>
<tr>
<td>Observe placement of urinary meatus</td>
<td>• Urinary meatus located at tip of penis</td>
</tr>
<tr>
<td></td>
<td>• Hypospadias: Urethral opening is on the ventral or underside of the penis</td>
</tr>
<tr>
<td></td>
<td>• Epispadias: Urethral opening is on the dorsal or upper side of the penis</td>
</tr>
<tr>
<td>Palpate scrotum for testicles</td>
<td>• Testes descended with rugae present</td>
</tr>
<tr>
<td></td>
<td>• Cryptorchidism: Undescended testicles</td>
</tr>
<tr>
<td>Inspect rectal area</td>
<td>• Rectal area clean and free of lesions and protrusions</td>
</tr>
<tr>
<td></td>
<td>• Caking of fecal matter may indicate neglect of an infant or poor hygiene in an older child</td>
</tr>
<tr>
<td></td>
<td>• Lesions may indicate sexually transmitted diseases and/or sexual abuse</td>
</tr>
<tr>
<td></td>
<td>• Protrusion from the rectum may indicate hemorrhoids or prolapsed rectum (prolapsed rectum more common in child with cystic fibrosis)</td>
</tr>
<tr>
<td><strong>Female Genitalia and Rectal Area</strong></td>
<td></td>
</tr>
<tr>
<td>Observe genitalia</td>
<td>• Skin intact without lesions</td>
</tr>
<tr>
<td></td>
<td>• Lesions may indicate diaper dermatitis, candidal infection, or sexually transmitted disease</td>
</tr>
</tbody>
</table>

*Continued*
### Assessments and Findings—cont’d

<table>
<thead>
<tr>
<th>Assessment Type and Technique(s)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Labia majora covers labia minora and clitoris</td>
</tr>
<tr>
<td></td>
<td>• Labia majora are poorly developed in premature infants</td>
</tr>
<tr>
<td></td>
<td>• A prominent clitoris may indicate a chromosomal abnormality</td>
</tr>
<tr>
<td></td>
<td>• Urethral and vaginal orifices patent</td>
</tr>
<tr>
<td></td>
<td>• Imperforate vaginal hymen should be referred</td>
</tr>
<tr>
<td>Inspect rectal area</td>
<td>• Rectal area clean and free of lesions and protrusions</td>
</tr>
<tr>
<td></td>
<td>• Caking of fecal matter may indicate neglect of an infant or poor hygiene in an older child</td>
</tr>
<tr>
<td></td>
<td>• Lesions may indicate sexually transmitted diseases and/or sexual abuse</td>
</tr>
<tr>
<td></td>
<td>• Protrusion from the rectum may indicate hemorrhoids or prolapsed rectum</td>
</tr>
</tbody>
</table>

### Heart and Respiratory Rate by Age Category

<table>
<thead>
<tr>
<th>Age</th>
<th>Sustained Heart Rate*</th>
<th>Sustained Respiratory Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-term newborn</td>
<td>100–160 (higher in premature infant)</td>
<td>30–60</td>
</tr>
<tr>
<td>Infant</td>
<td>80–120</td>
<td>30–60</td>
</tr>
<tr>
<td>Toddler and preschooler</td>
<td>70–110</td>
<td>24–40</td>
</tr>
<tr>
<td>School age and adolescents</td>
<td>60–100</td>
<td>15–26</td>
</tr>
</tbody>
</table>

*Rate may increase during periods of illness or stress and rate may decrease in well conditioned athletes.
Blood Pressure Measurement Interpretation in Children

1. Use the standard height charts (WHO and CDC charts on following pages) to determine the height percentile.
2. Measure and record the child’s systolic blood pressure (SBP) and diastolic blood pressure (DBP).
3. Use the correct gender table for SBP and DBP (BP tables follow).
4. Find the child’s age on the left side of the table. Follow the age row horizontally across the table to the intersection of the line for the height percentile (vertical column).
5. There (at the intersection described in step 4), find the 50th, 90th, 95th, and 99th percentiles for SBP in the left columns and for DBP in the right columns.
   ■ BP less than the 90th percentile is normal.
   ■ BP between the 90th and 95th percentiles is prehypertension. In adolescents, BP equal to or exceeding 120/80 mm Hg is prehypertension, even if this figure is less than the 90th percentile.
   ■ BP greater than the 95th percentile may be hypertension.
6. If the BP is greater than the 90th percentile, the BP should be repeated twice at the same office visit, and an average SBP and DBP should be used.
7. If the BP is greater than the 95th percentile, BP should be staged. If stage 1 (95th percentile to the 99th percentile plus 5 mm Hg), BP measurements should be repeated on 2 more occasions. If hypertension is confirmed, clinical evaluation and laboratory tests should proceed as described in Table 7 of the Fourth Report of the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents (Web link p 190). If BP is stage 2 (greater than the 99th percentile plus 5 mm Hg), prompt referral should be made for evaluation and therapy. If the patient is symptomatic, immediate referral and treatment are indicated. Medical treatment is outlined in Table 6 of the Fourth Report of the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents.
<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>BP Percentile of Height</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>82</td>
<td>87</td>
<td>92</td>
<td>97</td>
<td>102</td>
<td>107</td>
<td>112</td>
<td>117</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>81</td>
<td>86</td>
<td>91</td>
<td>96</td>
<td>101</td>
<td>106</td>
<td>111</td>
<td>116</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>105</td>
<td>110</td>
<td>115</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>79</td>
<td>84</td>
<td>89</td>
<td>94</td>
<td>99</td>
<td>104</td>
<td>109</td>
<td>114</td>
</tr>
<tr>
<td>50th</td>
<td></td>
<td>78</td>
<td>83</td>
<td>88</td>
<td>93</td>
<td>98</td>
<td>103</td>
<td>108</td>
<td>113</td>
</tr>
<tr>
<td>90th</td>
<td></td>
<td>77</td>
<td>82</td>
<td>87</td>
<td>92</td>
<td>97</td>
<td>102</td>
<td>107</td>
<td>112</td>
</tr>
<tr>
<td>95th</td>
<td></td>
<td>76</td>
<td>81</td>
<td>86</td>
<td>91</td>
<td>96</td>
<td>101</td>
<td>106</td>
<td>111</td>
</tr>
<tr>
<td>99th</td>
<td></td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>105</td>
<td>110</td>
</tr>
</tbody>
</table>

Blood Pressure Levels for Boys by Age and Height Percentile
### Blood Pressure Levels for Boys by Age and Height Percentile (Continued)

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>65</td>
<td>72</td>
<td>76</td>
<td>81</td>
<td>85</td>
<td>90</td>
<td>94</td>
<td>99</td>
</tr>
<tr>
<td>6</td>
<td>88</td>
<td>98</td>
<td>103</td>
<td>108</td>
<td>113</td>
<td>118</td>
<td>122</td>
<td>127</td>
</tr>
<tr>
<td>7</td>
<td>111</td>
<td>122</td>
<td>127</td>
<td>132</td>
<td>138</td>
<td>143</td>
<td>149</td>
<td>154</td>
</tr>
<tr>
<td>8</td>
<td>166</td>
<td>180</td>
<td>194</td>
<td>208</td>
<td>222</td>
<td>236</td>
<td>250</td>
<td>265</td>
</tr>
<tr>
<td>9</td>
<td>211</td>
<td>227</td>
<td>242</td>
<td>258</td>
<td>274</td>
<td>290</td>
<td>306</td>
<td>322</td>
</tr>
<tr>
<td>10</td>
<td>308</td>
<td>327</td>
<td>346</td>
<td>365</td>
<td>385</td>
<td>405</td>
<td>426</td>
<td>446</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentile of Height</th>
<th>Systolic BP (mm Hg)</th>
<th>Diastolic BP (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th</td>
<td>65</td>
<td>88</td>
</tr>
<tr>
<td>10th</td>
<td>72</td>
<td>98</td>
</tr>
<tr>
<td>25th</td>
<td>76</td>
<td>103</td>
</tr>
<tr>
<td>50th</td>
<td>81</td>
<td>108</td>
</tr>
<tr>
<td>75th</td>
<td>85</td>
<td>113</td>
</tr>
<tr>
<td>90th</td>
<td>90</td>
<td>118</td>
</tr>
<tr>
<td>95th</td>
<td>94</td>
<td>122</td>
</tr>
<tr>
<td>99th</td>
<td>99</td>
<td>127</td>
</tr>
</tbody>
</table>
## Blood Pressure Levels for Boys by Age and Height Percentile (Continued)

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>Systolic BP (mm Hg)</th>
<th>Diastolic BP (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5th</td>
<td>10th</td>
</tr>
<tr>
<td>59</td>
<td>69</td>
<td>60</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>61</td>
<td>71</td>
<td>72</td>
</tr>
<tr>
<td>62</td>
<td>72</td>
<td>73</td>
</tr>
<tr>
<td>63</td>
<td>73</td>
<td>74</td>
</tr>
<tr>
<td>64</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>65</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>66</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>67</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>68</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>69</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>71</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>72</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>73</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>74</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>75</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>76</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>77</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>78</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>79</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>80</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>81</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>82</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>83</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>84</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td>85</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>86</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>87</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>88</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>89</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>90</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Percentile of Height**
### Blood Pressure Levels for Boys by Age and Height Percentile (Continued)

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>5y</td>
<td>62</td>
<td>66</td>
<td>69</td>
<td>76</td>
<td>90</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>6y</td>
<td>63</td>
<td>67</td>
<td>70</td>
<td>77</td>
<td>90</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>7y</td>
<td>64</td>
<td>68</td>
<td>71</td>
<td>78</td>
<td>90</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>8y</td>
<td>65</td>
<td>69</td>
<td>72</td>
<td>79</td>
<td>90</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>9y</td>
<td>66</td>
<td>70</td>
<td>73</td>
<td>80</td>
<td>90</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
</tbody>
</table>

*The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean.*

### Blood Pressure Levels for Girls by Age and Height Percentile

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58</td>
<td>63</td>
<td>67</td>
<td>72</td>
<td>76</td>
<td>80</td>
<td>84</td>
<td>89</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>76</td>
<td>81</td>
<td>86</td>
<td>90</td>
<td>95</td>
</tr>
<tr>
<td>3</td>
<td>62</td>
<td>67</td>
<td>73</td>
<td>79</td>
<td>84</td>
<td>89</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>64</td>
<td>70</td>
<td>77</td>
<td>83</td>
<td>89</td>
<td>95</td>
<td>101</td>
<td>107</td>
</tr>
<tr>
<td>5</td>
<td>66</td>
<td>72</td>
<td>79</td>
<td>85</td>
<td>91</td>
<td>98</td>
<td>104</td>
<td>110</td>
</tr>
</tbody>
</table>

#### Percentile of Height

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>43</td>
<td>47</td>
<td>51</td>
<td>55</td>
<td>58</td>
<td>61</td>
<td>64</td>
<td>67</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>49</td>
<td>53</td>
<td>57</td>
<td>60</td>
<td>63</td>
<td>66</td>
<td>70</td>
</tr>
<tr>
<td>3</td>
<td>47</td>
<td>51</td>
<td>55</td>
<td>60</td>
<td>64</td>
<td>68</td>
<td>72</td>
<td>77</td>
</tr>
<tr>
<td>4</td>
<td>49</td>
<td>54</td>
<td>58</td>
<td>63</td>
<td>67</td>
<td>72</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>5</td>
<td>51</td>
<td>55</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td>81</td>
<td>87</td>
</tr>
</tbody>
</table>

#### Diastolic BP (mm Hg)

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>98</td>
<td>101</td>
<td>104</td>
<td>107</td>
<td>110</td>
<td>114</td>
<td>117</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>103</td>
<td>106</td>
<td>109</td>
<td>112</td>
<td>115</td>
<td>119</td>
<td>123</td>
</tr>
<tr>
<td>3</td>
<td>102</td>
<td>105</td>
<td>108</td>
<td>111</td>
<td>114</td>
<td>117</td>
<td>121</td>
<td>125</td>
</tr>
<tr>
<td>4</td>
<td>104</td>
<td>107</td>
<td>110</td>
<td>113</td>
<td>116</td>
<td>119</td>
<td>123</td>
<td>127</td>
</tr>
<tr>
<td>5</td>
<td>106</td>
<td>109</td>
<td>112</td>
<td>115</td>
<td>118</td>
<td>121</td>
<td>125</td>
<td>129</td>
</tr>
</tbody>
</table>
## Blood Pressure Levels for Girls by Age and Height Percentile (Continued)

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>93</td>
<td>96</td>
<td>99</td>
<td>101</td>
<td>103</td>
<td>106</td>
<td>109</td>
</tr>
<tr>
<td>7</td>
<td>110</td>
<td>113</td>
<td>115</td>
<td>118</td>
<td>121</td>
<td>123</td>
<td>125</td>
</tr>
<tr>
<td>8</td>
<td>124</td>
<td>127</td>
<td>129</td>
<td>132</td>
<td>135</td>
<td>138</td>
<td>141</td>
</tr>
<tr>
<td>9</td>
<td>142</td>
<td>145</td>
<td>147</td>
<td>150</td>
<td>153</td>
<td>156</td>
<td>159</td>
</tr>
</tbody>
</table>

**Blood Pressure Levels for Girls by Age and Height Percentile**

- **Systolic BP (mm Hg)**
- **Diastolic BP (mm Hg)**

**Percentile of Height**

- **5th**
- **10th**
- **25th**
- **50th**
- **75th**
- **90th**
- **95th**
- **99th**
<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>Percentile of Height</th>
<th>Blood Pressure Levels for Girls by Age and Height Percentile (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BP (mm Hg)</td>
<td>5th 10th 25th 50th 75th 90th 95th 99th</td>
</tr>
<tr>
<td>7</td>
<td>Systolic BP</td>
<td>75th 90th 95th</td>
</tr>
<tr>
<td></td>
<td>Diastolic BP</td>
<td>100</td>
</tr>
</tbody>
</table>

Blood Pressure Levels for Girls by Age and Height Percentile (Continued)
<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>5th</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>64</td>
<td>67</td>
<td>69</td>
<td>71</td>
<td>74</td>
<td>78</td>
<td>82</td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>65</td>
<td>68</td>
<td>71</td>
<td>74</td>
<td>77</td>
<td>81</td>
<td>85</td>
<td>89</td>
</tr>
<tr>
<td>7</td>
<td>66</td>
<td>69</td>
<td>72</td>
<td>75</td>
<td>78</td>
<td>82</td>
<td>86</td>
<td>90</td>
</tr>
<tr>
<td>8</td>
<td>67</td>
<td>70</td>
<td>73</td>
<td>76</td>
<td>79</td>
<td>83</td>
<td>87</td>
<td>91</td>
</tr>
</tbody>
</table>

Heart Auscultation Areas and Peripheral Pulses

- Carotid
- Temporal
- Apical
- Brachial
- Aortic area
- Pulmonic area
- Tricuspid area
- Mitral or apical area
- Femoral
- Radial
- Popliteal
- Posterior tibial
- Dorsal pedis
Lymph Nodes

- Subclavicular
- Axillary
- Epitrochlear
- Deep inguinal
- Superficial inguinal
- Preauricular
- Posterior preauricular
- Tonsillar
- Submental
- Submaxillary
- Deep cervical chain (deep to the sternomastoid)
- Occipital
- Superficial cervical
- Posterior cervical
- Supraclavicular
Centers for Disease Control recommends the following:
- World Health Organization (WHO) growth charts be used for infants and children ages 0 to 2 years of age in the United States.
- CDC growth charts be used for children age 2 years and older in the United States.
For training in the use of the growth charts, visit the following Web site: http://www.cdc.gov/nccdphp/dnpao/growthcharts/.

WHO Growth Charts

Use these charts from birth to 2 years of age.

Birth to 24 months: Girls
Head circumference-for-age and
Weight-for-length percentiles

Published by the Centers for Disease Control and Prevention, November 1, 2009
SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en/)

NAME ___________________________
RECORD # _______________________

201
BMI Calculation and Interpretation

According to CDC: BMI is used as a screening tool to identify possible weight problems for children. CDC and the American Academy of Pediatrics (AAP) recommend the use of BMI to screen for overweight and obesity in children beginning at 2 years old.

For children, BMI is used to screen for obesity, overweight, healthy weight, or underweight. However, BMI is not a diagnostic tool. For example, a child may have a high BMI for age and gender, but to determine whether excess fat is a problem, a health-care provider would need to perform further assessments. These assessments might include skinfold thickness measurements, evaluations of diet, physical activity, family history, and other appropriate health screenings.

First, BMI is calculated according to instructions below, then, BMI must be compared with age- and gender-specific data on the following percentile based charts.
First, calculate BMI using one of the following formulas:

<table>
<thead>
<tr>
<th>Measurement Units</th>
<th>Formula and Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilograms and meters (or centimeters)</td>
<td><strong>Formula</strong>: weight (kg)/[height (m)]^2 With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimeters, an alternate calculation formula, dividing the weight in kilograms by the height in centimeters squared, and then multiplying the result by 10,000, can be used.</td>
</tr>
<tr>
<td>Pounds and inches</td>
<td><strong>Formula</strong>: weight (lb)/[height (in)]^2 × 703 When using English measurements, ounces (oz) and fractions must be changed to decimal values. Then, calculate BMI by dividing weight in pounds (lb) by height in inches (in) squared and multiplying by a conversion factor of 703.</td>
</tr>
</tbody>
</table>

Next, to determine BMI percentile, plot the child’s BMI on the appropriate percentile chart (see following BMI percentile charts).

- **Alternative method for calculating BMI and BMI-for-age percentile:**
  use BMI calculator at the following Web site: [http://nccd.cdc.gov/dnpabmi/Calculator.aspx](http://nccd.cdc.gov/dnpabmi/Calculator.aspx)

205

2 to 20 years: Girls
Stature-for-age and Weight-for-age percentiles

<table>
<thead>
<tr>
<th>NAME</th>
<th>RECORD #</th>
</tr>
</thead>
</table>

Mother's Stature
Father's Stature

Date | Age | Weight | Stature | BMI* |
-----|-----|--------|---------|------|

*To Calculate BMI: Weight (kg) + Stature (cm) = Stature (cm) x 10,000
or Weight (lb) + Stature (in) = Stature (in) x 703

Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

SAFER, HEALTHIER, PEOPLE™

Peds Assess
Calculate BMI-for-age weight status categories and corresponding percentiles:

<table>
<thead>
<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than the 5th percentile</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>5th percentile to less than the 85th percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85th percentile to less than the 95th percentile for children and teens of same age and gender</td>
</tr>
<tr>
<td>Obese</td>
<td>Equal to or greater than the 95th percentile for children and teens of same age and gender</td>
</tr>
</tbody>
</table>

Data from [http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html](http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html).
## Dentition

### The Primary Teeth

#### Upper Teeth

- Central Incisor: 8–12 Months
- Lateral Incisor: 9–13 Months
- Canine (Cuspid): 16–22 Months
- First Molar: 13–19 Months
- Second Molar: 25–33 Months

#### Lower Teeth

- Second Molar: 23–31 Months
- First Molar: 14–18 Months
- Canine (Cuspid): 17–23 Months
- Lateral Incisor: 10–16 Months
- Central Incisor: 6–10 Months

### The Permanent Teeth

1. Central incisor
2. Lateral Incisor
3. Canine
4. 1st Premolar
5. 2nd Premolar
6. 1st Molar
7. 2nd Molar
8. 3rd Molar (wisdom teeth)
## Assessment of Acutely Ill or Hospitalized Child

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First assess ABCs</strong> (airway, breathing, circulation) and then perform relevant portions of the assessment based on the child’s condition and known or suspected diagnosis</td>
<td>Expected findings in black font; pathological findings and possible indications in red font</td>
</tr>
</tbody>
</table>

### Airway/Oxygenation*

*Also see “O₂ saturation” under Circulation

| Observe patency of airway | • Airway patent and free of foreign body and excess mucus  
|                           | • Airway impaired by foreign body, mucus, inflammation, or bronchospasm; note that smoke inhalation may cause inflammation  
|                           | • Gurgling or adventitious breath sounds may indicate partial obstruction of airway |
| Listen | • Respirations quiet  
|        | • Audible **wheezes** may indicate bronchospasm, bronchiolitis, or foreign body in airway; wheezes should be recorded as inspiratory or expiratory or biphasic (both)  
|        | • **Expiratory grunt** indicates an effort to increase end-expiratory pressure in order to keep alveoli expanded and to increase alveolar gas exchange  
|        | • No pursed-lip breathing  
|        | • Older children may purse lips during expiration in an attempt to keep the airway open for a longer period |

*Continued*
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Smell**       | • No smoky odor to breath  
| **Assess trauma or burn victims for smoky odor to breath** | • Smoky odor to breath may indicate smoke inhalation and indicates the need to observe for delayed airway swelling |

<table>
<thead>
<tr>
<th><strong>Breathing</strong></th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Observe rate, rhythm, and effort** | • Respiratory rate even with rate appropriate for age (see respiratory rate table on p 185)  
| | • Irregular respiratory rate or apnea may indicate airway obstruction, pain, or neurological abnormality  
| | • Note that periodic breathing (no breathing for 15–20 seconds) is common in young infants and is not known to be associated with pathology |

*Continued*
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
| No soft tissue retractions or flaring of nostrils | - Soft tissue retractions, head bobbing, or flaring of the nostrils indicate increased work of breathing; retractions may be one or more of the following types:  
  - Intercostal (between ribs)  
  - Subcostal (under ribs)  
  - Suprasternal (above sternum)  
  - Substernal (under sternum)  
  - Supraclavicular (above clavicle)  
- Shallow respirations may indicate fatigue and need for assisted ventilation; this may occur in infant with RSV infection |

| Auscultate lungs, all lobes; anterior and posterior Right middle lobe is auscultated in the right axilla | - **Bronchial sounds** are loud and high-pitched hollow sounds that are heard over the upper anterior chest  
- **Bronchovesicular sounds** are softer tubular sounds heard in the anterior central chest and between the scapula in the posterior chest  
- **Vesicular sounds** are soft blowing sounds heard throughout peripheral lung fields  
- **Adventitious sounds** (abnormal) heard with auscultation may indicate foreign body or mucus in airway, bronchiolitis, asthma, pneumonia, or other pathology; child may have more than one type of adventitious sound such as the following:  
  - **Rales:** Crackling sound; common in pneumonia  
  - **Rhonchi:** Coarse sounds; often clear with coughing  
  - **Wheezing, musical, or sibilant rales:** Whistling sounds; common with asthma and bronchiolitis |

*Continued*
Note that when mucus has collected in the pharynx or upper airway, a loud rhonchi-like sound may be transmitted and heard throughout the lung fields during auscultation; place the stethoscope on the child’s neck to determine whether this has happened; finding an indication of mucus in the upper airway does not eliminate the possibility of lung pathology; it is possible for a child to have both excess mucus in the upper airway AND lung pathology; adventitious sounds caused only by mucus in the upper airway will clear when the child coughs.

Observe activity and feeding
- Child active, playing, or interacting appropriately with environment and eating well
- In infants, decreased oxygenation may result in hunger and irritability due to short periods of frequent feeding that are interrupted by the need to rest
- Older child may lean forward in “tripod position” during shortness of breath; this position lessens pressure on diaphragm and maximizes chest expansion

Circulation
- Apical pulse has regular rhythm, and rate is appropriate for age (see Vital Signs chart on p 166)
- Note that child’s heart rate and rhythm will vary with respiratory effort
- No murmur heard
- A murmur is a blowing sound that is heard between “lub” and “dup” (systolic murmur) or between “dup” and “lub” (diastolic murmur); murmurs indicate turbulent blood flow or movement of blood under increased pressure; see p 180 for grading of murmurs

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note that when mucus has collected in the pharynx or upper airway, a loud rhonchi-like sound may be transmitted and heard throughout the lung fields during auscultation; place the stethoscope on the child’s neck to determine whether this has happened; finding an indication of mucus in the upper airway does not eliminate the possibility of lung pathology; it is possible for a child to have both excess mucus in the upper airway AND lung pathology; adventitious sounds caused only by mucus in the upper airway will clear when the child coughs.</td>
<td></td>
</tr>
</tbody>
</table>
| Observe activity and feeding                      | • Child active, playing, or interacting appropriately with environment and eating well  
• In infants, decreased oxygenation may result in hunger and irritability due to short periods of frequent feeding that are interrupted by the need to rest  
• Older child may lean forward in “tripod position” during shortness of breath; this position lessens pressure on diaphragm and maximizes chest expansion |
| Circulation                                       | • Apical pulse has regular rhythm, and rate is appropriate for age (see Vital Signs chart on p 166)  
• Note that child’s heart rate and rhythm will vary with respiratory effort  
• No murmur heard  
• A murmur is a blowing sound that is heard between “lub” and “dup” (systolic murmur) or between “dup” and “lub” (diastolic murmur); murmurs indicate turbulent blood flow or movement of blood under increased pressure; see p 180 for grading of murmurs |

*Continued*
**Assessment of Acutely Ill or Hospitalized Child—cont’d**

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palpate peripheral pulses and perfusion</td>
<td>• Pulses equal in all extremities (see illustration on p. 195 for location of pulses)</td>
</tr>
<tr>
<td></td>
<td>• Capillary refill is brisk in fingers and toes</td>
</tr>
<tr>
<td>Observe O₂ saturation (pulse oximetry) if indicated</td>
<td>• O₂ saturation = 95% or above</td>
</tr>
<tr>
<td></td>
<td>• O₂ saturation of less than 95% indicates decreased oxygenation of tissue</td>
</tr>
<tr>
<td></td>
<td>• Note: A pulse oximeter indicates the amount of hemoglobin that is saturated with oxygen; thus, an anemic child may have a “false high” O₂ saturation because it takes less oxygen to saturate less hemoglobin</td>
</tr>
<tr>
<td>Measure blood pressure (BP)</td>
<td>• Blood pressure appropriate for gender and age (see table on pp. 187–194)</td>
</tr>
<tr>
<td></td>
<td>• Note: Elasticity of a child’s blood vessels means that decreased blood pressure may not occur in early shock</td>
</tr>
</tbody>
</table>

**Temperature**

| Measure using age appropriate method and device | • Temperature appropriate for assessment site:                                                                                           |
|                                               | • Oral temperature is near 98.6°F or 37°C in most children                                                                             |
|                                               | • Ear or rectal temperature is near 99.6°F; axillary temperature near 97.6°F                                                            |
|                                               | • Note that small, premature infants normally have little variation in temp based on assessment site                                    |
|                                               | • Elevated temperature may indicate infection                                                                                          |
|                                               | • In a newborn or young infant, a subnormal body or an elevated temperature and poor feeding are important indicators of sepsis        |

**Lymph Nodes**

| Palpate with fingertips, using a circular motion | • Lymph nodes are nonpalpable (see figure on p. 196 for location of lymph nodes)                                                     |
|                                                | • Lymph nodes that are enlarged, tender, and mobile are signs of infection                                                             |

*Continued*
## Neurological Status

<table>
<thead>
<tr>
<th>Observation and Test</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observe behavior and test reflexes</td>
<td>Behavior and reflex responses appropriate for stimuli</td>
</tr>
<tr>
<td>Test using Glasgow Coma Scale if child has a neurological injury</td>
<td>Glasgow Coma Score (see p 224)</td>
</tr>
<tr>
<td>Perform tests for meningeal irritation (meningitis is an example) if child is febrile and diagnosis has not been established</td>
<td>Neck moves without pain, stiffness, or flexion of the legs</td>
</tr>
<tr>
<td></td>
<td>Stiffness of neck movement may indicate meningeal irritation (meningitis)</td>
</tr>
<tr>
<td></td>
<td>Flexion of hip and knee during neck flexion is an indicator of meningeal irritation and is termed a positive Brudzinski sign</td>
</tr>
<tr>
<td></td>
<td>Flex the hip and knee, then, attempt passive extension of the knee</td>
</tr>
<tr>
<td></td>
<td>Knee extends to approximately 180° without pain</td>
</tr>
<tr>
<td></td>
<td>Pain with extension of knee to 180° is an indicator of meningeal irritation and is termed a positive Kernig sign</td>
</tr>
</tbody>
</table>

Continued
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Mouth and Pharynx**    | - Mucous membranes pink without lesions  
- White coating that cannot be removed from tongue or mucous membranes may indicate thrush, a candidal infection that is common in children who are immunosuppressed or who are taking antibiotics  
- Mucosal ulcers may indicate immunosuppression, autoimmune disease, or viral infection  
- Pharynx pink without exudate or swelling of pharynx or tonsils  
- Pharyngeal or tonsillar redness, exudate, or enlargement may indicate viral or bacterial infection |
| **Skin**                 | - Skin warm and slightly moist  
- Skin has elastic turgor  
- Skin recoils slowly or “tents” when lightly pinched, indicating dehydration  
- Note: Because of a large body surface area, young children rapidly become dehydrated  
- Taut, shining skin indicates swelling or edema that may be caused by excess IV fluid, kidney malfunction, or heart failure  
- Skin is intact and free of lesions, including diaper area  
- If reddened areas or skin breakdown is observed, note and record size, characteristics, and number of lesions as well as distribution (see Skin Lesion table on p 169)  
- Notes:  
  - Ill children are prone to have diaper dermatitis—always assess for this |

*Continued*
Children who have been taking antibiotics have an increased risk for a candidal diaper rash; this rash often appears beefy red with satellite lesions.

Irritation or pressure areas may form when a child is on bed rest, in one position, for extended periods of time, or when tape or equipment is in constant contact with skin; children with edema or swelling and those who are being treated with topical steroids are at higher risk for skin breakdown.

Pustules with honey-colored crust are characteristic of impetigo, a common skin infection that is highly contagious.

A sandpaper-like rash on the trunk is characteristic of scarlet fever or scarlatina; caused by strep pharyngitis.

Desquamation (peeling) of skin on palms of hands, feet, and diaper area may occur after Kawasaki disease or strep infection.

Circular lesions with central clearing are characteristic of tinea, or ringworm, which is caused by a fungus.

Roseola is a common viral condition that occurs in children ages 6 mo to 3 yr; the child has high fever and possibly a mild upper respiratory illness (URI) and cervical lymphadenopathy for several days, followed by lower or normal temperature and a macular or papular pinkish-red rash that begins on the trunk and may spread over the entire body; the rash blanches when pressure is applied, and individual spots may appear to be surrounded by halos.

### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children who have been taking antibiotics have an increased risk for a candidal diaper rash; this rash often appears beefy red with satellite lesions.</td>
<td></td>
</tr>
<tr>
<td>Irritation or pressure areas may form when a child is on bed rest, in one position, for extended periods of time, or when tape or equipment is in constant contact with skin; children with edema or swelling and those who are being treated with topical steroids are at higher risk for skin breakdown.</td>
<td></td>
</tr>
<tr>
<td>Pustules with honey-colored crust are characteristic of impetigo, a common skin infection that is highly contagious.</td>
<td></td>
</tr>
<tr>
<td>A sandpaper-like rash on the trunk is characteristic of scarlet fever or scarlatina; caused by strep pharyngitis.</td>
<td></td>
</tr>
<tr>
<td>Desquamation (peeling) of skin on palms of hands, feet, and diaper area may occur after Kawasaki disease or strep infection.</td>
<td></td>
</tr>
<tr>
<td>Circular lesions with central clearing are characteristic of tinea, or ringworm, which is caused by a fungus.</td>
<td></td>
</tr>
<tr>
<td>Roseola is a common viral condition that occurs in children ages 6 mo to 3 yr; the child has high fever and possibly a mild upper respiratory illness (URI) and cervical lymphadenopathy for several days, followed by lower or normal temperature and a macular or papular pinkish-red rash that begins on the trunk and may spread over the entire body; the rash blanches when pressure is applied, and individual spots may appear to be surrounded by halos.</td>
<td></td>
</tr>
</tbody>
</table>
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abdomen</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Observe                  | • Abdomen flat without visible peristalsis  
• Abdominal distention may indicate obstruction, heart failure, internal bleeding, or gastrointestinal infection  
• Visible peristalsis may indicate obstruction  
• An olive-shaped mass in the upper abdomen, accompanied by vomiting, may indicate pyloric stenosis                                                                                                                                                        |
| Auscultate               | • Bowel sounds heard in four quadrants  
• Hyperactive or absent bowel sounds may indicate infection or obstruction                                                                                                                                                                                                                                        |
| Palpate abdomen for masses | • No palpable masses  
• Palpable mass; record location and approximate palpable size                                                                                                                                                                                                                                                                       |
| Palpate liver            | • Edge of liver may be palpable below right costal margin (RCM)  
• Liver more than 2 cm below RCM may indicate heart failure, hepatitis, biliary atresia, and other illnesses                                                                                                                                                                     |
| Palpate spleen           | • Spleen usually not palpable  
• Spleen that is palpable in left upper quadrant may occur in a child with infectious mononucleosis (as part of the lymphatic system) or in a child with sickle cell anemia (as an organ that removes defective red blood cells)                                                                                           |
| Perform scratch test     | • A dull sound is heard over the organ and a hollow sound beyond the edges of the organ; see previous palpation entries for comments on organ size  
• Note that a full bowel may distort test sounds                                                                                                                                                                                                                       |
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use one hand to place stethoscope over the organ (liver or spleen) while using the index finger of the opposite hand to make light scratching movements over the organ; move stethoscope toward each edge of the organ while continuing scratching motion near the stethoscope</td>
<td></td>
</tr>
<tr>
<td><strong>Extremities</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Palpate each extremity for warmth and mobility while assessing for pain       | • All extremities pink, warm, and mobile without painful movement  
• Limited movement may occur with cerebral palsy or with the formation of contractures following trauma  
• Pain in joints may indicate Lyme disease, rheumatoid arthritis, infection, or rheumatic fever, which is an autoimmune reaction to a strep infection |
Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe, following treatments and procedures, to be certain that no tourniquets or inappropriate restraints have been left on any extremity and no needles or syringes have been left in the bed | No tourniquets, nonessential restraints, or other nonessential medical devices left in the child’s bed  
Note: When more than one attempt has been made to start an IV, a forgotten tourniquet may be inadvertently left on an extremity or small medical devices (such as needles or caps) may be hidden under sheets or other bedding |
| Observe and palpate extremities for evidence of fracture after suspected or validated traumatic injury | • No report of pain when extremities are palpated  
• No swelling, false motion (movement at a point where there is normally no motion), or obvious deformity of extremities  
• No crepitation (grating or popping sound)  
• Peripheral pulses strong  
• Pain, deformity, swelling, false motion, or crepitation may occur with fracture (see p ** for illustration of fracture types) |
| Elimination                                                                    |                                                                                                    |
| Observe and record time, size, color, and consistency of stools and recent frequency of bowel elimination | • Stools brown and soft  
• Red blood-tinged stools indicate bleeding from lower gastrointestinal (GI) tract or rectal area  
  • Note: Cranberry-colored stools should be guaiac-tested for blood; consumption of red gelatin may cause cranberry-colored stools in child with diarrhea  
• Black stools may indicate GI bleeding (from upper GI tract) or may be caused by supplemental iron intake  
• Pale stools may indicate liver pathology  
• Fatty stools (steatorrhea) may indicate high-fat diet, celiac disease, or cystic fibrosis |

Continued
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Observe color and frequency of urination            | • Urine pale yellow with at least four urine voidings per day  
• Dark urine in a child most often indicates dehydration                                                                                           |
| Measure urine specific gravity (s.g.) if indicated  | • Urine s.g. of 1.002–1.028  
• Urine s.g. that is higher than 1.023 and that does not decrease in response to conservative treatment (oral fluids) may indicate need for intravenous fluids  
• High urine s.g. may indicate contamination or high urine glucose content                                                                         |
| (especially if child has had vomiting or diarrhea or has been without fluid intake for longer than usual) |                                                                                                                                                                                                            |

### Secretions/Drainage

| Observe and record amount, color, and consistency of nasal mucus secretions and sputum | • Mucus is scant and clear  
• Profuse amounts of clear mucus secretions may indicate irritation and/or allergy  
• Bloody mucus or sputum may indicate trauma, infection, or a bleeding disorder  
• Green or yellow mucus may indicate infection  
• Note that respiratory tract mucus may be slightly yellow during a viral infection but that prolonged yellow or green secretions generally indicate a bacterial infection; viral infections may predispose to bacterial infections |
| Observe drainage from wounds or lesions             | • Wound or lesion drainage is serous (pale yellow and thin) or serosanguineous (a mixture of serous and bloody secretions)  
• Dark yellow or greenish wound or lesion drainage may indicate bacterial infection                                                                 |
### Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appetite and Activity</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Observe intake | • Child eating, sleeping, playing, and showing interest in surroundings  
• Failure to eat, sleep, play, or show an interest indicates illness and may precede changes in vital signs |
| **Environment, Equipment, and Medical Devices** | |
| Observe environment for safety hazards, including possible need for bubble-top crib | • Side rails up without indication that child may climb out of crib  
• Infants and toddlers who are able to pull to a standing position may be able to climb over crib rails and should be placed in a bubble top bed if they will be left unattended |
| Observe bedding and immediate area for bottles, cups, medications, tubing, tourniquets, needles, needle caps, writing pens, paper, etc., that may have been accidently left in child’s bed | • No unsafe objects in child’s bed or within reach  
• No excess linens in bed |
| Observe appearance, function, and readings of medical devices in room | • Monitors indicate that vital signs are appropriate for age  
• Feeding tube properly placed  
• GI contents can be aspirated from nasogastric (NG) tube, or small quantity of air forced into tube can be heard or palpated over gastric area  
• Note: Before each feeding, check back of infant’s mouth where NG tube can be regurgitated and displaced |

*Continued*
Assessment of Acutely Ill or Hospitalized Child—cont’d

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Findings</th>
</tr>
</thead>
</table>
|                 | • IV delivering prescribed fluids at prescribed rate  
|                 | • No swelling or redness at IV site  
|                 | • Foley catheter draining clear pale yellow urine  
|                 | • Oxygen and respiratory devices operating at prescribed settings  
|                 | • Suction equipment operational and clean |

Specialized Assessment Tools
The following four assessment tools are for use in children with traumatic injury.

**Pediatric Trauma Score**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Score +2</th>
<th>Score +1</th>
<th>Score –1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>&gt;20 kg</td>
<td>10–20 kg</td>
<td>&lt;10 kg</td>
</tr>
<tr>
<td>Airway</td>
<td>Normal</td>
<td>Maintainable</td>
<td>Invasive (intubated)</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>&gt;90 mm Hg</td>
<td>50–90 mm Hg</td>
<td>&lt;50 mm Hg</td>
</tr>
<tr>
<td>Mental status</td>
<td>Awake</td>
<td>Obtunded</td>
<td>Comatose</td>
</tr>
<tr>
<td>Open wound</td>
<td>None</td>
<td>Minor</td>
<td>Major</td>
</tr>
<tr>
<td>Skeletal trauma</td>
<td>None</td>
<td>Closed fracture</td>
<td>Open or multiple fractures</td>
</tr>
</tbody>
</table>

Pediatric Trauma Score <8 = significant mortality risk.

# Glasgow Coma Scale for Infants and Toddlers

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye Opening</strong></td>
<td></td>
</tr>
<tr>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td>To sounds and speech</td>
<td>3</td>
</tr>
<tr>
<td>To pain</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td><strong>Verbal Response—Infant</strong></td>
<td></td>
</tr>
<tr>
<td>Smiles, interacts, follows objects</td>
<td>5</td>
</tr>
<tr>
<td>Cries, consolable</td>
<td>4</td>
</tr>
<tr>
<td>Cries, inconsistently consolable</td>
<td>3</td>
</tr>
<tr>
<td>Cries, inconsolable</td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
</tr>
<tr>
<td><strong>Verbal Response—Toddler</strong></td>
<td></td>
</tr>
<tr>
<td>Interacts appropriately</td>
<td>5</td>
</tr>
<tr>
<td>Interacts but confused</td>
<td>4</td>
</tr>
<tr>
<td>Moans, uses inappropriate words</td>
<td>3</td>
</tr>
<tr>
<td>Incomprehensible sounds</td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
</tr>
<tr>
<td><strong>Best Motor Response</strong></td>
<td></td>
</tr>
<tr>
<td>Obeys command to move body part</td>
<td>6</td>
</tr>
<tr>
<td>Localized pain</td>
<td>5</td>
</tr>
<tr>
<td>Tries to remove painful stimuli</td>
<td>4</td>
</tr>
<tr>
<td>Flexes arm in response to pain</td>
<td>3</td>
</tr>
<tr>
<td>Extends arm in response to pain</td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
</tr>
</tbody>
</table>
Types of Fractures

- Greenstick
- Comminuted
- Segmental
- Butterfly
- Serial
- Hairline
- Displaced
- Incomplete
- Complete
Estimation of Burned Body Surface Area in Children

Percentages in a Child

- 18% (BACK)
- 18%
- 9%
- 13.5%
- 1%
- 9%
Asthma

Pathophysiology
Airway stimuli result in spasms and edema of the bronchi and bronchioles with increased production and viscosity of mucus. Air is trapped distal to the resulting obstruction. Alveolar gas exchange is impaired. There is a familial predisposition to asthma.

Possible Causes of Acute Exacerbation
- Respiratory infection
- Allergens
- Respiratory irritants such as smoke, dust, or cold air
- Exercise
- Emotional stress

Signs and Symptoms
- Wheezing
- Dyspnea
- Uncontrollable cough
- Nasal flaring
- Musical rales
- Anxiety

Medical Treatment
- Bronchodilators (such as Albuterol)
- Epinephrine
- Corticosteroids
- Expectorants
- Antibiotics if infection is present

Nursing Diagnoses
- Ineffective airway clearance
- Impaired gas exchange
- Activity intolerance
- Anxiety

Nursing Implications
- Wash hands before and after care
- Monitor vital signs and report marked changes
Monitor oxygen saturation (O₂ sat)
Monitor oral intake
Monitor hydration
Encourage oral fluid intake
Administer ordered medications and monitor for side effects
Monitor IV fluids type and rate
Administer prescribed medications and monitor for side effects and adverse reactions
Auscultate respiratory sounds, listening for failure to move air and for adventitious sounds
Report change in intensity or duration of breath sounds
Plan care to allow for uninterrupted periods of rest
Educate regarding avoidance of exacerbations

Prognosis
About half of children will outgrow exacerbations. Persistent asthma may lead to development of chronic obstructive pulmonary disease (COPD).

**Bronchiolitis**

**Pathophysiology**
Swelling of the small airways leads to hyperinflations distal to the obstructions. Resultant pneumonitis and patchy areas of atelectasis may be present. Most common in children younger than 2 years. Prematurity increases the risk for condition.

**Possible Causes**
- Respiratory infection
  - RSV infection in most cases
  - Adenovirus
  - Parainfluenza virus

**Signs and Symptoms**
- Barrel-shaped chest
- Retractions
- Nasal flaring
- Tachypnea
- Cough
- Wheezing (mimics asthma)
- Anorexia
- Fever
Medical Treatment
- Bronchodilators
- Corticosteroids
- High humidity air (croup tent)
- Supplemental oxygen to maintain Sao₂ ≥ 95%
- Increased fluid intake at 1½ times maintenance (see Pediatric Fluid Calculation on p 259)

Nursing Diagnoses
- Ineffective breathing pattern
- Ineffective airway clearance
- Impaired gas exchange
- Potential fluid volume deficit
- Anxiety

Nursing Implications
- Hand washing is the most effective prevention against RSV and its spread
- Suction as needed
- Monitor and maintain hydration
- Monitor oxygen saturation
- Provide supplemental oxygen if indicated
- Pregnant women should be warned that RSV may be teratogenic
- Educate all visitors regarding hand washing

Prognosis
Normal lung function is usually recovered after several weeks. Lung problems may persist for years. There is an increased incidence of asthma.

Croup (Laryngotracheobronchitis)

Pathophysiology
Inflammation and spasm of the larynx, trachea, and bronchi.

Cause
Viral infection, usually parainfluenza, but may also be caused by RSV, influenza, or bacterial infection.

Signs and Symptoms
Seal-like barking cough and inspiratory stridor, x-ray may show narrowing of the trachea (subglottic) or the “steeple sign.”
**Medical Treatment**
- Hydration
- Humidified air
- Corticosteroids
- Oxygen
- Racemic epinephrine

**Nursing Diagnoses**
- Ineffective airway clearance
- Fluid volume deficit
- Fear

**Nursing Implications**
- Wash hands before and after care
- Close monitoring of vital signs
- Monitor respiratory effort
- Monitor oxygen saturation (pulse oximeter)
- Keep environment calm
- Ensure adequate fluid intake
- Explain all procedures to family
- If possible, allow a parent or caregiver to room in with child

**Prognosis**
- Good with prompt treatment

---

**Cystic Fibrosis**

**Pathophysiology**
Inherited autosomal recessive disease of the lungs, pancreas, urogenital system, skeleton, and skin. Mucus secretions are thick, leading to respiratory infections, poor food absorption, and constipation. Excess salt is lost via sweat. There is progressive lung dysfunction.

**Common Causes of Acute Illness**
- Respiratory infection
- GI malfunction such as constipation

**Signs and Symptoms**
- Nasal polyps
- Failure to thrive
- Voracious appetite
- Dyspnea, cough
Excess salt in sweat
■ Thick mucus secretions
■ Frequent respiratory infections
■ Bulky, foul-smelling stools
■ Constipation
■ Meconium ileus (failure to pass meconium) in newborns
■ Rectal prolapse

**Medical Treatment**
■ Annual influenza immunization
■ Pneumococcal vaccination
■ Oral pancreatic enzymes
■ Antibiotics during infections
■ Humidified air
■ Chest physiotherapy (percussion and postural drainage)

**Nursing Diagnoses**
■ Ineffective airway clearance
■ Potential for infection
■ Altered nutrition, less than body requirements
■ Risk for electrolyte imbalance
■ Risk for constipation
■ Knowledge deficit
■ Fear
■ Diversional activity deficit
■ Sleep pattern disturbance

**Nursing Implications**
■ Wash hands before and after care
■ Administer medications and monitor for side effects
  ■ Note: Frequent and prolonged use of antibiotics may decrease intestinal bacterial synthesis of vitamin K and impair blood clotting
■ IV fluids as ordered
■ Ensure compatibility of IV antibiotics
■ Encourage oral fluid intake
■ Plan care, including chest physiotherapy, to allow for uninterrupted periods of rest
■ Plan chest physiotherapy so that it does not occur near meal times (cough and mucus expectoration may decrease appetite)
■ Offer extra snacks with salt to taste; as a result of poor food absorption, extra calories are needed
■ Referral to support groups
**Prognosis**
Average life span is 35 years. Males generally survive longer than females.

**Dehydration**

**Pathology**
Children have less body fluid reserve than adults and have a larger body surface area that allows more fluid to be lost through perspiration. The GI tract is proportionately longer in children, leading to relatively greater fluid loss. Immature kidneys mean that a child is less able to conserve electrolytes. In early dehydration, fluid loss is both intracellular and extracellular. In chronic dehydration, fluid loss is predominantly cellular. Fluid loss may result in shock, acidosis, or alkalosis, kidney and brain damage, and death.

**Common Causes of Dehydration**
- Viral or bacterial infection that results in vomiting and/or diarrhea
- Extensive burns
- Diabetic ketoacidosis

<table>
<thead>
<tr>
<th>Severity of Dehydration</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Child should be assessed for signs and findings recorded at least every 8 hours, when assessing child who is hospitalized for treatment of dehydration)</td>
</tr>
<tr>
<td>Mild</td>
<td>Wt loss 3%–5% of body weight</td>
</tr>
<tr>
<td></td>
<td>Vital signs normal</td>
</tr>
<tr>
<td></td>
<td>Mucous membranes normal</td>
</tr>
<tr>
<td></td>
<td>Tears present</td>
</tr>
<tr>
<td></td>
<td>Fontanel normal</td>
</tr>
<tr>
<td></td>
<td>Behavior normal</td>
</tr>
<tr>
<td></td>
<td>Urine output decreased</td>
</tr>
<tr>
<td>Moderate</td>
<td>Wt loss 6%–10% of body weight</td>
</tr>
<tr>
<td></td>
<td>BP may be decreased</td>
</tr>
<tr>
<td></td>
<td>Mucous membranes dry</td>
</tr>
<tr>
<td></td>
<td>Tears decreased</td>
</tr>
<tr>
<td></td>
<td>Fontanel may be sunken</td>
</tr>
<tr>
<td></td>
<td>Irritable</td>
</tr>
<tr>
<td></td>
<td>Urine output markedly decreased</td>
</tr>
</tbody>
</table>

*Continued*
### Severity of Dehydration

<table>
<thead>
<tr>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Wt loss 10%–15% of body weight</td>
</tr>
<tr>
<td>BP may be markedly decreased</td>
</tr>
<tr>
<td>Mucous membranes very dry</td>
</tr>
<tr>
<td>No tears</td>
</tr>
<tr>
<td>Fontanel sunken</td>
</tr>
<tr>
<td>Very irritable or lethargic</td>
</tr>
<tr>
<td>Urine output scant or absent</td>
</tr>
</tbody>
</table>

#### Signs and Symptoms
May include the following:
- Poor skin turgor
- Lack of tears
- Sunken anterior fontanel
- Weight loss/decreased urine output
- Increased urine specific gravity (greater than 1.023)

#### Medical Treatment
May include the following:
- Oral rehydration solutions (ORS)
- IV fluids and electrolytes if fluids cannot be ingested or retained
- IV fluid formula:
  - First 8 hours = maintenance fluids + half the estimated fluid deficit
  - Use 1 kg of weight loss to represent 1000 mL of fluid loss (see Pediatric Maintenance Fluid Calculation on p 259)
  - Next 24–48 hours = maintenance fluids + remaining estimated fluid deficit is added to maintenance fluid

#### Nursing Care
May include the following:
- Wash hands before and after care
- Weigh on admission to estimate severity of dehydration (see table on p 232)
- Continue to assess hydration status, e.g., turgor, mucous membranes
- Wear gloves when changing diapers
- Adhere to ordered feeding type and times
- If oral feedings induce vomiting most of ingested fluids, or if volume of stools is increased with feeding, notify physician so that IV fluids may be initiated or appropriate rate of IV flow may be determined
Monitor IV fluids type and control appropriate rate of flow
- Note: Potassium (K+) is not added to IV fluids until after the child voids (voiding indicates presence of kidney function)
Assess and record size, color, and consistency of all vomitus and stools
Weigh diapers using gram scale (subtract weight of dry diaper)
- 1 gram in wt equals 1 mL of urine or liquid stool
- Goal is to achieve 0.5 to 1 mL/h urinary output for each kilogram of body wt
Keep diaper area clean and inspect for skin breakdown with each diaper change
Be aware that in children blood vessels adapt quickly to intravascular fluid loss, so decreased blood pressure is not a reliable indication of early shock in young children
Communicate to family and other caregivers that the nurse needs to be made aware of all elimination
Educate all visitors regarding hand washing
Notify physician of acute change in condition

Prognosis
Good with rehydration.

Diabetes Mellitus (DM)

Pathophysiology
A group of syndromes characterized by the inability to metabolize carbohydrates.
- Type 1 DM is caused by autoimmune destruction of the insulin-secreting cells of the pancreas and results in failure of the pancreas to produce insulin
- Type 2 DM may result from insufficient insulin production and/or body cellular resistance to the effects of insulin; excess body weight increases the risk for type 2 DM
- Diagnosis requires at least one of the following:
  - Fasting plasma glucose level exceeds 126 mg/dL on two occasions
  - Random glucose levels exceed 200 mg/dL
  - 2-hour oral glucose tolerance test is 200 mg/dL or higher

Signs and Symptoms
May include the following:
- Hyperglycemia
- Polydipsia (excessive thirst)
Polyuria (excessive urination)
Polyphagia (excessive hunger)
Anorexia (loss of appetite)
Weight loss (type 1)
Ketones in urine

Medical Treatment
May include the following:
- Medications that replace insulin, stimulate insulin secretion, or decrease insulin resistance
- Monitor for complications
- Monitor blood glucose and A1C
- In patients with type 1 diabetes, regular laboratory testing for other autoimmune conditions, e.g., Graves’ disease and celiac disease
- Regular dilated eye examinations
- ACE inhibitor for blood pressure and to preserve renal function

Nursing Diagnoses
May include the following:
- Altered nutrition, less than or more than body requirements
- Unstable blood glucose
- Alteration in elimination
- Potential fluid volume deficit
- Fatigue
- Risk for infection
- Knowledge deficit
- Multiple psychosocial diagnoses

Nursing Implications
- Wash hands before and after care
- Monitor blood glucose
- Monitor for the following:
  - Signs of Hypoglycemia—low blood sugar
    - Hunger
    - Shakiness
    - Sweating
    - Headache
    - Pallor
    - Tingling around mouth
  - Signs of Hyperglycemia—high blood sugar
    - Blurring of vision
    - Drowsiness
• Frequent urination
• Polydipsia

**Signs of Ketoacidosis**—(most common in patients with type 1 diabetes) when the body does not have enough insulin to use glucose or if insufficient glucose is consumed for energy, it may respond by burning fat for energy; fat breakdown results in ketones, which are acids, building up in the blood and appearing in the urine; ketoacidosis can result in diabetic coma and death
• High level of urine ketones
• High level of blood glucose and urine ketones
• Vomiting when urine ketones are high
• Abdominal pain
• Fatigue
• Dry or flushed skin
• Respirations that are short and shallow, followed by respirations that are deep and labored (Kussmaul respirations) as body attempts to “blow off” CO₂
• Fruity odor on breath
• Confusion

**Signs of Hyperosmolar Nonketotic Coma**—(most common in type 2 diabetes) occurs most often when the patient is stressed or ill with an infection or after a myocardial infarction or other illness; insulin deficiency leads to elevated blood glucose that may result in diabetic coma without ketosis (fat breakdown); this is different from diabetic ketoacidosis in which there is no insulin
• Polydipsia (excess thirst)
• Polyuria (excess urination)
• Dehydration
• Shock

■ Thoroughly assess feet, including soles and between toes
■ Assess hydration
■ Teach patient and family regarding diet, monitoring of blood glucose, signs and symptoms and management of hypoglycemia, importance of regular exercise, signs and symptoms of infection, foot care, compliance with medical regimen, medication side effects, importance of eye examinations, home blood pressure monitoring, and when to contact the health-care provider
■ Teach signs of hypoglycemia and hyperglycemia and treatment of each
■ Provide encouragement and emotional support for patient and family
Prognosis
Varies with type of diabetes, age of onset, compliance, and complicating factors. Poor glucose and blood pressure control increase the risk for complications and early mortality. Excess body weight increases the risk for complications in patients with type 2 diabetes.

Meningitis

Pathophysiology
Inflammation of the meninges (covering) of the spinal cord and/or brain, usually caused by an infection, either viral or bacterial.

Usual Causes
- Infection
  - Viral
  - Bacterial (bacterial meningitis is a medical emergency that may result in death if not quickly treated with antibiotics)

Signs and Symptoms
May include the following:
- Fever
- Vomiting
- Headache
- Nuchal (neck) rigidity to flexion
- Positive Kernig sign (see p 215)
- Positive Brudzinski sign (see p 215)
- Irritability
- Photosensitivity
- Seizures

Medical Treatment
May include the following:
- IV antibiotics
- IV dexamethasone
- Antipyretics

Nursing Diagnoses
May include the following:
- Pain
- Sensory perception alteration
- Risk for ineffective cerebral tissue perfusion
- Hyperthermia
Risk for trauma/suffocation (related to alternations in consciousness and risk for seizures)

**Nursing Implications**
May include the following:
- Frequent vital sign and neuro checks
- Administer medications as ordered, including prn medications for fever and discomfort
- Monitor for side effects and adverse reactions to medications
- Assess compatibility of IV medications
- Monitor I&O—watch for signs of inappropriate secretion of antidiuretic hormone (ISADH) caused by excess release of diuretic hormone (vasopressin) from the posterior pituitary, which may result in hyponatremia and fluid overload
- Prevention of bacterial meningitis by encouraging routine immunization for *Haemophilus influenzae* (Hib) and pneumococcus (Prevnar) (use of this immunization has also resulted in a decrease in the incidence of epiglottitis)

**Prognosis**
Varies depending on type and age of child; brain damage and hearing impairment may occur; bacterial meningitis has a mortality rate of 10% to 40%.

---

### Pneumonia

**Pathophysiology**
Infection and inflammation of the lungs lead to alveolar edema that promotes spread of the infecting organism. Solidification of the infected lobe(s) is caused by exudates (referred to as consolidation in radiology reports).

**Usual Causes**
- Aspiration
- Fluid stasis
- Infection
  - Bacterial
  - Viral

**Signs and Symptoms**
May include the following:
- Fever
- Chills
Cough
Dyspnea
Tachypnea
Tachycardia
Chest pain
Rales and crackles
Increased fremitus
Egophony
Dullness on percussion of affected lobes

Medical Treatment
May include the following:
- Prevention via pneumococcal vaccination for children with chronic respiratory illnesses
- Antimicrobial agents
- Supplemental oxygen
- Incentive spirometry
- Hydration
- Arterial blood gas (ABG) assessment

Nursing Diagnoses
May include the following:
- Impaired gas exchange
- Ineffective breathing pattern
- Hyperthermia
- Fluid volume deficit
- Pain
- Anxiety
- Knowledge deficit

Nursing Implications
May include the following:
- Wash hands before and after care
- Encourage prevention via pneumococcal vaccination for children with chronic respiratory illnesses
- Monitor vital signs
- Monitor ABG reports and notify physician of significant change
- Administer antibiotics and monitor for side effects
- Administer prescribed analgesics with attention to respiratory response
- Encourage coughing and deep breathing
Prognosis
Varies depending on cause, age of child, coexisting illnesses, and complications.

Sickle Cell Crisis

Pathophysiology
Sickle cell disease is an autosomal recessive disorder. About 1 in 12 African Americans in the United States carries the gene. Normal hemoglobin is partly or completely replaced by abnormal hemoglobin. Under conditions of dehydration or decreased oxygenation or infection, increased numbers of red blood cells (RBCs) assume irregular shapes (some are sickle shaped). Fragile, sickled cells are poor transporters of oxygen. Sickled cells easily become enmeshed with one another, resulting in early cell destruction, clogging of small blood vessels, and tissue necrosis. “Pain crisis” or vaso-occlusive crisis occurs. Organs such as the liver, spleen, kidneys, and brain may be damaged.

Signs and Symptoms
May include the following:
- Hemoglobin S in blood
- Anorexia
- Increased susceptibility to infection
- Small for age
- Pain—frequently in the abdomen

Common Causes of Hospital Admission
- Infection resulting in increased sickling and resultant pain crisis
- Dehydration resulting in increased sickling and resultant pain crisis
- Cerebral vascular accident (vaso-occlusion of blood vessels in brain)

Medical Treatment
May include the following:
- Supplemental oxygen
- Analgesics
- IV fluids
  - Fluids are encouraged to be at least 1½ times maintenance (see Pediatric Maintenance Fluid Calculation on p 259)
- Prevention: Decrease risk for infection and dehydration to decrease risk for sickling
  - Prophylactic antibiotics may be ordered
  - Supplemental folic acid, B₆, and B₁₂ to support RBC production

240
Nursing Diagnoses
May include the following:
- Pain
- Altered tissue perfusion
- Altered growth and development
- Potential for infection
- Constipation related to analgesic use
- Knowledge deficit

Nursing Implications
- Hand washing before and after care to decrease risk for infection
- Teach child and family the role of infection and hydration in pain crisis prevention
- Encourage fluids to 1½ times usual maintenance amount
- Monitor need for and administer analgesics as needed
- Monitor for and provide ordered medication for analgesic-induced constipation
- Provide emotional support for chronic illness
- Refer to support groups

Seizures
Pathophysiology
A convulsion caused by a sudden discharge of electrical activity in the brain. Generalized seizures are caused by abnormal electrical activity throughout the brain. Partial seizures are caused by abnormal electrical activity in a limited area of the brain.

Common Causes
- Fever
- Increased intracranial pressure from:
  - Hydrocephaly
  - Infection (encephalitis or meningitis)
  - Tumor
  - Head trauma
  - Electrolyte imbalances
  - Hypoglycemia
  - Drug overdose

Signs and Symptoms
Depend on seizure type. Two main types are partial and generalized.
Partial seizures begin in a discreet or “focal” area of the brain

| Simple partial seizure | • No loss of consciousness  
| • Sudden jerking movements may occur, or child may turn head to side or have visual changes  
| • One type of simple partial seizure is the Jacksonian seizure; in the “Jacksonian march,” sudden movements begin in one part of the body and progress or “march” to other body parts |

| Complex partial seizure | • Similar to simple partial but with loss of consciousness  
| • Child may have uncontrollable laughter, paralysis, or sense unusual smells or tastes |

Generalized seizures involve large areas of the brain—often both hemispheres

| Grand mal seizure | • A generalized seizure with loss of consciousness, convulsions, and muscle rigidity (tonic-clonic)  
| • Tongue biting and urinary incontinence may occur  
| • Lasts for 1–2 minutes |

| Absence seizure | • Known as petit mal seizure—brief lapses of consciousness or vacant staring  
| • Lasts for 2–15 seconds |

| Myoclonic seizure | • Brief jerking movements  
| • Usually occurs in the first 5 years of life |

Seizure terminology

- **Neonatal seizures:** Symmetrical flexion of the limbs or repeated smacking or chewing movements of the mouth
- **Febrile seizures:** Seizure caused by fever; usually in children younger than 5 years when the seizure threshold is low; more common in boys
- **Atonic:** Loss of muscle tone
Clonic: Repetitive, jerking movement
Tonic: Stiffening and rigidity of muscles
Lennox-Gastaut: Severe form of epilepsy that may be associated with intellectual disability; type of seizure activity varies
Status epilepticus: Continuous seizures that cannot be controlled
Post-ictal: Period following a seizure

Medical Treatment
May include the following:
- Treatment of underlying causes of increased intracranial pressure
- Medications to prevent seizure activity
- Ketogenic diet: A diet high in fat and low in carbohydrates may be recommended (resulting elevated ketones in the blood reduces seizure rate in some children; note that this diet may lead to dehydration, constipation, renal calculi, elevated cholesterol, and slow growth)

Nursing Diagnoses
May include the following:
- Risk for trauma/suffocation
- Impaired social interaction
- Chronic low self-esteem
- Knowledge deficit

Nursing Implications
May include the following:
- Remove sharp objects from environment
- Roll child onto side after seizure activity
- Assess airway and breathing after seizure activity
- Young children with frequent seizures may need to wear a helmet to prevent head injury
- Educate child and family regarding safety
- Do not force objects into mouth during seizure activity

Prognosis
Varies with type of seizure and age of onset.
### Foreign Body Airway Obstruction and CPR
Initial Response of Health-Care Provider

#### Alert Infant or Child Who Has Airway Obstruction Due to Foreign Body

<table>
<thead>
<tr>
<th>Age 1 Year and Older</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>If child is coughing do NOT interfere.</td>
<td>If infant is coughing do NOT interfere.</td>
</tr>
<tr>
<td>If coughing stops and child is unable to breathe or make a verbal sound, ask “Are you choking?”</td>
<td>If infant stops coughing, is unable to make a vocal sound, or becomes cyanotic, alternate <strong>back slaps and chest thrusts until object is removed or child becomes unresponsive</strong></td>
</tr>
<tr>
<td>If the child nods “yes,” has stopped breathing, or becomes cyanotic, stand behind child and perform <strong>abdominal thrusts</strong> (Heimlich maneuver).</td>
<td>Continue alternating back slaps and chest thrusts until the object is forced out or until the child becomes unresponsive.</td>
</tr>
<tr>
<td><strong>Continue</strong> thrusts until the object is forced out or until the child becomes unresponsive.</td>
<td><strong>Continue</strong> alternating back slaps and chest thrusts until the object is forced out or until the child becomes unresponsive.</td>
</tr>
</tbody>
</table>

#### Unresponsive Infant or Child With Foreign Body Airway Obstruction

- If infant or child becomes unresponsive, look into the mouth and remove any visible foreign body.
- Do NOT perform blind finger sweeps.
- Begin CPR if foreign body removal is not possible or if foreign body removal does not result in spontaneous respirations.
- Look into the mouth before each set of respirations and remove any visible object.
First Responder Health-Care Provider Infant CPR—One or Two Rescuers

Wear gloves if feasible.

■ Assess safety of environment before touching infant
■ Assess baby’s responsiveness, movement, and respirations; if absent, see next steps. Note that agonal (gasp breathing or abnormal pattern) or gasping breathing is to be treated the same as no breathing
■ Activate emergency services or call 911 (use cell phone if available) or call code or tell bystander to do so. Send someone for automated external defibrillator (AED)
■ Tilt head back (unless there is a head, neck, or back injury) and deliver two rescue breaths, using the amount of air that you can collect in your puffed cheeks and making sure that the infant’s chest rises and falls with each breath
■ Assess pulse in brachial artery (mid–upper arm between biceps and triceps) or carotid artery (neck) for no more than 10 seconds
■ If breathing absent or abnormal, provide rescue breathing every 3-5 seconds
■ If no brachial or carotid pulse is found or pulse is below 60 beats per minute or baby meets lack of normal breathing criteria, see next steps
■ Place the infant or child supine (on the back) on a flat, hard surface

■ Begin compression/breathing cycles
  • On the lower half of the sternum, between the nipples
  • Two fingers may be used to administer compressions in the infant
  • Administer 30 chest compressions \( \frac{1}{3} \) the depth of the full chest of the baby or at least 1.5 inches
  • Use a rate of AT LEAST 100 compressions per minute (or more)
  • Allow chest to recoil after each compression

■ Respirations
  • Gently place head in the sniffing position (unless there is neck injury); jaw thrust may be used if neck movement is inadvisable
  • Administer 2 breaths, making the chest rise. Note that rescuer’s mouth may cover the baby’s nose and mouth or, if an appropriate sized mask is not available, an inverted adult-sized oxygen mask may be used to administer breaths; the smaller part of the mask that usually covers the adult’s nose is placed over the baby’s chin
Continue ratio of 30 chest compressions to 2 breaths (30:2) until advanced responders take over or child begins to move—and/or use AED according to device directions as soon as it is available. If AED use does not restore heart rate and breathing, administer 2 more minutes of CPR compressions and breathing, followed by repeat use of AED, repeating cycle until advanced life support providers take over or child begins to move.

If single rescuer is still alone, activate emergency system (if not done) and retrieve and use AED appropriately.

If second rescuer is involved:

- Chest compression rate to breath ratio is 15:2 (total rate of 100 compressions/minute)
- If advanced airway has been placed and two rescuers are active, chest compressions are continuous during breaths
- Two rescuers switch places every 2 minutes—minimize interruptions in compressions to less than 10 seconds; check pulse rate and rhythm while switching rescuer positions
- Two rescuers—use AED as soon as it is available (analyze rhythm and shock if indicated)
- If AED use does not restore heart rate and breathing, administer two more minutes of CPR compressions and breathing, followed by repeat use of AED, repeating cycle until advanced life support providers take over or child begins to move.

First Responder Health-Care Provider Child CPR—One or Two Rescuers

- Check for environmental safety before touching patient
- Assess for responsiveness; if none, activate emergency services as for infant and send for AED
- Follow instructions as for infant CPR and AED use with following adaptations for child:
  - Compressions
    - Compressions may be administered with heel of one hand or second hand on top of first
    - At least ⅔ anteroposterior (AP) check diameter or 2 inches in depth
    - Continue CPR until advanced responders take over or until the infant or child starts to move

Adapted from American Heart Association Guidelines for Choking and CPR (2015).
Apnea Monitor Set Up

Leads

Apnea monitor leads may vary but are generally placed in the following manner:
- White: Top right (at horizontal nipple line)
- Black: Top left (note: Black and white leads should be just to the sides of the nipples and should be parallel)
- Green: Lower right or left (ground lead)
- Red: Lower left (red is sometimes omitted)

Note: If snap-on leads are used, they should be attached to the electrode before lead placement on the chest.

Alarm Settings

- Cardiac alarm is usually set to sound at 15 bpm above and 15 bpm below age-appropriate resting limits (see heart rate for age on p 185)
- Respiratory alarm limit is usually set to sound if there is no respiration for 15 seconds

Children’s Fears Related to Hospitalization

<table>
<thead>
<tr>
<th>Age</th>
<th>Common Fears</th>
<th>Nursing Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mo–3 yr</td>
<td>• Separation from mother or usual caregiver</td>
<td>• Encourage rooming in</td>
</tr>
<tr>
<td></td>
<td>• Punishment</td>
<td>• Encourage patient to bring familiar objects from home such as toys or blankets</td>
</tr>
<tr>
<td>1–18 yr</td>
<td>• Bodily harm</td>
<td>• Explain procedures in simple terms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do not inform the child of painful procedures too far in advance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Demonstrate procedures with dolls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Be honest regarding painful procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do not discourage crying</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Allow parents to be with child during painful procedures when possible</td>
</tr>
</tbody>
</table>

Continued
### Children’s Fears Related to Hospitalization—cont’d

<table>
<thead>
<tr>
<th>Age</th>
<th>Common Fears</th>
<th>Nursing Approaches</th>
</tr>
</thead>
</table>
| 6–18 yr  | • Separation from parents  
• Separation from peers  
• Loss of control              | • A school-aged child or adolescent may fear harm that may cause him or her to “look different” (body mutilation)  
• Encourage visits from family and friends  
• Encourage use of telephone and e-mail to maintain family and peer contact  
• Allow choices when possible  
• Explain procedures in simple terms  
• Do not discourage crying |


### Children’s Understanding of Death

<table>
<thead>
<tr>
<th>Age</th>
<th>Usual Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth–1 yr</td>
<td>No concept</td>
</tr>
</tbody>
</table>
| 1–3 yr        | Believes death is temporary and reversible  
May believe his or her thoughts or actions caused another person’s death |
| 4–8 yr        | Begins to understand permanence of death  
May view death as separation  
May worry about effect of own death on family |
| 8 yr and older| Understands permanence of death  
May begin to face reality of own mortality |

**Nursing Approaches With Child and Family Who Face Death**

- Allow child and family to ask questions regarding illness and prognosis; be aware that parents often feel responsible for child’s condition.

Continued
Children’s Understanding of Death—cont’d

Nursing Approaches With Child and Family Who Face Death

- Determine child’s concept of death and support system before providing answers
- Consider wishes of parents when providing answers
- Allow liberal visiting for siblings and parents; ensure that family has access to support from a minister from their own faith and that religious activities are not hindered


### Age-Appropriate Play and Diversional Activities for Hospitalized Children

<table>
<thead>
<tr>
<th>Age</th>
<th>Appropriate Activity for Child With Nurse, Family, or Other Caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth–1 mo</td>
<td>• Cuddle</td>
</tr>
<tr>
<td></td>
<td>• Rock</td>
</tr>
<tr>
<td></td>
<td>• Smile at and talk to infant</td>
</tr>
<tr>
<td></td>
<td>• Place a mobile over bed</td>
</tr>
<tr>
<td>2–6 mo</td>
<td>• Provide a nonbreakable mirror at eye level</td>
</tr>
<tr>
<td></td>
<td>• Provide solid, one-piece toys without detachable parts that do not fit into the mouth and that do not pose a suffocation risk</td>
</tr>
<tr>
<td>6–9 mo</td>
<td>• Play peek-a-boo</td>
</tr>
<tr>
<td></td>
<td>• Provide brightly colored toys that do not fit into the mouth, do not have small detachable parts, and do not pose a suffocation risk</td>
</tr>
<tr>
<td></td>
<td>• Show pictures in a book</td>
</tr>
<tr>
<td>9–12 mo</td>
<td>• Provide blocks and demonstrate stacking</td>
</tr>
<tr>
<td></td>
<td>• Provide a large ball and demonstrate how to roll the ball</td>
</tr>
<tr>
<td></td>
<td>• Provide toys and a large container into which toys can be placed and demonstrate placing toys into the container and pouring them out</td>
</tr>
<tr>
<td></td>
<td>• Play “Where’s your nose?” “Where’s your mouth?”</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Age</th>
<th>Appropriate Activity for Child With Nurse, Family, or Other Caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–3 yr</td>
<td>• Provide pull and push toys (helpful when plan of care includes encouraging ambulation)</td>
</tr>
<tr>
<td></td>
<td>• Hold a wand filled with commercial “bubble” solution and show the child how to blow bubbles (useful when plan of care includes encouraging deep breathing)</td>
</tr>
<tr>
<td></td>
<td>• Provide a doll and safe “pretend” hospital supplies such as band aides</td>
</tr>
<tr>
<td></td>
<td>• Provide a tea set or small pitcher and cup for child to pour and drink (helpful when increased fluid intake is needed)</td>
</tr>
<tr>
<td></td>
<td>• Read to child</td>
</tr>
<tr>
<td>3–6 yr</td>
<td>• Provide simple puzzles</td>
</tr>
<tr>
<td></td>
<td>• Provide simple board or card games</td>
</tr>
<tr>
<td></td>
<td>• Provide art supplies</td>
</tr>
<tr>
<td></td>
<td>• Allow child to use a straw to blow bubbles into a glass (helpful when plan of care includes deep breathing exercises)</td>
</tr>
<tr>
<td></td>
<td>• Tell the beginning of a story and ask the child to complete the story</td>
</tr>
<tr>
<td>School age or adolescent</td>
<td>• Provide books</td>
</tr>
<tr>
<td></td>
<td>• Provide board games; allow children with noninfectious diseases and noncompromised immune systems to play together</td>
</tr>
<tr>
<td></td>
<td>• Allow free access to telephone</td>
</tr>
<tr>
<td></td>
<td>• Allow access to video games if appropriate</td>
</tr>
<tr>
<td></td>
<td>• Provide art supplies</td>
</tr>
</tbody>
</table>

Encouraging Hospitalized Children to Eat

- Ask about food preferences and communicate these to the dietary department
- If diet allows, give a choice of mealtime beverages
- For toddlers, provide finger foods that can be self-fed
- Unless child expresses a preference, serve food lukewarm rather than hot or cold
- Avoid adding pepper and other spices unless child asks for these; many children dislike spicy food
- Suggest having an “unbirthday” party when meals arrive
- Try to schedule procedures after meals or at least an hour before mealtime
- Allow child to use a tea set or pour liquids from a small pitcher at mealtime
- Encourage family or friends to stay with the child during meals and to eat with the child when possible
- Allow children to eat with other children if possible
- Avoid overemphasizing the need to eat; children who are ill and/or febrile often have decreased appetites and are prone to vomiting
Safe dosing for the child is usually based on the following:

- Weight
- Body surface area (calculated using a nomogram that can be found in a pediatric or drug text)
- Age (note that metabolism and excretion of some drugs vary with the age of the child and maturity of the liver and kidneys)

Before administering drug:

- Check the patient’s chart for the prescriber’s order to determine the following:
  - Name of drug
  - Dose of drug
  - Frequency of dosing
  - Route of administration
  - Check for drug allergies
- Determine why the drug is being given
- Check a drug reference book for special precautions, such as the need to count the heart rate before giving a beta blocker or digoxin
- Determine drug side effects and complications and monitor for both
  - Notify the prescriber if there are signs of serious side effects or complications
- Use a drug reference book to compare the ordered dose to the recommended dose; pounds (lb) must usually be converted to kilograms (kg) to determine safe dosing; to do this:
  - Divide pounds by 2.2 or multiply pounds by 0.45
  - Check approximate accuracy of lb-to-kg conversion by first dividing number of lb by half and then deducting 10% from the answer; for example:
    - Half of 30 lb = 15 lb, subtract 10% (1.5 lb) and the answer is 13.5 kg
    - Note that when 30 lb is divided by 2.2, the answer is 13.6 kg, which is approximately the same answer
- If the calculated safe dose is significantly different from the ordered dose, then check with prescriber for verification of the dose
  - For children with serious infections, antibiotics are often given in higher doses than recommended in texts; because of potentially serious side effects, sedating or analgesic medication doses should be within the text-stated safe range
Determine the volume of medication to be given
- Ask a second person to determine volume (for example, # of mL if medication is liquid) of medication before preparing and giving any medication dose for the first time
- Compare the label on the medication container with the prescriber’s order three times:
  1. When taking the medication from storage
  2. Before measuring the medication
  3. After measuring the medication
- Use a syringe (without needle) to measure small doses of liquid PO medications
- A TB syringe is best for measuring less than 1 mL of liquid medicine
- When doses are small (less than 0.5 mL), avoid adding extra diluent to the syringe and avoid allowing an air bubble to remain in the syringe because either may cause medication that is in the syringe’s dead space (the area in the syringe tip adapter and needle hub) to be administered, thereby increasing the amount of the drug that the child receives

Tips for Administering Oral Medications

For All Children
- Identify the child by checking the name band; do not ask the child if his name is John or Jim, etc.; the child may answer “yes” to any name; do not use the name on the bed for identification; children sometimes change beds while playing
- Allow the parent to give the medication if the child prefers
- Remain in the room until the child has taken all of the medication

For Infants
- Use a syringe to administer small amounts of liquid medications
- If the medication has an unpleasant taste, it can be mixed with a small amount (about 1–5 mL) of juice or syrup
- Medications that have a pleasant taste may be placed into an empty nipple if the infant is able to suck
- Note: It is acceptable for the nurse to taste a very small amount of liquid medications to determine the taste
If the infant refuses to suck the medication from a nipple, gently squeeze the infant’s cheeks and push a small amount of the liquid medication into the side of the mouth and toward the back of the tongue.

Do not place medication on top of the tongue where it may be easily pushed from the mouth.

Do not place medication into a bottle with formula or mix it with a feeding because this makes it impossible to know how much medication has been taken if the feeding is not completely consumed.

Do not blow into the infant’s face to make him swallow; this may cause the infant to gasp and aspirate the liquid into the airway.

For Older Children

Offer choices when possible; for instance, “would you like to take your medication with water or juice?” or ask the child which medication he or she wants to take first.

Do not offer a choice; e.g., do not say, “are you ready to take your medicine?” unless taking the medication is optional (such as prn medications); tell the child that it is time to take the medicine.

Do not tell a child that medication is candy.

Specific Medications

Otic (Ear Drops)

Identify the child by checking the name band; do not ask the child if his name is John or Jim, etc.; do not use the name on the bed for identification; children sometimes change beds while playing.

Ensure that medication is not cold.

Position the child with the affected ear up.

Straighten the ear canal:

For children 3 years of age and younger, gently pull the pinna of the ear down and back.

For children older than age 3 years, gently pull the pinna of the ear up and back.

Squeeze the medication onto the side of the outer ear canal; continue to hold the pinna of the ear to keep the ear canal straightened as the liquid runs deeper into the ear.
Avoid dropping medication into the center of the ear canal because this may trap air between the liquid and the tympanic membrane and prevent the medication from coating the entire ear canal.

Continue to hold the pinna of the ear for 1 full minute to allow the medication to reach the tympanic membrane.

**IM Injections**

- Identify the child by checking the name band; do not ask the child if his name is John or Jim, etc.; do not use the name on the bed for identification; children sometimes change beds while playing.
- Use a syringe that allows accurate measurement of the proper dose.
- Needle gauge should be 23–25.
- Length of the needle should be ⅜ inch to 1 inch, depending on size of child and technique used for administration.
  - If muscle tissue is stretched and held taut, a ⅜-inch needle may be long enough.
  - If muscle tissue is bunched and held between the nurses thumb and fingers, a 1-inch needle is appropriate for all except the smallest of infants.
- The maximum amount of medication injected into one site is 1 mL for infants and young children and 2 mL for older children.
- When administering IM medications, enter the child’s room with someone who is prepared to restrain the child while the injection is being given; do not ask the parent to restrain the child.
- Explain the procedure immediately before giving the injection; do not tell a child that an injection will be given until immediately before it is scheduled.
- Keep injection materials out of sight until immediately before the injection.
- Have assistant restrain child, if necessary; important areas to immobilize are the child’s knees, elbows, and area to be injected; avoid contact with the child’s mouth to avoid being bitten.
- Tell the child that it is okay to cry.
- Offer a small decorative bandage for the injection site.
- Praise child’s efforts to cooperate.
Illustrations of IM injection sites follow.
IV Medications

Preparation for Administration
- Determine the recommended dilution and safe delivery rate for the IV medication to determine method of administration (see following methods)
- Consider the amount of fluid that the child can safely receive (see p 259)
- Consider the compatibility and timing of other IV medications that are ordered
- For the initial IV fluids, potassium (K⁺) is added to fluids AFTER the child voids (to ensure that kidneys are functional)

Methods of Administration
- **Heparin locks:** IV medications given through a small port are followed by a “flush” of diluted heparin to prevent clotting of the IV needle or catheter; the amount of flush used depends on the size of the device, but it is usually 1–2 mL; this method can be used when the child does not need IV fluids
- **IV push or bolus:** Medication is pushed into the IV tubing manually or by a pump; this method is useful when immediate effects of the medications are desired or when the IV is running slowly
- **Buretrol:** Medication is added to fluids that are in a calibrated chamber below the IV bag; when using this method, it is important to consider the following:
  - The amount of fluid in the chamber
  - The rate of IV flow
  - The stability of the drug (ampicillin rapidly becomes unstable)
  - The amount of fluid already in the IV tubing
    - Unless the IV is delivering at a rapid rate, the amount of fluid in the chamber (Buretrol) should be small when the medication is added; after the Buretrol is empty, part of the medication will remain in the IV tubing; the amount of fluid needed to clear the line of the medication is equal to the amount of fluid that the tubing will hold—usually 15 to 25 mL
- **Retrograde:** The IV line is clamped while the medication is added to a Y port above the clamp in the IV line; the displaced IV fluid in the line is pushed into a receptacle or empty syringe that is above the injection site and may be discarded; to avoid having any of the medication go into the receptacle or empty syringe, the amount of fluid in the tubing between the medication and the receptacle or syringe must be greater than the volume of the medication being
injected; this method may be used when IV fluids are running at a slow rate

### Starting an IV Line and IV Fluids

- Check the accuracy of all fluid orders with the same care used to calculate drug dosages; remember that infants and young children become dehydrated or fluid-overloaded more rapidly than adults
- Isotonic IV solution for a child younger than 5 years is usually D5.2NS, which is different from adult isotonic solution because of the child’s greater extracellular fluid volume
- Isotonic IV solution for a child older than 5 years is usually D5.45NS
- Hang a volume control chamber, such as a Buretrol, below the IV bag
- Use a microdrop device for infants and young children (when using a microdrop device, mL/hr is equal to gtts/min)
- KVO (keep vein open) is a term used when no parenteral fluids are needed but frequent IV medications are being administered; KVO means to set the IV rate to run as slowly as possible without allowing the needle or catheter to develop a clot
- To prevent fluid overload, do not add more than 2 hours’ worth of fluid to the Buretrol
- If possible, place the IV tubing on a pump to decrease the possibility of accidental fluid overload
- Arrange assistance to restrain child as described under IM Injections
- Use the smallest needle or IV catheter that will allow delivery of the ordered fluids
- Prepare small sections of tape and any splint that is to be used before inserting the needle or catheter
- Monitor IV site closely for infiltration
Venous access in child.

Pediatric I.V. Sites

- Median antebrachial v.
- Median basilic v.
- Median cephalic v.
- Cephalic v.
- Basilic v.
- Great saphenous v.
- Dorsal venous arch
- 5th inter-digital v.
- Supraorbital v.
- Frontal v.
- Superior temporal v.
- Posterior auricular v.
- Jugular v.
- Cephalic v.
- Dorsal arch

Maintenance Fluids

Check the accuracy of all fluid orders with the same care used to calculate drug dosages; remember that infants and young children become dehydrated or fluid-overloaded more rapidly than adults.

The following steps can be used to calculate maintenance fluid requirements for children:

- Note: Maintenance fluids are the amount of PO or IV fluid needed to maintain hydration in a healthy child; additional fluid may be needed to compensate for certain pathological states such as dehydration or sickle cell anemia crisis.

Steps in Maintenance Fluid Calculation

1. Convert the child’s weight in pounds (lb) to kilograms (kg) by multiplying the number of lb by 0.45
2. Calculate 100 mL of fluid per kg/24 hr for the 1st 10 kg of body wt
3. Calculate 50 mL of fluid per kg/24 hr for the 2nd 10 kg of body wt
4. Calculate 10 to 25 mL of fluid per kg/24 hr for each kg of body wt over 20
5. Add the products of steps 2, 3, and 4 to determine the mL of fluid needed per 24 hours (eliminate any step that is not applicable to the wt of the child)

**Note:** Add 12% of the total maintenance fluid needed for every degree (Celsius or Centigrade) of body temp over 37.5.

### Examples of Maintenance Fluid Calculation for Children

#### For a 15-Pound Child
- Convert 15 lb to kg by multiplying $15 \times 0.45 = 6.75$ kg
- Allow 100 mL/kg for each of the 6.75 kg = 675 mL
- Divide 675 by 24 (hr) to determine the number of mL fluid/hr = 28
- When using a microdrop device, the rate of IV flow will be the same as mL/hr = 28 gtts/min

#### For a 70-Pound Child
- Convert 70 lb to kg by multiplying $70 \times 0.45 = 31.5$ kg
- Allow 100 mL/kg for each of the 1st 10 kg = 1000 mL
- Allow 50 mL/kg for each of the 2nd 10 kg = 500 mL
- Allow 20 mL/kg for each of the remaining 11.5 kg = 230 mL
  - Note that the physician will determine the exact amount (usually 10–25 mL per kg) for the 3rd and additional kg, based on the child’s condition
- Add 1000 mL + 500 mL + 230 mL = 1730 mL
- Divide 1730 by 24 (hr) to determine mL/hr = 72 mL/hr
- The IV rate is 72 gtts/min

### Illustration Credits


Selected References


262


Index

Page numbers followed by "f" denote figures

A
Abdominal assessment
in child, 181–182
in ill or hospitalized child, 218–219
in newborn, 125–126
Abdominal thrusts, 244
Abortion
definition of, 30
missed, 31
spontaneous, 30, 54
threatened, 32
Abruptio placenta, 57, 57f, 93f, 93–94
Absence seizure, 242
Abstinence, 15
Abuse, 135
A1C, 29, 235
Acanthosis nigricans, 169
Acne vulgaris, 170
Acrocyanosis, 84, 119, 123, 178
Activity level
of ill or hospitalized child, 222, 249–250
of newborn, 122–123
of postpartum patient, 118
Acute abdomen, 135
Acute inspiratory stridor, 211
Acute otitis media (AOM), 135, 173
ADD/ADHD, 135
Adjuvant therapy, 1
Adolescents, 155–156. See also Children
Adventitious sounds, 212
Afterbirth cramps, 95
Air-fluid line, 173
Airway
assessment of, in ill or hospitalized child, 210–211
obstruction of, 181, 211, 244
Albinism, 171
Alpha-fetoprotein (AFI), 30
Amenorrhea
definition of, 1
lactational, 16
Amniocentesis, 40
Amniocentesis, 32, 86–87
Amniotic fluid index (AFI), 32
Amniotomy, 86
Anemia
definition of, 135
sickle cell, 240–241
Ankyloglossia, 177
Anorexia, 9, 155, 228, 235, 240
Antepartum, 30
Anticipatory guidance, in child care, 152–156
Apgar score, 84
Apnea monitors, 247
Appetite assessment, in ill or hospitalized child, 222
Appropriate for gestational age (AGA), 119
Approximation, 95
Arrhythmia, 59, 179
Arterial blood gases (ABGs), 135
Assessment
of child, 165–185
of ill or hospitalized child, 210–223
of newborn, 122–126
of postpartum patient, 96–106
Artificial rupture of membranes (AROM), 63
Asthma, 135, 227–228
Athlete’s foot, 169
Atrial septal defect (ASD), 135
Auscultation sites, 195f
Autoimmune disorders, 142, 175, 216, 219, 234–235
Automated external defibrillator (AED), 245
Autosomal dominant, 135
Autosomal recessive, 135

B
Babinski reflex, 119, 122
Back assessment, in newborn, 126
Back slaps, 244
Backache, pregnancy and, 50
Ballard tool, 119
Barlow’s test, 119
Basal body temperature, 16
Bathing, of newborn, 130
Bayley Scales of Infant Development, 136, 168
Biophysical profile (BPP), 53, 63
Biphasic stridor, 211
Biphasic wheeze, 210
Birthing unit, admission to, 65–66
Bishop’s score, 63
Bladder, postpartum status of, 100
Bleeding
nasal, during pregnancy, 43
vaginal
postpartum, 107–108
during pregnancy, 53–57, 56f, 57f, 92–94, 93f
Blood pressure, 235
in child, 180, 186–194
in ill or hospitalized child, 214
postpartum, 104
in pregnancy, 60–61
Blount’s disease, 183
Body language, 145
Body mass index (BMI), 183, 202–208, 204f–207f
Body temperature
assessment of, in ill or hospitalized child, 214
monitoring of, for fertility awareness, 16
in newborn, 122
Body weight
gaining of, during pregnancy, 45
healthy, 136, 202, 208
underweight, 45, 202, 208
Bone density, loss of, 24
Bone fractures, 225f
Bottle feeding, 132–133, 156–160
Bowleggedness, 183
Bradycardia, 74
BRAT diet, 136
Braxton-Hicks contractions, 50
Breast(s)
cancer of, 25
discomfort of, during pregnancy, 42
examination of, 13–14, 14f
postpartum assessment of, 97–98
postpartum infection of, 109
Breastfeeding
description of, 112–116, 113f–114f, 156
Breathing  
agonal, 245  
avaluation of  
in child, 181  
in ill or hospitalized child, 211–213  
periodic, 211  
pursed-lip, 211  
Breech presentation, 63  
Bronchial sounds, 181, 212  
Bronchiolitis, 136, 210, 212, 228–229  
Bronchopulmonary dysplasia (BPD), 136  
Bronchosperm, 136, 141, 210  
Bronchovesicular sounds, 181, 212  
Brudzinski sign, 215, 237  
Bruit, 178  
Bullae, 170  
Burette, 136  
Burn  
description of, 232  
size estimation of, body surface area and, 226f  
C  
Cancer  
breast, 25  
cervical, 25  
endometrial, 26  
ovarian, 26  
Candida, 143, 175, 184, 216–217  
Capillary refill, 170, 178, 214  
Caput succedaneum, 119  
Cardinal movements, 63  
Cardiopulmonary resuscitation (CPR), 134, 153, 245–246  
Cardiovascular assessment, in child, 178–180, 195f  
Celiac disease, 220, 235  
Cephalic presentation, 63  
Cephalocaudal, 137  
Cephalohematoma, 119  
Cerebral palsy, 137, 184, 219  
Cervical mucus, 15–16  
Cervix  
dilation of, 30, 63  
dysplasia of, 1  
effacement of, 30, 63  
ripening of, 87  
Cesarean delivery/section (C/S), 30, 88  
aval assessment following, 106  
vaginal birth after, 65, 90–91  
Chadwick’s sign, 30  
Cheilitis, 169  
Chest assessment  
in child, 180–181  
in newborn, 125  
Chest physiotherapy, 231  
Children  
aval assessment of, 165–185  
care for, 152–156  
development of, 146–151  
disease prevention in, 152–156  
fluid maintenance in, 259–260  
growth of, 197, 198f–201f, 202  
developmental tasks associated with, 148–151  
health promotion in, 152–156  
il/hospitalized, assessment of, 210–223. See also Hospitalized child medications for, 253–258  
dosages of, 252–253  
nutrition for, 156–161  
breastfeeding, 112–116, 113f–114f, 156  
food groups, 161
formula feeding in, 132–133, 156–160 hospitalization and, 251 solid foods in, 160–161 play by, 152 in cases of illness or hospitalization, 249–250 terminology relating to, 135–143 understanding of death by, 248–249 venous access in, 259f well child assessment, 165–185 Chlamydia, 8 Chloasma, 30, 51 Choanal atresia, 175 Choking, 129, 133–134, 153, 244, 246 Chorionic villus sampling, 39 Chronic inspiratory stridor, 211 Chronic obstructive pulmonary disease (COPD), 137, 228 Circulation assessment, in ill or hospitalized children, 213–214 Circumcision, 131–132 Cleft lip/palate, 125, 176 Climacteric, 1 Clitoris, 185 Clubfoot, 183 Coarctation of the aorta, 179 Cognitive development, 147–148 Colic, infantile, 137 Colostrum, 30, 95, 119 Comfort level assessment of, 104–105 postpartum, 117 Comminuted fracture, 225f Communication, with child, 165–166

INDEX

D
Deep tendon reflexes, 48, 59–60, 67, 168
Deep venous thrombosis, postpartum, 111
Dehydration, 58, 124, 129, 138, 156, 175, 177, 216, 221, 232–234, 236, 240, 243, 259
Delivery
  Cesarean, 88
    assessment following, 106
    vaginal birth after, 65, 90–91
  complications associated with, 91–94
  estimated date of, 33–34
  of placenta, 85–86
  vaginal discharge following, 101–102, 102f, 116
Dentition, 209f
Denver Developmental Screening Test-Revised (DDST-R), 138, 168
Depo-medroxyprogesterone, 20
Depression, postpartum, 110, 118
Development, 138, 146-151, 168
Developmental delay, 138
Diabetes mellitus, 234–237 gestational, 30, 61–62
Diabetic ketoacidosis, 232, 236
Diaper dermatitis, 184, 216
Diaphragm contraceptive, 16–17
Diarrhea, 138
Direct Coombs’ test, 95
Disease prevention, in child care, 152–156
Dorsal recumbent, 95

Down syndrome, 138
Drainage assessment, 221
Dual-energy x-ray absorptiometry, 23
Dyspnea, 46, 52, 111, 230, 237, 239

E
Ears, assessment of
  in child, 172–173
  in newborn, 124
Eating, 251
Ectopic pregnancy, 54
Eczema, 138
Education
  of parents of newborn, 128–134
  postpartum period, 111–118
  pregnancy, 42–44
Effleurage, 63
Electronic fetal monitoring (EFM), 63
Elimination assessment, in ill or hospitalized child, 220–221
Emancipated minor, 138
Embryo, 30
Emotional lability, in pregnancy, 42
Encephalitis, 138, 241
End-expiratory pressure, 210
Endometrial cycle, 5
Endometriosis, 1, 27
Endometritis
  definition of, 95
  postpartum, 109
Environment, assessment of, 222–223
Environmental teratogens, 43
Epidural analgesia, 88–89

268
Epiglottitis, 139, 238
Episiotomy, 95, 102–103
Epispadias, 119, 126, 184
Epistaxis, 43
Epstein pearls, 176
Erikson, Erik, 139, 146–147
Erythema toxicum, 119
Estimated date of delivery (EDD), 33–34
Evil eye, 146
Exercise(s)
  following pregnancy, 117
  in pregnancy, 45–46
Expiratory stridor, 211
Expiratory wheeze, 210
Expulsion of fetus, 82–83
Extremities, assessment of
  in ill or hospitalized child, 219–220
  in newborn, 122–123
  in postpartum patient, 103
Extrusion reflex, 119
Eyes
  assessment of
    in child, 174
    in newborn, 124
  diabetes mellitus effects on,
    medical treatment for, 235
F
Face assessment, in newborn, 124–125
Failure to thrive (FTT), 12, 139, 230
Faintness, during pregnancy, 50
Family planning, 15–22
Fatigue, pregnancy-related, 42
Fear, of hospitalization, 247–248
Ferguson reflex, 64
Ferning, 30
Fertility awareness, 15–16

269
Fetal attitude, 63–64
Fetal heart rate (FHR), 63,
  72–77, 73f
  accelerations of, 74, 74f
  baseline, changes to, 74–77
  decelerations of, 75f–77f,
    75–76
  interpretation of, 69–70,
    73f–77f, 74–77
Fetal kick counts, 49–50
Fetal lie, 64
Fetal monitoring, 70f–72f,
  70–72
Fetal movement, 48
Fetal nuchal transparency, 40
Fetal position, determination of, 47, 47f
Fetal presentation, 64
Fetal surveillance
  description of, 52–53
Fetoscope, 70f
Fever, 10, 29, 43, 89, 139–140,
  142, 146, 166, 217, 219, 228,
  237–238, 241–242
  Fibroids, uterine, 3, 29
  Fibrosis, cystic, 230–232
  Fine motor skills, 139
  First prepartum health care visit, 36–41
  Fissure, 169
  Flatfeet, 184
  Fluids administration, intravenous, 258–260
  Folic acid, 45
  Fontanels, 124, 129, 172,
    232–233
  Food groups, 161
  Formula feeding, 132–133,
    156–160
  Fracture Risk Assessment Tool (FRAX), 23
  Fractures, 175, 223, 225, 225f
  Fragile X syndrome, 139
INDEX

Freckle, 170
Fremitus, 239
Frenulum, 177
Freud, Sigmund, 139, 147
Friedman curve, 64
Fronto-occipital circumference (FOC), 139
Functional murmurs, 140
Fundal height, during pregnancy, 37, 37f
Fundal massage, 99f, 99–100
Fundus, 64, 95

G
Genitalia, assessment of
  in child, 184–185
  in newborn, 125–126
Genu valgum, 183
Genu varum, 183
Gestation, 30
Gestational trophoblastic disease, 54
Glasgow Coma Scale, 215, 224
GnRH, 1
Gonorrhea, 8
Goodell’s sign, 31
Gravida (G), 31
Gross motor, 139
Growth, 197, 198f–201f, 202
  definition of, 139
  developmental tasks associated with, 148–151
Growth charts
  CDC, 202
  WHO, 197, 198f–201f
Grunt/grunting, 125, 128, 210
Gynecologic terms and abbreviations, 1–3

H
Haemophilus influenzae type b
  description of, 135, 238
  vaccine, 7
Hair assessment, 171
Hairline fracture, 225f
hCG (human chorionic gonadotropin), 31
Head assessment of
  in child, 171–172
  in newborn, 123–124
  bobbing of, 212
Headache, 12, 18, 46, 60, 79, 235, 237
Health promotion
  for children, 152–156
  for women, 6
Hearing loss, 173
Hearing screen, in newborn, 128
Heart assessment, 178–180
Heart failure, 178, 182, 216, 218
Heart rate
  in child, 185
  fetal. See Fetal heart rate (FHR)
Heartburn, pregnancy and, 51
Heave, 178
Heelstick, blood sampling via, 126–127, 127f
Hegar’s sign, 31
Heimlich maneuver, 244
HELLP syndrome, 60–61
Hemoglobin A1C, 29, 235
Hemorrhage, postpartum, 103–104. See also Bleeding
Hemorrhoids, pregnancy and, 50
Heparin locks, 257
Hepatitis A, 7
Hepatitis B, 7, 9
Hernia, 182
Herpes simplex virus, 10
Herpes zoster vaccine, 7
Homans’ sign, 95, 103

270
Hormonal contraceptives, 18–21
Hormone replacement therapy, 23
Hospitalized children
assessment of, 210–223
eating by, 251
fears experienced by, 247–248
play by, 249–250
Human immunodeficiency virus (HIV), 10
Human papillomavirus infection (HPV)
description of, 1, 11
vaccine for, 7
Hydration, 80, 123, 216, 228–230, 233, 236, 239, 241, 259
Hydrocephalus, 119
Hydrocephaly, 124, 172, 241
Hygiene, 117, 184–185
Hyperbilirubinemia, 120
Hyperemesis gravidarum, 58
Hyperglycemia, 235–236
Hyperosmolar nonketotic coma, 236
Hypertension
description of, 19, 29, 46–47, 75, 140, 180, 186
pregnancy-induced, 60–61
Hypoglycemia, 123, 235
Hyponatremia, 238
Hypospadias, 120, 126, 184
Hypothalamic-pituitary cycle, 5
Hypothermia, 166
Hysterectomy, 1
Hysterosalpingography, 1
Hysteroscopy, 2

271
for newborn, 134
in pregnancy, 44
Imperforate anus, 120
Imperforate hymen, 185
Impetigo, 170, 217
Increased intracranial pressure, 172, 241
Indirect Coombs’ test, 95
Indomethacin, 59
Induced labor, 89
Infants. See also Children;
Newborn
airway obstruction in, 244
dos and don’ts of care for, 152–153
medications for, 253–258
dosages of, 252–253
unresponsive, 244
Infections
immunization against, 7, 44, 162
postpartum, 108–110
sexually transmitted, 8–12
wound, 109–110
Infectious mononucleosis, 140
Influenza vaccine, 231
for pregnancy patient, 44
schedule for, 7
Injections
in child, 255–258, 256f
in newborn, 127–128
Innocent murmurs, 140
Inspissation in pregnancy, 51
Inspiratory stridor, 211
Inspiratory wheeze, 210
Intramuscular injections
in child, 255–256, 256f
in newborn, 127–128
Intrauterine pressure catheter (IUPC), 64
Intrapartum period, 64
Intrauterine resuscitation, 77
Intrauterine system/intrauterine device, 21
Intravenous fluid administration, 258–260
Intravenous medications, for children, 257–258
Involution, of uterus description of, 96, 98, 99f measures promoting, 99f, 100
Irritability, 84, 213, 237
IV push or bolus, 257

J
Jaundice, in newborn, 123, 131

K
Kangaroo care, 64, 95, 120
Kawasaki disease, 177, 217
Kegel exercises, 2, 95, 117
Kernicterus, 120
Kernig sign, 215, 237
Ketoacidosis, 232, 236
Knock-knees, 183
Kyphosis, 183

L
Labia majora/minora, 185
Laboratory findings in child, 163–164 in postpartum patient, 105 in pregnant patient, 38, 48–49
Lactation child nutrition and, 112–116, 113f–114f, 156 lactational amenorrhea method (LAM), 16
Lanugo, 120
Large for gestational age (LGA), 120
Laryngotracheobronchitis, 229–230
Last normal menstrual period (LNMP), 31
Latch-on, for breastfeeding, 113–114
Left occiput anterior (LOA), 64
Leg cramps, pregnancy and, 51
Length, 122–123, 150, 172, 182
Lennox-Gastaut syndrome, 243
Leopold’s maneuver, 47, 47f, 64
Leukorrhea, 42
Level of comfort assessment of, 104–105 postpartum, 117
Lift, 125, 178
Lightening, 31, 64
Linea nigra, 31, 51
Lipoma, 170
Lochia, 95, 101–102, 102f, 116
Lordosis, 183
Lyme disease, 219

272
Lymph nodes
  assessment of, in ill/hospitalized child, 214–215
  description of, 2–3, 10, 14, 25, 177, 196
  illustration of, 196f
Lymphedema, 2
Lymphocyte, 139

\textbf{M}
Macrosomia, 31, 95
Macule, 170
Magnesium sulfate, 59
Maintenance fluid calculations, 259–260
Malnutrition, 171
Mastectomy, 2
Mastitis, 95, 120
Maternal screening, in pregnancy, 41
Maturation, 140
McRobert’s maneuver, 64
Measles, mumps, rubella vaccine, 7
Meconium, 120
Meconium ileus, 231
Medications, for infants and children, 253–258
dosages of, 252–253
  teratogenic, 44
Menarche, 2
Meningitis, 8, 138, 140, 172, 178, 215, 237–238, 241
Meningococcal vaccine, 7
Menopause, 2, 22–23
Menorrhagia, 2
Menstrual cycle, 3–4, 4f
cessation of, 22–23
education about, 3–4
  postpartum, 117
Mental development, 147–148
Metrorrhagia, 2

\textbf{Microdrop}, 140
\textbf{Milia}, 120
\textbf{Molding}, 120
\textbf{Mole}, 169
\textbf{Mongolian spot}, 120, 170
\textbf{Mononucleosis}, 140, 182, 218
\textbf{Moro reflex}, 120, 122, 125, 168, 173
\textbf{Mouth}, assessment of
  in child, 175–177
  in ill or hospitalized child, 216
  in newborn, 124–125
\textbf{Multiparity}, 31
\textbf{Murmurs}, 140, 179–180, 213
\textbf{Musculoskeletal system assessment}, 182–184
\textbf{Myomectomy}, 2

\textbf{N}
Naegele’s rule, 34
\textbf{Nail(s)}
  assessment of, 170–171
  clubbing of, 171
\textbf{Nasal flaring}, 125, 128, 227–228
\textbf{Nausea, during pregnancy}, 43
\textbf{Neck}, assessment of
  in child, 177–178
  in newborn, 123–124
\textbf{Neglect}, 184–185
\textbf{Neonate}. \textit{See also} \textbf{Newborn}
\textbf{Neurologic assessment, of child}
  description of, 167–168
  ill or hospitalized child, 215
\textbf{Newborn}
  abbreviations relating to, 119–121
  \textbf{Apgar scoring of}, 84
  assessment of, 122–126
  definition of, 140
feeding of. See Nutrition, for child
immediate care of, 83–85
nursery care of, 121, 126–128
parents of, education of, 128–134
terminology relating to, 119–121
Nitrazine paper, 59
Nodule, 170
Nonketotic coma, hyperosmolar, 236
Nonstress test (NST), 31, 52, 65
Nose
assessment of
in child, 174–175
in newborn, 124
bleeding from, during pregnancy, 43
Nuchal rigidity, 178, 237
Nuchal transparency, 40
Nursery care of newborn, 121, 126–128
Nutrition for child, 156–161
breastfeeding, 112–116, 113f–114f, 156
food groups, 161
formula feeding in, 132–133, 156–160
hospitalization and, 251
solid foods in, 160–161
postpartum assessment, 105
for pregnant patient, 44–45

O
Obese, 45, 183, 208
Obstetric terms and abbreviations, 30–32, 35
Oligomenorrhea, 2
Oophorectomy, 2
Oral medications, for infants and children, 253–254
Oral rehydration solutions (ORS), 140
Organic murmurs, 140
Osteoporosis, 23–24
Otic medications, for infants and children, 254–255
Otitis externa, 173
Otitis media, acute (AOM), 135, 173
Otitis media with effusion (OME), 140, 173
Ovarian cycle, 5
Over-the-counter medications (OTC), 31
Overweight, 45, 183, 202, 208
Ovulation, 2
Oxygenation assessment, in ill or hospitalized child, 210–211
Oxytocin, for labor induction, 90
Oxytocin challenge test, 52–53

P
Pain
cultural influences on responses to, 145
management of, in labor, 80–81, 83, 88–89
sickle cell crisis, 240–241
Pallor, 32, 39, 169, 235
Palmar grasp reflex, 120, 122, 168
Papule, 169
Pra (P), 31, 65
Parallel play, 152
Patent ductus arteriosus (PDA), 140
Pediatric nurse practitioner (PNP), 14
Pediatric trauma score, 223
Pediculosis, 171
Pelvic floor dysfunction, 28
Percentile, 141
Perineal lacerations postpartum assessment of, 102–103
postpartum cleansing of, 117
Peripheral edema, in pregnancy, 51
Peripheral pulses, 195f
Peritonsillar abscess, 176–177
Permanent birth control methods, 22
Pertussis, 141
Pessary, 2
Pharyngitis, strep, 142, 217
Pharynx assessment, in ill or hospitalized child, 216
Phenylketonuria (PKU), 141
Photosensitivity, 237
Physical assessment. See Assessment
Physiotherapy, 231
Piaget, Jean, 147–148
Pigmentation changes, in pregnancy, 51
Pilonidal cyst, 169
Placenta previa, 31, 55, 56f, 92–93
Plantar grasp reflex, 121
Plaque, 170
Pneumococcal vaccine, 7, 239
Pneumonia, 8, 181, 212, 238–240
Point of maximum cardiac impulses (PMI), 178
Polycystic ovarian syndrome (PCOS), 2, 29
Polydactyly, 121

275
Polydipsia, 234
Polyphagia, 234
Polyps, 175, 230
Port wine stain, 170
Post-ictal period, 243
Postnatal, 31
Postpartum period, 95–118
assessment in, 96–106
complications in, 107–111
education in, 111–118
emotional response, 103–104
nursing care in, 96–106
terminology relating to, 95–96
Pound to kilogram conversion, 252
Pregnancy, 32–93
abbreviations relating to, 30–32, 35
complications of, 53–62
warning signs of, 46–47
delivery in. See Delivery
diabetes mellitus in, 61–62
ectopic, 54
education about, 42–44, 49–52
exercise during, 45–46
health care visits during, 34, 36–41, 47–49
health history and, 34–36, 65–66
hormonal changes in, 36
hyperemesis in, 58
hypertension in, 60–61
labor in. See Labor
laboratory findings in, 38, 48–49
nutrition in, 44–45
physiological changes in, 38
preconception counseling and, 14–15
sexuality during, 46
INDEX

signs of, 32
spontaneous abortion of, 54
terminology relating to, 30–32, 35
tests for, 32
trimesters of, 34
ultrasound in, 33, 39
vaginal bleeding in, 53–57, 56f–57f, 92–94, 93f
vomiting in, 43, 58
weight gain in, 45
Prehypertension, 186
Premature/prematurity, 121, 136–137, 185, 214
Premature rupture of membranes (PROM), 65
Prenatal health care visits, 34, 36–41, 47–49
Prenatal health history, 34–36, 65–66
Preschooler, 141, 154–155
Primary amenorrhea, 1
Primipara, 65
Prophylactic antibiotics, 240
Prostaglandin agonist, 59
Proximodistal, 141
Psoriasis, 170
Psychosexual development, 147
Psychosocial development, 146–147
Puberty, 141
Pulmonary embolism, 111
Pulse assessments, 104, 122, 195f
Pulse oximeter, 214, 230
Pustule, 170
Pyloric stenosis, 218

R
Rales, 181, 212, 227, 239
Reactive airway disease (RAD), 141
Rectal assessment, in child, 184
Rectal prolapse, 184–185, 231
Rectocele, 2, 28
Red light reflex, 174
Reflexes, 168
Reproductive disorders, 25–29
Respirations
in newborn, 122
postpartum assessment of, 104
Respiratory distress syndrome (RDS), 121
Respiratory rate, 185
Respiratory syncytial virus (RSV), 135–136, 142, 212, 228–229
Respiratory system
assessment, in child
description of, 180–181
in ill or hospitalized child, 211–213
Resuscitation, 244–246
Retractions, 125, 128, 173, 212, 228
Retrograde administration, of intravenous medications, 257
Return prenatal health care visits, 47–49
Rh-negative patient, 105
Rheumatic fever, 142, 219
Rhonchi, 181, 212–213
Rickets, 183
Ringworm, 117, 171
Ritodrine, 59
Rooting reflex, 113, 121, 124–125, 133, 168

276
Roseola, 142, 217
Round ligament pain, 32, 51
Rubella, 142
Rubeola, 142

Safety recommendations
in medication dosing, 252–253
in parental care of newborn, 133–134
Salpingectomy, 3
Scabies, 169
Scarlatina, 217
Scarlet fever, 142, 217
School-age child, 155
Scissoring, 184
Scoliosis, 176, 183
Scratch test, 218–219
Screen time, 154–155, 165
Screening
maternal, 41
newborn, 126–128
Sebaceous cyst, 169
Seborrheic keratosis, 170
Secondary amenorrhea, 1
Secretions, 221
Seizures, 241–243
Sensorineural hearing loss, 173
Sentinel node, 3
Sepsis, 8, 122, 166, 214
Serum testing, in pregnancy, 33, 41
Sexual health, 6
Sexuality
postpartum, 117
during pregnancy, 46
Sexually transmitted infections
(STI), 3, 6–12, 15, 35, 155, 184–185
Shaken baby syndrome, 142

Shifting to the left, 142
Shock, 54, 57, 91, 94, 108, 232, 234, 236, 246
Shortness of breath, in pregnant patient, 52
Shoulder dystocia, 92
Sibilant rales, 212
Sickle cell crisis, 240–241
Sinus arrhythmia, 179
Sitz bath, 95
Skin
assessment of
in child, 169–170
in cases of illness or hospitalization, 216–217
in newborn, 123
pigmentary changes of, in pregnancy, 51
Skin turgor, 216, 233
Sleep, recommended positions for, 133, 152–153, 171
Small for gestational age (SGA), 121
Smoke inhalation, 211
Solid foods, 160–161
Solitary play, 152
Startle reflex, 120
Station, 32, 65, 67f
Stature, 143, 182
Status epilepticus, 243
Steatorrhea, 220
Sterilization, tubal, 22
Stool(s), 9, 83, 85, 125, 131, 138, 220, 231, 233–234
Strep, 217, 219
Striae, 32, 51
Stridor, 211
Supine hypotension, 32
Surfactant, 32, 121
Sydenham’s chorea, 142
Syndactyly, 121
INDEX

Syndrome of inappropriate secretion of antidiuretic hormone (SIADH), 238
Syphilis, 11–12

T
T-Score, 23
Tachycardia, 74
Tachysystole, 65
Talipes equinovarus, 183
Tanner stage, 143
Teeth, 209f
Telangiectatic nevi, 121
Temperature
assessment of, in ill or hospitalized child, 214
monitoring of, in fertility awareness, 16
postpartum assessment of, 104
Teratogens, 32, 43–44
Terbutaline, 59
Term (T), 32
Tetanus, diphtheria, pertussis vaccine, 7
Tetralogy of Fallot (TOF), 143
Thril, 125, 179–180
Thrombophlebitis, postpartum, 111
Thrombosis, postpartum, 111
Thrush, 143, 175, 216
Tinea, 117, 171
Tocolytics, 32, 61, 65
Toddlers, 143, 153–154
Tongue-tie, 177
Tonic neck reflex, 121–122, 168
Tonsils, 173, 176–177, 216
Cryptic, 177
Grading of, 176
Torticollis, 178
Total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO), 3
Transcervical tubal sterilization, 22
Trauma, in child, 223
Trichomoniasis, 12
Triesteres of pregnancy, 34
Triple screen, 41
Tripod position, 213
Trunk incurvation reflex, 121
Tubal ligation, 22
Turner syndrome, 143, 177
Turtle sign, 65
Tympanic membrane, 255

U
Ultrasound in pregnancy, 33, 39
Umbilical cord
care of, 131
prolapse of, 91–92
Underweight, 45, 202, 208
Undescended testicles, 184
Unresponsive infant, 244
Urinary frequency, 43
Urinary tract infection, 110
Urine
ketones in, 58, 62, 235–236, 243
specific gravity of, 221, 233, 235
testing of, for pregnancy, 33
Uterine artery embolization, 3
Uterine atony, 96
Uterine fibroid, 3
Uterus
contractions of, 78, 78f–79f
fetal response to, 52
fibroids of, 29
fundal height, 37, 37f
involution of, 96, 98, 99f
measures promoting, 99f, 100
postpartum infection of, 109
prolapse of, 3, 28

278
Vaccination. See Immunizations
Vaginal birth after Cesarean delivery (VBAC), 65, 90–91
Vaginal bleeding postpartum, 107–108
during pregnancy, 53–57, 56f–57f, 92–94, 93f
Vaginal discharge after delivery, 101–102, 102f, 116
ever in pregnancy, 42
Varicella, 7, 143
Varicose veins, 52
Vaso-occlusive crisis, 240
Venous access, in child, 259f
Venous thrombosis, postpartum, 111
Ventricular septa defect (VSD), 143
Vesicle, 170
Vesicular sounds, 181, 212
Viral exanthem, 143
Viral teratogens, 43

279
Vital signs
in child, 166
in postpartum patient, 104
in pregnancy, 43, 58

W
Weaning, from breastfeeding, 116
Weight
 gaining of, during pregnancy, 45
 healthy, 136, 202, 208
 underweight, 45, 202, 208
Wheeze/wheezing, 181, 210, 212, 228
Wilms’ tumor, 181
Wound
description of, 61, 95, 108–109, 221, 223
drainage of, 106, 110, 221
Wound infection, 109–110

X

X chromosome, 143