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1

Standard (Universal) Precautions

- **Indications:** Recommended for the care of all Pts, regardless of their diagnosis or presumed infection status.
- **Purpose:** Designed to provide a barrier precaution for all health-care providers—prevent the spread of infectious disease.
- **Application:** Applies to blood, other bodily fluids, secretions, excretions, nonintact skin, and mucous membranes.

Types of Standard Precautions

- **Hand washing:** The single most important means of preventing the spread of disease. Perform before and after every Pt contact, and after contact with blood, bodily fluids, or contaminated equipment.
- **Gloves:** Nonlatex gloves should be worn whenever contact with bodily fluids is possible. Note: lotions may degrade gloves.
- **Mask and eye protection:** Worn whenever there exists the potential for getting splashed by bodily fluids.
- **Gown:** Worn whenever exposed skin or clothing is likely to become soiled during Pt contact.
- **Disposal of sharps:** Sharp instruments and needles are disposed of in a properly labeled, puncture-resistant container. **NEVER** recap needles at any time.
- **Containment:** Soiled linen should be placed in a leak-proof bag. Grossly contaminated refuse is placed in a red biohazard bag and placed in appropriate receptacle.
- **Decontamination:** Contaminated equipment should be properly disinfected per facility guidelines. Single-use equipment must be properly disposed of after use.

Transmission-Based Precautions

Airborne: In addition to Standard Precautions, use **Airborne Precautions** for Pts known or suspected to have serious illnesses transmitted by airborne droplet nuclei.

- **Particulate Size:** Droplet nuclei smaller than 5 microns
- **Common Etiology:** Measles, chickenpox, disseminated varicella zoster, TB (tuberculosis)
- **Specific Precautions:** Private room, negative airflow (at least six changes per hour), and a mask for the health-care provider. The Pt may be required to wear a mask if coughing is excessive.

Droplet: In addition to Standard Precautions, use **Droplet Precautions** for Pts known or suspected to have serious illnesses transmitted by large particle droplets.

- **Particulate Size:** Droplet nuclei larger than 5 microns
- **Common Etiology:** *Haemophilus influenzae* type-B, (meningitis, pneumonia, epiglottitis, and sepsis), *Neisseria meningitidis* (meningitis, pneumonia, and sepsis), diphtheria, pertussis, mycoplasma pneumonia, pneumonic plague, streptococcal (group A) pharyngitis, pneumonia, scarlet fever in children, adenoviruses, mumps, parvovirus B19, rubella, and chicken pox
- **Specific Precautions:** Private room and a mask for the health-care provider are required. The Pt may be required to wear a mask if coughing is excessive.

Contact: In addition to Standard Precautions, use **Contact Precautions** for Pts known or suspected to have serious illnesses transmitted by direct Pt contact or by contact with items in the Pt's environment.

- **Common Etiology:** GI, respiratory, skin, or wound colonization or infection with drug-resistant bacteria. Other pathogens include *Clostridium difficile* (C-diff), *Escherichia coli*, (E-coli), *Shigella*, hepatitis, rotavirus, respiratory syncytial virus (RSV), diphtheria, herpes simplex, impetigo, pediculosis, scabies, chicken pox, and viral hemorrhagic infections, such as Ebola.
- **Specific Precautions:** Private room for the Pt, and gloves and gown for the health-care provider. The Pt may be required to wear a mask if coughing is excessive.

3

Nosocomial Infection

- **Definition:** A hospital-acquired infection that can be fatal to an immunosuppressed Pt. Nosocomial infections are transmitted by either accidental or deliberate disregard for standard precautions designed to minimize transmission from Pt to Pt or from health-care provider to Pt.
- **Common Organisms:** *Clostridium difficile* (C-diff), methicillin-resistant *Staph. aureus* (MRSA), vancomycin-resistant *Staph. aureus* (VRSA), vancomycin-resistant *Enterococcus* (VRE).
- **Likely Access:** Indwelling catheters, vascular access devices, endotracheal (ET) tubes, nasogastric (NG) and gastric tubes, and surgical wound sites.
- **Prevention:** Use Standard Precautions during Pt contact.

Communication

Lifespan Considerations

- Approach children at their eye level. Address them by name often and use language appropriate to their developmental level.
- Be aware of cognitive impairment, but never assume that a Pt is cognitively impaired simply because of advanced age.
- Be considerate of generational and gender differences.

Cultural Considerations

- Be aware that culture has a strong influence on an individual's interpretation of and responses to health care.
- An interpreter may help ease the anxieties of a language barrier.
- Be sensitive to cultural influence on nonverbal communication, i.e., touching or eye contact may be perceived as disrespectful.

Safety—Restraints

General Information

- Restraints are any physical or pharmacological means used to restrict a Pt's movement, activity, or access to his/her body.
- Restraints are used only as a last alternative after all other methods of control have been attempted prior to application.
- Restraints can only be used to prevent Pts from harming themselves or others, or interfering with medical treatment.
- Restraints may never be used for staff convenience or discipline.
- The application of restraints requires a written physician order specifying the clinical necessity, type of restraint, frequency of assessment, and duration restraint is to be used.
- Use of restraints should not exceed 24 hours.
  Note: Always refer to specific agency's policy and procedure when using restraints.

Procedure (Physical Restraints)

- Informed consent should be obtained from Pt or family.
- Obtain a written physician order—must be renewed every 24 hours.
- Always use the least restrictive form of restraint available.
- Assess skin and circulation, sensation, and motion (CSM) of area to be restrained prior to application.
- Pt should be restrained in an anatomically correct position with all bony prominences adequately padded and protected to prevent the development of pressure sores.
- Follow manufacturer's instructions when applying restraints.
- Apply loosely enough for two fingers to fit under the restraints.
- Restraints must not interfere with medical devices or treatment.
- Restraints should be secured to chair or bed frame (**Never** to side rails) using quick-release knots. For adjustable beds, secure to the parts of the bed frame that move with the Pt.
- A call bell must be easily accessible to the Pt.
- Assess restraint sites (skin, distal circulation, etc.) q 15 min.
- Remove restraints every 2 hours if possible. For aggressive Pts, remove only one restraint at a time.
- Document findings and interventions after each assessment.

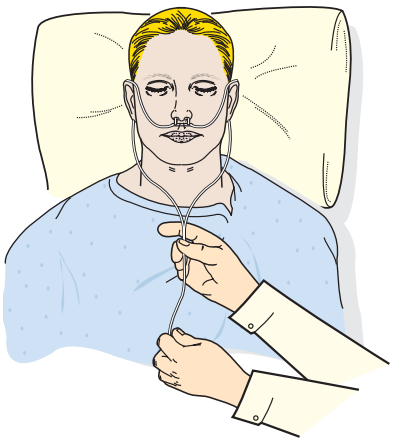
Alternatives to Restraints

- Provide regular orientation to reality and diversional activities.
- Encourage family to be involved with diversion and supervision.
- Allow ample opportunity for supervised ambulation and toileting.
- Move Pt closer to nurse's station. Monitor more frequently and respond to call lights promptly.
- Utilize pressure-sensitive alarms in beds and chairs or sitters.
- Conceal tubes and lines with pajamas or scrubs.

Oxygen Delivery Equipment

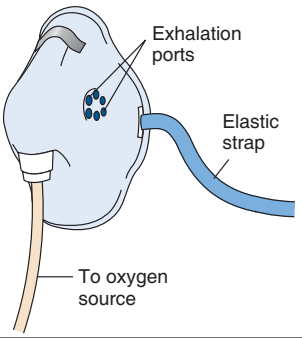
Nasal Cannula:

- Indicated for low flow, low percentage supplemental oxygen
- Flow rate of 1–6 L/min
- Delivers 22%–44% oxygen
- Pt can eat, drink, and talk
- Extended use can be very drying; use with a humidifier



Simple Face Mask:

- Indicated for higher percentage supplemental oxygen
- Flow rate of 6–10 L/min
- Delivers 35%–60% oxygen
- Lateral perforations permit exhaled CO_2 to escape
- Permits humidification



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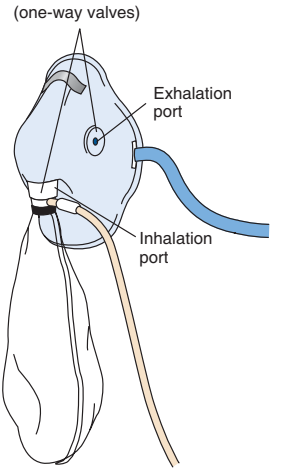
Oxygen Delivery Equipment *(continued)*

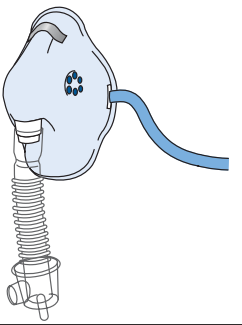
Nonrebreather (NRB) Mask:

- Indicated for high percentage supplemental oxygen
- Flow rate of up to 15 L/min
- Delivers up to 100% oxygen
- One-way flaps open and close with respiration, resulting in a high concentration of delivered oxygen and minimal to no CO_2 rebreathed by the Pt



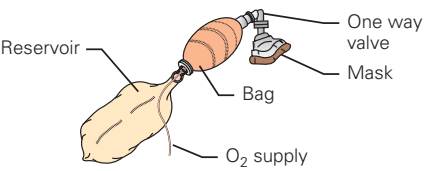
Venturi Mask (venti-mask):

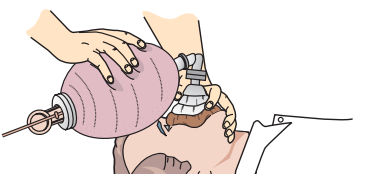
- Indicated for precise titration of percentage of oxygen
- Flow rate of 4–8 L/min
- Delivers 24%–40% oxygen
- Accurate delivery of O_2 is accomplished with a graduated dial which is set to the desired percentage of oxygen to be delivered



Bag-Valve-Mask (BVM):

- Indicated for manual ventilation of a Pt who has no or ineffective respirations
- Can deliver up to 100% O_2 when connected to O_2 source
- Appropriate mask size and fit are essential to create a good seal and prevent injury
- To create seal, hold mask with thumb and index finger and grasp underneath the ridge of the jaw with remaining three fingers





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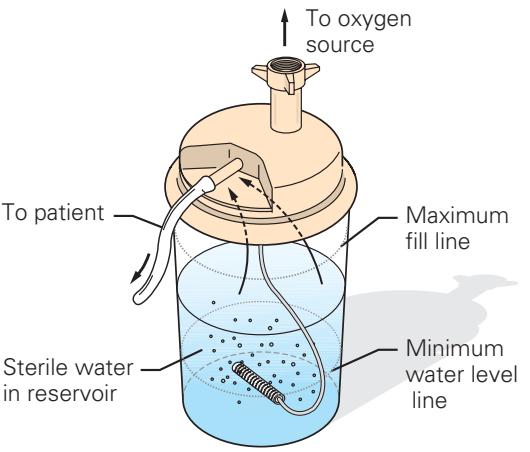
Oxygen Delivery Equipment *(continued)*

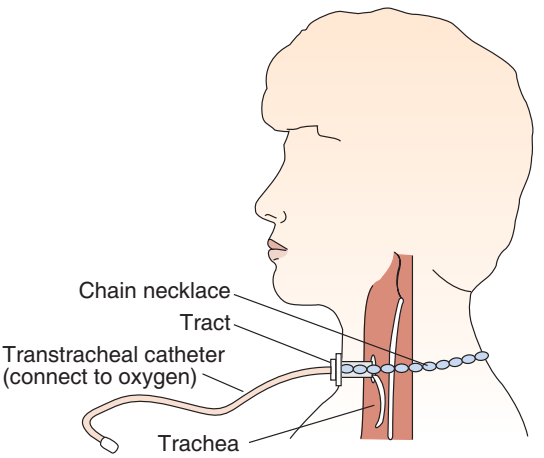
Humidified Systems:

- Indicated for Pts requiring long-term oxygen therapy to prevent drying of mucous membranes
- Setup may vary between brands. Fill canister with sterile water to recommended level, attach to oxygen source, and attach mask or cannula to humidifier
- Adjust flow rate



Transtracheal Oxygenation:

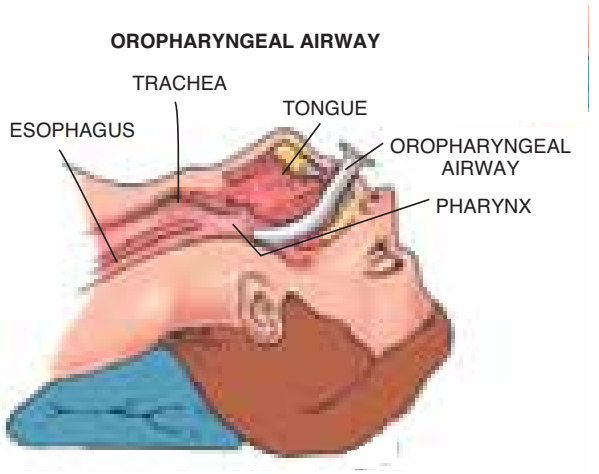
- Indicated for Pts with a tracheostomy who require long-term oxygen therapy and/or intermittent, transtracheal aerosol treatment
- Ensure proper placement (over stoma, tracheal tube)
- Assess for and clear secretions as needed
- Assess skin for signs of irritation



Artificial Airways

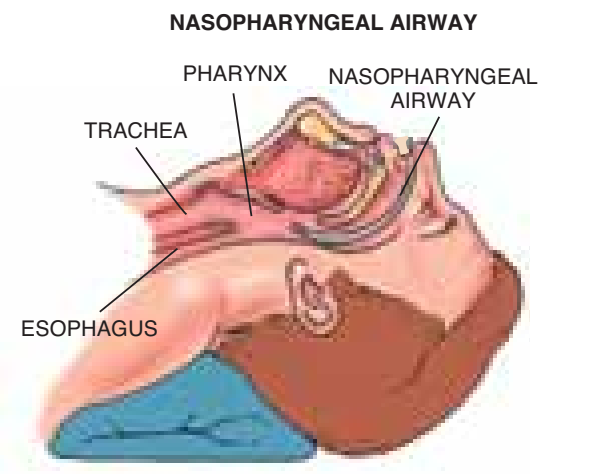
Oropharyngeal Airway (OPA):

- Indicated for unconscious Pts who do not have a gag reflex
- Measure from the corner of the Pt's mouth to the earlobe
- Rotate airway 180° while inserting into oropharynx



Nasopharyngeal Airway (NPA):

- Indicated for Pts with a gag reflex, or comatose with spontaneous respirations
- Measure from the tip of the Pt's nose to the earlobe
- The diameter should match the Pt's smallest finger
- **NEVER insert in the presence of facial trauma!**



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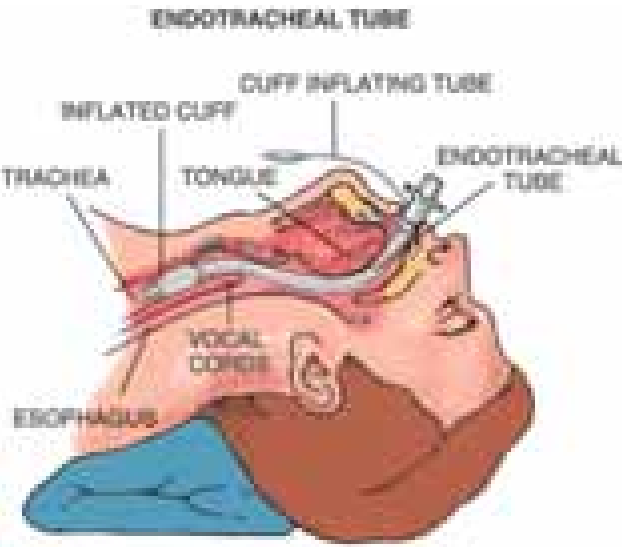
Artificial Airways *(continued)*

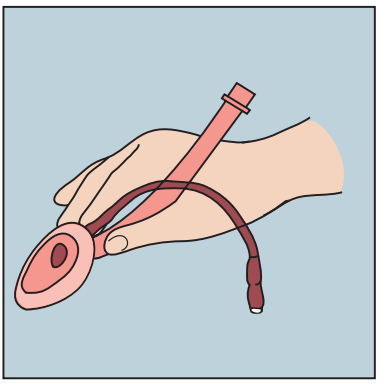
Endotracheal Tube (ETT):

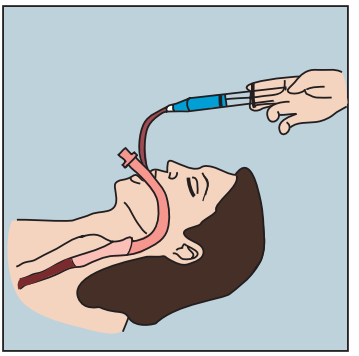
- Indicated for apnea, airway obstruction, respiratory failure, risk of aspiration, or therapeutic hyperventilation
- Can be inserted through the mouth or nose
- Inflated cuff protects Pt from aspiration



Laryngeal Mask Airway (LMA):

- Often used in noncomplicated surgeries and by EMS
- Direct visualization not needed for proper placement
- When cuff is inflated, the mask conforms to the hypopharynx, occluding the esophagus and protecting the glottic opening





Pulse Oximeters

Finding	Intervention
SpO_2 > 95%	■ Considered normal and requires no intervention. ■ Continue routine monitoring of Pt.
SpO_2 91%–94%	■ Considered acceptable. ■ Assess probe placement and adjust if necessary. ■ Continue to monitor Pt.
SpO_2 85%–90%	■ Raise head of bed (HOB) and stimulate Pt to breathe deeply. ■ Assess airway and encourage coughing. ■ Suction airway if needed. ■ Administer oxygen and titrate to SpO_2 > 90%. ■ Notify physician and respiratory therapist (RT) if SpO_2 fails to improve after a few minutes.
SpO_2 < 85%	■ Administer 100% oxygen, position Pt to facilitate breathing, suction airway if needed, and notify physician and RT immediately. ■ Check medication record and consider naloxone or flumazenil for medication-induced respiratory depression. ■ Be prepared to manually ventilate or aid in intubation if condition worsens or fails to improve.

Caution: Consider readings within the overall context of the Pt's medical history and physical exam. The reliability of pulse oximeters is sometimes questionable and many conditions can produce false readings. Assess the Pt's skin signs, respiratory rate (RR), and heart rate (HR). Ask how the Pt is feeling. Repositioning the probe to a different location (ears, toes, or a different finger) may help correct a suspected false reading.

Conditions That May Produce False Readings

Anemia	false high
Carbon monoxide (CO) poisoning	false high
Hypovolemia	false high
Pt movement	erratic readings
Cool extremities	false low
Dark pigment	false low
Nail polish	false low
Medication (peripheral vasoconstrictors)	false low
Poor peripheral circulation	false low
Raynaud's disease	false low

Ventilated Patient in Distress

Patient in sudden, severe respiratory distress

- **Manually ventilate the patient:** Disconnect the ventilator tubing from the ET tube and manually ventilate Pt with 100% oxygen using a bag-valve mask (BVM).
- **Have RT/MD notified stat.**

If patient is easy to manually ventilate

- The ventilator is the probable source of the problem.
- Notify RT.
- While you manually ventilate the Pt, RT should assess the ventilator per manufacturer's guidelines.
- The ventilator may need to be changed if the problem cannot be found.

If patient is difficult to manually ventilate

- **Clear airway:** Suction the ET tube to clear secretions. Notify RT. If unable to clear obstruction or pass suction catheter, extubate and manually ventilate with 100% oxygen using a BVM. Suction the oropharynx to clear secretions. **Notify RT/MD stat and assist with reintubation.**

- **Assess for air leak:** Listen for air around the cuff and check the cuff pressure with a manometer if available. Notify RT for possible reintubation if air leak cannot be fixed.
- **Assess for dislodgement:** If tube is dislodged, remove and manually ventilate Pt with 100% oxygen using a BVM. Suction oropharynx to clear secretions. Notify RT/MD stat and assist with reintubation.
- If ineffective ventilation continues after airway, ET, and ventilator are all determined to be patent, inspect and auscultate the Pt's chest for equal and adequate air movement. If there is unequal chest wall movement and/or decreased air movement on one side, it may be related to an incorrectly positioned ET tube, atelectasis, or a tension pneumothorax. Notify MD and RT stat.
- If ineffective ventilation continues and no physical or mechanical cause can be found consider sedating the Pt.

Troubleshooting Ventilator Alarms

- **When the ventilator alarms:** Check the Pt first. If Pt is in no apparent distress, check ventilator to determine source of problem.
- **If patient is showing signs of distress ("fighting the vent"):** Try to calm the Pt. If unsuccessful, immediately disconnect Pt from vent and manually ventilate with 100% oxygen using a BVM. Notify the physician and RT immediately.

Alarm	Intervention
Low-Pressure: Usually caused by system disconnections or leaks.	■ Reconnect Pt to ventilator. ■ Evaluate cuff and reinflate if needed (if ruptured, tube will need to be replaced). ■ Evaluate connections and tighten or replace as needed. ■ Check ET tube placement (auscultate lung fields and assess for equal, bilateral breath sounds).

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Alarm	Intervention
High-Pressure: Usually caused by resistance within the system. Can be kink or water in tubing, Pt biting the tube, copious secretions, or plugged endotracheal tube.	■ Suction Pt if secretions are suspected. ■ Insert bite block to prevent Pt from biting tube. ■ Reposition Pt's head and neck, or reposition tube. ■ Sedation may be required to prevent a Pt from fighting the vent, but only after careful assessment excludes a physical or mechanical cause.
High Respiratory Rate: Can be caused by anxiety or pain, secretions in ETT/airway, or hypoxia.	■ Suction Pt. ■ Look for source of anxiety (e.g., pain, environmental stimuli, inability to communicate, restlessness, etc.). ■ Evaluate oxygenation.
Low Exhaled Volume: Usually caused by tubing disconnection or inadequate seal.	■ Evaluate/reinflate cuff; if ruptured, ETT must be replaced. ■ Evaluate connections; tighten or replace as needed; check ETT placement, reconnect to ventilator.

Suctioning a Patient on the Ventilator

Preparation

- **Prepare the patient:** Explain procedure—offer reassurance.
- **Gather supplies**: Sterile gloves, sterile suction catheter and tubing, sterile normal saline, sterile basin, bag-valve mask connected to a supplemental oxygen source, suction source.
- **Equipment:** Ensure that wall or portable suction is turned on (no higher than 120 mm Hg) and position supplies and the suction tubing so that they are easily accessible.
- **Wash hands:** Follow standard precautions.

Preprocedure

- **Setup:** Using sterile technique, open and position supplies so that they are within easy reach. Fill sterile basin with sterile normal saline and open sterile gloves close by so that they are easy to reach.
- **Position yourself:** Stand at the Pt's bedside so that your nondominant hand is toward the Pt's head.
- **Preoxygenate:** Manually ventilate Pt with 100% O_2 for several deep breaths.

Technique

- Don sterile gloves.
- Wrap the sterile suction catheter around your dominant hand and connect it to the suction tubing. *Wrapping the catheter around your hand prevents it from dangling and minimizes risk of contamination.* Be careful not to touch your dominant hand with the end of the suction tubing.
- **Note:** Your nondominant hand is no longer sterile and must not touch any part of the catheter or your dominant hand.
- Insert suction catheter just far enough to stimulate a cough reflex.
- Apply intermittent suction while withdrawing catheter and rotating 360° for no longer than 10–15 seconds to prevent hypoxia.
- Manually ventilate with 100% O_2 for several deep breaths.
- Repeat until the Pt's airway is clear.
- Suction oropharynx after suctioning of airway is complete.
- Rinse catheter in basin with sterile saline in between suction attempts (apply suction while holding tip in the saline).
- Rinse suction tubing when done and discard soiled supplies.

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Troubleshooting Chest Tubes

Air Leak

Continuous bubbling in the water seal chamber suggests that there is an air leak, either in the Pt or in the drainage system. Possible causes include a disconnection or break in the drainage system, an incomplete seal around the tube at the insertion site, or an improperly inserted tube. Notify the MD, and check the Pt and system for the source of the air leak:

- Briefly occlude the tube manually by pinching the tubing close to the chest wall. A cessation of bubbling suggests that the air leak is within the Pt at the insertion site. Notify the physician.
- If bubbling continues, assess to see if air might be entering at the insertion site around the wound. Using both hands, apply pressure around insertion site. If bubbling stops or decreases with pressure, notify physician and discuss replacing dressing with another pressure dressing. A suture may be required around tube.
- If neither measure decreases bubbling, the air leak may be in the tubing and/or connections. Secure and retape all connections.
- If air leak is still present, change out drainage system.

The Chest Tube Has Become:

Completely separated from the Pt.

- Assess Pt for respiratory distress and notify physician stat.
- Apply occlusive dressing to insertion site (taped on three sides to allow air to escape, but not enter the chest).*

Partially pulled out of the insertion site, exposing the drainage opening, but the end of the chest tube still remains in the Pt.

- Assess Pt for respiratory distress and notify physician stat.
- Remove dressing at insertion site and wrap chest tube (covering the drainage opening) with an occlusive dressing.*

*Be prepared to assist with reinsertion of new chest tube.

Chest tube has become disconnected from drainage unit

- Do one of three things while preparing to reattach tubes: (1) Leave the tube open to air, (2) Submerge the distal end of the chest tube under 1–2 inches of sterile water or normal saline (essentially, a water seal), or (3) Attach a one-way (Heimlich) valve.
- Clean both exposed ends with Betadine swabs for 30 seconds and let air dry for 30 seconds. Reconnect drainage system and retape with fresh waterproof tape.
- If tube connections have been grossly contaminated (i.e., with feces, urine, etc.), a new drainage system including sterile connector must be attached. This must be done as quickly as possible to prevent respiratory distress due to possible pneumothorax.

NG (Nasogastric) Tube—Insertion

- **Explain** the procedure to the Pt and offer reassurance.
- **Auscultate** abdomen for positive bowel sounds if NG tube is to be used for administration of feedings or medication.
- **Position** the Pt upright in high-Fowler's position. Instruct the Pt to keep a chin-to-chest posture during insertion. This helps to prevent accidental insertion into the trachea.
- **Measure** the tube from the tip of the nose to the ear lobe, then down to the xyphoid. Mark this point on the tube with tape.
- **Lubricate** the tube by applying water-soluble lubricant to the tube. Never use petroleum-based jelly, which degrades PVC tubing.
- **Insert** the tube through the nostril until you reach the previously marked point on the tube. Instruct the Pt to take small sips of water during insertion to help facilitate passing of the tube.
- **Secure** the tube to Pt's nose using tape. Be careful not to block the nostril. Tape tube 12–18 inches below insertion line and then pin tape to Pt's gown. Allow slack for movement.
- **Position** HOB at 30°–45° to minimize risk of aspiration.

- **Confirm** proper location of NG tube:
  - Pull back on plunger* of a 20-mL syringe to aspirate stomach contents. Typically, gastric aspirates are cloudy and green, or tan, off-white, bloody, or brown. Gastric aspirate can look like respiratory secretions so it is best to also check pH.
  - Dip litmus paper into gastric aspirate. A reading of a pH of 1–3 suggests placement in the stomach.
  - An alternative method, but less reliable, is to inject 20 mL of air into the tube while auscultating the abdomen. Hearing a loud gurgle of air suggests placement in the stomach. If no bubbling is heard, remove tube and reattempt. Withdraw tube immediately if the Pt becomes cyanotic or develops breathing problems.
  - An inability to speak also suggests intubation of the trachea instead of the stomach.

*Note: small-bore NI (nasointestinal) tubes (e.g., Dobhoff) may collapse under pressure and initial confirmation of placement is obtained with x-ray.

- **Assemble** equipment (wall suction, feeding pump, etc.) per manufacturer guidelines.
- Document the type and size of NG tube, which nostril, and how the Pt tolerated the procedure. Document how tube placement was confirmed and whether tubing was left clamped or attached to feeding pump or suction.

NG Tube—Care and Removal

Patient Care

- Reassess placement of tube prior to administering bolus feedings, fluids, or meds and q shift for continuous feedings.
- Flush tube with 30 mL of water after each feeding and after each administration of medication.
- Assess for skin irritation or breakdown. Retape daily and alternate sites to avoid constant pressure on one area of the nose. Gently wash around nose with soap and water and dry before replacing tape. Provide nasal hygiene daily and p.r.n.
- Provide good oral hygiene every 2 hours and p.r.n. (mouthwash, water, toothettes → clean tongue, teeth, gums, cheeks, and mucous membranes). If Pt is performing oral hygiene, remind him or her not to swallow any water.

Removal

- Explain procedure to Pt. Observe standard precautions.
- Remove tape from nose and face.
- Clamp or plug tube (prevents aspiration), instruct Pt to hold breath, and remove tube in one gentle but swift motion.
- Assess for signs of aspiration.

NG Tube Feedings

- **Confirm placement prior to using:** (1) using a 20-mL syringe, inject a 20-mL bolus of air into the feeding tube while auscultating the abdomen. Loud gurgling indicates proper placement. **DO NOT** attempt this with water! (2) Use a 20-mL syringe and gently aspirate gastric content. Dip litmus paper into gastric aspirate—a pH of 1–3 suggests proper placement.
- **Maintenance:** Flush with 30 mL of water every 4 to 6 hours and before and after administering tube feedings, checking for residuals, and administering medications.
- **Medication:** Dilute liquid medications with 20–30 mL of water. Obtain all medications in liquid form. If liquid form is not available, check with pharmacy to see if medication can be crushed. Administer each medication separately and flush with 5–10 mL of water between each medication. Do not mix medications with feeding formula!
- **Residuals:** Check before bolus feeding, administration of medication, or every 4 hours for continuous feeding. Hold feeding if greater than 100 mL and recheck in 1 hour. If residuals are still high after 1 hour, notify physician.

Types of Tube Feedings

- **Initial tube feedings:** Advance as tolerated by 10–25 mL/hour every 8–12 hours until goal rate is reached.
- **Intermittent feedings:** Infusions of 200–400 mL of enteral formulas several times per day infused over a 30-minute period.
- **Continuous feedings:** Feedings that are initiated over 24 hours with the use of an infusion pump.

Checking Residuals

- Using a 60-mL syringe, withdraw from the gastric feeding tube any residual formula that may remain in the stomach.
- The volume of this formula is noted, and if it is greater than a predetermined amount the stomach is not emptying properly and the next feeding dose is withheld.
- This process can indicate gastroparesis and intolerance to the advancement to a higher volume of formula.

Tube Feeding Complications

Problem	Possible Causes and Interventions
Nausea, vomiting, & bloating	■ **Large residuals:** Withhold or decrease feedings. ■ **Medication:** Review meds and consult physician. ■ **Rapid infusion rate:** Decrease rate.
Diarrhea	■ **Too rapid administration:** Reduce rate. ■ **Refrigerated TF (too cold):** Administer at room temp. ■ **Tube migration into duodenum:** Retract tube to reposition in the stomach and reconfirm placement.
Constipation	■ **Decreased fluid intake:** Provide adequate hydration. ■ **Decreased dietary fiber:** Use formula with fiber.
Aspiration and gastric reflux	■ **Improper tube placement:** Verify placement. ■ **Delayed gastric emptying:** Check residuals. ■ **Position of patient:** Keep HOB elevated 30°–45°.
Occluded tube	■ **Inadequate flushing:** Flush more routinely. ■ **Use of crushed meds:** Switch to liquid meds.
Displaced tube	■ **Improperly secured tube:** Retape tube. ■ **Confused patient:** Follow hospital protocol.

Ostomy Care

Types of Ostomies

- **Colostomy:** May be permanent or temporary. Used when only part of the large intestine is removed. Commonly placed in the sigmoid colon, the stoma is made from the large intestine and is larger in appearance than an ileostomy. Contents range from firm to fully formed, depending on the amount of remaining colon.
- **Ileostomy:** May be permanent or temporary. Used when the entire large intestine must be removed. The stoma is made from small intestine and is therefore smaller than that of a colostomy. Contents range from paste-like to watery.
- **Urostomy:** Used when the urinary bladder is either bypassed or must be removed altogether.

Procedure for Changing an Ostomy Bag

- Explain procedure to Pt.
- Gather supplies.
- Place Pt in a supine position.
- Wash hands and observe standard precautions (don gloves).
- Remove old pouch by gently pulling away from skin.
- Discard gloves, wash hands, and don a new pair of gloves.
- Gently wash area around stoma with warm, soapy water and then dry skin thoroughly.
- Inspect the appearance of the stoma, the condition of the skin, and note the amount, color, consistency of contents, and presence of unusual odor.
- Cover the exposed stoma with a gauze pad to absorb any drainage during ostomy care.
- Apply skin prep in a circular motion and allow to air dry for approximately 30 seconds.
- Apply skin barrier in a circular motion.
- Measure stoma using a stoma guide and cut ring to size.
- Remove paper backing from adhesive-backed ring and, using gentle pressure, center the ring over the stoma and press it to the skin.

- Smooth out any wrinkles to prevent seepage of effluent.
- Center faceplate of bag over stoma and gently press down until completely closed.
- Document appearance of the stoma, the condition of the skin, amount, color, and consistency of contents, and presence of any unusual odor.
- Discard soiled items per hospital policy using standard precautions.

Urinary Catheters

Straight Catheter

- Also called a **red rubber** catheter or "straight cath." Straight catheters have only a single lumen and do not have a balloon near the tip. Straight catheters are inserted for only as much time as it takes to drain the bladder or obtain a urine specimen.

Indwelling Catheter

- Also called a **Foley** or **retention** catheter. Indwelling catheters have two lumens, one for urine drainage and the other for inflation of the balloon near the tip. **Three-Way** Foley catheters are used for continuous or intermittent bladder irrigation. They have a third lumen for irrigation.

Procedure for Insertion

- Prepare Pt: Explain procedure and provide privacy.
- Collect the appropriate equipment.
- Place Pt in the supine position (Female: knees up, legs apart; Male: legs flat, slightly apart).
- Open and set up catheter kit using sterile technique.
- Don sterile gloves and set up sterile field.
- If placing indwelling catheter, check for leaks and proper inflation of balloon by filling with 5 mL of sterile water. Remove water.

- Lubricate end of catheter.
- Saturate cotton balls with cleansing solution (assess Pt allergies).
- With nondominant hand (now contaminated); ***Female***: hold labia apart; use dominant (sterile) hand to hold swabs with sterile forceps and swab from front to back, in the following order: (1) labia farthest from you, (2) labia nearest to you, (3) center of the meatus between each labia. Use one swab per swipe. ***Male***: retract foreskin; use dominant (sterile) hand to hold swabs with sterile forceps and swab in a circular motion from the meatus outward. Repeat three times, using a different swab each time. Ensure that foreskin is NOT left retracted once procedure is completed.
- Gently insert catheter (about 2–3 inches for females and 6–9 inches for males) until the return of urine is noted.
- **For straight catheters:** Obtain specimen or drain bladder and then remove and discard catheter.
- **For indwelling catheters:** Insert an additional inch and then inflate balloon.
- Attach catheter to drainage bag using sterile technique.
- Secure catheter to Pt's leg according to hospital policy.
- Hang drainage bag on bed frame below level of the bladder.
- Document type and size of catheter, amount and appearance of urine, and how Pt tolerated the procedure.

Urinary Catheters—Care and Removal

Routine Catheter Care

- Use standard precautions.
- Keep bag below level of Pt's bladder at all times.
- Check frequently to be sure there are no kinks or loops in the tubing and that the Pt is not lying on the tubing.
- Do not pull or tug on the catheter.
- Wash around the catheter entry site with soap and water twice each day and after each bowel movement.
- Do not use powder around the catheter entry site.
- Periodically check skin around the catheter entry site for signs of irritation, redness, tenderness, swelling, or drainage.

- Offer fluids frequently (if not contraindicated by health status), especially water or cranberry juice.
- Record urine output every shift or per physician orders.
- Empty collection bag each shift; note quantity, color, clarity, odor, and presence of sediment.
- **Notify physician of any of the following:**
  - Blood, cloudiness, or foul odor.
  - Decreased urine output (<30 mL/hour)—order a bladder scan.
  - Irritation, redness, tenderness, swelling, or drainage or leaking around the catheter entry site.
  - Fever, or abdominal or flank pain.

Procedure for Removal

- Don gloves and observe Standard Precautions.
- Use a 10-mL syringe to withdraw all water from balloon. Some catheter balloons are overinflated or have up to a 30-mL balloon; withdraw and discard water until no more water can be removed.
- Hold a clean 4x4 at the meatus in the nondominant hand. With dominant hand, gently pull catheter. If you meet resistance, stop and reassess if balloon is completely deflated. If balloon appears to be deflated and catheter cannot be removed easily, notify physician.
- Wrap tip in clean 4x4 as it is withdrawn to prevent leakage of urine. If a culture of the catheter tip is desired, wrap tip in a sterile 4×4 as it is withdrawn.
- Note time that catheter was discontinued.
- Provide bedpan, urinal, or assistance to bathroom as needed.
- Document time of removal and how Pt tolerated the procedure.
- Document amount and time of spontaneous void.
- If Pt does not void within 8 hours, palpate bladder and notify physician. Catheter may need to be reinserted.

Specimen Collection—Blood

General Guidelines

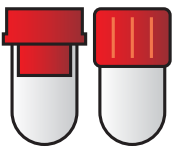
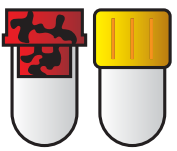
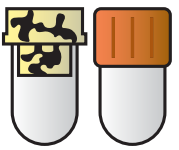
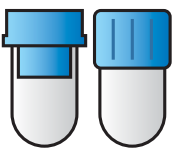
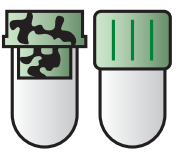
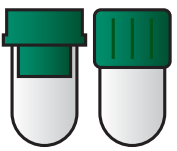
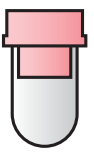
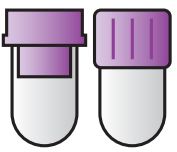
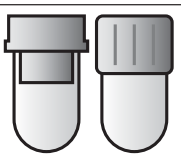
- Verify if Pt has allergies to latex, iodine, adhesives.
- A tourniquet should not be left in place longer than 1 minute.
- Previous puncture site areas should be avoided for 24–48 hours.
- Specimens should never be collected above an IV site.
- **Order of draw:** If multiple tubes are required, they are collected in the following order: blood cultures, red or red marble top with gel, light blue, green, lavender, and then gray.

Procedure

- **Prepare the patient:** Explain the procedure to the Pt and offer reassurance.
- **Supplies:** Tourniquet, skin cleanser, sterile 2x2 gauze, evacuated collection tubes or syringes, needle and needle holder, and tape.
- **Position patient:** Sitting or lying with arm extended and supported.
- **Tourniquet:** 3–4 inches above the intended venipuncture site.
- **Choose vein:** Most common and easily accessed are the median cubital, cephalic, and basilic veins located in the antecubital (AC) fossa anterior to the elbow. Veins of the forearm, wrist, and hand may also be used, but are smaller and often more painful.
- **Cleanse the site:** Briefly remove tourniquet. With an alcohol swab, cleanse the site from the center out using a circular motion. Allow the site to air dry for 30–60 seconds. For blood alcohol level and blood culture specimens, use iodine in place of alcohol.
- **Perform venipuncture:** Reapply tourniquet. If necessary, cleanse end of gloved finger for additional vein palpation. Insert needle, bevel up, at 15–30 degrees using dominant hand. With nondominant hand, push the evacuated collection tube completely into the needle holder *or* pull back on the syringe plunger with slow, consistent tension.
- **Remove tourniquet:** If the procedure will last longer than 1 minute, remove the tourniquet after blood begins to flow.

- **Remove needle:** Remove tourniquet if still in place. Place sterile gauze over puncture site, remove needle, and apply pressure.
- **Equipment disposal:** Per facility policy/standard precautions.
- **Prepare specimen:** If using syringes, transfer specimen into proper tubes. Mix additives with a gentle rolling motion. Label specimen tubes with Pt's name, ID number, date, time, and your initials.
- **Document:** Record specimen collection in medical record.

Common Blood Collection Tubes

Color (Additive)		Color (Additive)	
Red (None)		**Yellow** (SPS-Sodium Polyanethol-sulfonate)	
Red Marble Top or Gold (Clot activator and gel for serum separation)		**Yellow Marble Top or Orange** (Thrombin)	
Light Blue (Sodium Citrate)		**Light Green** (Lithium Heparin and gel for plasma separation)	
Green (Sodium Heparin *or* Lithium Heparin)		**Pink** (EDTA)	
Lavender (EDTA—ethylenediamine tetraacetic acid)		**Tan** (Sodium Heparin [glass tubes] EDTA [plastic])	
Gray (Potassium Oxalate/ Sodium Fluoride *or* Sodium Fluoride)		**Royal Blue** (Sodium Heparin EDTA None)	

Examples of Common Labs

Red: (blood bank, type and cross, discard tube)

Red marble top or **gold:** (chemistry, Ca, BUN, creatinine)

Light blue: (coagulation studies, PT, PTT, INR, fibrinogen)

Lavender: (Hematology, CBC, ABC, H&H, platelet counts)

Gray: (chemistry, glucose determinations)

Green: (chemistry, ionized Ca, plasma determinations)

Specimen Collection—Urine

Random

- Indicated for routine screening and may be collected at any time.
- Instruct Pt to void into the specimen container.

Clean Catch (midstream)

- Indicated for microbiologic and cytologic studies.
  - **Males:** Wash hands thoroughly, cleanse the meatus, pull back foreskin, void a small amount into the toilet, then void into the specimen collection container. Secure lid tightly.
  - **Females:** Wash hands thoroughly, and cleanse the labia and meatus from front to back. While holding the labia apart, void a small amount into the toilet and then, without interrupting the flow of urine, void into the specimen collection container. Secure lid tightly.

Catheterized Random/Clean Catch

- Ensure tubing is empty and then clamp the tube distal to the collection port for 15 minutes.
- Cleanse collection port with an antiseptic swab and allow to air dry.

- Using a needle and syringe, withdraw the required amount of specimen and then unclamp the tubing.
- Follow laboratory guidelines for handling.

First Morning

- Yields a very concentrated specimen for screening substances less detectible in a more dilute sample.
- Instruct Pt to void into the specimen container upon awakening.

Second Void

- Instruct Pt to void, drink a glass of water, wait 30 minutes, and then void into a specimen collection container.

Timed (24-hour urine)

- Used to quantify substances in urine and to measure substances whose level of excretion varies over time.
- Ideally, collection should begin between 6:00 a.m. and 8:00 a.m.
- Specimen container should be refrigerated or kept on ice for the entire collection period.
- The start time of the 24-hour collection begins with the collection and discard of the first void.
- Instruct Pt to discard the first void of the day and record the date and time on the collection container.
- Add each subsequent void to the collection container and instruct the Pt to void at the same time the following morning and add it to the collection container.
- This is the end of the 24-hour collection period.
- Record date and time and send the specimen to the lab.

Timed (24-hour urine) *Catheterized Patients*

- Follows the same guidelines as a regular timed urine, but is started after the bag and tubing have been replaced. This is the start time and should be recorded on the collection container.
- Either the collection bag is kept on ice, or the specimen is emptied every 2 hours into a collection container, which is refrigerated or kept on ice.
- At the end of 24 hours, the remaining urine is emptied into the collection container.
- This is the end of the 24-hour collection period.
- Record date and time and send the specimen to the lab.

Specimen Collection—Sputum/Throat Cx

General Guidelines

- Use standard precautions when obtaining or handling specimen.
- Cultures should be obtained prior to the administration of antimicrobial therapy.
- Document all specimen collections in medical record.

Expectorated Specimens

- Instruct Pt to brush teeth or rinse mouth prior to specimen collection to avoid contamination with normal oral flora.
- Assist Pt to an upright position and provide over-bed table.
- Instruct Pt to take 2–3 deep breaths and then cough deeply.
- Sputum should be expectorated directly into a sterile container.
- Label specimen container and send to the lab at room temperature.

Throat Culture

- **Contraindicated in Pts with acute epiglottitis.**
- Instruct Pt to tilt the head back and open mouth.
- Use tongue depressor to prevent contact with the tongue/uvula.
- Using a sterile culturette, swab both tonsillar pillars and the oropharynx.
- Place the culturette swab into the culturette tube and squeeze the bottom to release the liquid transport medium.
- Ensure that the swab is immersed in the liquid transport medium.
- Label specimen container—send to the lab at room temperature.

Specimen Collection—Stool

General Guidelines

- Use standard precautions when obtaining/handling specimen.
- The freshest sample possible will yield optimal results.
- Specimens should not contact urine or toilet water.
- Preservatives are poisonous; avoid contact with skin.

Occult Blood (Hemoccult, Guaiac)

- Open collection card.
- Obtain a small amount of stool with wooden collection stick and apply onto the area labeled box A.
- Use the other end of the wooden collection stick to obtain a second sample from a different area of the stool and apply it onto the area labeled box B.
- Close card, turn over and apply one drop of control solution to each box as indicated.
- A color change is positive, indicating there is blood in the stool.

- **Note:** If Pt will be collecting specimens at home, instruct Pt to collect the specified number of specimens, keep them at room temperature, and drop them off within the designated time frame.
- Document results on Pt record and notify physician if indicated.

Cysts and Spores—Ova and Parasites

- Open collection containers.
- Using the spoon attached to the cap, place bloody or slimy/whitish (mucous) areas of the stool into each container.
- Do not overfill the containers.
  - Place specimen in the empty container (clean vial) up to the fill line and replace cap and tighten securely.
  - Place enough specimen in the container with liquid preservative (fixative) until the liquid reaches the fill line and replace cap and tighten securely.
- Shake the container with preservative until specimen is mixed.
- Write Pt identification information and the date and time of collection on each of the containers, keep at room temperature, and send specimens to the laboratory immediately after collection.
- **Note:** If Pt will be collecting specimens at home, instruct Pt to collect the specified number of specimens, keep them at room temperature, and drop them off within the designated time frame.
- **Document:** Record specimen collection in medical record.

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Gordon's Functional Health Patterns

Developed by Dr. Marjory Gordon to group nursing diagnoses into categories of basic human health function.

- **Health Perception and Health Management:** Perceived level of health and well-being, and practices for maintaining health. Habits that may be detrimental to health are also evaluated, including smoking and use of alcohol or other drugs. Actual or potential problems related to safety and health management may be identified as well as needs for modifications or continued care in the home.
- **Nutrition and Metabolism:** Pattern of food and fluid intake relative to metabolic needs. The adequacy of local nutrient supplies is evaluated. Actual or potential problems related to fluid balance, tissue integrity, GI health, and host defense may be identified.
- **Elimination:** Excretory patterns (GI, GU, skin). Incontinence, constipation, diarrhea, and urinary retention may be identified.
- **Activity and Exercise:** Activities of daily living (ADLs) requiring energy expenditure including self-care activities, exercise, and leisure activities. Assess major body systems involved with activity and exercise including the respiratory, cardiovascular, and musculoskeletal systems.
- **Cognition and Perception:** Ability to comprehend and use information. Assess sensory functions. Sensory experiences such as pain and altered sensory input may be identified and evaluated.
- **Sleep and Rest:** Sleep, rest, and relaxation practices. Dysfunctional sleep patterns and fatigue may be identified.
- **Self-Perception and Self-Concept:** Attitudes toward self, including identity, body image, and sense of self-worth. Level of self-esteem and response to threats to self-concept.
- **Roles and Relationships:** Roles in the world and relationships with others. Satisfaction with roles, role strain, or dysfunctional relationships may be further evaluated.
- **Sexuality and Reproduction:** Satisfaction or dissatisfaction with sexuality patterns and reproductive functions. Concerns with sexuality may be identified.

- **Coping and Stress Tolerance:** Perception of stress and coping strategies. Support systems are evaluated, and symptoms of stress are noted. The effectiveness of coping strategies in terms of stress tolerance may be evaluated.
- **Values and Beliefs:** Values, beliefs, and goals that may guide choices or decisions.

Complete Health History

- **Biographical Data:** Record Pt's name, age, and date of birth, gender, race, ethnicity, nationality, religion, marital status, children, level of education, job, and advance directives.
- **Chief Complaint (subjective):** Symptom analysis for chief complaint. This is what the Pt tells you. The chief complaint should not be confused with the medical diagnosis (e.g., a Pt is complaining of nausea and vomiting and is later diagnosed to be having a myocardial infarction [MI]. The chief complaint is nausea and vomiting and is documented as such even though the medical diagnosis may be an evolving MI).
- **Past Health History:** Record childhood illnesses, surgeries, hospitalizations, serious injuries, medical problems, immunization, and recent travel or military service.
- **Medications:** Ask about prescription medications taken on a regular basis as well as those medications that are taken only when needed (prn). Note: prn medications may not be used very often and are likely to have an outdated expiration date. Remind Pts to replace outdated medications. Inquire about over-the-counter (OTC) drugs, vitamins, herbs, and alternative regimens.
- **Allergies:** Do not limit to drug allergies. Include allergies to food, insects, animals, seasonal changes, chemicals, latex, adhesives, etc. Try to differentiate between an allergy and a sensitivity, but always err on the side of safety if unsure. Determine type of allergic reaction (itching, hives, dyspnea, etc.).
- **Family History:** Includes health status of spouse/significant other, children, siblings, parents, aunts, uncles, and grandparents. If deceased, obtain age and cause of death.

- **Social History:** Assess health practices and beliefs, typical day, nutritional patterns, activity/exercise patterns, recreation, pets, hobbies, sleep/rest patterns, personal habits, occupational health patterns, socioeconomic status, roles/relationship, sexuality patterns, social support, and stress coping mechanisms.
- **Physical Assessment (objective):** There are two methods for performing a complete physical assessment.
  - **Head-to-toe:** More complete, it assesses each region of the body (e.g., head and neck) before moving on to the next.
  - **Systems Assessment:** More focused, it assesses each body system (e.g., cardiovascular) before moving on to the next.

Physical Assessment

Systematic Approach

- Always observe standard precautions.
- Listen to your Pt. Provide a comfortable environment.
- If there is an obvious problem, start at that point.
- Work from head to toe and compare right to left.
- Let your Pt know your findings and use this time to teach.
- Leave sensitive or painful areas until the end of the exam.
- Techniques used for physical assessment include (1st) inspection, (2nd) palpation, (3rd) percussion, and (4th) auscultation and, except for the abdomen, are carried out in this order.
- ***Document:*** All assessments, interventions, and outcomes.

Documenting Vital Signs

Heart Rate:

Document: Rate, rhythm, strength, and any differences from R–L

Respirations:

Document: Rate, depth, effort, rhythm, and any sounds, noting whether they were heard on inspiration, expiration, or both.

Blood Pressure:

NEVER perform a BP on an arm with a dialysis shunt, injury, or same side mastectomy or axilla surgery! Avoid arms with IV/VAD if possible.

Document: Point at which sound is first heard (systolic) over the point at which sound completely ceases (diastolic).

Temperature:

Document: Temperature reading and route.

Adult Vital Signs—Normal Ranges

HR	RR	SBP	DBP	Temp
60—100	12—20	95—140	60—90	**See below*

Tympanic Temperature	37.0°—38.1°C (98.6°—100.6°F)
Oral Temperature	36.4°—37.6°C (97.6°—99.6°F)
Rectal Temperature	37.0°—38.1°C (98.6°—100.6°F)
Axillary Temperature	35.9°—37.0°C (96.6°—98.6°F)

Factors Affecting Vital Signs

	HR	RR	SBP	Temp
Fever	↑	↑	Normal	↑
Anxiety	↑	↑	↑	Normal
Pain, acute	↑	↑	↑	Normal
Pain, chronic	↓	Normal	Normal	Normal
Acute MI	↓	↑	↓ (Late)	Normal
Spinal Injury	↓	↓	↓	Norm / ↑
Tamponade	↑	↑	↓	Normal
CHF	↑	↑	↑ (Early)	↑
Pulm. Embolism	↑	↑ (Dyspnea)	↓	↑
Exercise	↑	↑	↑	↑
↓ H&H	↑	↑	↓	↓

(Continued text on following page)

Factors Affecting Vital Signs *(continued)*

	HR	RR	SBP	Temp
↓ **Blood Sugar**	Norm / ↑	Normal	Norm / ↑	↓
↑ **Blood Sugar**	↑	↑ / Deep	↓	↑
↑ **WBC**	↑	↑	↓ (Sepsis)	↑
↑ **K+**	↓	Shallow	Norm / ↑	Normal
↓ **K+**	↑	Shallow	↓	Normal
↑ **Ca+**	↓	Normal	↓	Normal
↓ **Ca+**	↓	Varies	↓	Normal
↑ **Na+**	↑	Norm / ↑	↑	↑
↓ **Na+**	↑	Norm / ↑	↓	Normal
Narcotics	↓	↓	↓	↓
Beta-blockers	↓	↓	↓	Normal
Ca Chan-Blockers	↓	↓	↓	Normal

Head and Neck

Assess	**Document:** assessment, interventions, outcomes
Appearance: Inspect Pt's overall appearance.	■ Hygiene, state of well-being, nutrition status. ■ Level of consciousness, emotional status, speech patterns, affect, posture, gait, coordination, and balance. ■ Any gross deformities.
Skin: Inspect and palpate exposed skin.	■ Warmth, moisture, color, texture, lesions. ■ Scars, body piercings, tattoos.
Hair and Nails: Inspect hair, hands, and nails.	■ Hair color, fullness, and distribution, noting any signs of malnutrition (thinning). ■ Infestation or disease. ■ Clubbing, deformity, abnormalities of hands.

(Continued text on following page)

Head and Neck *(continued)*

Assess	**Document:** assessment, interventions, outcomes
Head: Inspect and palpate face and scalp.	■ Facial symmetry. ■ Scalp tenderness, lesions, or masses.
Eyes: Inspect conjunctiva, sclera, and pupils.	■ Color and hydration of conjunctiva and sclera. ■ *PERRLA:* Pupils equal, round, reactive to light and accommodation.
Ears: Inspection.	■ Hearing impairment. ■ Use of hearing aids. ■ Pain, inflammation, and drainage.
Nose: Inspection.	■ Congestion, drainage, and sense of smell. ■ Patency/equality of nostrils, nasal flaring. ■ Septal deviation.
Throat and Mouth: Inspect teeth, gums, tongue, mucous membranes, and oropharynx.	■ Color and hydration of mucous membranes. ■ Gingival bleeding or inflammation. ■ Condition of teeth (any missing, severe decay), dentures. ■ Difficult or painful swallowing. ■ Presence or absence of tonsils. ■ Oral hygiene and the presence of odor.
Neck: Inspect and palpate neck. Test range of motion (ROM).	■ Jugular vein distention (JVD), tracheal alignment (deviation), and retractions. ■ Swollen lymph nodes. ■ Decreased ROM, stiffness, or pain.

Cardiovascular System

Skill	**Document:** assessment, interventions, outcomes
Inspect	Overall condition and appearance. Inspect skin, nailbeds, and extremities for flushing, pallor, cyanosis, bruising, and edema. Observe chest for scars, symmetry, movement, and deformity. Inspect neck for JVD and inspect the PMI (point of maximal impulse) for any remarkable pulsations. Analyze ECG recording if available.
Palpate	Skin temperature and moisture. Palpate PMI for any lifts, heaves, thrills, or vibrations. Palpate and grade radial, dorsalis pedis, and posterior tibial pulses, noting rate and rhythm. Palpate and grade edema if present.
Percuss	Starting at the midaxillary line, percuss toward the left cardiac border along the 5th ICS. Sound should change from resonance to dullness at the midclavicular line.
Auscultate	Use a stethoscope and auscultate the apical pulse and compare it with the radial pulse. Auscultate heart valves for normal S1 (lub) and S2 (dub) heart sounds. Abnormal sounds include extra beats (S3 and S4), bruits, valvular murmurs, paricarditic rubs, and artificial valve clicks.

Respiratory System

Skill	**Document:** assessment, interventions, outcomes
Inspect	Respirations for rate, depth, effort, pattern, and presence of cough (productive or nonproductive), noting signs of distress such as nasal flaring or sternal retractions. Inspect size and shape of chest, symmetry of chest wall movement, and use of accessory muscles. Inspect extremities for cyanosis and fingers for clubbing indicating chronic hypoxia. Inspect trachea for scars, stomas, or deviation from midline.

(Continued text on following page)

Respiratory System *(continued)*

Skill	Document: assessment, interventions, outcomes
Palpate	Anterior and posterior thorax for subcutaneous emphysema, crepitus, and tenderness. Assess tactile fremitus by palpating the chest as the Pt says "99."
Percuss	Anterior and posterior thorax for tympany (hollow organs), resonance (air-filled organs), dullness (solid organs), or flatness (muscle or bone).
Auscultate	Use a stethoscope and auscultate all anterior and posterior lung fields, noting normal, abnormal, or absence of lung sounds.

Respiratory Patterns

Normal (Eupnea)	Regular and comfortable at 12—20 breaths/min
Tachypnea	> 20 breaths/min
Bradypnea	< 12 breaths/min
Hyperventilation	Rapid, deep respiration > 20 breaths/min
Apneustic	Neurologic—sustained inspiratory effort
Cheyne-Stokes	Neurologic—alternating patterns of depth separated by brief periods of apnea
Kussmaul's	Rapid, deep, and labored—common in DKA
Air Trapping	Difficulty during expiration—emphysema

Lung Sounds—Differential Diagnosis

Rales (Crackles)

- Simulated by rolling hair near the ear between two fingers.
- Best heard on inspiration in the lower bases.
- Unrelieved by coughing.
- Associated with bronchitis, congestive heart failure (CHF), and pneumonia.

Wheezes

- High-pitched, squeaky sound.
- Best heard on expiration over all lung fields.
- Unrelieved by coughing.
- Associated with asthma, bronchitis, CHF, and emphysema.

Ronchi

- Coarse, harsh, loud gurgling.
- Best heard on expiration over bronchi and trachea.
- Often relieved by coughing.
- Associated with bronchitis and pneumonia.

Stridor

- Harsh, high-pitched, audible sound.
- Easily heard without a stethoscope during inspiration and expiration.
- Indicates a progressive narrowing of the upper airway and can be life threatening, requiring immediate attention.
- Associated with partial airway obstruction, croup (inspiratory), and epiglottitis (severe, audible).

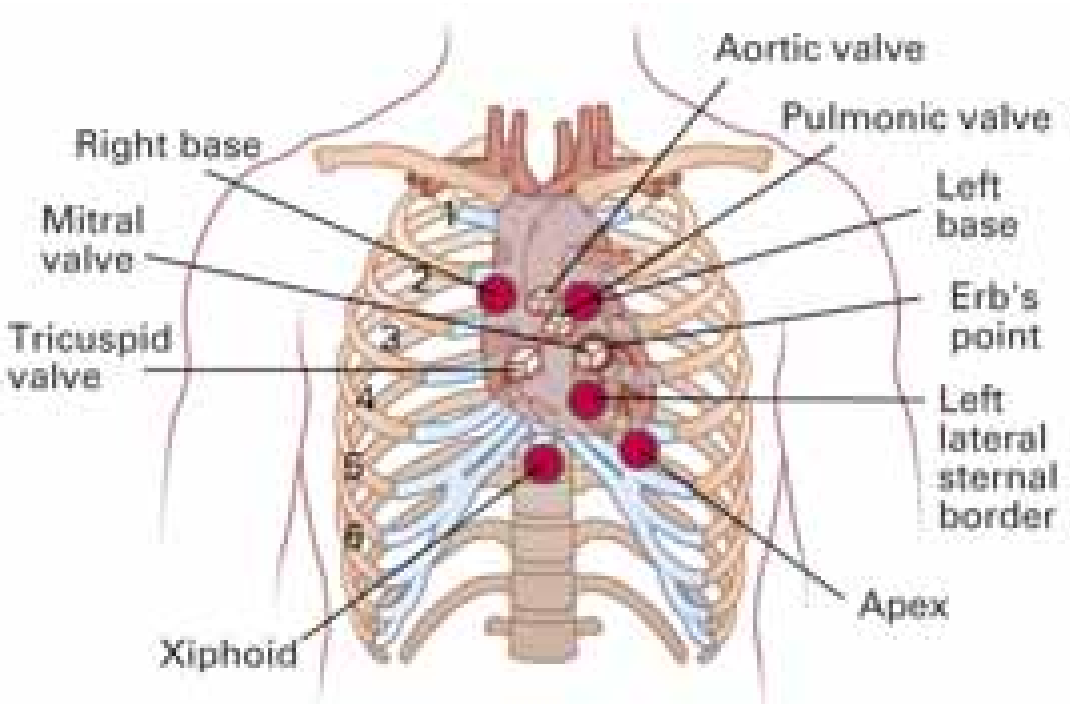
Unilaterally Absent or Diminished

- Inability to hear equal, bilateral breath sounds.
- Associated with pneumothorax, tension pneumothorax, hemothorax, or history of pneumectomy.

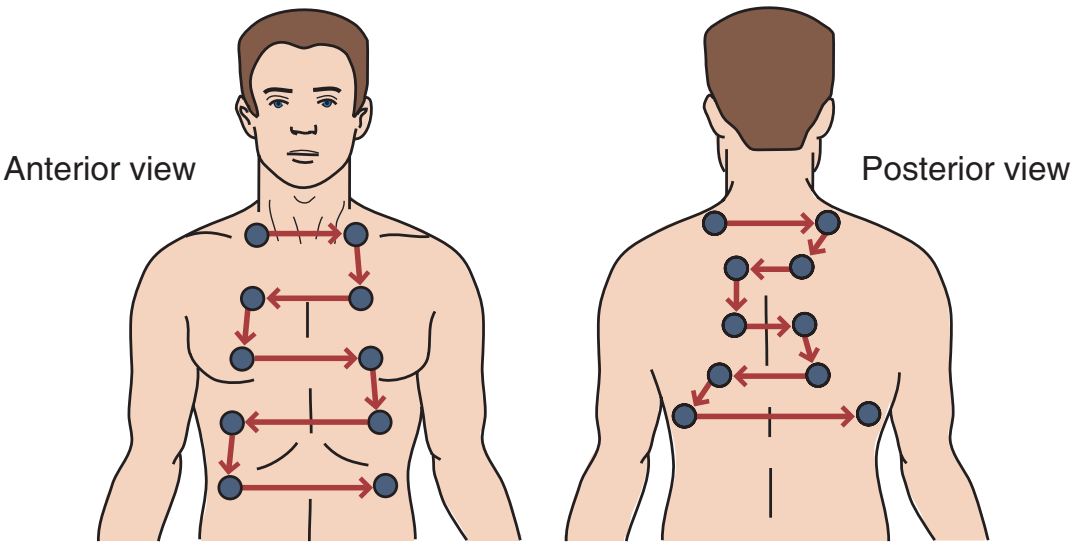
Documentation of Lung Sounds

- Rate, rhythm, depth, effort, sounds (indicate if sound is inspiratory and/or expiratory phase), and fields of auscultation.
- Interventions (if any implemented) and outcomes.

Cardiac Auscultation Sites



Order of Auscultating Lung Sounds



Circulation and Pulses

Assess	**Document:** assessment, interventions, outcomes
Pulses	Equality and character of pulses, comparing right and left.
6 Ps	Pain, pallor, pulselessness, polar, paresthesia, paralysis.
S/S	Swelling, limb pain, change in sensation, fatigue.
Skin	Color, temperature, moisture, hair growth.
Edema	Extremities and dependent areas for edema, varicosities.
Nails	Capillary refill, cyanosis, angle of attachment, clubbing.
History	PVD, DM, HTN, CHF, DVT, surgeries, lymphedema, meds.

Capillary Refill

Normal . . . . . < 3 seconds
Delayed . . . . . > 3 seconds

Pulse Strength

0 ..... Absent
1 ..... Weak
2 ..... Normal
3 ..... Full
4..... Bounding

Right arm:	**Left arm:**
Right leg:	**Left Leg:**

Edema Scale

+ 1 Slight pitting with **2 mm** of depression that disappears rapidly. No visible distortion of extremity.

+ 2 Deeper pitting with **4 mm** of depression that disappears in about 10–15 seconds. No visible distortion of extremity.

+ 3 Depression of **6 mm** that lasts more than a minute. Dependent extremity appears swollen.

+ 4 Very deep pitting with **8 mm** of depression that lasts 2–3 minutes. Dependent extremity is grossly edematous.

Common Pulse Points

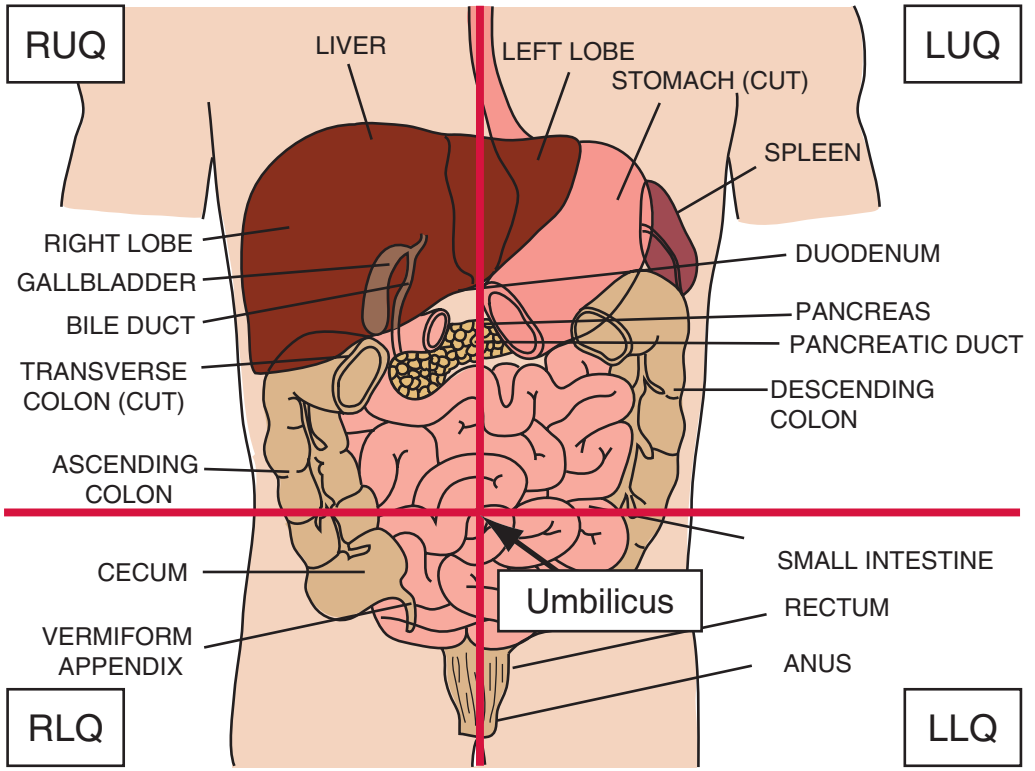
Temporal . . . . . just anterior to the upper third of the ear
Carotid . . . . . below the angle of the jaw on either side of the trachea
Apical . . . . . left side of the chest at the 5th ICS, mid-clavicular line
Brachial . . . . . medial antecubital fossa
Radial . . . . . medial-ventral wrist below the base of the thumb
Femoral . . . . . crease of the groin between pubis and hip bone
Popliteal . . . . . popliteal fossa behind the knee
Dorsalis Pedis . medial dorsum of the foot
Posterior Tibial . slightly below the posterior malleolus of the foot

Abdomen—Abdominal Organs

Skill	**Document:** assessment, interventions, outcomes
Inspect	Skin, distention, scars, obesity, herniations, bruising, pulsations.
Auscultate (before palpate)	Bowel tones: **hypoactive:** every min; **normal:** every 15–20 seconds; **hyperactive:** about every 3 seconds.
Percuss	Dullness—solid organ such as the liver. Tympany—hollow organs such as the bowels. Resonance—air-filled organs such as the lungs. Flatness—dense tissue such as muscle and bone.
Palpate (last)	Pulsations, masses, tenderness, rigidity.

Note: Always work from area of least pain toward area of most pain.

- Assess each abdominal quadrant (RUQ, LUQ, RLQ, LLQ).
- When documenting assessment findings, always refer to specific abdominal quadrant related to finding.



Extremities

Grips	Equality and strength—have Pts squeeze your fingers with their hands and assess push-pull strength of feet.
CSM	Distal pulses, capillary refill, sensation , and motor movement.
Nails	Cyanosis, angle of attachment, clubbing.
ROM	Limitations and pain during movement.
Edema	Localized versus diffuse, dependent versus nondependent.
DVT	**Homans' sign** (calf pain upon dorsiflexion of foot) especially with postsurgical and debilitated Pts (**NEVER** massage affected extremities!). Signs/symptoms include pain, venous distention, localized tenderness.

Skin—Integumentary

Assess	Document: assessment, interventions, outcomes
Color	Cyanosis, redness, pallor, or jaundice.
Temp	Coolness or warmth.
Moisture	Diaphoresis or excessive dryness.
Turgor	The time it takes the skin to flatten out after pinching a section on top of hand—poor skin turgor may indicate dehydration; called tenting.
Edema	Extremities, sacrum, dependent side (if debilitated, bed-, or chairfast), facial/sclera, bilateral versus unilateral.
Lesions	Presence and type of skin lesions.

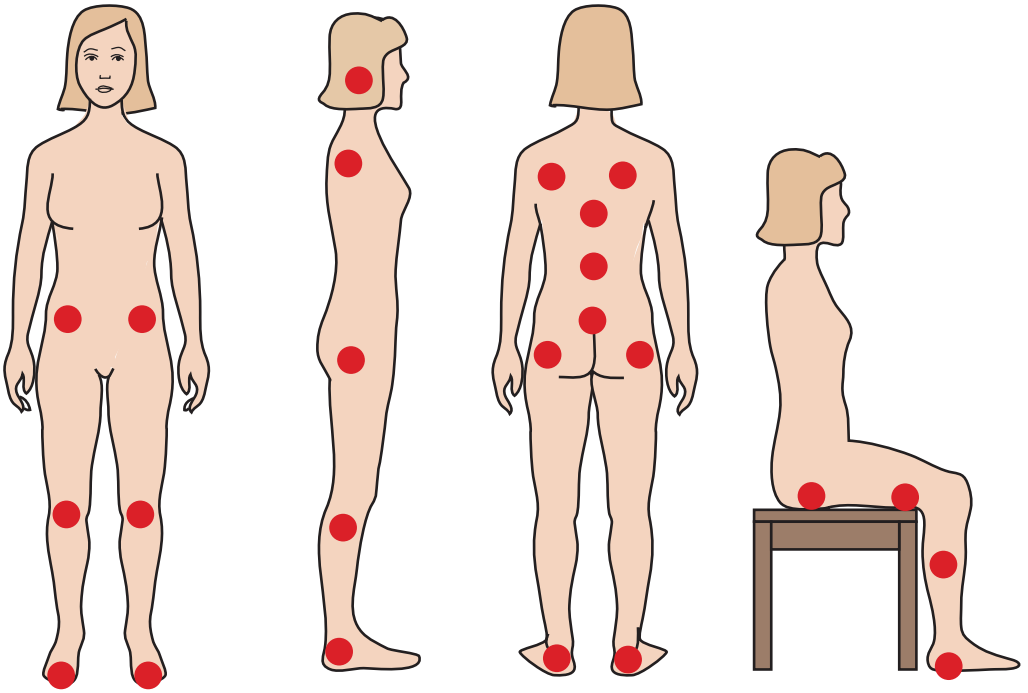
Staging Pressure Sores

Stage I	Intact, nonblanching erythemic area. Indicates potential for ulceration.
Stage II	Interruption of epidermis, dermis, or both; presents as an abrasion, blister, or very shallow crater.
Stage III	Full-thickness crater involving damage and/or necrosis down to, but not penetrating, the fascia.
Stage IV	Full thickness, similar to stage III, but penetrating the fascia with involvement of muscle, bone, and supporting structures. May involve undermining.
Note:	Ulcers that are covered with eschar cannot be staged without debridement.

Risk Factors for Developing Pressure Sores

- **Alterations in sensation or response to discomfort:** Degenerative neurological/neuromuscular disease, cerebrovascular disease, brain or spinal cord injury, depression, or drugs that adversely affect alertness.
- **Alterations in mobility:** Neurological disease/injury, fractures, contractures, pain, or restraints.
- **Significant changes in weight:** Protein-energy malnutrition (PEM), severe edema, obesity.

- **Medical conditions:** Malnutrition and dehydration, diabetes mellitus, peripheral vascular disease, end-stage renal disease, congestive heart failure, malignancies, chronic obstructive pulmonary disease, obesity, or bowel and bladder incontinence.



Areas Susceptible to Pressure Sores

Supine:
1. Occipital area
2. Scapula
3. Elbows
4. Sacrum
5. Ischium
6. Heels

Side-Lying:
7. Ears
8. Shoulders
9. Trochanter
10. Knees
11. Ankles

Prone:
12. Iliac crests
13. Knees
14. Toes

Sitting:
15. Scapula
16. Sacrum
17. Ischium
18. Rear knees
19. Sole of foot

Pressure Sore Management

Stage I Pressure Sore

- No dressing required.
- Prevent continued injury from pressure or shearing forces.
- Assess frequently.

Stage II Pressure Sore

- Use a dressing that will keep ulcer bed continuously moist.
- Keep surrounding intact skin dry.
- Fill wound dead space with loosely packed dressing material to absorb excess drainage and maintain a moist environment.

Stage III Pressure Sore

- Same as Stage II treatment plus debride eschar, necrotic tissue.
- Note: Heel ulcers with dry eschar and no edema, erythema, or drainage may not need to be debrided.
- Debridement may be done surgically, with enzymatic agents, or mechanically with wet-to-dry dressings, water jets, or whirlpool.
- Do not use topical antiseptics.

Stage IV Pressure Sore

- Same as Stages II and III plus remove all dead tissue, explore undermined areas and remove the skin "roof."
- Use clean, dry dressings for 8–24 hours after sharp debridement to control bleeding, then resume moist dressings.

Common Dressings for Pressure Sores

Transparent Dressings *(Stage I and II Pressure Sores):*

- Waterproof; maintains moisture and prevents bacterial contamination.
- For superficial wounds, blisters, and skin tears.

Hydrogel Dressings *(Stage II, III, and IV Pressure Sores):*

- Provides moist wound environment. Reduces pain and soothes.
- For dry, sloughy wound beds; cleanses and debrides.

Hydrocolloid Dressings *(Stage II and III Pressure Sores):*

- For autolytic debridement of dry, sloughy, or necrotic wounds.
- For wounds with low to moderate amounts of exudate.

Alginate Dressings *(Stage III and IV Pressure Sores):*

- Available in pads, ropes, or ribbons.
- For wounds with moderate to heavy amounts of exudate.

Foam Dressings *(Stage III and IV Pressure Sores):*

- Highly absorbent; may be left on for 3–4 days before changing.
- For wounds with heavy exudate, deep cavities, weeping ulcers.
- Used after debridement or desloughing of pressure sores.

Wound Care—Assessment

- **Appearance:** Color (pink—healing; yellow—infection; black—necrosis), sloughing, eschar, longitudinal streaking, etc.
- **Size:** Measure length, width, and depth in cm.
- **Incisions:** Approximated edges, dehiscence, or evisceration.
- **Undermining:** Use a sterile, cotton-tipped applicator to gently probe underneath the edges until resistance is met. With a felt-tipped pen, mark where the applicator can be felt under the skin.
- **Granulation:** Bright red, shiny, and granular. Indicates healing.
- **Drainage:** Type, (sanguineous, serosanguineous, purulent) amount, color, and consistency.
- **Odor:** Foul odor indicates infection.
- **Staging:** See *Staging Pressure Sores.*

Sterile Dressing Change

- Wash hands, explain procedure, and position and drape Pt.
- Open sterile gloves on a nearby surface.
- Using sterile technique open supplies and set up a sterile field.
- Instruct Pt not to touch incision/wound or sterile supplies.
- Don clean (nonsterile) gloves and remove old dressing:
  - Pull tape towards incision, parallel to skin.
  - Be careful not to dislodge any drainage tubes or sutures.
- Assess condition and appearance of wound. Note drainage on old dressing.
- Discard gloves and old dressing per Standard Precautions.
- Wash hands and don sterile gloves.
- Cleanse wound with prescribed solution:
  - Start from the area of least contamination, cleanse toward the area of most contamination (use separate swab for each stroke).
  - Cleanse around drains using a circular motion working outward.
- Apply medicated/antiseptic ointments as prescribed.
- Apply prescribed sterile dressing to the incision or wound:
  - Cut dressings to fit around drain if present (use sterile scissors).
  - **Dry dressing:** Cover wound with sterile gauze (2×2, 4×4, etc.).
  - **Wet-to-dry:** Cover or pack wound with saline-moist, sterile gauze, and then cover with dry, sterile gauze (2×2, 4×4, etc.).
  - **Wound packing:** Soak sterile gauze in prescribed sterile solution and ring out excess. Using sterile forceps, gently pack wound until all wound edges are in contact with the moist gauze, including any undermined areas. Do not over-pack the wound (stop at skin level).
- Reinforce with a thick cover dressing (ABD or Surgi-Pad®).
- Secure dressing with tape, rolled gauze, or Montgomery ties.
- **Document:** dressing change and assessment findings. Date, time, and initial new dressing.

Genitourinary—Reproductive Assessment

Female Patients

- **Pain:** Assess for dysmenorrhea (abnormally severe cramping or pain in the lower abdomen during menstruation).
- **Lesions:** Inspect perineum for blisters, ulcers, sores, warts, or rashes.
- **Breast:** Inspect for asymmetry. Inspect skin for dimpling or edema. Inspect nipples for color, discharge, or inversion. Palpate in a concentric circle, outward from the nipple, including the axillae, for lumps or tenderness. Does the Pt perform regular breast self-examination?
- **Discharge:** Assess for vaginal discharge and note color, odor, amount, and any associated symptoms.
- **Menstruation:** Describe last menstrual period. Do periods occur regularly? Have Pt describe her "normal flow." Bleeding other than the normal menstrual period should be further assessed including frequency, quantity, and associated symptoms.
- **Genitourinary Symptoms:** Kidney stones, blood in the urine, change in voiding pattern (frequency), or itching.
- **Sexual History:** Is Pt sexually active? Does she use protection against infection? Method of birth control? Multiple or same-sex partners? Any concern with or history of sexually transmitted disease (STD)?
- **Document:** assessment, interventions, and outcomes.

Male Patients

- **Pain:** Assess for pain in the penis, testes, scrotum, and groin area. Is there any history of painful or burning urination?
- **Lesions:** Inspect perineum for blisters, ulcers, sores, warts, or rashes.
- **Testicles:** Palpate scrotum and groin area for lumps, masses, or swelling. Does the Pt perform testicular self-examination?
- **Discharge:** Inspect meatus for discharge and note color, amount, and any associated symptoms.

- **Genitourinary Symptoms:** Kidney stones, blood in the urine, change in voiding pattern (frequency), itching, or erectile dysfunction.
- **Sexual History:** Is Pt sexually active? Does he use protection against infection? Method of birth control? Multiple or same-sex partners? Any concern with or history of STD?
- **Document:** assessment, interventions, and outcomes.

Brief Neurological Exam

Mental Status

- **Impression:** Observe affect, mood, appearance, and grooming.
- **Speech:** Assess for clarity and coherence.
- **LOC:** Is the Pt alert, lethargic, stuporous, or obtunded?
- **Orientation:** Person, place, and time.

Cranial Nerves

- See *Cranial Nerve Assessment.*

Motor

- **Inspect:** Involuntary movements, muscle symmetry, atrophy.
- **Muscle tone:** Flex and extend wrists, elbows, ankles, and knees; slight, continuous resistance to passive movement is normal. Note any decreased (flaccid) or increased (rigid or spastic) muscle tone.
- **Motor strength:** Have Pt move against your resistance and score accordingly (see *Muscle Strength Grading Scale*).

Reflexes

- **Tendon Reflexes:** (see *Deep Tendon Reflex Grading Scale*).
- **Babinski (Plantar Reflex):** Stroke the lateral aspect of the sole of each foot with a reflex hammer. Normal response is flexion (withdrawal) of the toes. A positive Babinski is characterized by extension of the big toe with fanning of the other toes (abnormal).
- **Clonus:** With knee supported in a partially flexed position, quickly dorsiflex the foot. Rhythmic oscillations—positive clonus.

Gait/Balance

- Observe gait while Pt walks across room and comes back.
- Have Pt walk heel-to-toe *or* on heels in a straight line.
- Have Pt hop in place on each foot.
- Have Pt stand from a sitting position or do a shallow knee bend.

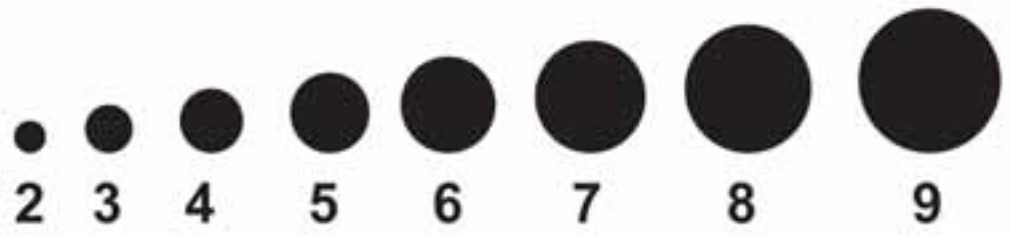
Coordination

- **Rapid Alternating Movements:** Instruct Pt to tap tip of thumb with tip of index finger as fast as possible.
- **Point-to-Point Movements:** Instruct Pt to touch his/her nose and your index finger alternately several times. Continually change the position of your finger during the test.
- **Romberg Test:** Be prepared to catch Pt! Request that Pt stand with feet together, eyes closed for 10 seconds. If Pt becomes unstable, test is positive, indicating a proprioceptive or vestibular problem.

Sensory

- Using your finger and a toothpick, instruct the Pt to distinguish between sharp and dull sensations. Compare left to right, with Pt's eyes closed.

Pupil Scale (mm)



Glasgow Coma Score

Eyes Open	■ Spontaneously . . . . . .4 ■ To command . . . . . .3 ■ To pain . . . . . .2 ■ Unresponsive 1	Findings
Best Verbal Response	■ Oriented . . . . . .5 ■ Confused . . . . . .4 ■ Inappropriate . . . . . .3 ■ Incomprehensible . . . .2 ■ Unresponsive 1	Findings
Best Motor Response	■ Obeys commands . . . .6 ■ Localizes pain . . . . . .5 ■ Withdraws from pain .4 ■ Abnormal flexion . . . .3 ■ Abnormal extension . .2 ■ Unresponsive 1	Findings
Total		

Muscle Strength Grading Scale

0 = No muscle movement
1 = Visible muscle movement, but no movement at the joint
2 = Movement at the joint, but not against gravity
3 = Movement against gravity, but not against added resistance
4 = Movement against resistance, but less than normal
5 = Normal strength

Deep Tendon Reflex Grading Scale

0 . . . . . Absent
1+ . . . . . Diminished
2+ . . . . . Normal
3+ . . . . . Hyperactive without clonus
4+ . . . . . Hyperactive with clonus

Levels of Consciousness

LOC	Characteristics
Alert	Awake, alert, and oriented. Understands written and spoken language and responds appropriately.
Confused	Disoriented first to time, then place, then person. Memory deficits, difficulty following commands, restless, agitated.
Lethargic	Oriented to time, person, and place, but demonstrates slow mental processes, sluggish speech. Sleeps frequently but wakens to spoken word or gentle shake. Maintains wakefulness with sufficient stimulation.
Obtunded	Extreme drowsiness, responds with one or two words, follows very simple commands, requires more vigorous stimulation to awake and stays awake for a few minutes at a time only.
Stuporous	Minimal movement, responds unintelligibly, and awakens briefly only to repeated vigorous stimulation.
Coma	Does not respond to verbal stimuli, does not speak. May have appropriate motor response (withdraws from noxious stimuli), nonpurposeful response, or no response.

Neurological Assessment Aids

Level of Orientation		AVPU (LOC)
Person, Place, and Time: Example: if Pt knows his or her name, but not the time or place, you would document that the Pt is oriented to name only. If Pt knows all three, then you would document that Pt is oriented × 3.	**A** **V** **P** **U**	**A**lert. Responds only to **V**erbal stimulus. Responds only to **P**ainful stimulus. **U**nresponsive.

Possible Causes of a Change in Mental Status

A . . . . . .Alcohol and ingested drugs and toxins
E . . . . . .Endocrine and electrolyte disorders; epilepsy
I . . . . . .Insulin; intoxication
O . . . . . .Oxygen deficiency; opioid
U . . . . . .Uremia
T . . . . . .Trauma; tumor
I . . . . . .Infection
P . . . . . .Psychiatric
S . . . . . .Stroke; shock; subarachnoid bleed

Cranial Nerve Assessment

Nerve		Name	Function	Test
I	S	Olfactory	Smell	Ask Pt to identify familiar odors (e.g., coffee, peppermint).
II	S	Optic	Visual acuity Visual field	Assess visual acuity using a Snellen, or similar, eye chart. Assess peripheral vision.

(Continued text on following page)

Cranial Nerve Assessment *(continued)*

Nerve		Name	Function	Test
III	M	Oculomotor	Pupillary reaction	Assess pupils for equality and reactivity to light.
IV	M	Trochlear	Eye movement	Have Pt follow your finger without moving his or her head.
V	B	Trigeminal	Facial sensation Muscles of mastication	Touch the face and assess for sharp and dull sensation. Have Pt hold mouth open.
VI	M	Abducens	Abduction of the eye	Have Pt follow your finger without moving his or her head.
VII	B	Facial	Facial expression Sense of taste	Have Pt smile, wrinkle face, puff cheeks. Ask Pt to differentiate between sweet and salty taste.
VIII	S	Acoustic	Hearing Balance	Snap fingers close to Pt's ears. Feet together, arms at side with eyes closed for 5 seconds.
IX	B	Glosso-pharyngeal	Swallowing and voice	Have Pt swallow and then say "AH."
X	B	Vagus	Gag reflex	Use tongue depressor or swab to elicit gag reflex.
XI	M	Spinal Accessory	Neck motion	Have Pt shrug shoulders or turn head against resistance.
XII	M	Hypoglossal	Tongue movement and strength	Have Pt stick out tongue and move it from side to side.

S = Sensory only; M = Motor only; B = Both sensory and motor

Psychiatric/Mental Health Assessment

General Safety Guidelines

- **Safety:** Your safety **ALWAYS** comes first!
- **Awareness:** Watch for nonverbal indicators of aggression or violence; clinched fists, pacing, raised tone of voice, increased respirations, profanity, verbal threats, weapons, wide-eyed stare.
- **Exit:** Always position yourself between the Pt and an exit. Never allow a Pt to block your means of escape.
- **Be Assertive:** Make your boundaries known, set limits, and stick to them. Avoid arguing or bargaining with Pts.

Psychiatric—Mental Status Assessment

Component	**Document:** assessment, interventions, outcomes
Appearance	Grooming, hygiene, posture, eye contact, correlation between appearance and developmental stage and age.
Motor Activity	Tremors, tics, mannerisms, gestures, gait, hyperactivity, restlessness, agitation, echopraxia, rigidity, aggressiveness.
Speech Pattern	phasia, volume, impairments, stutter.
General Attitude	Cooperative, uncooperative, friendly, hostile, defensive, guarded, apathetic.
Mood	Depressed, sad, anxious, fearful, labile, irritable, elated, euphoric, guilty, despairing.
Affect	Congruent with mood, flat, inappropriate.
Thought Process	**Form of thought:** tangentiality, word salads, neologisms, echolalia, attention span. **Content of thought:** delusional, suicidal, homicidal, obsessive, paranoid, suspicious, religiosity, phobic, magical.

(Continued text on following page)

Psychiatric—Mental Status Assessment *(continued)*

Component	**Document:** assessment, interventions, outcomes
Perceptual Disturbances	Hallucinations (auditory, visual, tactile, olfactory, gustatory), illusions (depersonalization, derealization).
Sensory/Cognitive	Alertness/orientation/memory/abstract.
Impulse Control	Aggression, fear, guilt, affection, sexual.
Judgment/Insight	Decision-making, problem-solving, coping.

Suicide—Assessment and Interventions

General Guidelines

- If, at any time, a Pt is threatening suicide, get help, call 911.
- Provide a safe environment.
- Always take overt or covert suicide threats or attempts seriously.
- Observe Pts closely.
- Encourage expression of feelings.
- Assign tasks to increase feelings of usefulness.
- Provide full schedule of activities.
- Show acceptance, respect, and appreciation.
- Do not argue with Pt.
- Remind Pt that there are alternatives to suicide.

Groups at Increased Risk for Suicide

- Adolescent and young adult Pts (ages 15–24).
- Elderly Pts.
- Terminally ill Pts.
- Patients who have experienced stress or loss.
- Survivors of persons who have committed suicide.

- Individuals with bipolar disorder.
- Patients coming out of depression.
- People who abuse alcohol or other drugs.
- Patients who have previously attempted suicide.
- More women attempt suicide; however, more men actually complete suicide.

Lethality Assessment

- **Intention:** Ask Pt if he or she thinks about and/or intends to harm him or herself.
- **Plan:** Ask Pt if he or she has formulated a plan. What are the details; where, when, and how will the plan be carried out?
- **Means:** Check availability of method to commit suicide. Does the Pt have access to a gun, knife, pills, etc?
- **Lethality of Means:** Pills versus a gun; jumping versus slitting wrist.
- **Rescue:** Possibility of rescue.
- Support or lack of support.
- Availability of alcohol or drugs.
- Anxiety level.
- Hostility.
- Disorganized thinking.
- Preoccupation with thought of suicide plan.
- Prior suicide attempts.

Alcohol and Drug Abuse Assessment

CAGE-AID Questionnaire	Yes	No
Cut down: Have you ever felt that you should ***cut down*** on your drinking or use of drugs?	**1**	**0**
Annoyed: Have you ever felt ***annoyed*** by being criticized about your drinking or use of drugs?	**1**	**0**
Guilty: Have you ever felt ***guilty*** about drinking or using drugs?	**1**	**0**

(Continued text on following page)

CAGE-AID Questionnaire	Yes	No
Eye-opener: Have you ever needed an ***eye-opener*** (alcohol or drugs) after waking up in order to get rid of a hangover or calm your nerves?	1	0
Note: A total score of 2 or greater is considered clinically significant and indicates a high likelihood for alcoholism.	**Total**	

Source: http://www.niaaa.nih.gov/publications/inscage.html

RAFFT Questionnaire	Yes	No
Relaxation: Do you ever use drugs or drink alcohol in order to relax or improve your self-esteem?	1	0
Alone: Do you ever use drugs or drink alcohol while you are alone?	1	0
Friends: Do you have any friends who use drugs or have a problem with alcohol?	1	0
Family: Does any of your close family use drugs or have a problem with alcohol?	1	0
Trouble: Have you ever gotten into trouble because of alcohol or drugs?	1	0
Note: Any positive answer warrants further investigation.	**Total**	

Source: http://p2001.health.org/Rs01/MRAPPL8.htm

Riggs S, Alario A. Adolescent substance use. In Dubé CE, Goldstein MG, Lewis DC, Myers ER, Zwick WR (eds.) (1989). Project ADEPT Curriculum for Primary Care Physician Training: Volume II Special Topics. Providence, R.I.: Brown University.

Pain Assessment

Definition of Pain	■ Whatever the Pt says it is, existing whenever the Pt says it exists. ■ Pain is the *"fifth vital sign."* Always include it with every assessment!
Cultural Factors	■ Beliefs about pain and how to respond to it differ between cultures. ■ Must be considered to effectively manage pain.

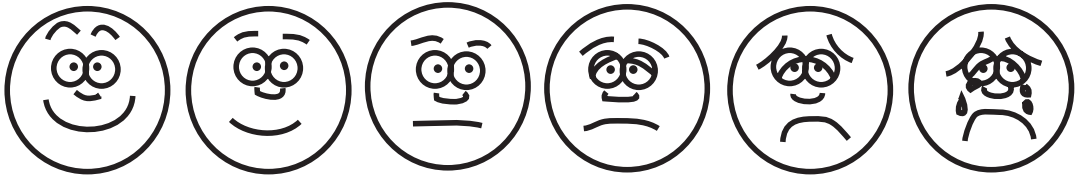
PQRST	
P (provokes)	What provokes the pain (exertion, spontaneous onset, stress, postprandial, etc.)?
Q (quality)	Is it dull, achy, sharp, stabbing, pressing, deep, surface, etc.? Similar to pain you've had before?
R (radiation or relief)	Does it travel anywhere (to the jaw, back, arms, etc.)? What makes it better (position, being still)? What makes it worse (inspiration, movement)?
S (severity or signs and symptoms)	Explain the pain scale and have Pt rate pain. Are there any associated signs or symptoms (nausea, vomiting, dizziness, diaphoresis, pallor, shortness of breath [SOB], dyspnea, abnormal vital signs, etc.)?
T (time; onset and duration)	When did it start? Is it constant or intermittent? How long does it last? Sudden or gradual onset? Does it start after you've eaten? Frequency?

COLDERRA	
Characteristics	Dull, achy, sharp, stabbing, pressure?
Onset	When did it start?
Location	Where does it hurt?
Duration	How long does it last? Frequency?
Exacerbation	What makes it worse?
Radiation	Does it travel to another part of the body?
Relief	What provides relief?
Associated s/s	Nausea, anxiety, autonomic responses?

Nursing Interventions—Pain Management

- Provide comfort . . . . . .Positioning, rest and relaxation
- Validate Pt's response to pain . . . . . .Offer reassurance
- Relieve anxiety and fears . . . . . .Set aside time with Pt
- Relaxation techniques . . . . . .Rhythmic breathing, guided imagery
- Cutaneous stimulation . . . . . .Massage, heat and cold therapy
- Decrease irritating stimulation . . . . . .Bright lights, noise, temp

Wong-Baker FACES Pain Rating Scale

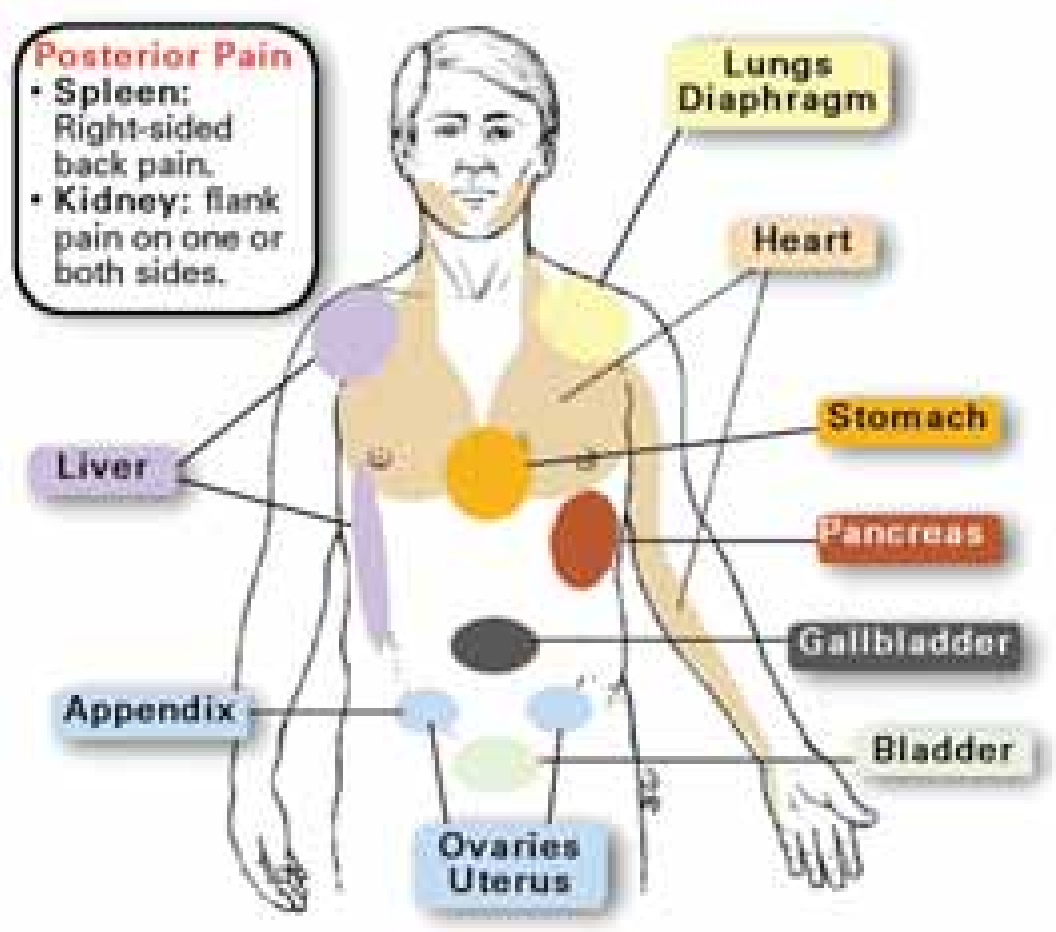


0	2	4	6	8	10
NO HURT	HURTS LITTLE BIT	HURTS LITTLE MORE	HURTS EVEN MORE	HURTS WHOLE LOT	HURTS WORST

For pediatric and non–English-speaking patients

Source: From Hockenberry MJ, Wilson D, Winkelstein ML: Wong's Essentials of Pediatric Nursing, ed. 7, St. Louis, 2005, p. 1259. Used with permission. Copyright, Mosby.

Referred Pain



Characteristics of Different Types of Pain

	Acute Pain	Chronic Pain	Cancer Pain
Onset	Current	Continuous or intermittent	■ May be acute or chronic.
Duration	< 6 months	> 6 months	■ Pain may be associated with cancer itself or the treatment.

(Continued text on following page)

Characteristics of Different Types of Pain *(cont'd)*

	Acute Pain	Chronic Pain	Cancer Pain
ANS response	↑ HR, RR, BP, diaphoresis, pupillary dilation, muscle tension	Rarely present	■ Second biggest fear among CA Pts. ■ Refer to your facility's cancer pain algorithms.
Relevance to healing	Diminishes as healing occurs	Continues long after healing	
Analgesics	Responsive	Rarely responsive	

Postoperative Assessment

Equipment and Preparation

- Anticipate all necessary equipment and arrange to have in room prior to Pt arriving from recovery or the OR.
- If Pt is on a ventilator, notify RT and coordinate RT arrival as soon as the Pt arrives to the room.
- Suction equipment hooked up (turned on), oxygen source, oxygen delivery equipment available and working, emesis basin.
- IV poles and infusion pumps available and plugged in.
- Traction equipment, abductor pillows, bed trapeze, etc.

Initial Assessment

- Assess and ensure patency of airway, breathing, and circulation.
- Inspect surgical site dressing for abnormal drainage or bleeding.
- Assess and establish a baseline neurological status.
- Assess circulation, sensation, and motor activity distal to the operative site (distal CSM) and compare right to left.

Tubes and Lines

- Ensure that all drains, tubes, and lines remain patent and intact throughout transfer (stretcher to bed) and reassess after transfer!
- Place drainage collection containers (urometer bag, hemo-vac, chest tubes, etc.) to facilitate optimal drainage. Avoid placing underneath bed—risk of crushing container when bed is lowered.
- Record initial fluid LTC in IV bag and urine/drain output on postop assessment record/flow sheet.
- Ensure IV is patent and rate is correct as ordered.

Postop Orders

- Review postop orders and note any changes compared to preop orders (e.g., new or d/c'd meds, fluids, diet restrictions, activity).
- Consult with charge nurse if orders seem incomplete or inappropriate.

Subsequent Assessments

- Assess ABCs, LOC, vital signs, pain, and distal CSM every 15 min until stable or as otherwise indicated in the postop orders.
- Inspect surgical site for bleeding, drainage, and signs of infection including *redness, tenderness, swelling,* and *localized warmth*.
- Monitor and record I/O (oral intake, voiding, IVs, and drains).

Nursing

- Perform routine assessments and dressing changes as ordered.
- Turn and reposition routinely—assess for signs of pressure sores.
- Encourage deep breathing and coughing, incentive spirometry.
- Provide routine hygienic care and assist Pt with ADLs p.r.n.
- Provide Pt and family teaching. Include home care and follow-up.

Nutrition Assessment

	Normal Findings	Suggests Malnutrition
Demeanor	Alert and responsive with a positive outlook	Lethargic, negative attitude
Weight	Reasonable for build	Underweight, overweight, or obese
Hair	Glossy, full, firmly rooted, and uniform in color	Dull, sparse, easily and painlessly plucked
Eyes	Bright, clear, and shiny	Pale conjunctiva, redness, dryness
Lips	Smooth	Chapped, red, and swollen
Tongue	Deep red and slightly rough with one longitudinal furrow	Bright red or purple, swollen or shrunken, several longitudinal furrows
Teeth	Bright and painless	Cavities, painful, mottled, or missing
Gums	Pink and firm	Spongy, bleeding, receding
Skin	Clear, smooth, firm, and not excessively dry	Rashes, swelling, light or dark spots, excessive dryness
Nails	Pink and firm	Spoon-shaped; ridged, spongy bases
Mobility	Erect posture, good muscle tone, walks without difficulty	Muscle wasting, skeletal deformities, loss of balance

Physical Findings of Dehydration

	Mild	Moderate	Severe
Mentation	Alert	Lethargic	Obtunded
Capillary refill	2 sec	2–4 sec	> 4 sec, cool skin
Mucous membranes	Normal	Dry	Parched, cracks
Heart rate	Slightly up	Increased	Very increased
Pulse (character)	Normal, full	Thready	Faint, impalpable
Respiratory rate	Normal	Increased	Fast; hyperpnea
Blood pressure	Normal	Orthostatic	Decreased
Skin turgor	Normal	Slow	Tenting
Urine output	Decreased	Oliguria	Oliguria, anuria

Fluid and Electrolytes

Normal Intake and Output

- **Intake:** 1500–2500 mL over a 24-hour period
- Remember! ***A kg gained is a liter retained!***
- **Output:** 1500–2500 mL over a 24-hour period (40–80 mL/hr)
- Minimum urine output is 30 mL/hr
- Insensible loss (respiration, sweating, BM) is 500–1000 mL/day

Fluid Volume Overload

- **General:** Weight gain and edema
- **Skin—mucous membranes:** Skin stretched and shiny
- **CV:** Decreased hematocrit, ↑ pulse pressure, emptying of hand veins > 5 seconds, pulmonary edema, congestive heart failure
- **Urinary:** Polyuria, dilute urine
- **GI:** Nausea and anorexia (edema of bowel)
- **CNS:** Deteriorating confusion

Fluid Volume Deficit

- **General:** Weight loss
- **Skin—mucous membranes:** Decreased skin turgor, dry mucous membranes
- **CV:** Increased hematocrit, narrowing pulse pressure, filling of hand veins > 5 seconds, postural hypotension, tachycardia upon standing
- **Urinary:** Oliguria, concentrated urine
- **GI:** Thirst, anorexia (decreased blood flow to intestine), longitudinal furrows on tongue
- **CNS:** Confusion and disorientation

Electrolyte Imbalances

Imbalance	Signs and Symptoms	Common Causes
Hypercalcemia Serum calcium level > 10.5 mg/dL	Weakness, fatigue, anorexia, nausea, vomiting, constipation, polyuria, tingling lips, muscle cramps, confusion, hypoactive bowel tones	Hyperparathyroidism or malignancies, thiazide diuretics, lithium, renal failure, immobilization, metabolic acidosis
Hypocalcemia Serum calcium level < 8.5 mg/dL	Anxiety, irritability, twitching around the mouth, convulsions, tingling/numbness of fingers, diarrhea, abdominal/muscle cramps, arrhythmias	Low albumin level is most common, renal failure, hyperthyroid, ↑ Mg, acute pancreatitis, Crohn's disease
Hyperkalemia Serum potassium level > 5.0 mEq/L	Weakness, nausea, diarrhea, hyperactive GI, muscle weakness and paralysis, arrhythmias, dizziness, postural hypotension, oliguria	K-sparing diuretics, NSAIDS, renal failure, multiple transfusions, ↓ renal steroids, OD of K-supplements

(Continued text on following page)

Electrolyte Imbalances *(continued)*

Imbalance	Signs and Symptoms	Common Causes
Hypokalemia Serum potassium level < 3.5 mEq/L	Anorexia, nausea, vomiting, fatigue, ↓ LOC, leg cramps, muscle weakness, anxiety, irritability, arrhythmias, postural hypotension, coma	Anorexia, fad diets, prolonged NPO status, alkalosis, transfusion of frozen RBCs, prolonged NGT suctioning
Hypermagnesemia Serum magnesium level > 2.7 mg/dL	Muscle weakness and fatigue are most common, nausea, vomiting, flushed skin, diaphoresis, thirst, arrhythmias, palpitations, dizziness	↑ Mg intake, chronic renal disease, pregnant women on parenteral Mg for preeclampsia, Addison's disease
Hypomagnesemia Serum magnesium level < 1.7 mg/dL	Diarrhea, anorexia, arrhythmias, lethargy, muscle weakness, tremors, nausea, dizziness, seizures, irritability, confusion, psychosis, ↓ BP, ↑ HR	Prolonged NGT suctioning, diarrhea, laxative abuse, malnutrition, alcoholic, prolonged diuretic use, DKA, digoxin
Hypernatremia Serum sodium level > 145 mEq/L	Confusion if severe, fever, tachycardia, low BP, postural hypotension, dehydration, poor skin turgor, dry mucous membranes/tongue, flushed	Fever, vomiting, diarrhea, ventilated Pts, severe burns, profuse sweating, diabetes insipidus, diuresis
Hyponatremia Serum sodium level < 135 mEq/L	Nausea, vomiting, abdominal cramps, diarrhea, HA, dizziness, confusion, flat affect, ↓ DBP, ↑ HR, postural hypotension, ↓ deep tendon reflex	Diuretic use, vomiting, diarrhea, burns, hemorrhage, fever, diaphoresis, CHF, renal failure, hyperglycemia, ↑ ADH

Reusable Assessment Form
(make photocopies for multiple Pts)

Name	**Vital Signs Q:**	**Height:**	**Weight:**
Room	**1st Assess ____:____**	**Treatments / Current Status**	
Age Sex	T°	Diet | NPO | Clear | Full | ADA | AHA	
Diagnosis	HR	CBG	
Code Status	RR	Activity	
Admit Date	BP	Dressing	
History	SpO_2 on	Foley	
	Lungs	IV/Fluids	
Allergies	Pain	Teaching	
	Tx/Result	Labs/Diagnostics	PRN
Primary	Intake		
Attending	Output		

Reusable Assessment Form *(make photocopies for multiple Pts)*

2nd Assess ___:___	Med/Treatment ↓	Times ↳	Scheduled Medications/Treatments							
T°										
HR										
RR										
BP										
SpO_2 on										
Lungs										
Pain										
Tx / Result										
Intake										
Output										

General Report *(make copies for multiple Pts)*				
Name		**Age**	**Sex**	**Rm #**
Diagnosis			**Code Status**	
Admit Date	**Dr.**			
Surgery—Procedure				
Neurological				
Respiratory				
CV				
GI—GU				
MS				
Pain				
Skin				
Incision—Dressing				
I & O				
IVs		**LTC**		
Diet—NPO				
Activity				
Labs—Procedures				
Miscellaneous				
D/C Planning—Teaching Needs				

Assessment Notes *(make copies for multiple Pts)*
Use for exception-based charting or additional notes
Neuro
Respiratory
CV
GI
GU
MS
Pain
Skin
Exception-Based Charting is used to document exceptions or deviations from the norm as compared to previous assessments. Only the exceptions/deviations need to be documented. In most cases, a check mark (✓) indicates within normal limits, an arrow (⇐) indicates no change from previous assessment, and an asterisk (*) indicates any deviation or change in status since the previous assessment. Any (*) needs to be clearly documented.

Erikson's Developmental Stages

Developed by psychiatrist Erik Erikson in 1956.

Stage	Age	(+) Outcome	(−) Outcome
Trust vs. Mistrust	Birth to 18 mo	Strong bonds, trust in mothering figure	Inability to bond, insecure, distrustful
Autonomy vs. Shame or Doubt	18 mo to 3 yrs	Independence, some self-esteem	Doubtful of own ability, dependent
Initiative vs. Guilt	3–6 yrs	Sense of purpose and ability.	Immobilized by guilt, dependent
Industry vs. Inferiority	6–12 yrs	Self-confidence by doing and achieving	Sense of inferiority, inability to achieve
Identity vs. Role Confusion	12–20 yrs	Secure sense of self, positive ideals	Confusion, inability to make decisions
Intimacy vs. Isolation	20–30 yrs	Lasting relationship or commitment	Isolation and a fear of commitment
Generativity vs. Stagnation	30–65 yrs	Creates a family, considers future welfare of others	Stagnation, self-centered, unfulfilled life and career
Ego Integrity vs. Despair	65–death	Positive sense of self-worth, accepts and prepares for death	Feeling of hopelessness, fears and denies death

Maslow's Hierarchy of Needs

Developed by psychologist Abraham Maslow in 1943. Throughout the lifespan, individuals seek self-actualization. Lower-level needs must be fulfilled before higher-level needs can be fulfilled. People fluctuate between levels depending on life circumstances.

Physiological Needs	Food, water, shelter, warmth, sexual expression
Safety	Security, freedom from fear, physical safety
Love	Satisfying interpersonal relationships
Esteem	Achievement, mastery, self-respect
Self-Actualization	Self-fulfillment, reach highest potential

Terms Associated with Pregnancy

Abortion . . . . . .the spontaneous or induced termination of pregnancy before the fetus reaches viability
Chloasma . . . . . .mask of pregnancy
Crowning . . . . . .presentation of the fetal head at the vaginal introitus
CST . . . . . .contraction stress test
Deceleration . . . . .decrease in fetal heart rate
Dilatation . . . . . .widening of cervical os and canal
Eclampsia . . . . . .seizures 2° to hypertension
EDD *or* EDC . . . . . .estimated date of delivery *or confinement*
Embryo phase . . .weeks 3–8
Effacement . . . . . .shortening and thinning of cervix
Fetus phase . . . . .from week 9 until delivery
FHR . . . . . .fetal heart rate
FHT . . . . . .fetal heart tone
Gravida . . . . . .number of ALL pregnancies, regardless of outcome, including current pregnancy

Terms Associated with Pregnancy *(continued)*

HCG . . . . . .human chorionic gonadotropin
HELLP . . . . . .Hemolysis, Elevated Liver enzymes, Lowered Platelets (a bleeding disorder similar to DIC)
Homans' sign . . . . . .pain elicited by dorsiflexion of foot
Hyperemesis gravidarum . . . . . .excessive nausea and vomiting in early pregnancy
IDM . . . . . .infant of diabetic mother
Involution . . . . . .return of uterus to nonpregnant size
Lanugo . . . . . .soft downy body hair
LGA . . . . . .large for gestational age
LNMP . . . . . .last normal menstrual period
L:S ratio . . . . . .lecithin/sphingomyelin ratio: determines fetal lung maturity (2:1 ratio is desirable)
MAb . . . . . .miscarriage abortion
Macrosomia . . . . . .birth weight > 4000 g
Meconium . . . . . .fetal defecation while in utero at time of labor that occurs with fetal distress
Miscarriage . . . . . .spontaneous abortion
Multigravida . . . . . .has been pregnant more than once
Multipara . . . . . .two or more pregnancies beyond 20 weeks
Nidation . . . . . .implantation—occurs between day 7 to 10 postconception
NST . . . . . .nonstress test
Nullipara . . . . . .never produced a viable offspring
OCT . . . . . .oxytocin challenge test
Operculum . . . . . .mucus plug
Organogenesis . . . . . .weeks 3–8
Para . . . . . .number of viable births > 20 weeks
Pica . . . . . .ingestion of nonnutritive substances
PIH . . . . . .pregnancy-induced hypertension (see preeclampsia this section)
Post-term . . . . . .gestation lasting longer than 42 weeks

Terms Associated with Pregnancy *(continued)*

POC . . . . . .product of conception
Preeclampsia . . . . .mild preeclampsia is 140/90 or higher and severe is 160/110 or higher
Preterm . . . . . .born prior to beginning of 38th week
Primigravida . . . . . .first pregnancy ever
Primipara . . . . . .only one pregnancy carried past 20 weeks
PTL . . . . . .preterm labor
Puerperal period . . . . . .up to 21–42 days postpartum
ROM . . . . . .rupture of membranes (1000 mL at term)
SGA . . . . . .small for gestational age
Station, fetal . . . . .relation of presenting part to maternal pelvic ischial spines
Striae . . . . . .stretch marks
Supine hypotension . . . . . .caused by compression of vena cava

- Relieved by lying in a lateral recumbent position

TAb . . . . . .therapeutic abortion
Teratogenic . . . . . .harmful to developing embryo
TPAL . . . . . .Term, Premature births, Abortions or miscarriages, Living children
Trimester . . . . . .one of three phases of pregnancy, each consisting of 13 weeks
Variability . . . . . .refers to irregularities in fetal heart rate
Vernix . . . . . .cheeselike coating on newborn's skin
Viability . . . . . .pregnancy lasting beyond 20 weeks of gestation
Viable fetus . . . . . .uncompromised fetus beyond 20 weeks

Predicting the Due Date (Nägele's Rule)

- Add **7 days** to the first day of the LNMP.
- Subtract **3 months.**
- Add **1 year.**
- See example to right →

1st day of LNMP 10/14/01
- Add 7 days 10/21/01
- Subtract 3 months 7/21/01
- Add 1 yr (EDD) 7/21/02

Comparison of True and False Labor

True Labor		False Labor	
Contractions	Consistent pattern	**Contractions**	Inconsistent pattern
■ Frequency	Progressively increasing	■ Frequency	Inconsistent
■ Duration	Progressively increasing	■ Duration	Inconsistent
■ Intensity	Progressively increasing; increases with walking	■ Intensity	Inconsistent; subsides or does not increase with walking
Cervix	Progressive effacement and dilation	**Cervix**	No significant change
Discomfort	Mostly low back and abdominal	**Discomfort**	Mostly abdominal abdominal and groin

Stages of Labor

Stage I	From onset of contractions through full effacement and dilatation of cervix (latent phase: 0–3 cm; active phase: 4–7 cm; transition phase: 8–10 cm). Duration—8 to 18 hours.
Stage II	From full dilatation of cervix until delivery of baby. Duration—15 to 90 minutes.
Stage III	From birth of baby until expulsion of placenta. Duration—up to 20 minutes.
Stage IV	First 1–2 hours after expulsion of placenta.

Electronic Fetal Monitoring (EFM)

Fetal Heart Rate (FHR)

Baseline	■ HR between contractions.
Normal	■ 120–160 BPM (can be higher for short periods of time, less than 10 minutes).
Tachycardia	■ Sustained FHR >160 for more than 10 minutes. ■ Common etiology can include early fetal hypoxia, immaturity, amnionitis, maternal fever, and terbutaline (Brethaire).
Bradycardia	■ Sustained FHR <120 for more than 10 minutes. ■ Common etiology can include late or profound fetal hypoxia, maternal hypotension, prolonged umbilical cord compression, and anesthetics.

Variability (Cardiac Rhythm Irregularities)

Absent	■ 0–2 variations per minute (abnormal)
Minimal	■ 3–5 variations per minute (abnormal)
Moderate	■ 6–25 variations per minute (normal)
Marked	■ More than 25 variations per minute (abnormal)

Deceleration (Decrease in Fetal Heart Rate)

	Etiology	Management
Early Decelerations *Mirror image of the contraction starting and stopping with contractions.*	Head compression	Observation

(Continued text on following page)

Deceleration (Decrease in Fetal Heart Rate) *(continued)*

	Etiology	Management
Late Decelerations *Reverse mirror image of the contractions, starting after contraction starts and ending after contraction has ended.*	Uteroplacental insufficiency	Lateral position, stop or slow pitocin, O_2, IV fluids, c-section if not corrected.
Variable Deceleration Pattern *Occurs at unpredictable times during contractions and has varying shape and size.*	Cord compression	Lateral, knee-to-chest position, O_2, c-section if not corrected.

Emergency Delivery

Signs of Imminent Delivery

- Regular contractions that are less than 2 minutes apart.
- Urge to have a bowel movement or strong urge to push.
- Bulging vaginal opening or crowning (baby's head is visible).

Normal, Uncomplicated Delivery

- Position mother on a flat surface with back supported by pillows.
- Don gloves and drape so that vaginal opening is exposed.
- During contractions, instruct mother to take slow, deep breaths.
- If birth is imminent, instruct the mother to push during each contraction (discourage pushing between contractions).
- With your gloved hand, apply gentle pressure against the baby's head to help slow rate of delivery—minimizes perineal tearing.

- **Suction:** Once the head is delivered, support it with one hand while using your free hand to suction the nose and mouth with a bulb syringe (discourage mother from pushing while suctioning).
- **Assess Location of Cord:** If umbilical cord is wrapped around the baby's neck, gently but quickly slip it over the baby's head.
- Once the head is delivered, place your hands on either side of the baby's head and gently guide it downwards while the mother pushes until the top shoulder emerges. Then guide the baby upwards and support its head and shoulders as the rest of the baby emerges.

Note: Newborns are slippery; use a dry towel to hold the baby.

- Keep the baby at the same level as the perineum.
- Suction the baby's nose and mouth with a bulb syringe to clear secretions, blood, and mucus.
- Stimulate the baby to breathe with vigorous rubbing and drying.
- Hypothermia can occur rapidly in newborns; dry and wrap the baby in dry towels to prevent excessive heat loss.
- Place the baby on the mother's abdomen or chest. Do not pull on the umbilical cord if placenta has not been expelled yet.
- Encourage breastfeeding to stimulate uterine contractions. This will help to expel the placenta.
- Clamp umbilical cord 8 inches from baby and place a second clamp 2 inches beyond first clamp and cut in the middle with a sterile scalpel. Assess number of cord vessels (2 veins, 1 artery).
- Once placenta has been expelled, save for analysis by physician.
- Massage mother's abdomen to stimulate uterine contractions.
- Assess and document APGAR at 1 and 5 minutes after delivery (see *APGAR Score*).

Complicated Delivery

- Assess for postpartum hemorrhage or other complications.

These are basic guidelines and are not meant to be exhaustive in content nor direction. The intent is not to replace established hospital protocols designed to address these specific complications, but rather prepare the reader for what to anticipate if these complications occur.

Note: It is assumed that ABCs, O_2, IV have been established.

Meconium-Stained Amniotic Fluid

- **During delivery:** Suction nose and mouth with a bulb syringe prior to delivery of the shoulders (once the shoulders are delivered, the baby can inhale, resulting in meconium aspiration).
- **After delivery:** Minimize stimulation and delay ventilation until meconium can be suctioned from airways to prevent aspiration.

Cord Presentation

- Place mother in Trendelenburg position with knees to chest.
- Relieve cord pressure by applying gentle pressure to baby's head.
- Monitor cord pulses and cover with saline-soaked gauze.
- Discourage pushing and prepare for an emergency c-section.

Breech Presentation (feet first)

- Support baby's legs and buttocks and gently pull during contractions.
- Once (if) shoulders are delivered, avoid pulling on baby.
- Place gloved fingers between the baby's face and the vaginal wall to create an airway for the baby.
- Prepare for an emergency c-section.

Limb Presentation

- Place mother in Trendelenburg position with knees to chest.
- Support presenting limb and assess pulse if possible.
- Discourage mother from pushing during contractions (pant instead).
- Prepare for an emergency c-section.

Postpartum Hemorrhage

- Massage fundus or put baby to breast, if appropriate, to stimulate uterine contractions.
- If bladder is distended, encourage Pt to void, straight cath.
- Place Pt in Trendelenburg position.
- Establish 2nd large-bore IV access and infuse 1–2 liters of crystalloid.
- Medication such as oxytocin may be administered.
- Possible hysterectomy if medical management is unsuccessful.

Initial Newborn Care and Assessment

ABCs and Temperature

- Baby should be pink and have a loud, vigorous cry.
- Suction the nose and mouth to clear excess secretions, mucus.
- Stimulate breathing with vigorous rubbing and drying.
- Dry baby and maintain warmth (wrap in blankets, warmer, etc.).

APGAR and Vital Signs (see *APGAR Score*)

- Assess and document APGAR at 1 and 5 minutes after delivery. **Note:** Some hospitals also require a 10-minute APGAR score.
- Assess and record vital signs *(see normal ranges below)*.

Preterm	**RR:** 50–70	**HR:** 140–180	**SBP:** 40–60	**T:** 36.8°–37.5°C
Newborn	**RR:** 30–60	**HR:** 120–160	**SBP:** 60–90	**T:** 36.8°–37.5°C

Identification

- Place ID bands on baby and mother.
- Record baby's footprints in chart.

Measurements

- **Weight:** Normal is 6–10 lb.
- **Length:** Normal is 18–22 inches.
- **Head circumference:** Normal is 33–35 cm.
- **Chest circumference:** Normal is 30–33 cm.

Physical Assessment

Note: Perform a regular, head-to-toe assessment, similar to an adult, but note the following areas specific to newborn assessment.

- **Appearance:** Baby should be pink, have a loud, vigorous cry, and be well-flexed with full ROM and spontaneous movements.
- **Fontanels:** Anterior is diamond-shaped—about 4 cm at widest point; posterior is triangular—1 cm or less at widest point.
- **Molding:** Skull may be odd-shaped with overlapping cranial bones.
- **Mouth:** Inspect the mouth for cleft lip and/or cleft palate.
- **Heart Murmur:** Soft murmur considered normal in first few days.
- **Breathing:** Abdominal breathing is normal in newborns.
- **Umbilical Cord:** Should have 1 vein and 2 arteries. It should be clamped, may or may not be pulsating, and no sign of bleeding.
- **Extremities:** Legs and arms equal length to each other and all fingers and toes accounted for.
- **Male Genitalia:** Testes palpable in scrotum or inguinal canal.
- **Female Genitalia:** Large labia minora and vaginal discharge of blood or mucus is considered normal.

Routine Newborn Medication and Labs

- **Eyes:** Eyes are medicated with antibiotic ointment according to hospital policy.
- **Vitamin K injection:** Given to prevent hemorrhage.
- **PKU (phenylketonuria):** Should be obtained 24 hours after feeding begins. The normal serum blood level is < 4 mg/dL. The sample is obtained from a heel stick using a lancet.

- **Coombs' Test:** Done if mother's blood is ***Rh-negative***. Determines if the mother has formed harmful antibodies against her fetus's RBCs and transferred them to her baby via the placenta. Heel stick sample.
- **Immunizations:** The physician may order the first hepatitis-B vaccine (Hep-B) to be given soon after birth, prior to the discharge *(see Childhood Immunization Schedule)*.

APGAR Score

Appearance	**1 min**	**5 min**
■ Pink torso and extremities . . . . . .2 ■ Pink torso, blue extremities . . . . . .1 ■ Blue all over 0		
Pulse	**1 min**	**5 min**
■ > 100 . . . . . .2 ■ < 100 . . . . . .1 ■ Absent 0		
Grimace (irritability)	**1 min**	**5 min**
■ Vigorous cry . . . . . .2 ■ Limited cry . . . . . .1 ■ No response to stimulus 0		
Activity	**1 min**	**5 min**
■ Actively moving . . . . . .2 ■ Limited movement . . . . . .1 ■ Flaccid 0		
Respiratory Effort	**1 min**	**5 min**
■ Strong loud cry . . . . . .2 ■ Hypoventilation, irregular . . . . . .1 ■ Absent 0		
Totals*		

***8–10: normal; 4–6: moderate depression; 0–3; aggressive resuscitation (see *Initial Steps to Neonatal Resuscitation*).**

Postpartum Care and Assessment—Mother

General Assessment Pearls

- Monitor for signs of postpartum hemorrhage and shock.
- If preeclamptic, assess blood pressure every hour.
- It's considered normal to have a slight fever (100.4°F) for the first 24 hours postpartum. Temp > 101.4°F indicates an infection.
- Urinary retention is likely to occur postpartum; encourage fluids and monitor I & O for the first 12 hours.
- Encourage early ambulation; instruct Pt to change position slowly, because postural hypotension is common postpartum.

Breast and Breastfeeding

- Colostrum appears within 12 hours and milk appears in about 72 hours postpartum. Breasts become engorged by postpartum day 3 or 4 and should subside spontaneously within 24–36 hours.
- Assess breasts for infection and assess nipples for irritation.
- Encourage the use of a bra between feedings.

Complications:

- **Pain:** Assess for mastitis, abscess, milk plug, thrush, etc. Proper positioning of infant (football carry) will minimize soreness. Breast shields are used to prevent clothing from rubbing on the nipples.
- **Engorgement:** Apply moist heat for 5 minutes prior to breastfeeding. Use ice compress after each feeding to reduce swelling and discomfort. Avoid giving baby bottles and pacifiers while engorged, as they may cause nipple confusion or preference.
- **Mastitis:** Encourage rest and continuation of feeding or pumping. Administer prescribed antibiotics. Note: Breast milk is not infected and will not harm the infant.

Abdomen and Uterus

- The uterus should be firm, about the size of a grapefruit, central, and at the level of the umbilicus immediately postpartum. Deviation to the right may indicate distended bladder.
- Assess for bladder fullness—have mother void if bladder is full. A full bladder may inhibit uterine contractions, causing bleeding.
- If postvoid uterus is still boggy, massage top of fundus with fingers held together and reassess every 15 minutes.
- Mother and/or partner may be instructed to massage fundus.
- Auscultate bowel sounds and inquire daily about BMs.
- Constipation is common from anesthesia and analgesics as well as fear of perineal pain.
- Increased fiber and fluid intake, along with early and routine ambulation, will help to reduce the occurrence of constipation.

Perineum

- **Episiotomy:** Assess for swelling, bleeding, stitches, infection.
- **Hemorrhoids:** Encourage sitz baths to help reduce discomfort.
- **Lochia:** Amount, character, and color. Explain the stages and duration of lochial discharge and instruct Pt to report any odor.
  - *Lochia rubra:* 1–3 days postpartum, mostly blood and clots.
  - *Lochia serosa:* 4–10 days postpartum, serosanguineous.
  - *Lochia alba:* 11–21 days postpartum, creamy-white, scant flow.

Lower Extremities

- **Thrombophlebitis:** Unilateral swelling, decreased pulses, redness, heat, tenderness, and positive Homans' sign (calf pain or tenderness upon dorsiflexion of the foot). Leg exercises and early ambulation help minimize the occurrence of venous stasis and clot formation.

Emotional Status

- Explain to the mother and to her family that her emotions may shift from high to low and that these changes are considered normal due to the tremendous hormonal changes occurring postpartum.
- Assess parent-infant bonding and family support system.

Normal Pediatric Vital Signs

Age	RR	HR	SBP	Temp
Preterm	50–70	140–180	40–60	36.8°–37.5°C
Newborn	30–60	110–120	60–90	36.8°–37.5°C
6 months	25–35	110–180	85–105	37.5°C
1 year	20–30	80–160	95–105	37.5°C
2 years	20–30	80–130	95–105	37.5°C
4 years	20–30	80–120	95–110	37.5°C
6 years	18–24	75–115	95–110	37°C
8 years	18–22	70–110	95–115	37°C
10 years	16–20	70–110	95–120	37°C
12 years	16–20	60–110	95–125	37°C
Teenager	12–20	60–100	95–135	37°C

Average Height and Weight *(50th Percentile)*

Age	Height		Weight	
	in	cm	lb	kg
Newborn	18	45.7	8	3.6
6 months	26	66	16	7.2
1 year	30	76.2	21	9.5

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Average Height and Weight *(50th Percentile)* *(continued)*

Age	Height		Weight	
	in	cm	lb	kg
2 years	34	86.4	27	12.2
4 years	40	101.6	35	16
6 years	45	114.3	45	20.5
8 years	50	127	56	25.5
10 years	55	139.7	73	33.2
12 years	60	152.4	92	41.8
Teenager	65	165.1	> 110	> 50

Pediatric Health History

Chief Complaint

- What prompted the parents to bring their child to the hospital?
- What is the child complaining of (pain, nausea, dyspnea)?

Symptom Analysis

- **P:** Precipitating or Palliative factors.
- **Q:** Quality/Quantity; describe symptom(s). Are ADLs affected?
- **R:** Radiation/Region/Related symptoms.
- **S:** Severity; is the symptom mild, moderate, or severe?
- **T:** Timing; time of onset, frequency, and duration.

Immunization History

- Are the child's immunizations up to date? (see *Childhood Immunization Schedule* this section)
- Has the child ever been diagnosed with a communicable disease?
- Has there been any recent exposure to a communicable disease?

Allergies

- Has the child ever had an allergic reaction to food, meds, and so on?
- What types of reactions occur with known allergies?

Medications

- Is the child currently taking any medications? Include both prescription and over-the-counter medications.
- What was the time and dose of the last medication taken?

Past Medical History

- Prior illnesses and injuries.
- Past or recent hospitalizations and surgeries.
- Overall health status since birth.

Events Surrounding Illness or Injury

- History and onset of current illness.
- History and mechanism of injury.

Current Intake and Output

- Document last oral intake.
- Has child been drinking and eating normally?
- Assess for malnutrition and dehydration.
- Does urine and stool output seem normal?

Pediatric Assessment

Age	Developmental Milestones
1 month	Cries to communicate, reflex activity, eye contact
2 months	Coos, smiles, frowns, tracks objects, lifts head
3 months	Turns from back to side, sits with support
4 months	Turns from back to abdomen, lifts head and bears weight on forearms, can hold head erect, places everything in mouth, grasps with both hands, laughs, makes consonant sounds
5 months	Turns from abdomen to back, uses hands independently, plays with toes, puts feet into mouth
6 months	Sits alone leaning forward on hands, holds bottle, extends arms to be picked up, starts to show a fear of strangers, begins to make wordlike sounds, looks for dropped objects, plays "peek-a-boo"
7 months	Begins to crawl, bears weight on feet when supported
8 months	Pulls to a standing position, sits alone without any support, increased fear of strangers
9 months	Walks along side furniture, well-developed crawl, bangs objects together, drinks from cup, attempts to feed self, looks for hidden objects
10 months	May begin to walk and climb, one-handed dominance apparent, may say one or two meaningful words
11 months	Understands meaning of word "No," shakes head to indicate "No," can follow simple directions, cooperates with dressing activities, uses spoon

(Continued text on following page)

Pediatric Assessment *(continued)*

Age	Developmental Milestones
12 months	Walks alone or with one hand held, falls frequently while walking, points with one finger, drinks well with cup, pulls off socks
15 months	Walks independently, throws overhanded, pulls or pushes toys, builds with blocks, scribbles with crayon
18 months	Runs clumsily, jumps in place with both feet, can say about 10 words, may be able to control anal and urinary sphincters
2 years	Runs well, climbs stairs by placing both feet on each step, attains bladder and bowel control between 2 and 3 years of age, names familiar objects, combines two to three words into meaningful phrase
2 1/2 years	Jumps from chair or step, stands on one foot briefly
3 years	Rides tricycle, turns doorknobs, climbs stairs by alternating feet on steps, dresses self, uses short sentences
4 years	Hops on one foot, catches ball, names colors
5 years	Skips well, jumps rope, maintains balance with eyes closed, uses complete sentences, vocabulary of about 2100 words
6–12 years	Swims, skates, rides bicycle, ties shoes, uses crayon or pencil well, has strong sense of fairness, awareness of rule-governed behavior, uses complex sentences, reads, counts, forms clubs or groups
Adolescent	Learns to care for self independently while learning to effectively interact with society

Pediatric Assessment Pearls

- Begin by obtaining the history from the child's parent(s) and work toward the physical assessment. Use this time to establish trust.
- Have parent hold child as much as possible during the assessment.
- Approach child at his or her eye level and use first name frequently.
- Use simple language appropriate for child's developmental level.
- Begin assessment with a diversion such as a toy or game.
- Demonstrate procedures on a doll whenever possible.
- Always tell the truth, especially when it comes to painful procedures.
- Hold off on any invasive assessment that may cause pain or discomfort until the end of the assessment.
- Be friendly, but assertive. Do not give a choice when there is none.

Pain Assessment and Intervention

Signs and Symptoms by Developmental Stage

- **Infants:** Grimacing, frowning, startled expression, flinching, high-pitched, harsh cry, generalized, total-body response, extremities may thrash about, tremors, increased HR and BP, ↓ oxygen saturation.
- **Toddler:** Guarding, may touch or rub the area, generalized restlessness, loud cry, increased HR and BP, may verbalize with words such as, "owie" or "boo-boo."
- **Preschooler:** May perceive pain as punishment, may deny pain to avoid treatment, may be able to describe location and intensity, may exhibit crying and kicking, or may be withdrawn.
- **School-aged:** Fear of bodily harm and mutilation, awareness of death, able to describe pain, may exhibit stiff body posture, may withdraw, and may attempt to delay procedures.
- **Adolescent:** Perceives pain at a physical, emotional, and mental level, is able to describe pain, may exhibit increased muscle tension, may be withdrawn, and may show decreased motor activity.

Interventions for Pain

Nonopioid Analgesics:

- **Acetaminophen (Tylenol):** 10–15 mg/kg PO q4h, max 5 doses/day.
- **Ibuprofen (Advil):** (> 2y) 7.5 mg/kg PO qid, max 30 mg/kg/day.
- **Naproxen (Naprosyn):** (> 2 y) 5 mg/kg PO bid, max 2 doses.

Opioid Analgesics:

- **Codeine:** (> 1 y) 0.5 mg/kg (15 mg/m^2) PO, IM, SC q 4–6h, max 4 doses/day. **Note:** Not recommended for IV use. Infants may receive SC or IM codeine at same dose.
- **Meperidine (Demerol):** 1.1–1.8 mg/kg PO, IM, SC q 3–4h prn. Max 50–100 mg/dose.
- **Morphine:** 0.1–0.2 mg/kg IV, IM, or SC prn, max 15 mg/dose.
- **Sublimaze (Fentanyl):** (> 2 y) 2–3 mcg/kg IV.

Nonpharmacological Interventions:

- **Distraction:** Music, TV, games, dolls, stuffed animals, art, etc.
- **Minimize environmental stimuli:** Noises, bright lights, etc.
- **Provide comfort:** Positioning, rest, and relaxation.
- **Cutaneous stimulation:** Massage, heat or cold therapy.
- **Guided imagery:** Guide the child to either a make-believe place or someplace they have visited in the past (e.g., Disneyland). Encourage the child to describe this place.

Pediatric Formulas (> 1 yr)

Systolic BP	(2 × Age in years) + 90
Diastolic BP	Approximately 2/3 of the SBP
Weight (KG)	(2 × Age in years) + 8
ET Tube Size	(Age in years ÷ 4) + 4
ET Tube Depth of Insertion	(Age in years ÷ 2) + 12
Fluid Bolus	10–20 mL/kg

Pediatric IM Injection Sites

Infant	Ventrogluteal or vastus lateralis (5/8–7/8 inch needle)
Toddler	Ventrogluteal or dorsogluteal (5/8–1 inch needle)
Older child	Ventrogluteal or deltoid (5/8–1 inch needle)

Pediatric IV Pearls

IV Catheter Selection

- **20–24 gauge** over-the-needle catheters are most common.

IV Site Selection

- Developmental stage should be considered during site selection.
- Feet are more appropriate for infants who are not yet walking.
- Most common sites are dorsal hand, wrist, and antecubital (AC).
- Obtain IO (intraosseous) access when IV access is unavailable.

Special Considerations

- In an emergency, if an IV can't be obtained within 90 seconds, obtain IO access without delay.
- **Caution:** Always use a burette (volume-control set) or infusion device for pediatric Pts.
- Scalp veins have no valves and can be infused in either direction.
- Avoid placement, if possible, into the dominant hand.
- Use numbing gels and ointments to help minimize discomfort.
- Utilize parental assistance when appropriate, but never insist that the parent restrain the child.
- Using a doll will sometimes help distract the child and help you convey to the child what you need to do.
- Use age-appropriate items (stickers, dolls, etc.) to reward child.
- Change IV bags and tubing according to your facility's policy.

Childhood Immunization Schedule—United States • 2005

Indicates range of recommended ages | **Indicates catch-up vaccines** | **Preadolescent assessment 11–12 years old**

Vaccine	Birth	1 mo	2 mo	4 mo	6 mo	12 mo	15 mo	18 mo	24 mo	4–6y	11–12y	13–18y
Wellness check	X	X	X	X	X	X	X	X	X	X	Every 2 yr after age 6	
HBV-B (hepatitis vaccine)	1st	*HBsAg(-)mom* 2nd			3rd				Hep-B Series			
DTP (diphtheria, tetanus, pertussis)			DTaP	DTaP	DTaP		DTaP			DTaP	Td	Td
HIB (*H. influenzae* type B)			HIB	HIB	HIB	HIB						
IPV (inactivated polio vaccine)			IPV	IPV	IPV					IPV		
MMR (measles, mumps, rubella)						1st MMR				2nd MMR	Catch-Up MMR	
VAR (varicella) Chicken Pox						VAR 1 dose			Catch-Up VAR			
PCV (pneumococcal conjugate vaccine)			PCV	PCV	PCV	PCV						
Influenza					Influenza (yearly)							
Vaccines below this line are for selected populations												
Hepatitis A									Hep-A series			
PPV (pneumococcal polysaccharide vaccine)									Catch-Up PCV	PPV		
Influenza									Influenza (yearly)			

Geriatric Assessment Pearls

General Guidelines

- Be mindful that the elderly may be hard of hearing, but never assume that being elderly automatically makes it hard to hear.
- Approach and speak to elderly Pts as you would any other adult Pt. It is insulting to speak to the elderly like a child. Speaking slowly is sometimes necessary, but does not indicate decreased intelligence.
- Eye contact helps instill confidence and, in the presence of impaired hearing, it will help the Pt to better understand you.
- Be aware that decreased tactile sensation and ROM are both normal changes with aging. Care should be taken to avoid unnecessary discomfort or even injury during an assessment.
- Be aware of generational differences, especially gender differences (e.g., modesty for females, independence for males).
- Assess for altered mental states. Use your "3-D Vision."
  - **Dementia**: Cognitive deficits (memory, reasoning, judgment).
  - **Delirium**: Confusion/excitement marked by disorientation to time and place, usually accompanied by delusions and/or hallucinations.
  - **Depression**: Diminished interest or pleasure in most or all activities.

Age-Related Changes and Implications

Decreased skin thickness	Elderly Pts are more prone to skin breakdown and should be assessed more frequently for pressure sores.
Decreased skin vascularity	Altered thermoregulation response can put the elderly at risk for heat stroke.
Loss of subcutaneous tissue	Decreased insulation can put the elderly at risk for hypothermia.

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Age-Related Changes and Implications *(continued)*	
Decreased aortic elasticity	Increased diastolic blood pressure.
Calcification of thoracic wall	Obscured heart and lung sounds and displacement of apical pulse.
Loss of nerve fibers/ neurons	Allow for extra time to comprehend, to learn, and to perform certain tasks.
↓ nerve conduction	Response to pain is altered.
Reduced tactile sensation	Puts Pt at risk for injury to self.

Pharmacokinetics in the Elderly

Pharmacokinetics is the way that the body absorbs, distributes, metabolizes, and excretes medication. Age-related physiological changes affect body systems, altering pharmacokinetics and increasing or altering a drug's effect.

	Physiological Change	Effect on Pharmacokinetics
Absorption	■ Decreased intestinal motility ■ Diminished blood flow to the gut	■ Delayed peak effect ■ Delayed signs and symptoms of toxicity
Distribution	■ ↓ fluid volume ■ ↑ body fat percentage ■ ↓ plasma proteins ■ ↓ lean body mass	■ ↑ serum concentration of water-soluble drugs ■ ↑ half-life of fat-soluble drugs ■ ↑ amount of active drug ■ ↑ drug concentration
Metabolism	■ ↓ blood flow to liver ■ ↓ liver function	■ ↓ rate of drug clearance by the liver ■ ↑ accumulation of some drugs
Excretion	■ ↓ kidney function ■ ↓ creatinine clearance	■ ↑ accumulation of drugs that are normally excreted by the kidneys

Polypharmacy

Polypharmacy is the concurrent use of several drugs. Taking two drugs increases the risk of an adverse drug event by 6%; taking eight drugs increases the risk by 100%.

How Polypharmacy Develops

- Medications being taken for no apparent reason.
- Duplication; different medications being taken for same reason.
- Concurrent use of interacting medications.
- Contraindicated medications being taken.
- Medications used to treat the side effects of other medications.
- Medications are not discontinued after resolution of problem.

Assessment and Prevention

- Have pharmacy and physician regularly review medications.
- Take a complete medication history, including OTC, herbal and natural supplements.
- Evaluate all medications for correct dose, duplication, and potential for drug-drug interactions.
- Look up contraindications and drug-drug interactions of medications.
- Coordinate care if multiple physicians are caring for the Pt.
- Educate Pt and family about medication use.
- Encourage Pts to use one pharmacy for all their prescriptions.
- Help Pts develop a simple medication regimen.
- Ensure that all pill bottles are easy to read and labeled correctly.
- Encourage nonpharmacological treatments whenever possible.

Inappropriate Medications for the Elderly

Note: Based on 1997 Beers Criteria & Classification by Expert Panel

Always Avoid	Rarely Appropriate	Often Misused
■ Barbiturates ■ Belladonna alkaloids ■ Chlorpropamide ■ Dicyclomine ■ Flurazepam ■ Hyoscyamine ■ Meperidine ■ Meprobamate ■ Pentazocine ■ Propantheline ■ Trimethoben-zemide	■ Carisoprodol ■ Chlordiazepoxide ■ Chlorzoxazone ■ Cyclobenzaprine ■ Diazepam ■ Metaxalone ■ Methocarbamol ■ Propoxyphene	■ Amitriptyline ■ Chlorpheniramine ■ Cyproheptadine ■ Diphenhydramine ■ Dipyridamole ■ Disopyramide ■ Doxepin ■ Hydroxyzine ■ Indomethacin ■ Methyldopa ■ Oxybutynin ■ Promethazine ■ Reserpine ■ Ticlopidin

Source: Beers, MH. Explicit criteria for determining potentially inappropriate medication use by the elderly. An update. Arch Intern Med 1997; 28, 157: 1531–1536.

Fall Risk Assessment and Prevention

Risk Factor	Intervention
Assessment Data: ■ Age > 65 ■ History of falls	■ Monitor frequently. ■ Pt should be close to nurses' station. ■ Implement fall prevention interventions.
Medications: ■ Polypharmacy ■ CNS depressants ■ BP/HR lowering ■ Diuretics and meds that ↑ GI motility	■ Review medications with physician. ■ Assess for medications that may affect blood pressure, heart rate, balance, or LOC. ■ Educate about use of sedatives, narcotics, and vasoactive medications. ■ Encourage nonopioid pain management.

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Fall Risk Assessment and Prevention *(cont'd)*

Risk Factor	Intervention
Mental Status: ■ Altered LOC or orientation	■ Routinely reorient Pt to situation. ■ Maintain a safe and structured environment. ■ Utilize pressure-sensitive alarms in bed and chairs.
Cardiovascular: ■ Postural	■ Change positions slowly. ■ Review med record for possible changes.
Neurosensory: ■ Visual impairment ■ Peripheral neuropathy ■ Difficulty with balance or gait	■ Provide illumination at night. ■ Minimize clutter and remove unnecessary or infrequently used equipment from room. ■ Provide protective footwear. ■ Provide appropriate assistive devices and instruct on proper use.
GI/GU: ■ Incontinence ■ Urinary frequency ■ Diarrhea	■ Ensure call light is within easy reach. ■ Create a toileting schedule. ■ Provide a bedside commode or urinal. ■ Unobstructed, well lit path to the bathroom.
Musculoskeletal: ■ Decreased ROM ■ Amputee	■ Provide ROM exercises and stretching. ■ Physical or Occupational Therapy consult. ■ Provide appropriate assistive devices.
Assistive Devices: ■ Use of cane, walker, or wheelchair (WC)	■ Ensure that assistive devices are not damaged and are appropriately sized. ■ Instruct Pt on proper and safe use.
Environment: ■ Cluttered room ■ Tubes and lines	■ Minimize clutter and remove unnecessary or infrequently used equipment. ■ Ensure call light is within easy reach.

Adult Immunization Schedule—United States • 2005

	19–49 years	50–64 years	> 65 years
Tetanus-Diphtheria (Td)	1 dose booster every 10 years		
Influenza	1 dose annually	1 dose annually	
Pneumococcal (Polysaccharide)	1 dose		1 dose
Hepatitis A	2 doses (6–12 months apart)		
Hepatitis B	3 doses (each dose 2–3 months apart)		
Measles, Mumps, Rubella (MMR)	■ 1 dose if MMR history unreliable. ■ 2 doses if occupational or other indications exist.		Not recommended
Varicella	2 doses (4–8 weeks apart) for those who are susceptible		
Meningococcal (Polysaccharide)	1 dose		

■ All persons in this group
■ Catch up on childhood vaccinations
■ For persons with medical or exposure indications

DISEASES AND DISORDERS
Alzheimer's Disease (AD)

Definition: A disabling degenerative disease of the nervous system characterized by dementia and failure of memory for recent events, followed by total incapacitation and eventually death.

Incidence: Most common cause of elderly dementia, accounting for about half of all dementias.

Onset: The disease process starts long before symptoms start to develop. The early-onset form of AD may begin as early as 40 years of age and the late-onset form typically begins after age 60. Life expectancy after development of symptoms ranges from 8–10 years.

Etiology: Unknown.

Clinical Findings:

Stage I: Loss of recent memory, easily irritated, loss of interest in life, and decline of abstract thinking and problem-solving ability.

Stage II: (Most common stage when disease is diagnosed) profound memory deficits, inability to concentrate or manage business or personal affairs.

Stage III: Aphasia, inability to recognize or use objects, involuntary emotional outbursts, and incontinence.

Stage IV: Pts become nonverbal and completely withdrawn. Loss of appetite leads to a state of emaciation. All body functions cease and death quickly ensues.

Nursing Focus

- Monitor vital signs and LOC and implement collaborative care as ordered.
- Keep requests simple and avoid confrontation.
- Maintain a consistent environment and frequently reorient the Pt.

Patient Teaching

- Provide Pt and family with literature on AD.
- Advise family that, as AD progresses, so does the need for supervision of ADLs such as cooking and bathing.
- Advise family to lock windows and doors to prevent wandering.
- Explain that Pt should wear an ID bracelet in case he or she becomes lost.
- Explain the actions, dosages, side effects, and adverse reactions of meds.

Asthma

Definition: Often referred to as *reactive airway disease (RAD),* asthma is an intermittent, reversible, obstructive disease of the lungs characterized by bronchospasm and hyper-reactivity to a multitude of triggering agents (allergens/antigens/irritants).

Incidence: Asthma can occur at any age and it is estimated that it affects about 5% of the population. Men are twice as likely as women to get asthma.

Onset: Onset is usually sudden.

Etiology: Triggers include allergens, infections, exercise, abrupt changes in the weather, or exposure to airway irritants, such as tobacco smoke, perfume, or cold air.

Clinical Findings: Difficulty breathing, wheezing, cough (either dry or productive of thick, white sputum), chest tightness, anxiety, and prolonged expiratory phase.

Nursing Focus

- During an attack, assess and maintain ABCs, notify RT/MD and implement collaborative care such as meds and IV fluid as ordered.
- Stay with the Pt and offer emotional support.
- Monitor vital signs and document response to prescribed therapies.

Patient Teaching

- Provide Pt and family with literature on asthma.
- Explain the actions, dosages, side effects, and adverse reactions of asthma meds.
- Provide instructions on the proper use of metered-dose inhalers.
- Provide instructions on the proper use of peak flow meter and answer any questions about the Pt's asthma management plan.
- Teach the Pt and family about the kinds of triggering agents that can precipitate an attack and how to minimize their risk of exposure.
- Instruct the Pt to seek immediate medical attention if symptoms are not relieved with prescribed meds.

Cancer—General Overview

Definition: Malignant neoplasia marked by the uncontrolled growth of cells, often with invasion of healthy tissues locally or throughout the body (metastasis).

Incidence: Second leading cause of death in the U.S., after cardiovascular (CV) disease.

Onset: Varies with different types of cancer.

Etiology: Varies with different types of cancer. Risk factors include tobacco use, sun exposure, environmental/occupational exposure to carcinogens, poor nutrition, decreased level of physical activity, and infectious diseases.

Clinical Findings: Vary with different types of cancer. For a general overview of symptoms suggestive of cancer, refer to ***CAUTION***—*7 Warning Signs of Cancer* in this section.

Types of Treatments

- **Surgery:** Removing cancerous tissue surgically or by means of cryosurgery (a technique for freezing and destroying abnormal cells).
- **Chemotherapy:** Treatment of cancer with drugs ("anticancer" drugs) that destroy cancer cells, or stop them from growing

or multiplying. Because some drugs work better together than alone, two or more drugs are often given concurrently (combination therapy).

- **Radiation Therapy:** Ionizing radiation (x-rays, gamma rays, or radioactive implants) deposits energy that injures or destroys the cells in the target tissue by damaging their genetic material, making it impossible for them to continue to grow.

Nursing Focus

- **Nausea/vomiting:** Administer antiemetics as needed and before chemotherapy is initiated. Withhold foods and fluids 4–6 hours prior to chemotherapy. Provide small portions of bland foods after each treatment.
- **Diarrhea:** Administer antidiarrheals. Monitor electrolytes. Give clear liquids as tolerated. Maintain good perineal care.
- **Stomatitis:** Avoid commercial mouthwash containing alcohol. Encourage good oral hygiene. Help Pt rinse with viscous Lidocaine prior to eating to reduce discomfort, and again after meals. Apply water-soluble lubricant to cracked lips. Popsicles provide a good source of moisture.
- **Itching:** Keep Pt's skin free of foreign substances. Avoid soap: wash with plain water and pat dry. Use cornstarch or olive oil to relieve itching, and avoid talcum powder and powder with zinc oxide.

Patient Teaching

- Provide literature for specific type of cancer to Pt and family.
- Prepare the Pt and family for what to expect with chemotherapy and radiation therapy.
- If surgery is to be performed, provide preoperative teaching to prepare the Pt and family for the procedure and postoperative care. Provide discharge instructions.
- Explain the actions, dosages, side effects, and adverse reactions of meds.

Cancer Facts

- **Benign tumors:** Noncancerous. They can often be removed and, in most cases, they do not come back. Cells from benign tumors do not spread to other parts of the body. Most importantly, benign tumors are rarely a threat to life.
- **Malignant tumors:** Cancerous. Cells in these tumors are abnormal and divide without control or order. They can invade and damage nearby tissues and organs.
- **Metastasis:** Process by which cancer cells break away from a malignant tumor and enter the bloodstream or the lymphatic system, thereby spreading from the original cancer site to form new tumors in other organs.

TNM—Staging of Cancer

T—Tumor Size	N—Nodes Involved	M—Metastasis
T—1 small	N—0 no involvement	M—0 none
T—2–3 medium	N—1–3 moderate	M—1 metastasis
T—4 large	N—4 extensive	

CAUTION—7 Warning Signs of Cancer

C	change in bowel or bladder habits
A	any sore that does not heal
U	unusual bleeding or discharge
T	thickening or lump in breast or elsewhere
I	indigestion or dysphagia
O	obvious change in wart or mole
N	nagging cough or hoarseness

ABCDs of Melanoma	
A—Asymmetry	one side of lesion different from the other
B—Border	edges are irregular, ragged, notched, or blurred
C—Color	color is not uniform throughout lesion
D—Diameter	diameter > 6 mm or an increase in size

Chronic Obstructive Pulmonary Disease (COPD)

Definition: A group of diseases that cause airflow blockage and breathing-related problems. It includes asthma, chronic bronchitis, and emphysema. COPD is a slowly progressive disease of the airways that is characterized by a gradual loss of lung function.

Incidence: COPD occurs most often in patients 25 years and older. COPD represents the fourth leading cause of death in the U.S.

Onset: COPD develops slowly, and it may be many years before symptoms start to develop.

Etiology: COPD is caused by repeated exposure to inhaled fumes and other irritants that damage the lung and airways. Cigarette smoking is the most common cause of COPD.

Clinical Findings: Cough productive of sputum, shortness of breath, wheezing, and chest tightness.

Three Types of COPD

- **Asthma:** See *Asthma.*
- **Chronic bronchitis:** Characterized by a productive cough lasting longer than 3 months during two consecutive years and airflow obstruction caused by excessive tracheobronchial mucus production.
- **Emphysema:** Characterized by abnormal, permanent enlargement of the distal air spaces past the terminal bronchioles, loss of elasticity, distal air space distention, and alveolar septal destruction.

Nursing Focus

- Position Pt to maximize ease of breathing (HOB 30°–45°).
- During an exacerbation, assess and maintain ABCs, notify RT/MD and implement collaborative care such as meds and IV fluid as ordered.
- Monitor vital signs and document response to prescribed therapies.

Patient Teaching

- Provide Pt and family with literature on specific type of COPD.
- Explain the actions, dosages, side effects, and adverse reactions of meds.
- Provide instructions on the proper use of metered-dose inhalers.
- Instruct the Pt to seek immediate medical attention if symptoms are not relieved with prescribed meds.

Congestive Heart Failure (CHF)

Definition: Condition in which the heart is unable to pump sufficient blood to meet the metabolic needs of the body. The result of inadequate cardiac output (CO) is poor organ perfusion and vascular congestion in the pulmonary (left-sided failure) and systemic (right-sided failure) circulation.

Incidence: Increases with age; about 1% of people over the age of 50 have CHF and about 10% of people over the age of 80.

Onset: With the exception of acute and severe damage to the myocardium, as in an AMI, CHF develops slowly, over a long period of time.

Etiology: Most common cause is coronary artery disease (CAD). Other causes include myocardial infarction (MI), HTN, diabetes, congenital heart disease, cardiomyopathy, and valvular disease.

Clinical Findings: The most common symptoms include fatigue, shortness of breath, and edema (vascular congestion in either the pulmonary or systemic circulation) in the ankles or feet, in the sacral area, or throughout the body. Ascites may cause the Pt to feel bloated. Onset of symptoms may be rapid or gradual,

depending on underlying etiology. ***Left-sided heart failure:*** Orthopnea, pulmonary edema, crackles or wheezes, dysrhythmias, tachycardia, tachypnea, dyspnea, anxiety, cyanosis, HTN (early CHF), low BP (late CHF), and decreased CO. ***Right-sided heart failure:*** Dependant edema, jugular venous distention (JVD), bounding pulses, oliguria, dysrhythmias, enlargement of the liver and/or spleen, increased central venous pressure (CVP), and altered liver function tests.

Nursing Focus

- Encourage rest and help alleviate dyspnea by elevating the HOB 30°–45°.
- In end-stage CHF, the slightest activity can cause fatigue and shortness of breath; therefore, assist the Pt with ADLs and eating as needed.
- Restrict fluid intake (typically < 2 L/day) and sodium intake as ordered (typically 1500–2300 mg/day depending on severity of heart failure).
- Assess vital signs before and after any level of increased activity.
- Monitor for signs and symptoms of fluid overload, impaired gas exchange, activity intolerance, daily intake & output, and weight gain will help in the early detection of exacerbation.

Patient Teaching

- Provide Pt with literature on CHF.
- Teach Pt and family to monitor for increased shortness of breath or edema.
- Teach Pt to limit fluids to 2 liters per day and restrict sodium as ordered.
- Teach the Pt to weigh him- or herself at the same time every day using the same scale, and report any weight gain > 4 lb in 2 days.
- Instruct the Pt to call for emergency assistance with acute shortness of breath or chest discomfort that is not relieved with rest.
- Review fluid and dietary restrictions and stress the importance of reducing sodium intake.
- Explain the dosages, route, actions, and adverse reactions of meds.

Coronary Artery Disease (CAD)

Definition: Narrowing and hardening of the arterial lumen resulting in decreased coronary blood flow and decreased delivery of oxygen and nutrients to the myocardium.
Incidence: Most common type of heart disease and the leading cause of death for both men and women in the U.S.
Onset: Can start in childhood and progress with age.
Etiology: Build up of fatty fibrous plaque or calcium plaque deposits on the inner walls of the coronary arteries causes atherosclerosis (thickening and hardening of the inner walls of coronary arteries).
Clinical Findings: The most common symptom is angina, though some individuals remain asymptomatic.

Nursing Focus

- Monitor vital signs and document response to prescribed therapies.
- Monitor and maintain cardiopulmonary function and enhance myocardial perfusion by implementing prescribed therapies.
- Document nursing and medical interventions and their outcomes.

Patient Teaching

- Provide Pt and family with literature about CAD.
- Explain lifestyle modifications necessary to control CAD.
- Review dietary restrictions and stress importance of reading food labels to avoid foods high in sodium, saturated fats, *trans* fats, and cholesterol.
- Explain the actions, dosages, side effects, and adverse reactions of prescribed meds.
- Provide information about the resumption of sexual activity acceptable for the Pt's medical condition.
- If surgery is to be performed, provide preoperative teaching to prepare Pt and family for the procedure, the ICU, postoperative care, and cardiac rehabilitation.

Crohn's Disease

Definition: Type of inflammatory bowel disease (IBD). Crohn's disease usually occurs in the ileum, but it can affect any part of the digestive tract, from the mouth to the anus. Diagnosis is sometimes difficult since Crohn's often is very similar to other disorders including irritable bowel syndrome and ulcerative colitis.

Incidence: Both men and women are equally affected.

Onset: Most likely to occur between the ages of 15 and 30 years, and after the age of 60.

Etiology: Unknown.

Clinical Findings: The most common symptoms are abdominal pain, often in the lower right quadrant, and diarrhea. Rectal bleeding, weight loss, and fever may also occur. Anemia may occur if bleeding is persistent.

Nursing Focus

- Monitor I/O and maintain fluid and electrolyte balance.
- Assess for skin breakdown and provide routine skin care.
- Unless contraindicated, fluid intake should be 3000 mL/day.
- Use calorie counts to ensure adequate nutrition.
- Monitor lab results.

Patient Teaching

- Provide Pt and family with literature on Crohn's disease.
- Instruct Pt that fluid intake should be at least 3 liters per day and meals should be small and frequent to maintain adequate nutrition.
- Teach Pt to minimize the frequency and severity of future exacerbations by getting adequate rest and relaxation, reducing or avoiding stress, and maintaining adequate nutrition.
- Explain the dosages, route, actions, and adverse reactions of meds.

Diabetes Mellitus (DM)

Definition: A chronic metabolic disorder marked by hyperglycemia. DM results either from a primary failure of the beta cells of the pancreas to produce enough insulin (type-1 DM) or from the development of insulin resistance in body cells, with initial increased insulin secretion to maintain metabolism, followed by eventual inability of the pancreas to secrete enough insulin to sustain normal metabolism (type-2 DM).

Type-1 Diabetes
(Previously called insulin-dependent diabetes mellitus [IDDM])

Incidence: Accounts for about 5% to 10% of diagnosed diabetes.

Onset: Develops most often in children and young adults, but the disorder can appear at any age.

Etiology: Develops when immune cells attack and destroy insulin-producing beta cells in the pancreas, resulting in loss of insulin production.

Clinical Findings: Weight loss, muscle wasting, loss of subcutaneous fat, polyuria, polydipsia, polyphagia, ketoacidosis (see comparison of hyperglycemia and hypoglycemia in *EMERG/TRAUMA*).

Type-2 Diabetes
(Previously called adult-onset diabetes)

Incidence: Most common form of diabetes, accounting for 90% to 95% of diagnosed diabetes.

Onset: Gradual. Early on, the pancreas is usually producing enough insulin, but for unknown reasons, the body cells lose their ability to respond to the insulin effectively. Eventually, insulin production decreases or ceases altogether.

Etiology: Associated with older age, obesity, family history of diabetes, previous history of gestational diabetes, physical inactivity, and ethnicity. About 80% of type-2 diabetics are overweight. Type 2 DM is increasingly being seen in children, adolescents, and young adults.

Clinical Findings: Polyuria, polydipsia, pruritus, peripheral neuropathy, frequent infections, and delayed healing of wounds or sores (see comparison table in *EMERG/TRAUMA*).

Gestational Diabetes

See OB/PEDS/GERI.

Nursing Focus

- Routine assessment for hyperglycemia and hypoglycemia, and their associated s/s.
- Monitor blood glucose level as ordered and document response to prescribed therapies.
- Assess body systems for complications associated with the effects of diabetes.

Patient Teaching

- Provide Pt with literature on managing diabetes.
- Encourage necessary lifestyle changes including weight reduction if Pt is overweight, dietary modifications, and exercise.
- Explain the purpose, dosage, route, and side effects of insulin and/or oral hypoglycemic agents.
- If self-administered insulin is prescribed, ensure Pt's ability to demonstrate appropriate preparation and administration.

Hypertension (HTN)

Definition: A persistent or intermittent elevation of the systolic BP above 140 mm Hg or diastolic BP above 90 mm Hg.

Primary (Essential) HTN

Incidence: Most common type.

Onset: Gradual (over many years).

Etiology: Underlying cause is unknown.

Clinical Findings: Typically asymptomatic, primary HTN is usually not recognized until secondary complications develop, including atherosclerosis, transient ischemic attacks (TIAs), strokes, myocardial infarction (MI), left ventricular hypertrophy, congestive heart failure (CHF), and renal failure.

Secondary HTN

Incidence: Less common.

Onset: Varies according to etiology.

Etiology: Can result from any condition that impairs normal regulation of blood pressure, such as renal, endocrine, vascular, or neurological disorders.

Clinical Findings: Variable, but most common symptoms are CV and neurological (malaise, weakness, fatigue, flushing of the face, HA, dizziness, lightheadedness, nose bleeds, ringing in the ears, or blurred vision) as well as symptoms associated with the underlying etiology.

Four Stages of HTN

- **Normal:** Systolic BP < 120 mm Hg and Diastolic BP < 80 mm Hg
- **Prehypertension:** SBP 120–139 mm Hg or DBP 80–89 mm Hg
- **HTN Stage I:** SBP 140–159 mm Hg or DBP 90–99 mm Hg
- **HTN Stage II:** SBP ≥ 160 mm Hg or DBP ≥ 100 mm Hg

Nursing Focus

- Monitor vital signs and document response to prescribed therapies for reducing blood pressure.
- Assess for signs of end-organ dysfunction (angina, low serum potassium levels, elevated serum creatinine and blood urea nitrogen [BUN], proteinuria, and uremia).
- Implement collaborative care such as administering antihypertensive meds.
- Caution: It is critical that BP be reduced gradually; an excessive and rapid reduction in BP can precipitate cerebral, myocardial, and renal ischemia.

Patient Teaching

- Provide Pt with literature on reducing high blood pressure.
- Encourage necessary lifestyle modifications including weight reduction (for Pts who are overweight), limiting alcohol intake to 1 drink per day, increased physical activity (30–45 minutes a day), and smoking cessation.
- Review dietary guidelines and stress importance of reading food labels to avoid processed foods high in sodium, saturated fats, *trans* fats, and cholesterol.

- Provide information to help Pt reduce intake of sodium, saturated fats, and cholesterol, and keep consumption of *trans* fats to an absolute minimum.
- Explain importance of maintaining adequate intake of potassium, calcium, and magnesium.
- Explain the actions, dosages, side effects, and adverse reactions of HTN meds.

Irritable Bowel Syndrome (IBS)

Definition: A condition marked by abdominal pain (often relieved by the passage of stool or gas); disturbances of evacuation (constipation, diarrhea, or alternating episodes of both); bloating and abdominal distention; and the passage of mucus in the stools.

Incidence: IBS is the most common digestive disorder in the U.S. and is more common in women than men by 3:1.

Onset: Usually vague and gradual, IBS most often begins to develop in Pts between 20–35 years of age.

Etiology: Unknown.

Clinical Findings: Classic IBS symptoms include abdominal pain, flatus, constipation, and diarrhea.

Nursing Focus

- Monitor hydration, intake, and output.
- Encourage Pt to eat small meals at regular intervals.
- Encourage fluids; goal is eight glasses of water per day.
- Encourage frequent ambulation.

Patient Teaching

- Provide Pt and family with literature on IBS.
- Encourage necessary lifestyle changes to promote stress reduction.
- Encourage regular exercise, such as walking 30 minutes per day.
- Suggest Pt get adequate sleep and avoid becoming fatigued.
- Suggest Pt eat frequent, small meals throughout the day and avoid foods and beverages identified as triggers, such as wheat, barley, rye, chocolate, dairy, caffeine, or alcohol.
- Explain the actions, dosages, side effects, and adverse reactions of meds.

Multiple Sclerosis (MS)

Definition: A chronic and progressive disorder of the brain and spinal cord (CNS) caused by damage to the myelin sheath (white matter). Destruction of the myelin sheath leads to scarring (sclerosis), which decreases and eventually blocks nerve conduction.

Incidence: Affects 1 out of 1,000 people and occurs more often in women.

Onset: Most commonly between 20 and 40 years of age.

Etiology: Unknown; possibly an autoimmune disorder or exposure to a virus.

Clinical Findings: Weakness, paresis, or paralysis of one or more limbs, myoclonus (involuntary muscle jerks), impaired or double vision, eye and facial pain, fatigue, dizziness, decreased coordination, and loss of balance.

Nursing Focus

- The goal of therapy is to control symptoms and preserve function to maximize quality of life.
- Perform or arrange for ROM exercises to be done twice a day.
- Assess skin for breakdown and perform routine skin care.

Patient Teaching

- Provide Pt and family with literature on MS.
- Encourage a healthful and active lifestyle that includes exercise to maintain good muscle tone, good nutrition, and plenty of rest and relaxation.
- Stress the importance of avoiding stress and fatigue.
- Depending on progression of MS, arrange for occupational, physical, and speech therapy.
- Explain the actions, dosages, side effects, and adverse reactions of all meds, which may include steroids and immunosuppressant therapy, antiviral agents, muscle relaxants, and/or antidepressants.

Pancreatitis

Definition: Inflammation of the pancreas caused by activation of pancreatic enzymes within the pancreas, digesting the pancreas itself.

Incidence: Affects about 80,000 people annually in the U.S.

Onset: Acute pancreatitis comes on suddenly and without warning. Chronic pancreatitis develops gradually, usually over many years, with symptoms that, initially, are vague and difficult to diagnose.

Etiology: Most common causes are gallstones and excessive alcohol intake. Acute pancreatitis becomes chronic once pancreatic tissue is destroyed and scarring develops. Other, less common, causes include hyperlipidemia, hypercalcemia, abdominal trauma, and bacterial or viral infection.

Clinical Findings: A classic symptom of pancreatitis is abdominal pain that radiates toward the back and increases when supine. Other symptoms include a swollen and tender abdomen that may get worse after eating, nausea, vomiting, fever, and tachycardia.

Nursing Focus

- The goal of treatment is supportive care and the prevention of secondary complications.
- Assess lab results for elevated levels of serum amylase and serum lipase.
- Monitor glucose, Ca^{++}, Mg^{++}, Na^{+}, K^{+}, and bicarbonate levels.

Patient Teaching

- Provide Pt and family with literature on pancreatitis.
- Teach Pt to avoid alcoholic beverages and decrease the consumption of foods high in fat.
- Provide teaching prior to diagnostic procedures, which include an abdominal ultrasound to look for gallstones and a CT scan to look for inflammation and destruction of the pancreas.
- Explain the dosages, route, actions, and adverse reactions of meds.

Peripheral Vascular Disease (PVD)

Definition: A disease of the peripheral blood vessels characterized by narrowing and hardening of the arteries that supply the legs and feet. The decreased blood flow results in nerve and tissue damage to the extremities.

Incidence: PVD is a very common disorder, and is most common in men over 50 years of age.

Onset: Similar to CAD, PVD has a gradual onset and, initially, is asymptomatic until secondary complications develop.

Etiology: Atherosclerosis is the primary cause of PVD. Risk factors include smoking, diabetes, hyperlipidemia, CAD, A-fib, cardiovascular accident (CVA), and renal disease.

Clinical Findings: Intermittent claudication (leg pain upon activity, which is relieved with rest), weak or absent peripheral pulses, pallor or cyanosis, numbness, cool extremities, and minimal to no hair growth on extremities.

Nursing Focus

- Assess and monitor distal circulation, and sensory and motor function.
- Prevent pressure sores with frequent position changes and assessment.
- Encourage and assist with frequent ambulation.

Patient Teaching

- Provide Pt and family with literature on PVD.
- Encourage light to moderate activity alternated with periods of rest.
- Explain options available for smoking cessation.
- Teach Pt to reduce intake of saturated fats, *trans* fats, and cholesterol.
- Explain proper foot care such as wearing shoes that fit properly (avoid open-toed/heeled shoes), keeping feet clean and dry, and minimizing risk of injury by never going barefoot. Inspect bottom of feet daily for injuries.
- Encourage leg exercises (ankle rotations) and/or a walking regimen.
- Explain the dosages, route, actions, and adverse reactions of meds.

Pneumonia

Definition: An infection and/or inflammation of the interstitial tissues of the lung in which fluid, white blood cells, and cellular debris from phagocytosis of the infectious agent accumulate in the alveoli.

Incidence: Approximately 50% of all pneumonia cases are bacterial with pneumococcal pneumonia accounting for 25%–35% of all community-acquired pneumonia and approximately 40,000 deaths annually. Mycoplasma accounts for 20% of all cases of pneumonia.

Onset: Varies according to type of pneumonia.

Etiology: Causes include viruses, bacteria, fungi, and the inhalation of vomitus, food, liquid, or gases. TB and other respiratory diseases can also secondarily cause pneumonia.

Clinical Findings: Fever, productive cough, substernal pain and discomfort, shortness of breath, crackles on auscultation, increased fremitus, and dullness on percussion over affected lobe(s).

Three Types of Pneumonia

- **Primary pneumonia:** Caused by inhalation or aspiration of a bacterial or viral pathogen into the lower respiratory tract.
- **Secondary pneumonia:** Results from lung injury that was caused by the spread of bacteria from an infection elsewhere in the body or by inhalation of a noxious chemical, which can precipitate acquired respiratory distress syndrome (ARDS).
- **Aspiration Pneumonia:** Caused by aspiration of foreign matter such as food, vomitus, or secretions into the bronchial tree. Risk factors include old age, decreased gag reflex, anesthesia and sedation, debilitation, and ALOC.

Nursing Focus

- Position Pt to facilitate an open airway and ease breathing (HOB 30°–45°).
- Encourage coughing and deep breathing every 2 hours.
- Suction the airway to clear secretions as needed.
- Encourage fluids as ordered.
- If antibiotic therapy is started, closely monitor routine peak and trough levels.

Patient Teaching

- Provide Pt and family with literature on pneumonia.
- Explain the dosages, route, actions, and adverse reactions of meds.
- Stress the importance of limiting activity and resting frequently to avoid fatigue.
- Explain that combined fluid intake (liquid, soup, Jello, etc.) should be at least 3 L/day.
- Teach Pt to eat small, frequent meals to maintain adequate nutrition.
- Explain that prescribed coughing, deep breathing, and incentive spirometry promote healing and help prevent recurrence.
- Provide literature on smoking cessation to Pts who smoke.
- Advise Pts over age 65 and those in high-risk groups to receive the pneumonia vaccine.

Renal Failure—Chronic (CRF)

Definition: Inability of the kidneys to perform vital functions including excretion of toxins, electrolytes, fluids, and hydrogen ions.

Incidence: Affects more than 2 out of a 1000 people in the U.S. annually.

Onset: Gradual, over many years.

Etiology: Diabetes and HTN are the primary causes of CRF, accounting for 40% and 25%, respectively, of all cases. Other causes include trauma, autoimmune disorders, birth defects, drug OD, and genetic diseases.

Clinical Findings: Edema throughout the body, shortness of breath, fatigue, flank pain, oliguria (progressing to anuria), elevated BP, and pale skin.

Nursing Focus

- Never take a BP or perform a venipuncture on an arm with a dialysis shunt.
- Help minimize discomfort from frustrations with fluid restrictions by offering ice chips, frozen lemon swabs, diversional activities, and hard candies.

- Provide routine skin care; uremia causes itching and dryness of skin.
- Monitor blood urea nitrogen (BUN) and serum creatinine levels.
- Monitor strict fluid intake and output; fluids are typically restricted to an amount equal to the previous day's urine output plus 500–600 mL.
- Perform frequent turning and ROM exercises to minimize skin breakdown.

Patient Teaching

- Provide Pt and family with literature on CRF and/or dialysis.
- Restrict sodium, water, potassium, phosphate, and protein intake as ordered.
- Encourage compliance with secondary preventive measures.
- Explain the actions, dosages, side effects, and adverse reactions of meds.

Urinary Incontinence

Definition: Intermittent or complete absence of ability to control excretion of urine.

Incidence: Affects more than 13 million people in the U.S. and twice as many women as men.

Onset: Depending on cause, incontinence may occur at any age.

Etiology: In women, pregnancy, childbirth, and menopause are responsible for the majority of cases. In both men and women, various underlying medical conditions include spinal cord injury, birth defects, strokes, multiple sclerosis, and physical problems associated with aging.

Clinical Findings: Involuntary leakage of urine.

Types of Incontinence

- **Stress:** Leakage of small amounts of urine during physical movement (coughing, sneezing, exercising).
- **Urge:** Involuntary passage of urine occurring soon after a strong sense of *urgency* to void.
- **Mixed:** Usually the occurrence of stress and urge incontinence together.

- **Overflow:** Unexpected leakage of urine because of a full bladder.
- **Functional (Environmental):** Untimely urination because of physical disability, external obstacles, or problems in thinking or communicating that prevent a person from reaching a toilet.
- **Transient:** Leakage that occurs temporarily because of a condition that will pass (infection, med).

Nursing Focus

- Provide routine skin care and assessment including fluid intake and output.
- Encourage Pt to practice Kegel exercises and monitor effectiveness.
- Offer reassurance and encouragement.
- Ensure a barrier-free pathway to the bathroom (functional incontinence).

Patient Teaching

- Provide Pt and family with literature on incontinence.
- Teach Kegel exercises: Contract the pelvic floor muscles (the same muscles that stop the flow of urine) for 10 seconds, and then relax for 10 seconds. Perform 3 sets of 10 contractions every day.
- Encourage Pt to quit smoking to reduce coughing and bladder irritation. Smoking also increases risk of bladder cancer.
- Explain that alcohol and caffeine can overstimulate the bladder and should be avoided.
- Advise the Pt to avoid foods and drinks that may irritate the bladder such as spicy foods, carbonated beverages, and citrus fruits and juices.
- Explain the actions, dosages, side effects, and adverse reactions of meds.
- If surgery is to be performed, provide preoperative teaching to prepare the Pt and family about the procedure, and postoperative care and recovery.

CPR Quick Reference

Determine unresponsiveness.

- Call 911: get help—AED if available.
- Child or infant: call 911 after 2 min (5 cycles) of CPR.

Airway: Open airway.

- All ages: head-tilt, chin-lift
- If trauma suspected, use jaw-thrust method.

Breathing: Assess for breathing.

- If not breathing, give two slow breaths at 1 second/breath.
- If unsuccessful, reposition airway and reattempt to ventilate. If still unsuccessful, refer to *Choking Quick Reference*.

Circulation: Check for a pulse for 10 seconds.

- Adult or child: carotid artery. Infant: brachial or femoral artery. Newborn: brachial or femoral (may use umbilicus).
- If pulse is present, but Pt is not breathing, begin rescue breathing. Adult: 10–12/min. Child or infant: 12–20/min. Newborn: 40–60/min.
- If no definite pulse after 10 sec, start chest compressions.

AED: Power on and follow voice prompts.

- Perform 2 minutes of CPR between each shock.
- Adults: Do not use pediatric pads
- Child: Use after 2 minutes (5 cycles) of CPR.

Note: Recheck pulse every 2 minutes and after each shock.

	Adult	Child/Infant	Newborn
Ventilation Rate	10–12/min	12–20/min	40–60/min
Compression Rate	100/min	100/min	120/min
Ratio	30:2 (1 or 2 rescuers)	30:2 (15:2 if 2 rescuers)	3:1 (1 or 2 rescuers)
Compression depth	1 1/2–2 inches	1/2–1/3 the depth of the chest	1/3 the depth of the chest

Choking Quick Reference

Conscious Victim

Assess for airway obstruction.

- Adult or child: ask if choking, can they speak?
- Infant: cannot cry or ineffective cough.

Attempt to relieve obstruction.

- Adult or child: abdominal thrusts until the obstruction is relieved or victim becomes unresponsive.
- Infant: 5 back blows and 5 chest thrusts until the obstruction is relieved or victim becomes unresponsive.

Unresponsive Victim

Determine unresponsiveness.

- Adult: get help or call 911 prior to any intervention.
- Child or infant: get help or call 911 after 1 minute.

Open airway. head-tilt, chin-lift. If trauma suspected, use the jaw-thrust method.

Assess breathing and attempt to ventilate. If unsuccessful, reposition airway and reattempt ventilation. If still unsuccessful:

- Adult or child: straddle victim's thighs and administer abdominal thrusts.
- Infants: administer 5 back blows and 5 chest compressions.

Inspect mouth and remove obstruction.

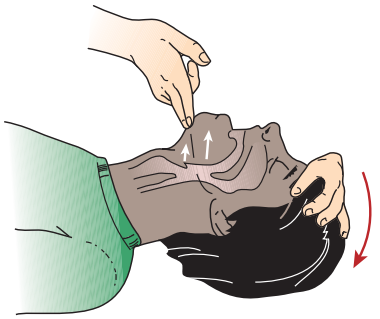
- Adult: tongue-jaw lift and sweep mouth.
- Child/infant: tongue-jaw lift and remove only if obstruction can be seen.

Repeat the following steps: inspect, sweep, ventilate, and abdominal thrusts/back blows until relieved.

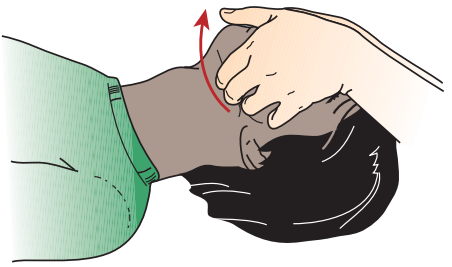
Note: If Pt resumes breathing, place into recovery position and reassess ABCs every minute.

Resuscitation Maneuvers

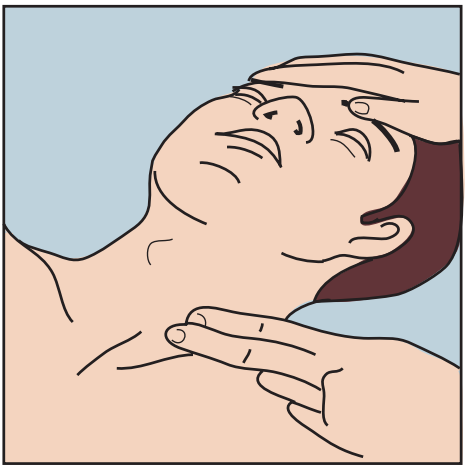
Head-Tilt, Chin-Lift: Adult/Child



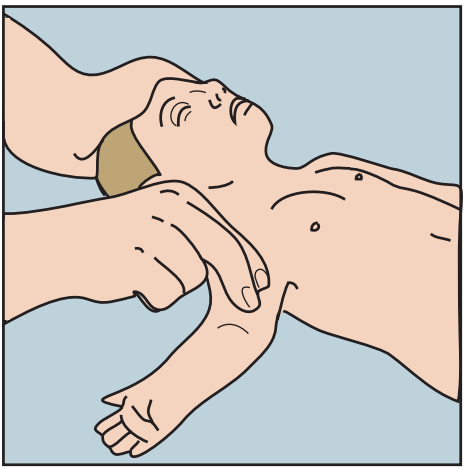
Jaw-Thrust: Adult/Child
For known or suspected trauma



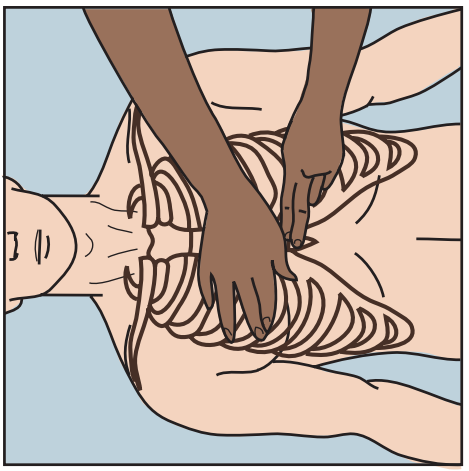
Pulse Check: Adult/Child (Carotid)



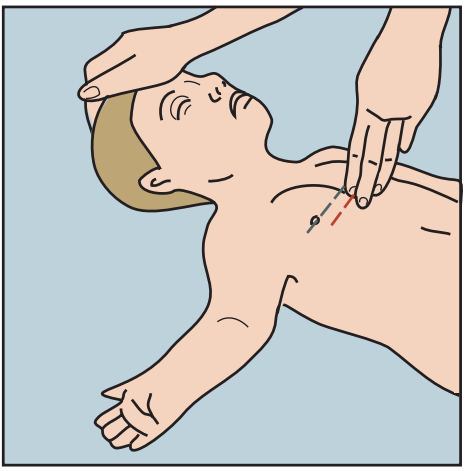
Pulse Check: Infant (Brachial)



Hand Placement: Adult/Child
Lower half of sternum



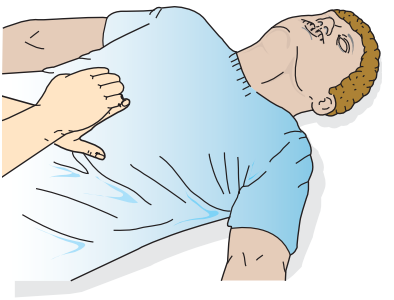
Finger Placement: Infant
One finger width below nipples



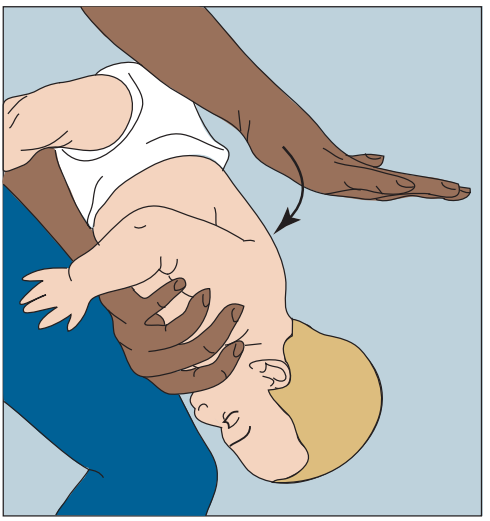
Resuscitation Maneuvers *(continued)*

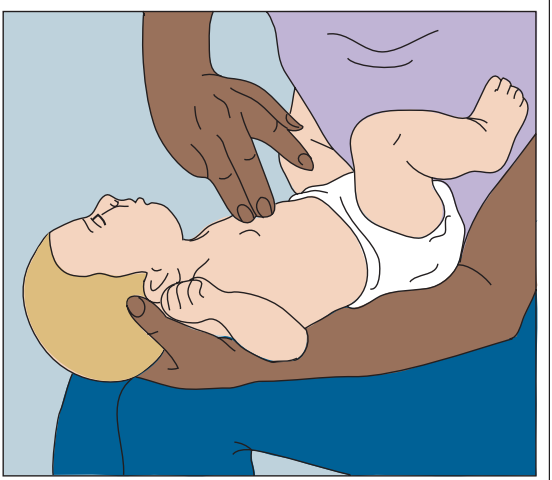
Heimlich Maneuver: Adult/ Child
Use chest thrusts for head/ neck

Heimlich Maneuver: Unresponsive Adult/Child
Stay well below the xyphoid



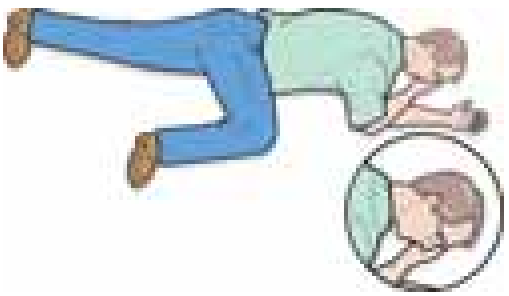
Back blows and chest thrusts: Infant—Always support head/neck



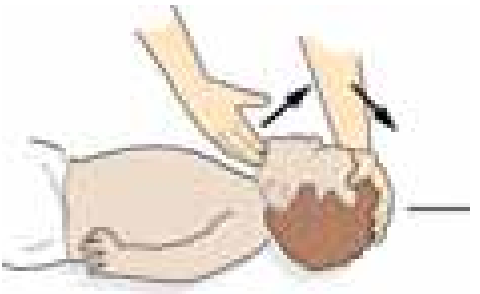


Resuscitation Maneuvers *(continued)*

Recovery Position
Reassess ABCs frequently



Head-Tilt, Chin-Lift: Infant
Do not hyperextend the neck



Emergency Assessment

Primary Survey

- **A**irway with cervical spine immobilization
- **B**reathing and ventilation
- **C**irculation with hemorrhage control
- **D**isability (pupils, posturing, seizures, Glasgow Coma Score [GCS])
- **E**xpose/**E**nvironment

Airway

Assessment

- Can the Pt speak comfortably?
- Inspect the oropharynx for foreign objects, blood, and injury.
- Are there audible abnormal sounds? Wheezing? Stridor?
- Are there signs of hypoxia or obvious trauma to the airway?

Airway Interventions (1)

- Establish patent airway with:
  - Jaw-thrust method.
  - Suctioning to clear blood, vomitus, secretions, and debris.
  - Oral or nasopharyngeal airway. **Caution:** Nasal airways are contraindicated in the presence of facial trauma.
- Immobilize cervical spine.

Airway Interventions (2)

- Endotracheal intubation—indications:
  - Protect airway and ensure patency.
  - Correct hypoxemia.
  - Severe head injury or GCS < 8.
  - Confusion or fluctuating LOC requiring head CT (computed tomography).
- Tracheostomy if unable to ventilate or intubate.

Breathing

Assessment

- Assess rate and ease of breathing.
- Check nail beds and circumoral area for cyanosis.
- Is the Pt restless?
- Feel trachea, percuss chest, and auscultate lungs.
- Evaluate arterial blood gas (ABG) results.

Breathing Interventions

- Provide 100% supplemental oxygen via NRB mask.
- Manually ventilate if necessary with BVM.
- Identify and treat major thoracic injuries: Pneumothorax (simple, or tension, sucking chest wound), hemothorax, rib fractures, flail chest.

Circulation

- Check pulse and BP.
- Check peripheral perfusion.
- Insert two large-bore IVs.
- Send blood for type and cross-match.

Disability

- Initial neurological assessment is limited to checking pupils and assessing level of responsiveness using the AVPU or GCS:
  - **AVPU: A**—**Alert**, **V**—Responds to **Voice** only, **P**—Responds to **Pain** only, or **U**—**Unresponsive**.
  - **GCS:** See Glasgow Coma Scale.
- Any change in AVPU requires reassessment of **ABCs.**

Expose/Environment

- Remove clothing and inspect for obvious injuries.
- Cover Pt to reduce heat loss.

Secondary Survey

- Follows primary survey and resuscitation.
- Involves systematic and thorough head-to-toe assessment for undetected injuries.
- Includes **AMPLE** history (**A**llergies, **M**edications, **P**ast medical history, **L**ast meal eaten, **E**vents prior).
- Includes continuous reassessment of primary survey.
- Provides for assessment of each body area for signs of deformity, contusion, abrasion, hemorrhage, penetrating injury, altered perfusion, and altered function.

Complete Head-to-Toe Assessment

Head and Face

- Inspect and palpate head and face for lacerations, contusions, fractures, or other injuries.
- Eyes (injury, hemorrhage, contact lens, dislocation of lens).
- Ears and nose for CSF (cerebrospinal fluid).
- Mouth (blood, emesis, broken or missing teeth).
- Cranial nerves.

Cervical Spine and Neck

- Inspect for signs of injury, tracheal deviation.
- Palpate for tenderness, deformity, swelling, subcutaneous emphysema.
- Auscultate for carotid bruits.

Chest

- Inspect for injury, use of accessory muscles.
- Palpate entire chest for tenderness, crepitation, and injury.
- Percuss for hemothorax (dullness) or pneumothorax (tympany).
- Auscultate lung sounds and compare left to right.

Abdomen
- Inspect for distension, skin condition.
- Auscultate for bowel sounds.
- Percuss.
- Palpate: soft or rigid, tender or nontender?

Extremities
- Inspect for signs of injury or deformity.
- Palpate for sensation, tenderness, crepitation, abnormal movement.
- Check all pulses.

Perineum
- Inspect for rectal bleeding or injury. Assess sphincter tone.
- Inspect for bleeding, priapism (males), or injury to genitalia.

Back and Spine
- Inspect for injuries, hematoma, swelling.
- Palpate spine for tenderness, flank pain.

Fractures—Dislocation
- Bone or joint deformity.
- Loss of function.
- 6 Ps: **P**ain—**P**allor—**P**ulse—**P**olar—**P**aresthesia—**P**aralysis.

Neurological
- Reevaluate pupils and LOC.
- Determine and document GCS.
- Evaluate extremities for weakness or loss of sensation.

Diagnostic Studies

- Type and cross-match for blood
- Hemoglobin and hematocrit
- White blood cell count
- Glucose
- Urinalysis
- Amylase
- Cardiac and liver enzymes
- Arterial blood gas
- Cervical spine radiographic series
- Chest x-ray
- Head and abdominal CT

Emergency Drugs *(Name: [indication] adult dose)*

Activated charcoal: [OD/Poisoning] 1 gram/kg PO or NG. Mix with 250 mL water to make into a slurry.

Adenosine (Adenocard): [SVT] 6 mg rapid IV push (1–3 sec) followed with 20 mL NS flush. May repeat twice, each dose being 12 mg. Max 30 mg (3 doses).

Albuterol (Ventolin): [Acute bronchospasm] 2.5 mg nebulized in 3 mL normal saline (min O_2 flow rate of 10 LPM).

Amiodarone (Cordarone): [VF, Pulseless VT] 300 mg IV, repeat 150 mg in 3–5 min; [Perfusing VT or SVT] 150 mg over 10 min followed by infusion drip—see infusion tables in *MEDS*. Max cumulative dose is 2.2 grams in 24 hrs.

Amyl nitrite: [Cyanide antidote] Inhale vapor from crushed capsules for 30 seconds of every minute while on 100% O_2.

Aspirin (ASA): [ACS] 160–325 mg PO (chewable tablet).

Atenolol (Tenormin): [MI, CP, PSVT, A-fib/flutter, HTN] 5 mg slow IVP (over 5 min). May repeat second dose of 5 mg slow (over 5 min) IVP in 5 min.

Atropine: [Asystole, PEA] 1 mg IV (2–3 ET)* q 3–5 min, max 0.03–0.04 mg/kg; [Bradycardia] 0.5–1.0 mg IV or ET q 3–5 min, max 0.04 mg/kg.

Dexamethasone (Decadron): [Cerebral edema, anaphylaxis, spinal trauma, COPD] 10–100 mg IVP.

Dextrose 50%: [Hypoglycemia] 25 gram slow IVP.

Diazepam (Valium): [Seizure, sedation] 5–10 mg slow IVP.

Digoxin: [A-fib, A-flutter, PSVT] Loading dose 10–15 mcg/kg IV.

Diltiazem (Cardizem): [A-fib/flutter, PSVT refractory to adenosine] 15–20 mg (0.25 mg/kg) IV over 2 min, may repeat in 15 minutes at 20–25 mg (0.35 mg/kg) over 2 min. IV infusion: 5–15 mg/hr titrated to HR.

*ET administration: 2–2.5 × normal dose. Follow with an NS flush.

Diphenhydramine (Benadryl): [Allergic reaction, adjunct to anesthesia, EPS] 25–50 mg IV or deep IM.

Dopamine (Intropin): [Cardiogenic shock, refractory bradycardia] 10–20 mcg/kg/min IV (Renal dose 2–5 mcg/kg/min; Inotropic dose 5-10 mcg/kg/min).

Epinephrine (Adrenalin): [Cardiac arrest] 1 mg of 1:10,000 IV (2–2.5 ET)* q 3–5 min; [anaphylaxis, asthma] 0.3–0.5 mg of 1:1000 SC.

Flumazenil (Romazicon): [Benzodiazepine toxicity] 0.2 mg IVP q min. Max 1 mg.

Furosemide (Lasix): [Pulmonary edema] 0.5–1 mg/kg IVP.

Glucagon: [Hypoglycemia] 1 mg IV, IM, SC; [Ca channel blocker OD] 2 mg IV; [Beta blocker OD] 50–150 mcg/kg IV, then infusion of 1–5 mg/hr; [to decrease GI motility] 0.25–1 mg slow IVP.

Ipecac Syrup: [OD/Poisoning of noncaustic agent] 15–30 mL PO followed with 1–2 glasses of water, may repeat in 30 minutes.

Isoproterenol (Isuprel): [Bradycardia in heart transplant Pts, beta blocker OD, torsade] 2–10 mcg/min IV titrate to HR.

Labetalol (Normodyne): [MI, CP, PSVT, A-fib/flutter, HTN] 10 mg IVP over 1–2 min, repeat 10–20 mg q 10 min, max 150 mg.

Lidocaine (Xylocaine): [VF, VT] 1.0–1.5 mg/kg IV (2–4 mg/kg ET),* repeat 0.5–0.75 mg/kg q 5–10 min, max 3 mg/kg. Infusion drip: 1–4 mg/min. *Never give for ventricular escape rhythms!*

Lorazepam (Ativan): [Status epilepticus, sedation] 4 mg/dose, slow IVP q 10–15 min. Max 8 mg.

Magnesium ($MgSO_4$): [↓Mg, cardiac arrest-torsade de pointes] 1–2 g IVP; [torsade de pointes, non-cardiac arrest] Loading dose of 1–2 g in 50–100 mL D5W infused over 5–60 minutes. Follow with 0.5–1.0 g/hr, titrated to control of torsade de pointes.

Meperidine (Demerol): [Analgesia] 12.5–100 mg IV, IM.

Metaproterenol (Alupent): [Bronchospasm] 10–15 mg nebulized in 3 mL of normal saline.

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*ET administration: 2–2.5 × normal dose. Follow with an NS flush.

Methylprednisolone (Solu-Medrol): [Allergic Rx] 1–2 mg/kg.

Metoprolol (Lopressor): [MI, CP, PSVT, A-fib/flutter, HTN] 5 mg slow IVP q 5 min. Max 15 mg.

Midazolam (Versed): [Seizures] 2.5 mg IVP; [Sedation] 0.1 mg/kg max 5 mg/dose.

Morphine (MS): [CP, pulmonary edema, MS pain] 1–4 mg IVP.

Naloxone (Narcan): [Narcotic-induced respiratory depression] 0.4–2 mg IV, IM, SC, or ET* q 2–3 min titrated to effect.

Nitroglycerine (NTG): [CP] 0.4 mg SL q 3–5 min, max 3 doses.

Ondansetron (Zofran): [Nausea] 4 mg slow IVP or IM.

Procainamide (Pronestyl): [Recurrent VF, VT] 20 mg/min IV infusion, max 17 mg/kg.

Sodium bicarbonate 8.4% ($NaHCO_3$): [Hyperkalemia, OD of TCA, ASA, Benadryl, phenobarbital, and cocaine] 1 mEq/kg IV, may repeat 0.5 mEq/kg q 10 min.

Succinylcholine (Anectine): [Paralytic] 1–2 mg/kg IV.

Vasopressin (Pitressin): [Cardiac arrest] 40 units IVP × 1.

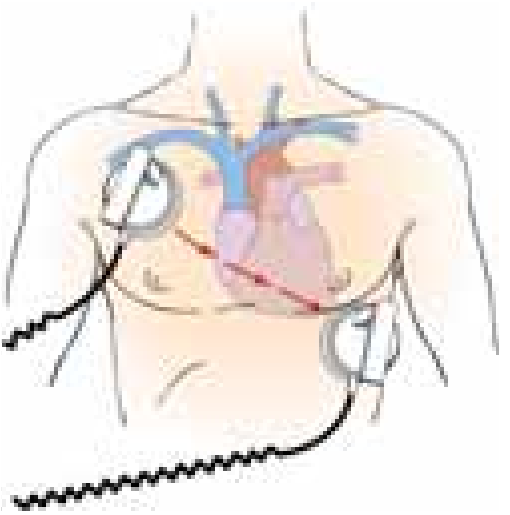
Verapamil (Isoptin): [PSVT, A-fib, A-flutter] 2.5–5.0 mg IV bolus over 2 minutes. May repeat a 2nd dose of 5–10 mg in 15–30 min if needed. Max 20 mg.

Manual Defibrillation

- **Power:** Turn on and verify all cables are connected.
- **Lead select:** Turn "lead select" to "paddles" or "defibrillator."
- **Energy:** ***Biphasic:*** 200 J; ***monophasic:*** 360 J.
- **Paddles:** *Sternum*; upper right sternal border–cardiac apex.
- ***Hands-free defibrillation pads:** Sternum–cardiac apex.
- **Verify rhythm:** Confirm V-Fib or pulseless VT.
- **Charge defibrillator:** Say, "Charging defibrillator, stand clear!"
- **Clear:** Say, "I'm going to shock on three. One, I'm clear, two, you're clear, three, everybody's clear."
- **Defibrillate:** ***Biphasic:*** 200 J; ***monophasic:*** 360 J—reassess rhythm—refer to appropriate algorithm for resulting rhythm and ongoing intervention.

*ET administration: 2–2.5 × normal dose. Follow with an NS flush.

Hand-Held Paddles: Apply 25 lb of pressure to both paddles and depress both paddle discharge buttons simultaneously.
Hands-Free Defibrillation Pads: Depending on type of defibrillator, either press the "shock" button on the defibrillator or depress both paddle (docked in defibrillator) discharge buttons simultaneously.



Paddle Placement

Automatic External Defibrillators (AEDs)

- **Assessment:** Determine unresponsiveness and assess ABCs.
  - Children 1–8 years, get help/AED/call 911 after 1 minute of CPR.
  - Adults ≥ 8 years, get help/AED/call 911 immediately.
- **Perform** CPR until AED arrives.
- **Power:** Turn on the AED and follow voice or visual prompts.
- **Attach Pads:** Stop CPR, attach appropriate size pads to Pt.
  - Upper right sternal border and cardiac apex.
- **Analyze:** Press the "Analyze" button and wait for instructions (do not make contact with Pt while AED is analyzing rhythm).
- **Shock:** Announce *"shock indicated, stand clear!"* and be sure that no one is in contact with the Pt.
  - Fully automatic units analyze rhythm and deliver shock if indicated.
  - Semi-automatic units analyze rhythm and then instruct the operator to press the "Shock" button if indicated.

Transcutaneous Pacing (TCP)

Indications

- Symptomatic 2nd-degree AV block type II or 3rd-degree AV block.
- Symptomatic bradycardia unresponsive to atropine.
- Bradycardia with ventricular escape rhythms.
- Overdrive pacing of tachycardia refractory to drug therapy or electrical cardioversion (to be preformed by a physician only).

Pacing Modes

- Demand (synchronous) mode senses the Pt's heart rate and paces only when the heart rate falls below the clinician-set rate.
- Fixed (asynchronous) mode does not sense the heart rate, but rather paces at the rate set by the clinician.

Procedure

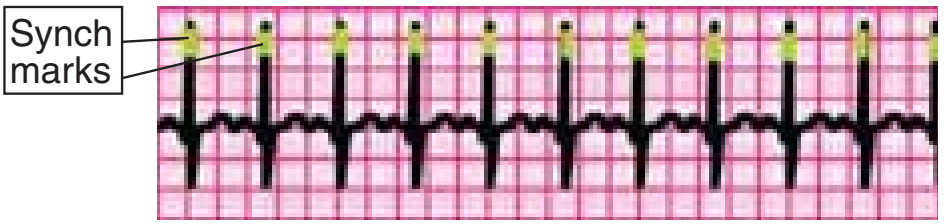
- Pads: Apply pacing electrodes to Pt per package instructions.
- Power: Turn on the pacemaker and ensure all cables are connected.
- Rate: Set demand rate to approximately 80 bpm.
- Current: Output ranges from 0–200 milliamperes (mA)
  - *Bradycardia:* Increase mA from minimum setting until a consistent capture is achieved, then increase output by 2 mA.
  - *Asystole:* Begin at full output. If capture occurs, slowly decrease output until capture is lost, and then increase output by 2 mA.

Electrical Cardioversion

- **Equipment:** Oxygen, suction, intubation, IV, oxygen sat monitor, defibrillator, paddles or hands-free defibrillator pads, electrode patches, and paddle gel.
- **Sedation/Analgesia:** (one of the following) Valium, Versed, MS, Demerol, barbiturates, ketamine, etomidate, methohexital.
- **Setup:** Turn on defibrillator, attach ECG electrodes, press "synch" button, and verify that R-waves are sensed by machine.
  - **Note:** It may be necessary to adjust the gain until each R-wave has a synch-marker (see ***Synch Marks*** following).
- **Energy level:** Select energy level based on presenting arrhythmia.
  - **PSVT or Atrial-flutter:** 50 J, 100 J, 200 J, 300 J.
  - **VT or Atrial-fib:** 100 J, 200 J, 300 J, 360 J.
- **Paddles:** Apply paddles or hands-free pads to Pt's chest.
  - **Paddles:** Sternum-Apex.
  - **Hands-free defibrillation pads:** Once applied, no need to contact the Pt or pads (discharge buttons are located on the defibrillator itself).
- **Charge:** Say, "Charging defibrillator, stand clear!"
- **Clear:** Say, "I'm going to shock on three. One, I'm clear, two, you're clear, three, everybody's clear."
- **Cardiovert:** Apply 25 lb of pressure (n/a for hands-free pads) to both paddles, press and hold both defibrillator buttons simultaneously until a shock is delivered. **NOTE:** Delays are normal; do not release discharge buttons until shock is delivered.
- **Assess rhythm:** Refer to appropriate algorithm for treatment.

Caution: Most cardioverters default back to defibrillator mode after each cardioversion. If subsequent synchronized cardioversion is needed, confirm that the cardioverter is in the correct mode.

Note: If QRS is too wide for machine to identify R-waves, switch to unsynchronized cardioversion (same steps as above, but turn lead select to "paddles" or "defibrillator" instead of "synch" mode).



V-Fib or Pulseless V-Tach

- **Shock:** (biphasic: 200 J; monophasic: 360 J) reassess rhythm.
- **CPR:** Immediately perform 5 cycles of CPR (about 2 min).
- **Epinephrine** 1 mg IV or IO (2–2.5 mg ET) every 3–5 min ***or*** **Vasopressin** 40 units IV or IO, one time only. May use to replace 1st or 2nd dose of epinephrine (given without interrupting CPR).
- **Shock:** (biphasic: 200 J; monophasic: 360 J) reassess rhythm.
- **Consider antiarrhythmics** (given without interrupting CPR):
  - **Amiodarone** 300 mg IV or IO, may repeat 150 mg in 3–5 min.
  - **Lidocaine** 1.0–1.5 mg/kg IV or IO, may repeat 0.5–0.75 mg/kg q5–10 min, max 3 mg/kg.
  - **Magnesium** 1–2 g IV or IO for Torsade de Pointes.

Asystole or PEA (pulseless electrical activity)

- Resume CPR for 5 cycles (about 2 minutes).
- **Epinephrine** 1 mg IV or IO (2–2.5 mg ET) every 3–5 min ***or*** **Vasopressin** 40 units IV or IO, one time only. May use to replace 1st or 2nd dose of epinephrine (given without interrupting CPR).
- **Atropine** 1 mg IV (2–3 ET) every 3–5 min (max 3 mg) for asystole or bradycardic PEA.

Bradycardia (HR < 60 bpm)

Stable, with adequate Perfusion:

- Monitor and supportive care as needed.

Unstable, without adequate perfusion (CP, ↓BP, SOB, or ALOC):

- **Pace:** Prepare for transcutaneous pacing (TCP). Do not delay for 2nd degree type 2 or 3rd degree complete AV block.
- **Atropine** 0.5 mg IV every 3–5 min to a max of 3 mg.
- **Epinephrine** 2–10 mcg/min or **Dopamine** 2–20 mcg/kg/min if TCP is ineffective or unavailable.
- Prepare for transvenous pacing, and treat underlying causes.

Tachycardia—Unstable (CP, ↓BP, SOB, or ALOC)

- **Perform immediate synchronized cardioversion**.
  - Monomorphic VT and A-fib → 100 J, 200 J, 300 J, 360 J.
  - A-flutter and SVT—may start with 50 J.
  - Polymorphic VT—unsynchronized with 360 J.
- Premedicate with sedative and analgesia whenever possible.
- If delays in synchronization occur and clinical situation is critical, go immediately to unsynchronized cardioversion at 360 J.

Narrow-Complex Tachycardia—Stable

Regular

- **Valsalva maneuver:** Instruct Pt to cough, or bare down.
- **Adenosine:** 6 mg rapid IV push (1–3 sec) followed with 20 mL NS flush. May repeat 12 mg every 1–2 min. Max 30 mg.

Rhythm Converts	Rhythm Does Not Convert
■ Most likely reentry SVT. ■ Use adenosine for recurrence or longer acting AV nodal blocking agents such as diltiazem or beta-blockers.	■ Most likely A-flutter, ectopic atrial or junctional tachycardia. ■ Control rate with diltiazem or beta-blockers.

Irregular

- Most likely A-fib/flutter or multifocal atrial tachycardia (MAT).
- Control rate with diltiazem or beta-blockers—avoid when associated with Wolff-Parkinson-White Syndrome (WPW).

Wide-Complex Tachycardia—Stable

Regular

Monomorphic ventricular tachycardia or uncertain rhythm:

- Amiodarone 150 mg IV given over 10 min repeated as needed to a max of 2.2 gram/24 hr.
- Prepare for synchronized cardioversion.

Irregular

Recurrent polymorphic ventricular tachycardia:

- Obtain expert medical guidance.

Torsade de Pointes:

- Magnesium 1–2 gram over 5–60 min followed by an infusion.

Note: A-Fib/Flutter with WPW? Avoid adenosine, beta-blockers, Ca-channel blockers, and diltiazem.

Pediatric Advanced Life Support

Pediatric Bradycardia (HR < 60 bpm)

Asymptomatic

- Observe—Support ABCs—Admission to PICU

Symptomatic—severe cardiopulmonary compromise
(Poor perfusion, low BP, dyspnea, ALOC despite O_2 and ventilation)

- **Chest compressions:** 100/min (ratio 30:2)
- **Epinephrine*:** IV or IO—0.01 mg/kg of 1:10,000 strength (0.1 mL/kg) q 3–5 minutes. ET—0.1 mg/kg of 1:1,000 strength (0.1 mL/kg) q 3–5 minutes.
- **Atropine*:** 0.02 mg/kg (min dose 0.1 mg) may repeat one time. Max total dose is 1 mg.
- **Consider cardiac pacing:** Same as for adults, but use pediatric pads, placed anterior-to-posterior, and set rate to 100 bpm.

***Note:** If bradycardia due to suspected increased vagal tone or primary AV block, give atropine as first-line drug.

Pediatric Tachycardia—Poor Perfusion*

Narrow-Complex (0.08 sec or less)

- 12-lead to evaluate tachycardia if clinically practical.
- Consider vagal maneuvers.

***Note:** When the tachycardia is associated with adequate perfusion, consider pharmacological cardioversion first, then consider electrical cardioversion.

- **Immediate cardioversion:** 0.5–1 J/kg (repeat at 2 J/kg); **or**
- **Adenosine:** (if IV or IO established) 0.1 mg/kg rapid IV or IO push. Max 1st dose of 6 mg. May repeat 2nd dose at 12 mg.

Wide-Complex (> 0.08 sec)

- 12-lead to evaluate tachycardia if clinically practical.
- **Immediate cardioversion:** 0.5–1 J/kg, (repeat at 2 J/kg)

Consider one of the following antiarrhythmic medications:

- **Amiodarone:** 5 mg/kg IV over 20–60 min; **or**
- **Procainamide:** 15 mg/kg IV over 30–60 min; **or**

Cardiac Arrest (ABCs—CPR—O_2—Monitor—Intubate—IV)

V-Fib—Pulseless VT

- **Defibrillate:** 2 J/kg, CPR for 5 cycles while recharging, 4 J/kg.
- **Epinephrine:** Same dose/route as symptomatic bradycardia.
- **Defibrillate:** 2 J/kg, 2–4 J/kg, 4 J/kg (pattern: drug, CPR, shock).
- **Amiodarone:** 5 mg/kg IV or IO bolus; **or**
- **Lidocaine:** 1 mg/kg IV, IO, or ET bolus; **or**
- **Magnesium:** 25–50 mg/kg IV, or IO max 2 gm (Torsade).

Asystole—PEA

- **Epinephrine:** Same dose/route as symptomatic bradycardia.
- Continue CPR up to 5 cycles and then reassess rhythm.

Initial Steps to Neonatal Resuscitation[1]

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Newborn Equipment Size and Depth[2]

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Medical Emergencies (Adults)

Allergic Reaction—Anaphylaxis

Clinical Findings

Neuro: Anxiety, restlessness

Resp: Dyspnea, bronchospasm, wheezing, stridor, swelling of tongue or throat, respiratory arrest

CV: Hypotension, localized or systemic edema, CV collapse/arrest

Skin: Urticaria, itching, hives, coolness, pallor, cyanosis, diaphoresis

Emergency Management (may need MD order)

- Remove source of allergy. Remove stinger by scraping only! Do not use tweezers (squeezing venom sac will inject more venom)!

- Establish and manage ABCs and intubate if indicated.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Obtain IV access and titrate to hemodynamic status.
- Attach ECG monitor and manage dysrhythmias per advanced cardiac life support (ACLS).
- Administer prescribed medications which may include epinephrine 1:1,000 0.3–0.5 mg SC, albuterol 2.5 mg in 3 mL NS nebulized, diphenhydramine 25–50 mg IV or IM, dexamethasone 10 mg IV, and a dopamine infusion starting at 10 mcg/kg/min.

Drug Overdose—Poisoning

Clinical Findings

Varies depending on type of substance Pt has overdosed on.

Emergency Management (may need MD order)

- Establish and manage ABCs as indicated.
- Protect airway by placing Pt into a lateral-lying position and suctioning airway as needed. Insert an oropharyngeal airway (OPA), or, if Pt has a gag reflex and there is no evidence of facial trauma, use a nasopharyngeal airway (NPA).
- Intubate if indicated and confirm tube placement.
- Administer supplemental oxygen titrated to vital signs (VS).
- Contact MD, poison control stat (**USA: 1-800-222-1222**).
- If substance known, see *Antidotes* for specific reversal agents.
- Continue to monitor and manage ABCs, LOC, VS, and ECG.

CNS stimulants or hallucinogens: Minimize sensory stimulation.
Orogastric Lavage: May be done in ED—airway must be protected.
Activated Charcoal: 1 gram/kg PO or NG. Mix with 250 mL water to make a slurry. Caution: Ineffective for treating OD of heavy metals, alcohols, caustics, hydrocarbons, potassium, or potassium cyanide.
Caution: Avoid the use of *Ipecac* because vomiting may complicate or worsen clinical management of OD or poisoning.

Antidotes

NOTE: This is strictly a reference! It is intended to provide quick information about antidotes commonly used to reverse or remove common biological or pharmacological agents from the body. It is not intended to replace nor dictate hospital protocol!

Acetaminophen . . . . . .acetylcysteine or mucomyst
Anticholinesterase . . . . . .atropine or pralidoxime
Anticholinergics . . . . . .physostigmine
Antifreeze . . . . . .fomepizole, ethanol
Benzodiazepines . . . . . .Romazicon (flumazenil)
Beta-Blocking Agents . . . . . .Glucagon, epinephrine
Ca^{++} Channel Blockers . . . . . .Ca^{+} chloride, glucagon
Carbon Monoxide (CO) . . . . . .hyperbaric, oxygen
Coumadin . . . . . .phytonadione or vitamin K
Cyanide . . . . . .amyl nitrite, sodium nitrite, or sodium thiosulfate
Cyclophosphamide . . . . . .mesna
Digoxin . . . . . .Digibind or Digoxin Immune Fab
Dopamine . . . . . .Rigitine
EPS . . . . . .Benadryl (diphenhydramine)
(Extra Pyramidal Symptoms)
Ethylene Glycol . . . . . .fomepizole
Fluorouracil . . . . . .leucovorin calcium
Heroin . . . . . .Narcan (naloxone) or nalmefene
Heparin . . . . . .protamine sulfate
Insulin Reaction . . . . . .IV glucose (D50)
Iron (Fe) . . . . . .deferoxamine
Lead . . . . . .edetate calcium disodium, dimercaprol, or succimer
Malignant Hyperthermia (MH) .dantrolene
Methanol . . . . . .ethanol
Methotrexate . . . . . .leucovorin calcium
Narcotics . . . . . .Narcan (naloxone) or nalmefene
Opioid Analgesics . . . . . .Narcan (naloxone) or nalmefene
Organophosphate (OPP) . . . . . .atropine, pralidoxime

Potassium (K)	Insulin and glucose, $NaHCO_3$, albuterol inhaler, or Kayexalate (sodium polystyrene sulfonate)
Rohypnol	Romazicon (flumazenyl)
TCA (tricyclic antidepressants)	physostigmine or $NaHCO_3$
Tranquilizers—EPS symptoms	Benadryl (diphenhydramine)
Tylenol	acetylcysteine
Warfarin	phytonadione or vitamin K

Hyperglycemia (DKA, diabetic ketoacidosis)

Clinical Findings

- See *Comparing Hypoglycemia & Hyperglycemia* following

Emergency Management (may need MD order)

- Establish and manage ABCs as indicated.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Obtain stat blood glucose level and manage as indicated.
- Attach ECG monitor and manage dysrhythmias per ACLS.
- Obtain IV access and infuse 0.9% NS × 2 liters, then switch to 0.45% sodium chloride solution (may need up to 10 liters).
- Administer regular insulin (High-Alert Rx) 5–10 IU/hr IV infusion.
- Administer sodium bicarbonate 1–2 mEq/kg IV for pH < 7.0.
- Administer potassium (High-Alert Rx) added to IV until serum potassium repleted to > 4.0 mEq/L.
- Document assessment, interventions, and outcome.

Special Considerations

- Average fluid volume deficit in DKA is 5–10 liters.
- The goal of therapy is to lower the blood glucose by 100 mg/dL/hr.
- Switch to glucose-containing IV solution once blood glucose falls to 250 mg/dL.

Hypoglycemia (Diabetic Coma, Insulin Shock)

Clinical Findings

- See *Comparing Hypoglycemia & Hyperglycemia* following

Emergency Management (may need MD order)

- Establish and manage ABCs as indicated.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Obtain stat blood glucose level and manage as indicated.
- Attach ECG monitor and manage dysrhythmias per ACLS.
- Administer oral glucose 20 g PO (Pt MUST be alert and oriented).
- Obtain IV access and titrate to hemodynamic status.
- Administer dextrose (D50) 25 gram IV only.
- Administer glucagon 1–2 mg IM if IV access delayed or unavailable.
- Monitor blood glucose level every hour until stable.
- Document assessment, interventions, and outcome.

Special Considerations

- Known history of adrenal insufficiency: hydrocortisone 100 mg IV with glucagon 1 mg IV.
- Resistant hypoglycemia due to sulfonylureas: diazoxide 300 mg IV infusion over 30 minutes q 4 hr PRN (may cause hypotension).

Comparing Hypoglycemia & Hyperglycemia

	Hypoglycemia	Hyperglycemic Conditions	
Terms	**Hypoglycemia** Diabetic coma, insulin shock, insulin reaction	**DKA** (diabetic ketoacidosis)	**HHNC** (hyperglycemic hyperosmolar nonketotic coma)
Onset	Rapid (minutes)	Gradual (days)	Gradual (weeks)
History	Recent insulin injection, inadequate meal, or excessive exercise	Infection, stress, trauma, insufficient insulin intake. More common in type-1 diabetics	Pneumonia, UTI, dehydration, ALOC, immobility. More common in type-2 diabetics
Neuro	Confusion, delirium, or coma. Increased risk for **seizures**	Irritability, HA, double or blurred vision.	Fatigue, impaired vision, HA, **seizure**, delirium, coma
CV	Rapid, weak pulse, BP variable	HR normal to fast, BP variable	Tachycardia (early), hypotension (late)
RESP	Normal	Deep and rapid (Kussmaul's)	Tachypnea, may be depressed
Breath	Normal	Fruity odor	***No*** fruity odor

(Continued text on following page)

Comparing Hypoglycemia & Hyperglycemia *(continued)*

	Hypoglycemia	DKA	Hyperglycemic Conditions HHNC
Skin	Cool, pale, moist	Warm, dry, flushed	Itching, poor turgor
MS	Weakness, tremor, twitching	Muscle wasting	Weakness
GI/GU	Nausea and vomiting	Abdominal cramps, n/v, dehydrated, polydipsia, polyuria	Polyuria, decreased fluid intake
Weight	Normal	Weight loss	Weight loss
Labs	Blood glucose <80 mg/dL	Blood glucose >180 mg/dL, glucose and ketones in urine, metabolic acidosis, respiratory alkalosis	Blood glucose > 800 mg/dL, ↑BUN, ↑H&H, ↑WBC, serum osmolality > 320 mOsm/L
Rx	Glucose IV or PO, glucagon	IV, insulin, K^+, $NaHCO_3$	IV, insulin, K^+, $NaHCO_3$

Notes:

Increasing Intracranial Pressure (ICP)

Clinical Findings (Normal ICP is < 15 mm Hg):

Neuro: ALOC, HA, sensitivity to light, irritability, double or blurred vision, seizures, hemiparesis, GCS <8, unequal pupils.

Resp: Abnormal respirations, tachypnea (late).

CV: HTN, bradycardia (late), widening pulse pressure (late).

GI/GU: Nausea and vomiting.

MS: Weakness, decreased motor function.

Cushing's Triad: HTN, bradycardia, and abnormal respirations.

Emergency Management (may need MD order)

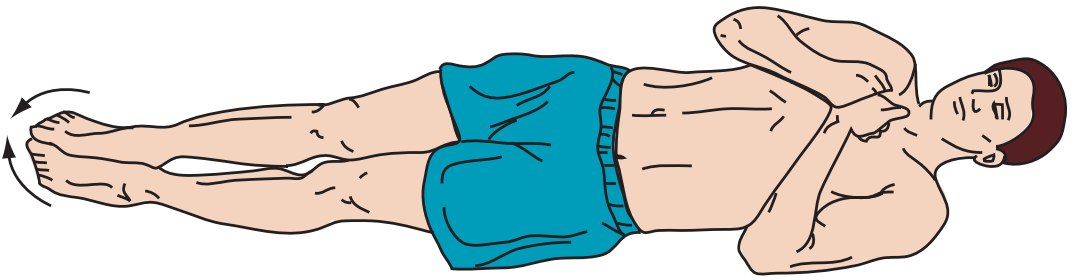
- Establish and manage ABCs and intubate if indicated.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Hyperventilate Pt with 100% O_2: This will result in decreased $PaCo_2$, causing cerebral vasoconstriction, which decreases ICP.
- Obtain IV access and titrate to hemodynamic status.
- Insert urinary catheter and monitor strict intake and output.
- Facilitate invasive ICP monitoring as ordered.
- Administer prescribed medications, which may include sedatives, osmotic diuretics, corticosteroids, neuromuscular blocking agents, antiemetics, and anticonvulsants.

Special Considerations

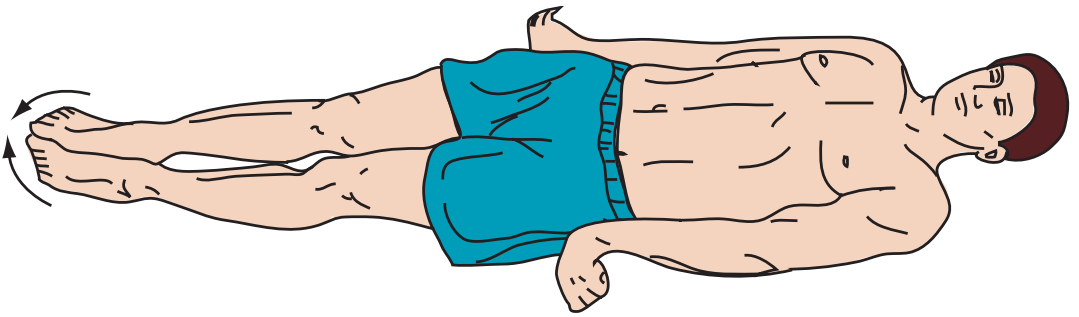
- Keep HOB Elevated 15°–30°.
- Keep head in neutral alignment and avoid flexion/rotation of neck.
- Restrict fluids and monitor fluid and electrolytes.
- Closely monitor vital signs and neurological status (see GCS).
- Reduce environmental stimuli.
- Schedule procedures to coincide with periods of sedation.
- Avoid activities that elicit a vasovagal response.

Posturing

Abnormal Flexion:



Abnormal Extension:



Seizure—Status Epilepticus

Clinical Findings (Progression of Seizure)

Aura (before the seizure starts)

A warning or recognition by the Pt that a seizure is imminent.

Ictal Phase (active seizing)

Neuro: Loss of consciousness (blank stare if petit mal seizure).

Resp: Cyanosis, inability to breath adequately, apnea.

MS: Repetitive jerking movements of upper and lower extremities.

GI/GU: Urinary or fecal incontinence.

Postictal Phase (after the seizure has subsided)
ALOC, extremely confused, frightened, and disoriented.

Emergency Management (may need MD order)

- Establish and manage ABCs and intubate if indicated.
- Protect the airway by placing Pt into a lateral-lying position and suctioning the airway as needed. Insert an OPA, or, if Pt has a gag reflex and there is no evidence of facial trauma, use an NPA.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Obtain stat blood glucose level and manage as indicated.
- Obtain IV access and titrate to hemodynamic status.
- Order stat labs (electrolytes, ABG, and serum blood levels of anticonvulsant medications).
- If seizure activity does not terminate within 4–5 minutes of first onset, administer anticonvulsant drugs (lorazepam, diazepam, and phenobarbital) given respectively after 3–5 minutes of each respective dose if the previous drug fails.
- Document seizure description; aura, onset, type and duration of seizure, interventions, and outcome.

Patient Safety

- Protect Pt from injury by clearing immediate area of potentially harmful objects including tables, chairs, and medical equipment.
- Do not attempt to restrain Pt during seizure.
- Position Pt in a lateral recumbent position (if able) to help minimize the risk of aspiration.
- Do not insert any objects into Pt's mouth.
- Stay with Pt and call for assistance.
- If Pt is in bed, raise side rails and protect from injury by placing pillows between Pt and rails. If seizures are likely to reoccur, install seizure pads on all side rails to minimize risk of injury.
- Reorient Pt, provide reassurance, and allow Pt to sleep.

Transfusion Reaction

Clinical Findings

Neuro: Anxiety, restlessness

Resp: Shortness of breath, dyspnea, tachypnea, bronchospasm

CV: CP, tachycardia, hypotension

Skin: Urticaria, pruritus, erythema, burning at infusion site

GI/GU: Nausea and vomiting, diarrhea, hematuria, oliguria, anuria

MS: Flank, back, or joint pain

Miscellaneous: Fever, chills, oozing at infusion site

Emergency Management (may need MD order)

- Stop transfusion and run NS through the IV to maintain IV access. Do not use lactated Ringer's (LR). It contains Ca and will clot blood in the tubing.
- Establish and manage ABCs as indicated.
- Obtain baseline VS noting temperature and LOC.
- Notify physician and blood bank of reaction stat.
- Recheck Pt ID and blood labels for possible errors.
- Return unused portion of blood product to blood bank for analysis.
- Administer prescribed medications (see specific reaction below).
- Continue to monitor VS, temp, respiratory status, and LOC.
- Insert urinary catheter and monitor UO.
- Continue IV fluids to maintain minimum UO 30 mL/hr.
- Monitor for early detection of any hemodynamic instability, which may include dysrhythmias, abnormal lab values, CHF, etc.
- Document assessment, interventions, and outcome.

Reaction-Specific Management (may need MD order)

Anaphylactic Reaction

- Support airway, breathing, and circulation as indicated.
- Administer epinephrine, diphenhydramine, and corticosteroids.
- Maintain intravascular volume.

Hemolytic Reaction

- Implement aggressive fluid resuscitation to maximize renal cortical perfusion.
- Furosemide may be administered to increase renal blood flow.
- Low-dose dopamine is considered to improve renal blood flow.
- Maintain urine output at 30–100 mL/h.

Febrile, Nonhemolytic Reaction

- Treat fever with acetaminophen.
- If Pt develops chills, cover with blanket unless temp is >102°F.

Primary Trauma Survey

Airway Management and Cervical Spine Immobilization

- Open airway using the jaw-thrust method.
- Assess airway for compromise and/or obstruction.
- Suction nasal/oral pharynx to clear blood, secretions, or debris.

Breathing and Ventilation

- Assess respirations for rate, depth, quality, and effort.
- Inspect and palpate chest and auscultate lung fields for diminished or absent breath sounds if ventilation is abnormal.
- Manually ventilate with a BVM if breathing absent or inadequate.

Circulation and Hemorrhage Control

- Assess pulse for presence, quality, and regularity.
- Begin chest compressions if no pulse can be detected.
- Assess skin color, temperature, moisture, and capillary refill.
- Control hemorrhage with direct pressure.

Disability

- Determine and establish a baseline GCS Score (may use AVPU).
- Assess pupils: PEARRL (pupils equal and round, reactive to light).

Expose/Environment

- Remove clothing and assess entire Pt for injury and hemorrhage.
- Maintain body temperature by keeping the Pt covered.
- Log roll to inspect and palpate posterior surfaces.
- Immobilize entire body using a c-spine collar and long board.

Special Considerations

IV Fluids and Blood

- LR is the fluid of choice in trauma Pts. Caution: LR contains calcium, which causes donor blood to clot in the IV tubing. If a blood transfusion is likely, then NS is the fluid of choice.

Pregnancy

- *Cervical spine immobilization*—Pregnant women (>24 wk) should be immobilized in the left lateral position if possible to avoid compression of the vena cava, which causes supine hypotension.

Mechanism of Injury

- *Motor vehicle accidents (MVA)*—Direction of impact, speed at impact, condition of vehicle, use of seatbelts or airbags, ejection from vehicle, was any other passenger from the same vehicle killed, delayed transport due to extrication from vehicle, chest or abdominal bruising from steering wheel or seatbelt.
- *Falls*—From what height and onto what type of surface.
- *Penetrating trauma*—Weapon, site and depth of injury, underlying organs, weapon-patient distance, caliber and velocity of bullet.
- *Burn injuries*—Degree of burns, % total body surface area (TBSA), associated trauma.

Revised Trauma Score (RTS)

Component	Finding	Value	Score
Respiratory Rate	10–29/min	4	
	> 29/min	3	
	6–9/min	2	
	1–5/min	1	
	Apnea	0	
Systolic Blood Pressure	> 89	4	
	76–89	3	
	50–75	2	
	1–49	1	
	Pulseless	0	
Glasgow Coma Scale Score	13–15	4	
	9–12	3	
	6–8	2	
	4–5	1	
	0–3	0	
		Total	

Abuse

Signs Consistent with All Forms of Abuse

- Unlikely mechanism of injury (story does not match injury).
- Details of injury change from person to person.
- Multiple injuries in various stages of healing.
- Injuries inconsistent with their explanation.
- Use of several different health-care providers or facilities.
- Unexcused delay in seeking medical attention.

Signs of Child Abuse

Physical Abuse:

- History is inconsistent with child's developmental stages.
- Overly protective parent (interferes with assessment).
- Unusual fear of parent or desire to please parent.

- Burns (scalding or cigarettes) or wire marks.
- Fractures or dislocations in a child less than 2 years old.
- Withdrawn or aggressive behavior.
- Malnutrition, insect infestation, or disheveled appearance.

Sexual Abuse:

- Bruised and/or bleeding genitalia or blood-stained underwear.
- Painful urination or itching of genital area.
- STD (sexually transmitted disease) or pregnancy.
- Unusual sexual behavior.

Signs of Elder Abuse

- Malnourishment and unexplained dehydration.
- Poor hygiene (body and clothing soiled with urine and feces).
- Clothing inappropriate for season.
- Signs of inappropriate use of restraints (wrist and ankle bruises).

Signs of an Abusive Partner

- Often, battered women will minimize their injuries or the seriousness of the situation.
- Repeated visits to the ED with increasing severity of injuries.
- Overprotective partner—refuses to leave Pt alone with staff.

Emergency Management

- Assess and ensure safety for yourself and the victim (call security if alleged abuser is present).
- Remove victim from abusive environment and treat as indicated.
- Avoid any confrontation with the alleged abuser.
- Discourage sexual assault victims from urinating, bathing, or changing clothes prior to going to the ED.
- It is a health-care provider's legal obligation to file a report with appropriate authorities or protective services when abuse is either witnessed or suspected.

Burns

Burn Assessment

- Depth of burn (1st; epidermis, 2nd; epidermis and partial dermis, or 3rd; penetrating the dermis and underlying tissues).
- Percentage of TBSA involved.
- Age of the Pt (age + TBSA = % probability of mortality).
- Pulmonary injury (smoke inhalation, toxic fumes).
- Associated injuries (airway burns and other trauma).
- Special considerations (chemical/electrical burns, CO poisoning).
- Preexisting diseases (potential for exacerbation).

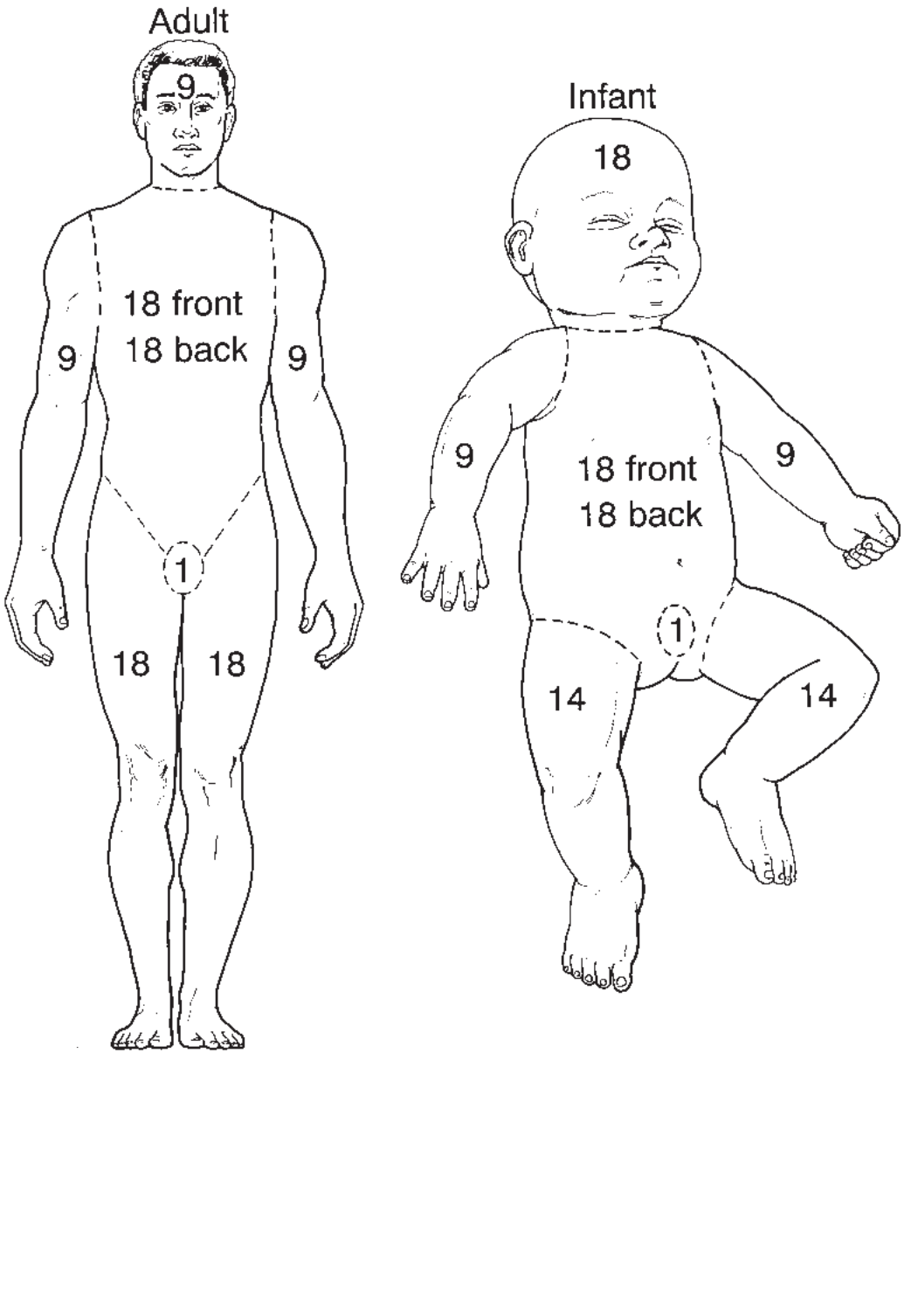
Emergency Management *(may need MD order)*

- Establish and manage ABCs and intubate if indicated. Use c-spine precautions if traumatic injury is suspected.
- Administer 100% oxygen via NRB mask or use BVM if indicated.
- Obtain IV access and titrate to hemodynamic status.
- Attach ECG monitor and manage dysrhythmias per ACLS.
- Order and review labs (glucose, BUN, creatinine, CBC, electrolytes, PT, and PTT).

Fluid Replacement—First 24 hr *(Start From Time of Injury)*

- 4 mL × percentage of BSA × weight (kg).
- Infuse half over 1st 8 hrs, a fourth over 2nd 8 hrs, and a fourth over last 8 hrs.

Rule of Nines



Shock: Signs and Symptoms

Type	Anaphylactic (allergic reaction)	Cardiogenic (pump failure)	Hypovolemic (low volume)	Neurogenic (spinal shock)	Septic (septicemia)
Pathophys	Vasodilatation, fluid shifts, laryngeal and peripheral edema, bronchospasms	↓ CO d/t lack of contractile force, ↓ BP, ↓ tissue perfusion	Decrease in intravascular volume causing decreased tissue perfusion	Profound vasodilatation causing ↓ BP and decreased tissue perfusion	Circulatory failure d/t systemic inflammatory response, capillary leak syndrome, and ↓ tissue perfusion
Etiology	Acute, life-threatening allergic reaction to a specific antigen	AMI, acute PE, tamponade, right or left vent failure	Low circulating volume d/t burns, hemorrhage, 3rd spacing, trauma, dehydration	Traumatic spinal cord injury, anesthesia	Endotoxin release usually from gram-negative organism
Clinical Findings	Respiratory distress, hypotension, edema, rash, cool, pale skin, possible seizure activity	↑ HR, weak pulses, ↑ cap refill, cyanosis, dysrhythmias, ALOC, cool, clammy skin	↓ BP, ↑ HR, weak pulses, ↑ cap refill, cyanosis, dysrhythmias, ALOC, cool, clammy skin	↓ BP, ↓ HR, bounding pulse, pale, warm, and dry skin	Flushed, warm skin, vasodilatation (early), ↑ temp, ↓ UO (late), vasoconstriction (late)
Interventions	ABCs Oxygen Antihistamine Epinephrine IV fluids Corticosteroids	ABCs Oxygen IV fluids Vasopressors	ABCs Oxygen Control bleeding Immobilize c-spine if trauma IV fluids Colloids	ABCs Immobilize c-spine if trauma Oxygen IV fluids Lie flat Vasopressors	ABCs Oxygen IV fluids Blood Cx, UA Sputum C&S Antibiotic therapy Vasopressors

Terrorism

Biological Agents

Anthrax

Etiology: Bacterial *(Bacillus anthracis)*

Signs and Symptoms: Initial flu-like symptoms (fever, muscle ache, cough, chest pain), which rapidly (over days) progress to severe respiratory difficulty and shock. Cutaneous anthrax is marked by a boil-like lesion that typically forms an ulcer with a black center.

Onset: Within 7 days, but most cases occur within 48 hours; inhalation can take as long as 6 weeks.

Transmission: Cutaneous and inhalation.

Communicability: Inhalation anthrax cannot be transmitted from person to person. On rare occasions, cutaneous anthrax can spread via direct contact with an open sore.

Prognosis: Inhalation anthrax is usually fatal if not treated immediately. Cutaneous is less fatal, but still requires prompt treatment.

Treatment: Ciprofloxacin or doxycycline.

Prevention: Currently, a vaccine is available only to people in high-risk areas such as military personnel.

Botulism

Etiology: Botulism is a muscle-paralyzing disease caused by a toxin made by a bacterium called *Clostridium botulinum.*

Signs and Symptoms: Double or blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, muscle weakness that always descends through the body: first shoulders are affected, then upper arms, lower arms, thighs, calves, etc. Paralysis of breathing muscles can lead to respiratory arrest.

Onset: Symptoms begin within 6 hours to 2 weeks (most commonly between 12 and 36 hours) after eating toxin-containing food.

Transmission: Botulism is transmitted by eating food contaminated with the botulinum toxin.

Communicability: Not spread from person to person.

Prognosis: Most Pts recover after weeks to months of supportive care.

Treatment: Antitoxin is available and will reduce the severity of the symptoms if administered early.

Prevention: No vaccine available.

Biological Agents

Plague

Etiology: Bacterial (*Yersinia pestis*).

Signs and Symptoms: Fever, cough, chest pain, hemoptysis.

Onset: 1–3 days for inhaled aerosol exposure; 2–8 days for flea-borne transmission.

Transmission: Person-to-person contact and direct contact with bodily fluids and contaminated objects. May be dispersed by intentional release of an aerosol form of plague.

Communicability: Pts are contagious until they have completed 72 hours of antibiotic treatment.

Prognosis: Fatal if not treated.

Treatment: Doxycycline (1st choice); ciprofloxacin (2nd choice).

Prevention: No vaccine available.

Smallpox

Etiology: Viral (Variola virus, of the genus *Orthopoxvirus*).

Signs and Symptoms: Skin lesions quickly appear, progressing from macules to papules to vesicles. Other symptoms include fever, myalgia, and rash. Note that the smallpox rash is more prominent on the head and extremities, whereas chicken pox is more concentrated around the trunk.

Onset: 7–17 days (the average onset is 12 days).

Transmission: Person-to-person contact and direct contact with bodily fluids and contaminated objects.

Communicability: From onset of rash until lesions have scabbed over and fallen off (approximately 3 weeks).

Prognosis: About 30% fatality rate.

Treatment: Supportive care only.

Prevention: Vaccine available.

Chemical and Nerve Agents

Mustard Gas

Signs and Symptoms:

- Itching and urticaria followed by blistering.
- Irritation of eyes, including pain, swelling, and tearing.

- Runny nose, epistaxis, sneezing, hoarseness, coughing, and shortness of breath.
- Abdominal pain, diarrhea, fever, nausea, and vomiting.

Onset: 2–24 hours after exposure.

Transmission Route: Skin contact, eye contact, or breathing.

Communicability: Not communicable.

Prognosis: Usually not fatal.

Treatment: Remove mustard residue from the body by blotting and then washing with soap and water. Treat effects of exposure as clinically indicated. No antidote is available.

Sarin Gas

Signs and Symptoms: Runny nose, sweating, blurred vision, headache, difficulty breathing, drooling, nausea, vomiting, ↑urination, ↑defecation, muscle cramps and twitching, confusion, convulsions, paralysis, and coma.

Onset: Within seconds of exposure.

Transmission Route: Skin/eye contact, inhalation, ingestion.

Communicability: Not likely after decontamination.

Prognosis: Can be fatal within 15 minutes of exposure.

Treatment: Antidote → Atropine 2–6 mg IM. Remove from source, remove and double-bag clothing, wash skin with soap and water, and irrigate eyes with water for 10–15 minutes. Do not induce vomiting.

VX Nerve Agent

Signs and Symptoms: Runny nose, sweating, blurred vision, headache, difficulty breathing, drooling, nausea, vomiting, ↑urination, ↑defecation, muscle cramps and twitching, confusion, convulsions, paralysis, and coma.

Onset: Within seconds to hours of exposure.

Transmission Route: Skin/eye contact, inhalation; ingestion is possible, but unlikely.

Communicability: Contaminated clothing can release VX for approximately 30 minutes after exposure.

Prognosis: Mild to moderate exposures usually recover within 1–2 weeks; however, severe exposure is usually fatal.

Treatment: Antidote → Atropine 2–6 mg IM. Remove from source, remove and double-bag clothing, wash skin with soap and water, and irrigate eyes with water for 10–15 minutes. Do not induce vomiting.

Medication Administration

Medication Rights

- Right Patient
- Right Medication
- Right Dose
- Right Time
- Right Route

Triple Check

- When obtaining medication from where it is stored.
- Side-by-side comparison of medication and the written order and the medical administration record (MAR).
- One last time after preparation, just prior to administration.

Approximate Onset

IV	3–5 minutes
IM	3–20 minutes
SC	3–20 minutes
PO	30–45 minutes

These onset times are only approximate, but will help guide you in your assessment.

Assessment and Documentation

- Assessment needs vary and depend on route and medication.
- Always assess patient after giving drugs that may adversely affect RR, HR, BP, LOC, and blood glucose.
- Assess meds for their efficacy and adverse drug reaction (ADR).
- **Document:** drug, dose, route, time given, and time d/c'd if applicable. Include patient response and any ADR.

Aspirate (IM and SC Injections)

- The reason for aspirating prior to actually injecting a medication is to ensure that the needle is not in a blood vessel.
- If blood appears in the syringe, withdraw the needle, discard the syringe, and prepare a new injection.

When Not to Aspirate

- When administering SC anticoagulants (e.g., heparin) or insulin, it is recommended that you do not aspirate.
- Entering a blood vessel is unlikely with SC injection and manipulating the syringe is more likely to cause bruising.
- Aspiration while administering anticoagulants increases the risk of bleeding and bruising.

Points to Remember

- Confirm MAR is up to date. Question unclear medication orders.
- Always confirm compatibility.
- Always check for allergies and assess for reactions to new drugs not previously taken by the patient.
- Do not crush sustained-release or enteric-coated capsules or pills.
- Take VS before and 5 minutes after applying NTG paste and the administration of IV vasoactive meds.
- Always use a filter needle when withdrawing medication from a glass ampule (discard and replace filter needle before injection).
- Use a straw for PO iron to prevent the staining of patient's teeth.

Medication Error—Intervention

Immediate Interventions

- Discontinue the medication.
- Treat symptoms of ADR per protocol.

Focused Assessment

- Assess for any ADR to the medication including changes in LOC, VS, N&V, allergic reaction, etc.
- Ascertain whether the patient has any known allergy to the medication given in error.

Ongoing Assessment and Intervention

- Notify physician of medication error, along with any adverse reactions to the medication.

Documentation

- Complete the appropriate documentation per hospital policy.
- Document on MAR and progress notes if indicated.
- Avoid using such phrases such as "given in error." State the facts; document the medication, dose, time, and route on the MAR.
- In the progress notes, document physician notified.
- If there was any ADR, include intervention and outcome.
- Do not indicate within the progress notes that an incident report was filled out (e.g., "see incident report").

Preventing a Medication Error

- Always observe the five medication rights.
- Triple check all medications given.
- Always read product packaging to note strength and route.
- Always double check with a pharmacist about dosage range.
- When mixing insulin, have second nurse witness.
- Always have a colleague confirm dosage calculations and infusion pump programming.
- Clarify any order that is unclear or contains abbreviations.
- Label all syringes and discard syringe immediately after use.
- Do not borrow medications from other patients.
- Do not begin new medications before the order has been received in the pharmacy, as this circumvents the built-in checks that can detect a potential error.
- Document immediately after administering any medication.
- Do not document a medication until after it has been administered.

High-Alert Medications

- Adrenergic agonists/antagonists
- Anesthetic agents
- Cardioplegic solutions
- Chemotherapeutic agents
- TPN solutions

Specific High-Alert Meds

- Insulin (IV and SC)
- IV amiodarone
- IV calcium

- Dextrose solutions >20%
- Dialysis solutions
- Epidural/intrathecal meds
- Glycoprotein IIb and IIIa inhibitors
- Hypoglycemic agents (oral)
- Inotropic meds
- Liposomal forms of drugs
- Moderate sedatives
- Narcotics and opiates
- Neuromuscular blocking agents
- Radiocontrast agents
- Thermolytics and fibrinolytics
- IV colchicine
- IV digoxin
- IV heparin
- IV lidocaine
- IV magnesium
- IV nitroprusside
- IV potassium
- Methotrexate
- Nesiritide
- Saline solutions > 0.9%
- Warfarin

Error-Prone Abbreviations and Symbols

Abbreviations

- µg
- AD, AS, AU
- OD, OS, OU
- BT
- cc
- D/C
- IJ
- IN
- HS, hs
- IU
- o.d., OD
- OJ
- Per os
- q.d., QD
- q1d
- q6PM, etc.
- SC, SQ, sub q
- ss
- SSRI, SSI
- 1/d
- TIW, tiw
- U, u

Symbols

- ℨ (dram)
- ♏ (minim)
- @ (at)
- & (and)
- ° (hour)
- / (slash)
- + (plus)
- − (minus)
- > (greater than)
- < (less than)
- Apothecary symbols

Drug Names

- ARA A
- AZT
- CPZ
- DPT
- DTO
- HCl
- HCT
- HCTZ
- IV Vanc
- MgSO4
- MTX
- Nitro drip
- Norflox
- PCA
- PTU
- T3
- TAC
- TNK
- ZnSO4

General Tips

- Avoid using a zero *after* a decimal point.
- Use a zero *before* a decimal point.
- Use commas for dosing units at or above 1,000.
- Place adequate space between a drug name, dose, and the unit of measure.

Common Medication Formulas

Injections: (Amount to be drawn up into a syringe)	$\frac{\text{(Desired amount of drug} \times \text{total volume)}}{\text{Total amount of drug on hand}}$
Volume/hr (mL/hr): (e.g., 150 mL/hr)	$\frac{\text{(Volume} \times \text{drip set factor)}}{\text{Time in minutes}}$
mg/min: (e.g., 4 mg/min) **mg/hr:** (e.g., 20 mg/hr)	$\frac{\frac{\text{(Desired amount} \times \text{volume} \times \text{drip set factor)}}{\text{Amount of drug on hand}}}{\text{Total infusion time in minutes}}$
To figure the rate of an existing IV	1. Count drops per minute and multiply by 60. 2. Divide result by the drip factor being used.

IV Fluid Drip Rate Table (drops/min)

Rate: mL/hr →	TKO	50	75	100	125	150	175	200	250
10 gtt/mL set	5	8	13	17	21	25	29	33	42
12 gtt/mL set	6	10	15	20	25	30	35	40	50
15 gtt/mL set	8	13	19	25	31	37	44	50	62
20 gtt/mL set	10	17	25	33	42	50	58	67	83
60 gtt/mL set	30	50	75	100	125	150	175	200	250

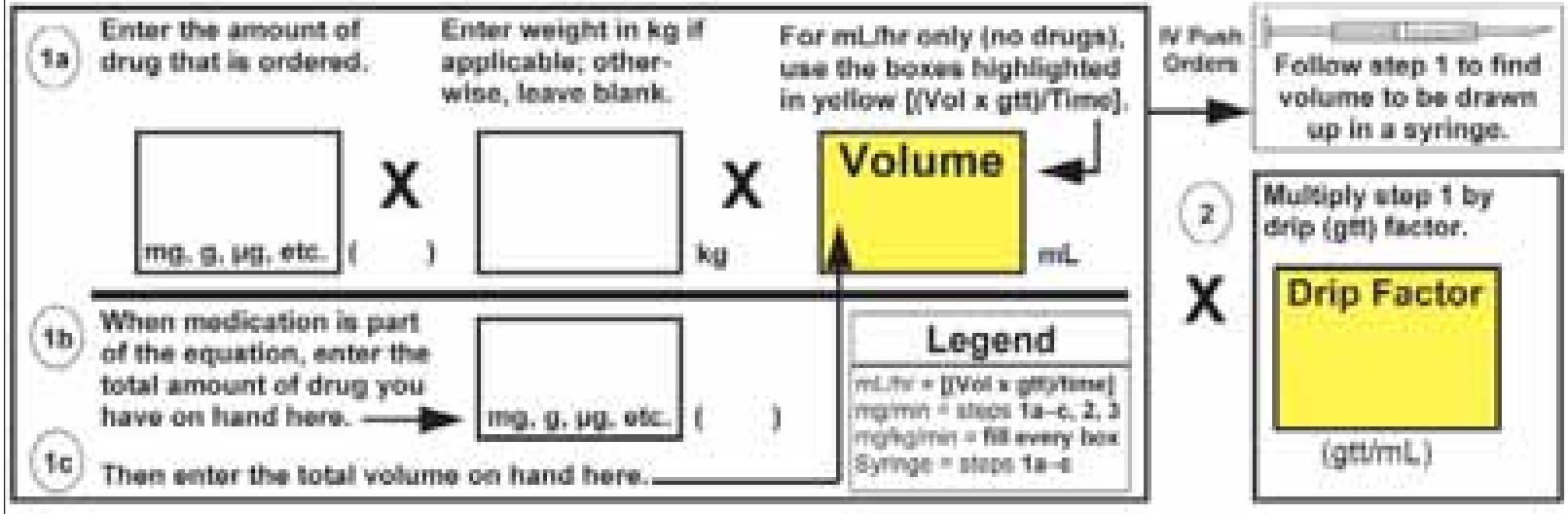
Note: TKO is 30 mL/hr.

Fluid Infusion Rate (4-2-1)

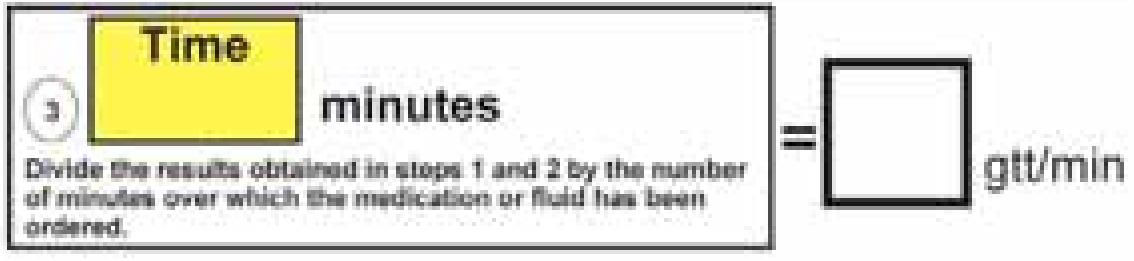
Minimum hourly fluid rate for children and adults

4 mL/kg times the first 10 kg, plus
2 mL/kg times the second 10 kg, plus
1 mL/kg for each additional kg equals appropriate IV infusion rate based on weight (e.g., an 80-kg patient would require 120 mL/hr).
Example: 1st 10 kg × **4** mL = 40 mL; 2nd 10 kg × **2** mL = 20 mL; each additional kg (60 kg left) × **1** mL = 60 mL for a grand total of 40 mL + 20 mL + 60 mL equaling **120 mL/hr** for an 80-kg patient.

Universal Formula—Figure Out Drip Rates and Drug Amounts



To figure out the running time (mL/hr) on an existing IV, first count the drops per minute. Then multiply that amount by 60 and divide the result by the drip factor being used.



IV Solutions

IV solutions can be divided into two basic categories:

- **Crystalloids** contain water, dextrose, and/or electrolytes, and are commonly used to treat different fluid and electrolyte imbalances.
- **Volume Expanders** (often referred to as colloids or plasma expanders) have an increased osmotic pressure in comparison to crystalloids; they remain in the intravascular space longer and are used for volume expansion.

Crystalloids

Type of Solution	Components	Indications
Saline solutions NS, 0.9% NaCl, sodium chloride, saline, 3% and 5% saline	Na and Cl	■ Alkalosis ■ Fluid loss ■ Sodium depletion
Dextrose solutions D5W, D10W	Dextrose in water	■ Replace calories as carbohydrates ■ Prevent dehydration ■ Maintain water balance ■ Promote sodium diuresis
Dextrose and saline mixtures D5NS, D5$^{1}/_{2}$NS, D10NS	Dextrose in saline	■ Promote diuresis ■ Correct moderate fluid loss ■ Prevent alkalosis ■ Provide calories and sodium chloride
Multielectrolyte solutions LR, Lactated Ringer's, Ringer's Lactate, RL	Combination of Na, Cl, K, Ca, and lactate	■ Replaces fluid lost due to vomiting or GI suctioning ■ Treats dehydration ■ Restores normal fluid balance

Volume Expanders

Volume expanders include albumin, dextran, and hetastarch. Often the term *colloid* is used to refer to all volume expanders.

- **Protein solutions:** Albumin, plasma, and commercial plasmas (e.g., Plasmanate).
- **Dextran:** Complex, synthetic sugar, metabolized slowly, does not stay in the vascular space as long as a colloid.
- **Hetastarch:** Synthetic colloid that works similarly to Dextran.

Volume Expanders (Colloids)

Solution	Components	Indications
Albumin 5% and 25%	Human plasma protein	■ **5%**—To expand volume and mobilize interstitial edema ■ **25%**—To treat hypoproteinemia
Plasma **Plasmanate** **Plasma protein fraction** (PPF)	Contains human plasma proteins in NS	■ To increase serum colloid osmotic pressure
Dextran 40 and 70	Synthetic colloid made of glucose polysaccharides	■ To expand volume ■ To mobilize interstitial edema
Hetastarch Hespan	Synthetic colloid made from corn	■ To expand volume ■ To mobilize interstitial edema

Blood and Blood Products

Product	Components	Indications
Whole Blood	Contains all blood products	■ Rarely used—may be given emergently to an exsanguinating patient
Packed Red Blood Cells (PRBCs)	No clotting factors or platelets, 80% plasma removed	■ To treat acute and chronic anemia, blood loss
Platelets	Usually given in pools of 6–10 units	■ To increase low platelet counts or treat coagulopathies ■ One unit will generally increase platelet count by 6000 units
Fresh Frozen Plasma (FFP)	Plasma and clotting factors	■ To replace clotting factors, e.g., after multiple transfusions (>6 units PRBCs), or to reverse the effects of Coumadin
Cryoprecipitate	Clotting factors	■ To treat hemophilia, fibrinogen deficiency, DIC

Autologous Blood Donation/Transfusion

- A procedure for collecting and storing a Pt's own blood several weeks before its anticipated need by the Pt.
- Salvage of blood normally lost during a surgical procedure.
- Used to prevent the transmission of disease from donor blood. It is not without risk: stored blood may still become contaminated.

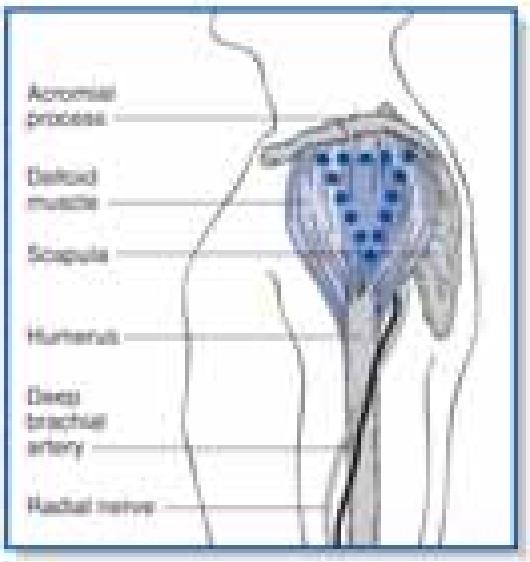
Blood Transfusion Reactions

Type	Cause	Manifestation
Allergic	Sensitivity to foreign proteins.	■ Hives, urticaria, flushing ■ Fever
Febrile, non-hemolytic	Sensitization to donor's WBC, platelets, and/or plasma proteins.	■ Fever, chills, and flushing ■ HA and muscle aches ■ Respiratory distress ■ Cardiac dysrhythmias
Acute hemolytic	ABO incompatibility reaction to RBC antigens.	■ Fever, chills, and flushing ■ Low back pain ■ Tachycardia and hypotension ■ Vascular collapse ■ Cardiac arrest
Anaphylactic	Administration of donor IgA proteins to recipient with anti-IgA antibodies.	■ Urticaria ■ Restlessness ■ Wheezing ■ Shock and cardiac arrest
Circulatory overload	Infusion of blood at a rapid rate that leads to fluid volume excess.	■ Pulmonary congestion ■ Restlessness ■ Cough, shortness of breath ■ HTN ■ Distended neck veins
Bacteremia	Infusion of blood infected with bacteria.	■ Fever and chills ■ Vomiting and diarrhea ■ Hypotension ■ Septic shock

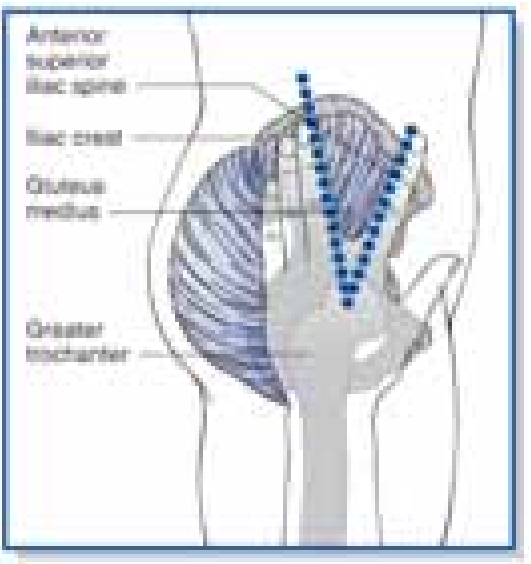
See *EMERG/TRAUMA* for assessment and management of blood transfusion reactions.

Intramuscular (IM) Injection Sites

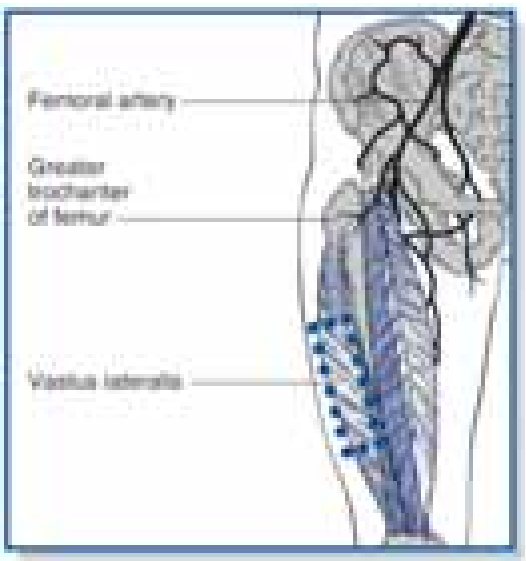
Deltoid Site



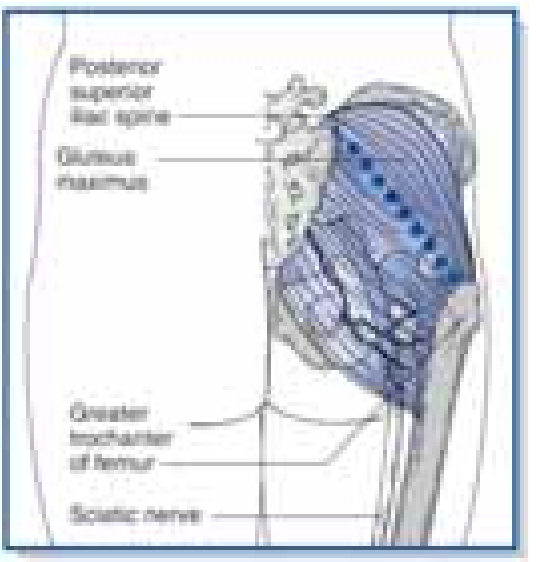
Ventrogluteal Site



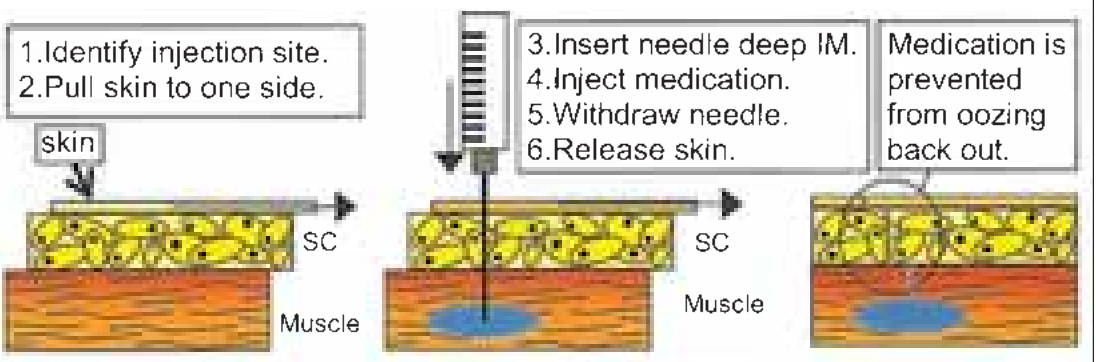
Vastus Lateralis Site



Dorsogluteal Site



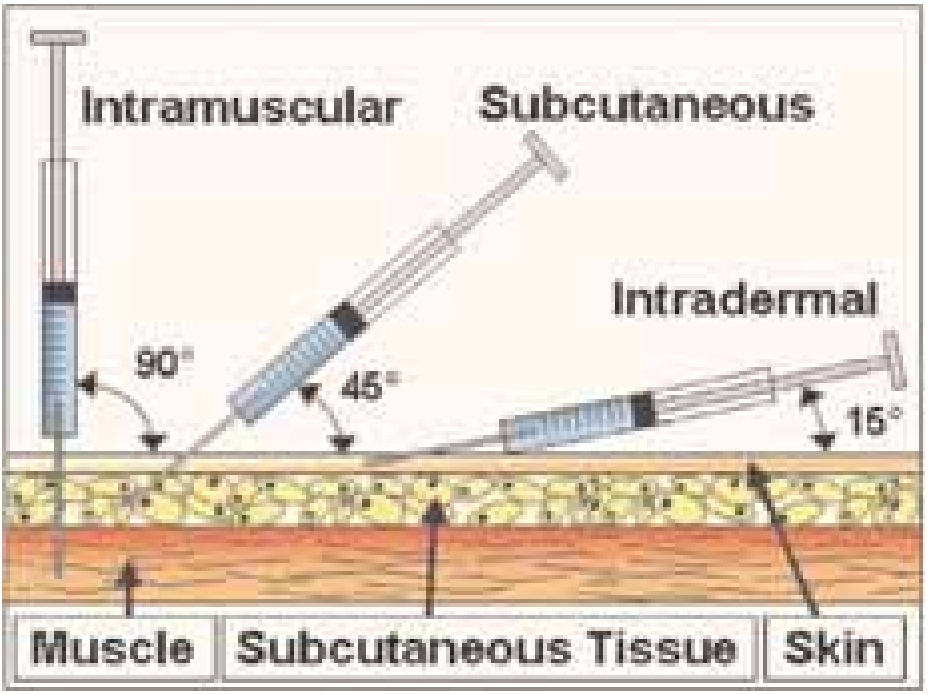
Z-Track Method for Giving IM Injections



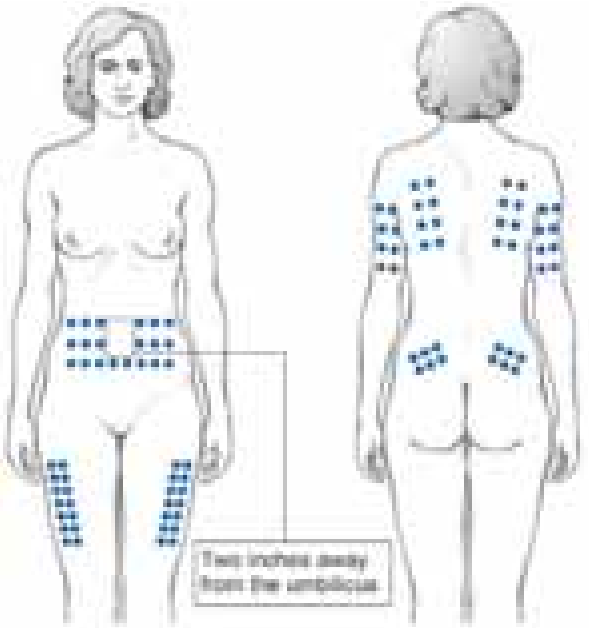
Injections—Intradermal (ID), Subcutaneous (SC), and Intramuscular (IM)

	ID	SC	IM
Site	Inner forearm, chest, and back	Upper posterior arm, upper back, low back, anterior lateral thigh, and abdomen	Gluteus, thigh, and deltoid muscles
Gauge	27–30 g	25–28 g	23 g
Length	1/4–3/8″	3/8–5/8″	1–1 1/2″
Angle	10°–15°	90° or 45° for very thin patients	90°
Volume	0.1–0.2 mL	0.5–1 mL	Up to 3 mL; small muscles (deltoid) no more than 1 mL

Angle of Injection



SC Injection Sites



ID Sites

Anterior aspect of the forearm

SC Injection Technique

- Always observe Pt rights and standard precautions.
- Select and cleanse appropriate sight with an alcohol swab.
- Don gloves and hold syringe in dominant hand.
- With nondominant hand, either pinch or spread skin.
- **Note:** If less than 1 inch can be pinched between fingers, pinch skin and insert needle at a 45° angle. If more than 1 inch can be pinched, spread the skin and insert needle at a 90° angle.
- Insert needle to the hub with one steady motion.
- Do not aspirate when administering heparin or insulin. Otherwise, aspirate to ensure that needle is not in a blood vessel.
- Inject medication and withdraw needle.
- Massage site and cover with a Band-Aid (do not massage site when administering heparin).
- Discard equipment per facility guidelines.
- Document medication, dose, site of injection, and Pt's response to the medication.

Types of Insulin

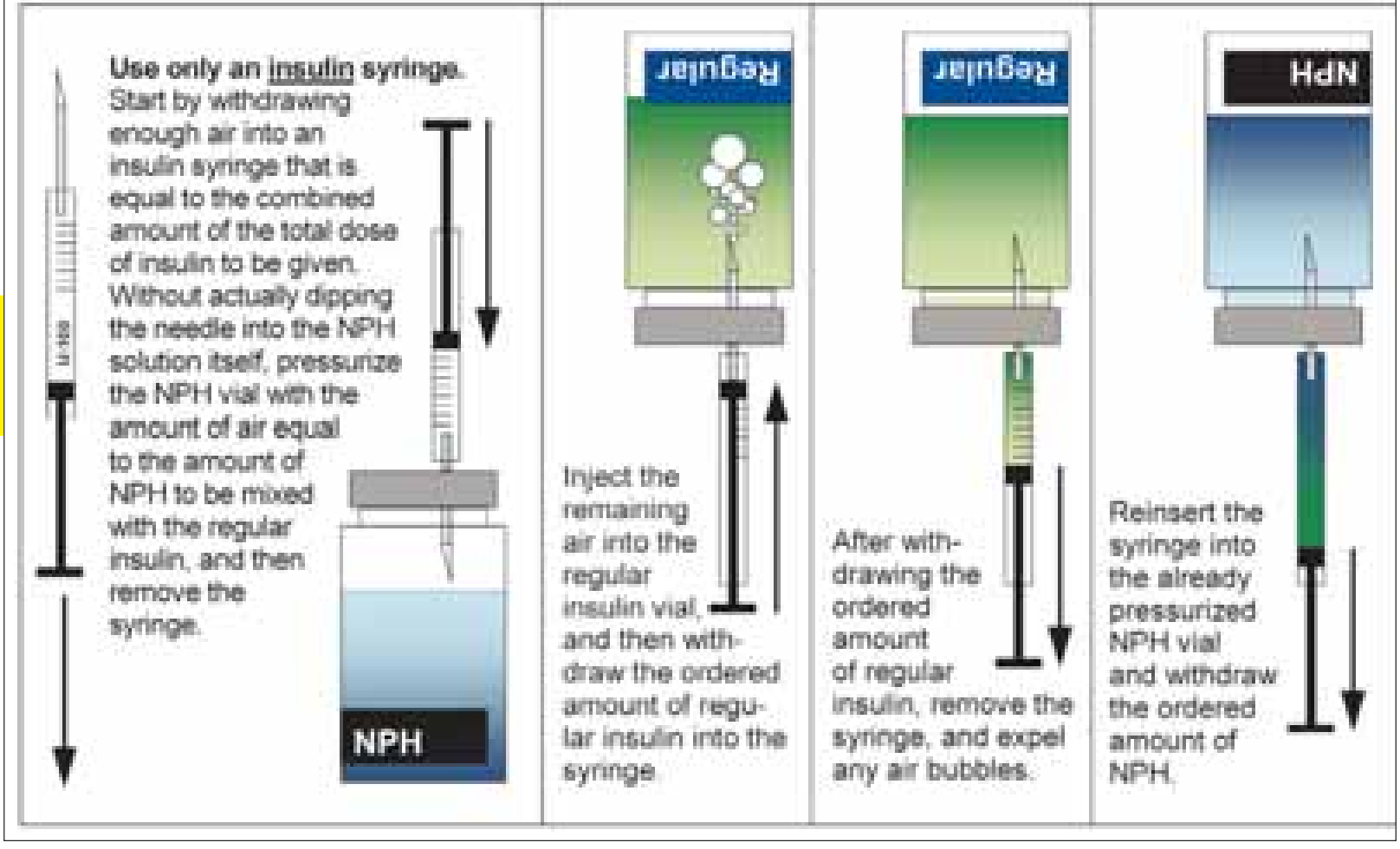
	Agent	Onset	Peak	Duration
Rapid-acting insulins	**insulin lispro** (Humalog)	5 min	60–90 min	4–6 hours
	insulin aspart (NovoLog)	10–20 min	1–3 hours	3–5 hours
Short-acting insulins	**concentrated insulin:** Iletin II regular (concentrated) Insulin U-500. **Caution:** Do ***not*** administer IV because of the potential for overdosage.	30–60 min	2–3 hours	5–7 hours
	regular insulin: (Humulin R, Insulin-Toronto, Novolin R, Iletin II Regular, Velosulin BR) **Caution:** Regular insulin is the ***only*** insulin that can be administered IV.	**SC route:** 30–60 min **IV route:** 10–30 min	**SC route:** 2–4 hours **IV route:** 15–30 min	**SC route:** 5–7 hours **IV route:** 30–60 min
Intermediate-acting insulins	**isophane (NPH):** (Humulin N, NPH Iletin II, Novolin Ge NPH, Novolin N)	1–2 hours	8–12 hours	18–24 hours
	lente: (Humulin L, Novolin Ge Lente, Novolin L) **No longer manufactured as of July, 2005**	1–2 hours	8–12 hours	18–24 hours

(Continued text on following page)

Types of Insulin *(continued)*

	Agent	Onset	Peak	Duration
Long-acting insulins	**insulin glargine** (Lantus) **Caution:** Lantus insulin ***cannot*** be mixed with other insulins; may cause unpredictable results.	Onset: 1 hour. Provides a constant concentration over a 24-hour period with no pronounced peak.		
	insulin detemir (Levemir)	2–4 hours	None	24 hours
	ultralente: (Humulin U, Novolin U) **No longer manufactured as of July, 2005**	4–8 hours	16–18 hours	36 hours
Pre-mixed insulins *(Note: other mixes are available)*	**NPH/regular:** (Humulin 50/50, Humulin 70/30, Novolin 70/30)	30–60 min	2–8 hours	24 hours
	aspart protamine/aspart (NovoLog Mix 70/30)	10–20 min	2 1/2 hours	24 hours
	lispro protamine/lispro (Humalog Mix 75/25)	5 min	2 hours	22 hours

Mixing Insulin

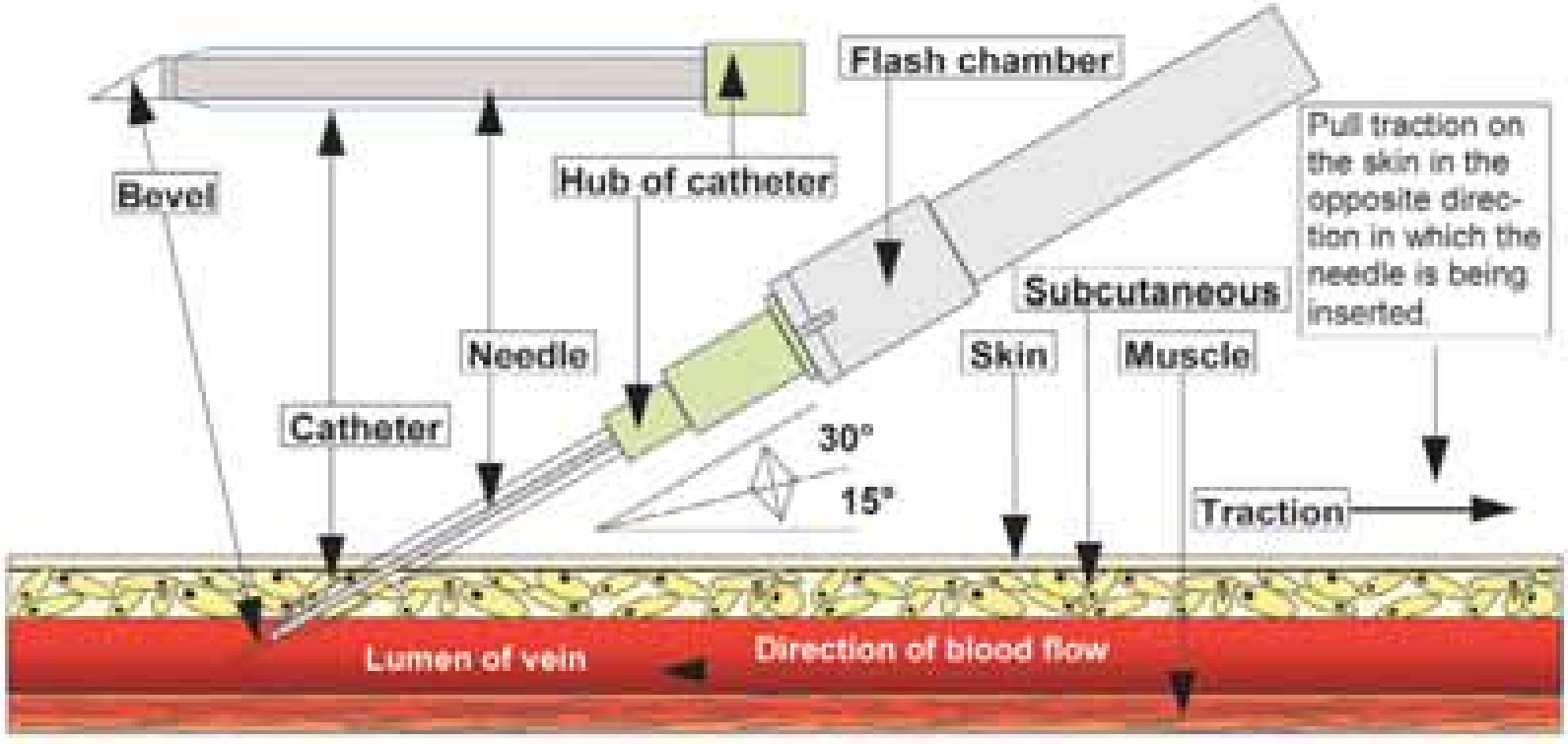


Starting an IV

- **Prepare the Pt:** Explain procedure, answer any questions, and give reassurance.
- **Gather equipment:** IV bag with primed tubing, sharps container, catheter, tape, dressing, tourniquet, antiseptic swabs, gloves, IV catheter of appropriate size.
- **Organize supplies:** Tear tape, hang IV solution with primed tubing close by, sharps container within easy reach, 2x2 or other dressing.
- **Apply tourniquet:** Proximal to intended insertion site, either mid-forearm or above the elbow; don gloves.
- **Locate vein:** Palpate with fingertips. To further enhance dilation, gently tap, apply heat/warm soak, have patient make a fist, or dangle arm below heart.
- **Cleanse site:** Using moderate friction, cleanse in a circular motion, moving outward from intended site.
- **Put on gloves:** While waiting for cleansed area to dry, avoid touching site once it has been prepared.
- **Apply traction:** Opposite the direction of the catheter.
- **Position needle:** Bevel side up, 15°–30°. **Note:** *Hold the needle with the thumb and pointer finger in a way that allows for visualization of the flash chamber.*
- **Insert needle:** Perform venipuncture and observe for "flash back" in flash chamber. Lower catheter almost parallel to the skin, and insert the needle 1–2 additional mm. This is done to ensure that the catheter has also entered the vein.
- **Advance the catheter:** Thread catheter into vein while maintaining skin traction and pulling back on needle.
- **Release the tourniquet:** After releasing tourniquet, apply digital pressure just above the end of the catheter tip while gently stabilizing the hub of the catheter.
- **Remove needle:** Remove and discard into approved sharps container.
- **Connect IV tubing:** Open clamp, and observe for free flow of IV fluid.
- **Secure catheter:** Apply tape and sterile dressing per policy.
- **Clean up:** Discard soiled equipment per hospital policy.
- **Document:** Per hospital policy and guidelines.

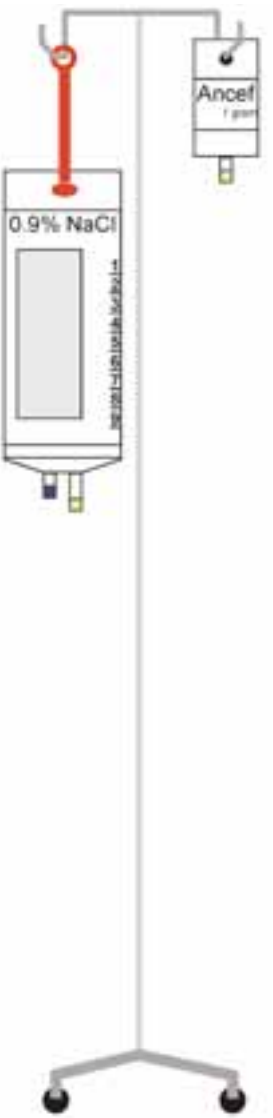
IV Insertion Guide

Notice how the catheter is slightly shorter than the needle. This is why the needle needs to be advanced 1–2 mm farther after the initial flash back and before advancing the catheter and removing the needle.



IV Piggyback (IVPB) Setup

- Confirm order and ensure bag is clearly labeled.
- The piggyback bag must be higher than the IV bag. To do this, hang the primary bag from an **extension hook** (see right).
- Use most proximal access port on primary line.
- Adjust piggyback stopcock to desired rate.
- After infusion is complete, the primary IV bag will begin to drip again. Discard IVPB bag.
- Reconfirm that primary drip rate is correct.
- **Document:** medication, infusion rate, date, and time.



Complications of Starting/Maintaining IVs

Infiltration	Phlebitis
Assessment: Swelling, tenderness, decreased or no infusion rate, blanching of skin, and site is cool to touch.	**Assessment:** Classic sign is red line along course of vein. Other signs include redness, heat, swelling, and tenderness.
Intervention: D/C IV and restart in a new site. Apply warm compress to the affected area.	**Intervention:** D/C IV and restart in a new site. Apply warm compress to the affected area.

Troubleshooting IV Complications

Decreased or No Infusion Rate

- Assess IV site for infiltration.
- If IV insertion site is close to a joint, straighten extremity.
- Use a padded arm board to help maintain alignment.
- Inspect entire length of tubing for kinks or holes.
- Inspect stopcocks and other flow-control devices.
- Ensure that burette (pediatrics) contains correct amount of fluid.
- If not using an infusion pump, raise the height of the IV bag.
- Attempt to flush with 3 mL of NS, but if a significant amount of resistance is encountered, notify the IV therapy team or RN. If IV therapy is unavailable, discontinue IV and restart a new one, preferably on the opposite arm.

Pain at the IV Site

- Assess IV site for infiltration, phlebitis, and irritation from tape.
- Ensure adequate stabilization of IV catheter.
- If IV insertion site is close to a joint, straighten extremity.
- Use a padded arm board to help maintain alignment.
- Consult the pharmacy or Davis's Drug Guide to ascertain if a medication being infused can cause pain or irritation.
- Notify the IV therapy team or RN if unsuccessful at relieving pain or discomfort.

Blood Backing Up into the IV Tubing

- Two common causes are allowing the IV bag to run dry (corrected by changing to a new bag) or hanging the IV bag at a level that is lower than either the IV insertion site or the Pt's heart (corrected by increasing the level of the bag).
- Note: If bag is allowed to run dry, the tubing may fill with air. After changing to a new bag, the air in the tubing can be removed by inserting a large syringe into the port distal to the air and aspirating, as the tubing is re-primed.
- Occasionally, an artery is cannulated. If this is suspected, palpate for a pulse under the insertion site and inspect for pulsation of blood in the tubing (D/C IV and hold direct pressure for at least 5 minutes).

Leaking Fluid at the IV Site

- Assess IV site for infiltration.
- Inspect the connection between the tubing and IV catheter.
- If all connections are patent, err on the side of safety and assume that the site is infiltrating, even if the IV is infusing freely. Call for an IV therapy consult.

Flushing Peripheral and Central Lines

Catheter Type	Solution	Strength	Frequency
Peripheral Vascular Access Devices (VAD)			
■ Peripheral IV line	NS	N/A	3 mL daily and PRN
■ Midline catheter	Heparin	10 units/mL	5 mL daily and PRN
Peripherally Inserted Central Catheters (PICC)			
■ Groshong PICC	NS	N/A	5 mL per lumen every 7 days and after each use
■ Per-Q-Cath (Pediatric VAD)	Heparin	10 units/mL	2.5 mL (child) or 0.5 mL (infant) q 8h and after each use
Central Venous Catheters (CVC)			
■ Valved-tip (no clamps)	NS	N/A	5 mL per lumen weekly and PRN
■ Open-ended (clamps)	Heparin	10 units/mL	5 mL daily and PRN
Implanted Port Catheters			
■ Groshong Port-A-Cath	Heparin	100 u/mL	5 mL daily and PRN

Routine Care of Peripheral and Central Lines

- **Clamps:** Open-ended catheters will always have clamps to prevent the backflow of blood and air embolisms. All open-ended catheters must be flushed with heparin to minimize fibrin collection and clot formation.
- **No Clamps:** Valved-tip catheters do not have any clamps and require saline flushes—use positive-pressure flush technique.

- **End-Caps:** Change the end cap(s) every 7 days or sooner if any blood, cracks, or leaks are seen.
- **Syringe Size:** The smaller the syringe size, the greater the pressure in pounds per square inch (PSI); greater PSI increases the potential for catheter damage. Therefore, a syringe size of 10 mL or greater is recommended for all central-line flushes.
- **Positive-Pressure Flush:** To reduce the potential for blood backflow into the catheter tip, which promotes clot formation and catheter occlusion, always remove needles or needleless caps slowly while injecting the last 0.5 mL of NS.

Common Prescription Drugs

Brand Names, generic names . . . . . .class [common uses]

Accupril, quinapril . . . . . .ACE inhibitor [HTN]
acyclovir, **Zovirax** . . . . . .antiviral [herpes, shingle]
Adalat, nifedipine, **Procardia** . . . . . .Ca channel blocker [HTN]
Adanocard, adenosine . . . . . .antiarrhythmic [PSVT]
adenosine, **Adenocard** . . . . . .antiarrhythmic [PSVT]
Advil, ibuprofen, **Motrin** . . . . . .antipyretic, antirheumatic, nonopioid analgesic, NSAID [pain]
albuterol, **Proventil, Ventolin** . . . . . .bronchodilator [asthma, COPD]
alprazolam, **Xanax** . . . . . .benzodiazepine [anxiety]
Allegra, fexofenadine . . . . . .allergy, cough, and cold remedy, antihistamine [allergic rhinitis]
Ambien, zolpidem . . . . . .nonbenzodiazepine, sedative/hypnotic [insomnia]
amitriptyline, **Elavil** . . . . . .tricyclic antidepressant [depression]
amlodipine, **Norvasc** . . . . . .Ca channel blocker [HTN]
amoxicillin, **Amoxil, Trimox** . . . . . .anti-infective, antiulcer agent [bacterial infection]

Brand Names, generic names . . . . . .class [common uses]

Amoxil, amoxicillin, **Trimox** . . . . . .anti-infective, antiulcer agent [bacterial infection]
atenolol, **Tenormin** . . . . . .beta blocker [HTN]
Ativan, lorazepam . . . . . .benzodiazepine [anxiety, seizures]
atorvastatin, **Lipitor** . . . . . .lipid-lowering agent [high cholesterol]
Atrovent, ipratropium . . . . . .allergy, cough, and cold remedy, bronchodilator [asthma, COPD]
Axid, nizatidine . . . . . .antiulcer agent [ulcers, GERD]
azithromycin, **Zithromax** . . . . . .anti-infective, *Mycobacterium* agent [bacterial infection]
Azmacort, triamcinolone . . . . . .corticosteroid, immune modifier [asthma]
Bactrim, trimethoprim/sulfamethoxazole . . . . . .anti-infective, antiprotozoal [infection]
beclomethasone, **Vancenase** . . . . . .corticosteroid [asthma]
benazepril, **Lotensin** . . . . . .ACE inhibitor [HTN]
Biaxin, clarithromycin . . . . . .anti-infective [bacterial infection]
BuSpar, buspirone . . . . . .antianxiety agent [anxiety]
buspirone, **BuSpar** . . . . . .antianxiety agent [anxiety]
Calan, verapamil, **Isoptin, Verelan** . . . . . .Ca channel blocker [HTN]
Cardizem, diltiazem . . . . . .Ca channel blocker [HTN]
Cardura, doxazosin . . . . . .antihypertensive [HTN]
Ceclor, cefaclor . . . . . .anti-infective [bacterial infection]
cefaclor, **Ceclor** . . . . . .anti-infective [bacterial infection]
cefprozil, **Cefzil** . . . . . .anti-infective [bacterial infection]
Ceftin, cefuroxime . . . . . .anti-infective [bacterial infection]
cefuroxime, **Ceftin** . . . . . .anti-infective [bacterial infection]
Cefzil, cefprozil . . . . . .anti-infective [bacterial infection]
cephalexin, **Keflex** . . . . . .anti-infective [bacterial infection]
cimetidine, **Tagamet** . . . . . .antiulcer agent [ulcers, GERD]
clarithromycin, **Biaxin** . . . . . .anti-infective [bacterial infection]
Claritin, loratadine . . . . . .antihistamine [seasonal allergies]

Brand Names, generic namess . . . . . .class [common uses]

clonazepam, **Klonopin** . . . . . .benzodiazepine [seizures]
codeine . . . . . .opioid analgesic, antitussive [pain, cough]
Coumadin, warfarin . . . . . .anticoagulant [AF, thrombosis]
Cozaar, losartan . . . . . .antihypertensive [HTN]
cyclobenzaprine, **Flexeril** . . . . . .skeletal muscle relaxant [muscle spasm]
Cycrin, medroxyprogesterone,
Provera . . . . . .antineoplastic, contraceptive hormone [HRT]
Darvocet-N,
propoxyphene/APAP . . . . . .opioid analgesic [pain]
Daypro, oxaprozin . . . . . .NSAID [rheumatoid arthritis & osteoarthritis]
Deltasone, prednisone . . . . . .anti-inflammatory, immune modifier [inflammation]
Depakote, divalproex . . . . . .anticonvulsant [seizures]
DiaBeta, glyburide . . . . . .antidiabetic [NIDDM]
diazepam, **Valium** . . . . . .benzodiazepine, sedative/hypnotic [anxiety]
Diflucan, fluconazole . . . . . .antifungal [vaginal candidiasis]
digoxin, **Lanoxin** . . . . . .antiarrhythmic, inotropic [AF, CHF]
Dilantin, phenytoin . . . . . .antiarrhythmic, anticonvulsant [seizures]
diltiazem, **Cardizem** . . . . . .Ca channel blocker [HTN]
divalproex,**Depakote** . . . . . .anticonvulsant [seizures]
doxazosin, **Cardura** . . . . . .antihypertensive [HTN]
Dyazide, triamterene/HCTZ . . . . . .diuretic [HTN, edema]
Effexor, venlafaxine . . . . . .antianxiety agent, antidepressant [major depression]
Elavil, amitriptyline . . . . . .tricyclic antidepressant [depression]
enalapril, **Vasotec** . . . . . .ACE inhibitor [HTN]
erythromycin . . . . . .anti-infective [bacterial infection]
estradiol, **Estrace,** . . . . . .contraceptive hormone [HRT]
Estraderm
estrogen/medroxypro-
gesterone, **Prempro** . . . . . .contraceptive hormone [HRT]
estrogen, **Premarin** . . . . . .contraceptive hormone [HRT]

Brand Names, generic names . . . . . .class [common uses]

etodolac, **Lodine** . . . . . .antirheumatic, nonopioid analgesic, NSAID [rheumatoid arthritis & osteoarthritis]
famotidine, **Pepcid** . . . . . .antiulcer agent [ulcers, GERD]
Flexeril, cyclobenzaprine . . . . . .skeletal muscle relaxant [muscle spasm]
fexofenadine, **Allegra** . . . . . .allergy, cough, and cold remedy, antihistamine [allergic rhinitis]
Flonase, fluticasone . . . . . .anti-inflammatory [allergies]
fluconazole, **Diflucan** . . . . . .antifungal [vaginal candidiasis]
fluoxetine, **Prozac** . . . . . .antidepressant, SSRI [depression]
fluticasone, **Flonase** . . . . . .anti-inflammatory [allergies]
fluvastatin, **Lescol** . . . . . .lipid-lowering agent [high cholesterol]
furosemide, **Lasix** . . . . . .diuretic [CHF, HTN, MI]
gemfibrozil, **Lopid** . . . . . .lipid-lowering agent [high cholesterol]
glipizide, **Glucotrol** . . . . . .antidiabetic [NIDDM]
Glucophage, metformin . . . . . .antidiabetic [NIDDM]
Glucotrol, glipizide . . . . . .antidiabetic [NIDDM]
glyburide, **DiaBeta** . . . . . .antidiabetic [NIDDM]
haloperidol, **Haldol** . . . . . .antipsychotic [acute psychosis]
hydrochlorothiazide, **Hydrodiuril** . . . . . .diuretic [CHF, HTN, MI]
hydrocodone . . . . . .allergy, cold, and cough remedy; opioid analgesic [pain]
hydrocodone/APAP, **Lortab, Vicodin** . . . . . .allergy, cold, and cough remedy; opioid analgesic [pain]
Hydrodiuril, hydrochlorothiazide . . . . . .diuretic [CHF, HTN, MI]
Hytrin, terazosin . . . . . .antihypertensive [HTN]
ibuprofen, **Advil, Motrin** . . . . . .antipyretic, antirheumatic, nonopioid analgesic, NSAID [pain]
Imdur, isosorbide . . . . . .nitrate [angina pectoris]

Brand Names, generic names . . . . . .class [common uses]

Imitrex, sumatriptan . . . . . .vascular headache suppressant [migraines]
ipratropium, **Atrovent** . . . . . .bronchodilator [asthma, COPD]
Isoptin, verapamil,
Calan, Verelan . . . . . .Ca channel blocker [HTN]
isosorbide, **Imdur** . . . . . .nitrate [angina pectoris]
K-Dur, potassium, **Slow-K** . . . . . .mineral and electrolyte replacement/ supplement [K replacement]
Keflex, cephalexin . . . . . .anti-infective [bacterial infection]
Klonopin, clonazepam . . . . . .benzodiazepine [seizures]
Lanoxin, digoxin . . . . . .antiarrhythmic, inotropic [AF, CHF]
Lasix, furosemide . . . . . .diuretic [CHF, HTN, MI]
Lescol, fluvastatin . . . . . .lipid-lowering agent [high cholesterol]
levothyroxine, **Synthroid** . . . . . .hormone—thyroid [hypothyroid]
Lipitor, atorvastatin . . . . . .lipid-lowering agent [high cholesterol]
lisinopril, **Prinivil, Zestril** . . . . . .antihypertensive [HTN]
Lodine, etodolac . . . . . .antirheumatic, nonopioid analgesic, NSAID (rheumatoid arthritis & osteoarthritis]
Lopid, gemfibrozil . . . . . .lipid-lowering agent [high cholesterol]
Lopressor, metoprolol . . . . . .beta blocker [HTN]
Lorabid,loracarbef . . . . . .anti-infective [bacterial infection]
loracarbef, **Lorabid** . . . . . .anti-infective [bacterial infection]
loratadine, **Claritin** . . . . . .antihistamine [seasonal allergies]
lorazepam, **Ativan** . . . . . .benzodiazepine [anxiety, seizures]
Lortab, hydrocodone /APAP, **Vicodin** . . . . . .allergy, cold, and cough remedy; opioid analgesic [pain]
losartan, **Cozaar** . . . . . .antihypertensive [HTN]
Lotensin, benazepril . . . . . .antihypertensive [HTN]
lovastatin, **Mevacor** . . . . . .lipid-lowering agent [high cholesterol]

Brand Names, generic names . . . . . .class [common uses]

medroxyprogesterone, **Cycrin, Provera** . . . . . .antineoplastic, contraceptive hormone [HRT]
metformin, **Glucophage** . . . . . .antidiabetic [NIDDM]
methylphenidate, **Ritalin** . . . . . .central nervous system stimulant [ADHD]
metoprolol, **Lopressor** . . . . . .beta blocker [HTN]
Mevacor, lovastatin . . . . . .lipid-lowering agent [high cholesterol]
Motrin, ibuprofen, **Advil** . . . . . .antipyretic, antirheumatic, non-opioid analgesic, NSAID [pain]
nabumetone, **Relafen** . . . . . .antipyretic, antirheumatic, NSAID [rheumatoid arthritis & osteoarthritis]
Naprosyn, naproxen . . . . . .antipyretic, antirheumatic, NSAID, nonopioid analgesic [pain]
naproxen, **Naprosyn** . . . . . .antipyretic, antirheumatic, NSAID, nonopioid analgesic [pain]
nifedipine, **Adalat, Procardia** . . . . . .Ca channel blocker [HTN]
nitroglycerin, **Nitrostat** . . . . . .nitrate [angina pectoris]
nizatidine, **Axid** . . . . . .antiulcer agent [ulcers, GERD]
Norvasc, amlodipine . . . . . .Ca channel blocker [HTN]
omeprazole, **Prilosec** . . . . . .antiulcer agent [GERD]
oxaprozin, **Daypro** . . . . . .NSAID [rheumatoid arthritis & osteoarthritis]
oxycodone/APAP, **Percocet** . . . . . .opioid analgesic [pain]
paroxetine, **Paxil** . . . . . .antianxiety agent; antidepressant, SSRI [depression]
Paxil, paroxetine . . . . . .antianxiety agent; antidepressant, SSRI [depression]
penicillin, V-K, **Veetids** . . . . . .anti-infective [bacterial infection]
pentoxifylline, **Trental** . . . . .blood viscosity reducing agent [PVD]
Pepcid, famotidine . . . . . .antiulcer agent [ulcers, GERD]
Percocet, oxycodone/APAP . . . . . .opioid analgesic [pain]
phenytoin, **Dilantin** . . . . . .anticonvulsant [seizures]
potassium, **K-Dur, Slow-K** . . . . . .mineral and electrolyte replacement/supplement [K replacement]

Brand Names, generic names . . . . . .class [common uses]

pravastatin, **Pravachol** . . . .lipid-lowering agent [high cholesterol]
prednisone, **Deltasone** . . . . . .anti-inflammatory, immune modifier [inflammation]
Premarin, estrogen . . . . . .contraceptive hormone [HRT]
Prempro, estrogen/ medroxyprogesterone . . . . . .contraceptive hormone [HRT]
Prilosec, omeprazole . . . . . .antiulcer agent [GERD]
Prinivil, lisinopril, **Zestril** . . . . . .antihypertensive [HTN]
Procardia, nifedipine, **Adalat** . . . . . .Ca channel blocker [HTN]
propoxyphene/APAP, **Darvocet-N** . . . . . .opioid analgesic [pain]
Proventil, albuterol, **Ventolin** . . . . . .bronchodilator [asthma, COPD]
Provera, medroxyprogesterone, **Cycrin** . . . . . .antineoplastic, contraceptive hormone [HRT]
Prozac, fluoxetine . . . . . .antidepressant, SSRI [depression]
quinapril, **Accupril** . . . . . .ACE inhibitor [HTN]
ranitidine, **Zantac** . . . . . .antiulcer agent [ulcers, GERD]
Relafen, nabumetone . . . . . .NSAID [rheumatoid & osteoarthritis]
risperidone, **Risperdal** . . . . . .antipsychotic [psychoses]
Ritalin, methylphenidate . . . . . .central nervous system stimulant [ADHD]
salmeterol, **Serevent** . . . . . .bronchodilator [asthma]
Serevent, salmeterol . . . . . .bronchodilator [asthma]
sertraline, **Zoloft** . . . . . .antidepressant, SSRI [depression]
simvastatin, **Zocor** . . . . . .lipid-lowering agent [high cholesterol]
Slow-K, potassium, **K-Dur** . . . . . .mineral and electrolyte replacement/supplement [K replacement]
sumatriptan, **Imitrex** . . . . . .vascular headache suppressant [migraines]
Synthroid, levothyroxine . . . . . .hormone–thyroid [hypothyroid]
Tagamet, cimetidine . . . . . .antiulcer agent [ulcers, GERD]
Tenormin, atenolol . . . . . .beta blocker [HTN]

Brand Names, generic names . . . . . .class [common uses]

terazosin, **Hytrin** . . . . . .antihypertensive [HTN]
tramadol, **Ultram** . . . . . .analgesic [moderate–severe pain]
Trental, pentoxifylline . . . . . .blood viscosity reducing agent [PVD]
triamcinolone, **Azmacort** . . . . . .corticosteroid, immune modifier [asthma]
triamterene/HCTZ, **Dyazide** . . . . . .diuretic [HTN, edema]
trimethoprim/sulfamethoxazole,
Bactrim . . . . . .anti-infective, antiprotozoal [infection]
Trimox, amoxicillin, **Amoxil** . . . . . .antiulcer agent [bacterial infection]
Ultram, tramadol . . . . . .analgesic [moderate–severe pain]
Valium, diazepam . . . . . .benzodiazepine [anxiety]
Vancenase, beclomethasone . . . . . .glucocorticoid [asthma]
Vasotec, enalapril . . . . . .ACE inhibitor [HTN]
Veetids, penicillin, V-K . . . . . .anti-infective [bacterial infection]
venlafaxine, **Effexor** . . . . . .antianxiety agent, antidepressant [major depression]
Ventolin, albuterol, **Proventil** . . . .bronchodilator [asthma, COPD]
verapamil, **Calan,**
Isoptin, Verelan . . . . . .Ca channel blocker [HTN]
Vicodin, Lortab,
hydrocodone/APAP . . . . . .opioid analgesic [pain]
warfarin, **Coumadin** . . . . . .anticoagulant [AF, thrombosis]
Xanax, alprazolam . . . . . .benzodiazepine [anxiety]
Zantac, ranitidine . . . . . .antiulcer agent [ulcers, GERD]
Zestril, lisinopril, **Prinivil** . . . . . .antihypertensive [HTN]
Zithromax, azithromycin . . . . . .anti-infective [bacterial infection]
Zocor, simvastatin . . . . . .lipid-lowering agent [high cholesterol]
Zoloft, sertraline . . . . . .antidepressant, SSRI [depression]
zolpidem, **Ambien** . . . . . .nonbenzodiazepine, sedative/hypnotic [insomnia]
Zovirax, acyclovir . . . . . .antiviral [herpes, shingles]

SOURCE: From Deglin, JH, and Vallerand, AH: Davis's Drug Guide for Nurses, ed 8. FA Davis, Philadelphia, 2003.

Pregnancy Risk Categories (FDA Definitions)

Category A: Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities.
Category B: (1) Animal studies show no adverse fetal effects, but there are no controlled human studies, or **(2)** animal studies show adverse fetal effects, but well-controlled human studies do not.
Category C: (1) Animal studies show adverse fetal effects, but there are no controlled human studies, or **(2)** no animal or well-controlled human studies have been conducted.
Category D: Well-controlled or observational human studies show positive evidence of human fetal risk. Maternal benefit may outweigh fetal risk in serious or life-threatening situations.
Category X: Contraindicated Well-controlled or observational human and/or animal studies show positive evidence of serious fetal abnormalities. Fetal risks far outweigh maternal benefit.

General Chemistry

Note: Reference ranges vary according to brand of laboratory assay materials used. Check normal reference ranges from your facility's laboratory when evaluating results.

Lab	Conventional	SI Units
Albumin	3.5–5.0 g/100 mL	35–50 g/L
Aldolase	1.3–8.2 U/L	22–137 nmol sec^{-1}/L
Alkaline phosphatase	13–39 U/L, infants and adolescents up to 104 U/L	217–650 nmol · sec^{-1}/L, up to 1.26 μmol/L
Ammonia	12–55 μmol/L	12–55 μmol/L
Amylase	4–25 units/mL	4–25 arb. unit
Anion gap	8–16 mEq/L	8–16 mmol/L
AST, SGOT	Male: 8–46 U/L Female: 7–34 U/L	0.14–0.78 μkat/L 0.12–0.58 μkat/L
Bilirubin, direct	up to 0.4 mg/100 mL	Up to 7 μmol/L
Bilirubin, total	up to 1.0 mg/100 mL	Up to 17 μmol/L
BUN	8–25 mg/100 mL	2.9–8.9 mmol/L
Ca^{+} (calcium)	8.5–10.5 mg/100 mL	2.1–2.6 mmol/L
Calcitonin	Male: 0–14 pg/mL Female: 0–28 pg/mL	0–4.1 pmol/L 0–8.2 pmol/L
Carbon dioxide (CO_2)	24–30 mEq/L	24–30 mmol/L
Chloride (Cl^{-})	100–106 mEq/L	100–106 mmol/L
Cholesterol	< 200 mg/dL	<5.18 mmol/L
Cortisol	(AM) 5–25 μg/100 mL (PM) <10 μg/100 mL	0.14–0.69 μmol/L 0–0.28 μmol/L
Creatine	Male: 0.2–0.5 mg/dL Female: 0.3–0.9 mg/dL	15–40 μmol/L 25–70 μmol/L

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General Chemistry *(continued)*

Lab	Conventional	SI Units
Creatine kinase (CK)	Male: 17–148 U/L Female: 10–79 U/L	283–2467 nmol sec^{-1}/L 167–1317 nmol sec^{-1}/L
Creatinine	0.6–1.5 mg/100 mL	53–133 μmol/L
Ferritin	10–410 ng/dL	10–410 μg/dL
Folate	2.0–9.0 ng/mL	4.5–0.4 nmol/L
Glucose	70–110 mg/100 mL	3.9–5.6 mmol/L
Ionized calcium	4.25–5.25 mg/dL	1.1–1.3 mmol/L
Iron (Fe)	50–150 μg/100 mL	9.0–26.9 μmol/L
Iron binding capacity (IBC)	250–410 μg/100 mL	44.8–73.4 μmol/L
K^+ (potassium)	3.5–5.0 mEq/L	3.5–5.0 mmol/L
Lactic acid	0.6–1.8 mEq/L	0.6–1.8 mmol/L
LDH (lactic dehydrogenase)	45–90 U/L	750–1500 nmol · sec^{-1}/L
Lipase	2 units/mL or less	Up to 2 arb. unit
Magnesium	1.5–2.0 mEq/L	0.8–1.3 mmol/L
Mg^{++} (magnesium)	1.5–2.0 mEq/L	0.8–1.3 mmol/L
Na^+ (sodium)	135–145 mEq/L	135–145 mmol/L
Osmolality	280–296 mOsm/kg water	280–296 mmol/kg
Phosphorus	3.0–4.5 mg/100 mL	1.0–1.5 mmol/L
Potassium (K^+)	3.5–5.0 mEq/L	3.5–5.0 mmol/L
Prealbumin	18–32 mg/dL	180—320 mg/L
Protein, total	6.0–8.4 g/100 mL	60–84 g/L
PSA	< 4.0 ng/mL	< 4 μg/L
Pyruvate	0–0.11 mEq/L	0–0.11 mmol/L

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General Chemistry *(continued)*

Lab	Conventional	SI Units
Sodium (Na^+)	135–145 mEq/L	135–145 mmol/L
T3	75–195 ng/100 mL	1.16–3.00 nmol/L
T4, free	Male: 0.8–1.8 ng/dL Female: 0.8–1.8 ng/dL	10–23 pmol/L 10–23 pmol/L
T4, total	4–12 μg/100 mL	52–154 nmol/L
Thyroglobulin	3–42 μ/mL	3–42 μg/L
Triglycerides	40–150 mg/100 mL	0.4–1.5 g/L
TSH	0.5–5.0 μU/mL	0.5–5.0 arb. unit
Urea nitrogen	8–25 mg/100 mL	2.9–8.9 mmol/L
Uric acid	3.0–7.0 mg/100 mL	0.18–0.42 mmol/L

Hematology (ABC, CBC, Blood Counts)

Lab	Conventional	SI Units
Blood volume	8.5%–9.0% of body weight in kg	80–85 mL/kg
Red Blood Cell **(RBC)**	Male: 4.6–6.2 million/mm^3 Female: 4.2–5.9 million/mm^3	4.6–6.2 $\times$ 10^{12}/L 4.2–5.9 $\times$ 10^{12}/L
Hemoglobin **(Hgb)**	Male: 13–18 g/100 mL Female: 12–16 g/100 mL	Male: 8.1–11.2 mmol/L Female: 7.4–9.9 mmol/L
Hematocrit **(Hct)**	Male: 45%–52% Female: 37%–48%	Male: 0.45–0.52 Female: 0.37–0.48
Leukocytes **(WBC)**	4,300–10,800/mm^3	4.3–10.8 $\times$ 10^9/L

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Hematology (ABC, CBC, Blood Counts) *(cont'd)*

Lab	Conventional	SI Units
■ Bands	0–5%	0.03–0.08 × 10^9/L
■ Basophils	0–1%	0–0.01 × 10^9/L
■ Eosinophils	1%–4%	0.01–0.04 × 10^9/L
■ Lymphocytes	25%–40%	0.25–0.40 × 10^9/L
■ *B-Lymphocytes*	10%–20%	0.10–0.20 × 10^9/L
■ *T-Lymphocytes*	60%–80%	0.60–0.80 × 10^9/L
■ Monocytes	2%–8%	0.02–0.08 × 10^9/L
■ Neutrophils	54%–75%	0.54–0.75 × 10^9/L
Platelets	150,000–350,000/mm^3	150–350 × 10^9/L
Erythrocyte Sedimentation Rate (ESR)	Male: 1–13 mm/hr Female: 1–20 mm/hr	Male: 1–13 mm/hr Female: 1–20 mm/hr

Lipids (Cholesterol)

Total	less then 200 mg/dL	< 5.20 mmol/L
HDL	30–75 mg/dL	0.80–2.05 mmol/L
LDL	less then 130 mg/dL	1.55–4.65 mmol/L
Triglycerides	40–150 mg/100 mL	0.4–1.5 g/L

Cardiac Enzyme Markers

Enzyme	Conventional	SI Units
Troponin-I	0–0.1 ng/mL	0–0.1 μg/L
Troponin-T	< 0.18 ng/mL	< 0.18 μg/L
CPK	<150 U/L	<150 U/L
CPK-MB	0–5 ng/mL	0–5 μg/L
SGOT	1–36 U/L	1–36 U/L

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Cardiac Enzyme Markers *(continued)*

Enzyme	Conventional	SI Units
LDH	45–90 u/L	750–1500 nmol sec^{-1}/L
Myoglobin	Male: 10–95 ng/mL	10–95 μg/L
	Female: 10–65 ng/mL	10–65 μg/L

Progression→	Onset	Peak	Duration
Troponin-I	3–6 hrs	12–24 hrs	4–6 days
Troponin-T	3–5 hrs	24 hrs	10–15 days
CPK	4–6 hrs	10–24 hrs	3–4 days
CPK-MB	4–6 hrs	14–20 hrs	2–3 days
SGOT	12–18 hrs	12–48 hrs	3–4 days
LDH	3–6 days	3–6 days	7–10 days
Myoglobin	2–4 hrs	6–10 hrs	12–36 hrs

Coagulation

Lab	Conventional	SI Units
ACT	90–130 sec	90–130 sec
PTT (activated)	21–35 sec	21–35 sec
Bleeding Time	3–7 min	3–7 min
Fibrinogen	160–450 mg/dL	1.6–4.5 g/L
INR	Target therapeutic: 2–3	Target therapeutic: 2–3
Plasminogen	62%–130%	0.62–1.30
Platelets	150,000–300,000/mm^3	× 10^6/L
PT (prothrombin time)	10–12 sec	10–12 sec
PTT (partial thromboplastin time)	30–45 sec	30–45 sec
Thrombin Time	11–15 sec	11–15 sec

DIC Panel—Disseminated Intravascular Coagulopathy

Lab	Conventional	SI Units
PT	10–12 sec	10–12 sec
PTT	30–45 sec	30–45 sec
Fibrinogen	160–450 mg/dL	1.6–4.5 g/L
Thrombin Time	11–15 sec	11–15 sec
D-Dimer	< 20	> 2000 μg/L

Cerebrospinal Fluid (CSF)

Color	Clear	Clear
Pressure	75–200 mm H_2O	
Cell Count and Diff.	0–5 cells (zero RBCs or granulocytes)	
Protein	15–45 mg/dL	0.15–0.45 g/L
A:G Ratio	8:1	
IgG	3%–12% of total protein	
Glucose	40–80 mg/dL	2.22–4.44 mmol/L
Lactate	10–20 mg/dL	1.1–2.2 mmol/L
Urea	10–15 mg/dL	3.6–5.3 mmol/L
Glutamine	< 20 mg/dL	< 1370 μmol/L

Thyroid Panel

T_3 Total	75–195 ng/100mL	1.16–3.00 nmol/L
T_3 Uptake (RT_3U)	25%–35%	0.25–0.35
T_3 Uptake Ratio	0.1–1.35	0.1–0.35
T_4 Total	4–12 μg/100 mL	52–154 nmol/L
T_4 Free	0.9–2.3 ng/dL	10–30 nm/L
TSH	0.5–5.0 μU/mL	0.5–5.0 arb. unit

Medication Levels (Therapeutic)

Medication	Therapeutic	Toxic	SI Units
Acetaminophen	5–20 mg/L	> 25	
Amiodarone	0.5–2.0 mg/L	> 2.0	
Carbamazepine	4.0–12.0 μg/mL	> 15	17–51 μmol/L
Digoxin	0.5–2.0 μg/L	> 2.4	
Lidocaine	1.5–5.0 mg/L	> 7.0	
Lithium	0.6–1.2 mEq/L	> 2.0	0.6–1.2 nmol/L
Nitroprusside	< 10 mg/dL	> 10	
Phenobarbital	15–50 μg/mL	> 45	65–215 μmol/L
Phenytoin (Dilantin)	10–20 μg/mL	> 20	20–80 μmol/L
Procainamide	4–10 mg/mL	> 15	17–42 μmol/L
Propranolol	50–100 ng/mL	> 100	
Quinidine	1.2–4.0 mg/mL	> 5.0	3.7–12.3 μmol/L
Salicylate	20–25 mg/100 mL	> 30	1.4–1.8 mmol/L
Theophylline	10–20 mg/L	> 20	

Antibiotic Levels

Antibiotic	Peak	Trough
Gentamycin	5–12 μg/mL	< 2 μg/mL
Tobramycin	5–12 μg/mL	< 2 μg/mL
Vancomycin	20–40 μg/mL	5–10 μg/mL

Renal/Kidney

Lab	Conventional	SI Units
BUN	6–23 mg/dL	2.5–7.5 mmol/L
Creatinine	15–25 mg/kg of body weight/day	0.13–0.22 mmol kg^{-1}/day
Uric acid	Male: 4.0–9.0 mg/dL	238–535 μmol/L
	Female: 3.0–6.5 mg/dL	178–387 μmol/L

Urinalysis (UA)

Color	Yellow-straw	
Specific Gravity	1.005–1.030	
pH	5.0–8.0	
Glucose	Negative	
Sodium	10–40 mEq/L	
Potassium	< 8 mEq/L	
Chloride	< 8 mEq/L	
Protein	Negative-trace	
Osmolality	500–800 mOsm/L	

24 Hour Urine

Acetone	Negative	Negative
Amylase	24–76 units/ml	24–76 arb. unit
Calcium	300 mg/day or less	7.5 mmol/day or less

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24 Hour Urine *(continued)*

Lab	Conventional	SI Units
Chloride	110–250 mEq/24hrs	110–250 mmol/d
Creatine	Under 100 mg/d	<0.75 mmol/d
Creatinine clearance	70–130 mL/min	70–130 mL/min/1.73m^2
Magnesium	5–10 mEq/24hrs	2.5–5.0 mmol/d
Osmolality	450–900 mOsm/kg	450–900 mOsm/kg
Phosphorus	900–1300 mg/24hrs	900–1300 mmol/d
Potassium	40–80 mEq/24hrs	40–80 mmol/d
Protein	<150 mg/24hrs	<150 mg/d
Sodium	80–180 mEq/24hrs	80–180 mmol/d
Urea nitrogen	7–20 g/24hrs	
Uric acid	250–750 mg/24hrs	1.5–4.5 mmol/d

Normal Arterial Blood Gases

pH	7.35–7.45	36–45 μmol/L
PO_2	75–100 mm Hg	10.0–13.3 kPa
PCO_2	35–45 mm Hg	4.7–6.0 kPa
HCO_3	22–26 mmo/L	22–26 mmol/L
Base Excess	($^-$2) – ($^+$2) mEq/L	($^-$2) – ($^+$2) mmol/L
CO_2	19–24 mEq/L	19–24 mmol/L
SaO_2	96%–100%	0.96–1.00

The Body's Reaction to Acid-Base Imbalance

	pH	HCO_3	pCO_2	Compensation
Respiratory acidosis	↓	↑ or normal	↑	Kidneys conserve HCO_3 and eliminate H^+ to ↑ pH
with compensation	Slightly ↓ or normal	↑	↑	
Respiratory alkalosis	↑	↓ or normal	↓	Kidneys eliminate HCO_3 and conserve H^+ to ↓ pH
with compensation	Slightly ↓ or normal	↓	↓	
Metabolic acidosis	↓	↓	↓ or normal	Hyperventilation to blow off excess CO_2 and conserve HCO_3
with compensation	Slightly ↓ or normal	↓	↓	
Metabolic alkalosis	↑	↑	↑ or normal	Hypoventilation to ↑ CO_2 Kidneys keep H^+ and excrete HCO_3
with compensation	Slightly ↓ or normal	↑	↑	

Common Causes of Acid-Base Imbalance

Resp. acidosis	Asphyxia, resp. depression, CNS depression
Resp. alkalosis	Hyperventilation, anxiety, DKA
Metabolic acidosis	Diarrhea, renal failure, salicylate OD (aspirin)
Metabolic alkalosis	Hypercalcemia, OD on an alkaline (antacid)

Hemodynamic Values

Arteriovenous oxygen difference .....3.5–5.5 vol%
Aortic pressure:

- Systolic .....100–140 mmHg
- Diastolic.....60–80 mm Hg
- Mean.....70–90 mm Hg

Cardiac output (CO).....4–8 L/min
Cardiac index (CI) .....2.5–4 L/min m^2
Central venous pressure (CVP) .....2–6 mm Hg
Coronary artery perfusion pressure .....60–80 mm Hg
Left arterial mean pressure .....4–12 mm Hg
Left ventricular systolic pressure .....100–140 mm Hg
Left ventricular diastolic pressure.....0–5 mm Hg
Left ventricular stroke
work index.....30–50 g/beat/m^2
Mean arterial pressure (MAP) .....70–90 mm Hg
Oxygen content of blood:

- Arterial.....17.5–20.5 vol%
- Venous .....12.5–16.5 vol%

Oxygen consumption (VO_2) .....200–250 mL/min
Oxygen delivery (DO_2) .....900–1100 mL/min
Pulmonary artery pressure:

- Systolic .....20–30 mm Hg
- Diastolic.....10–20 mm Hg
- Mean.....10–15 mm Hg

Pulmonary capillary wedge pressure (PCW) .....4–12 mm Hg
Right arterial mean pressure.....2–6 mm Hg
Right ventricular pressure:

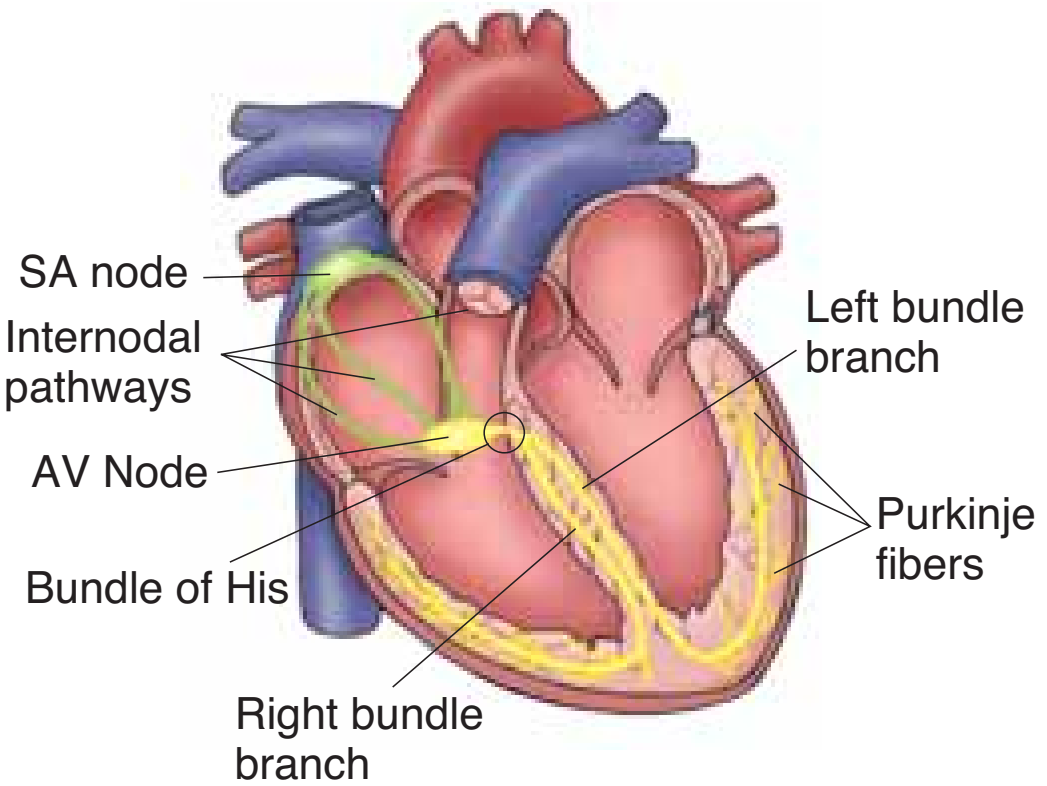
- Systolic.....20–30 mm Hg
- Diastolic.....0–5 mm Hg
- End diastolic .....2–6 mm Hg

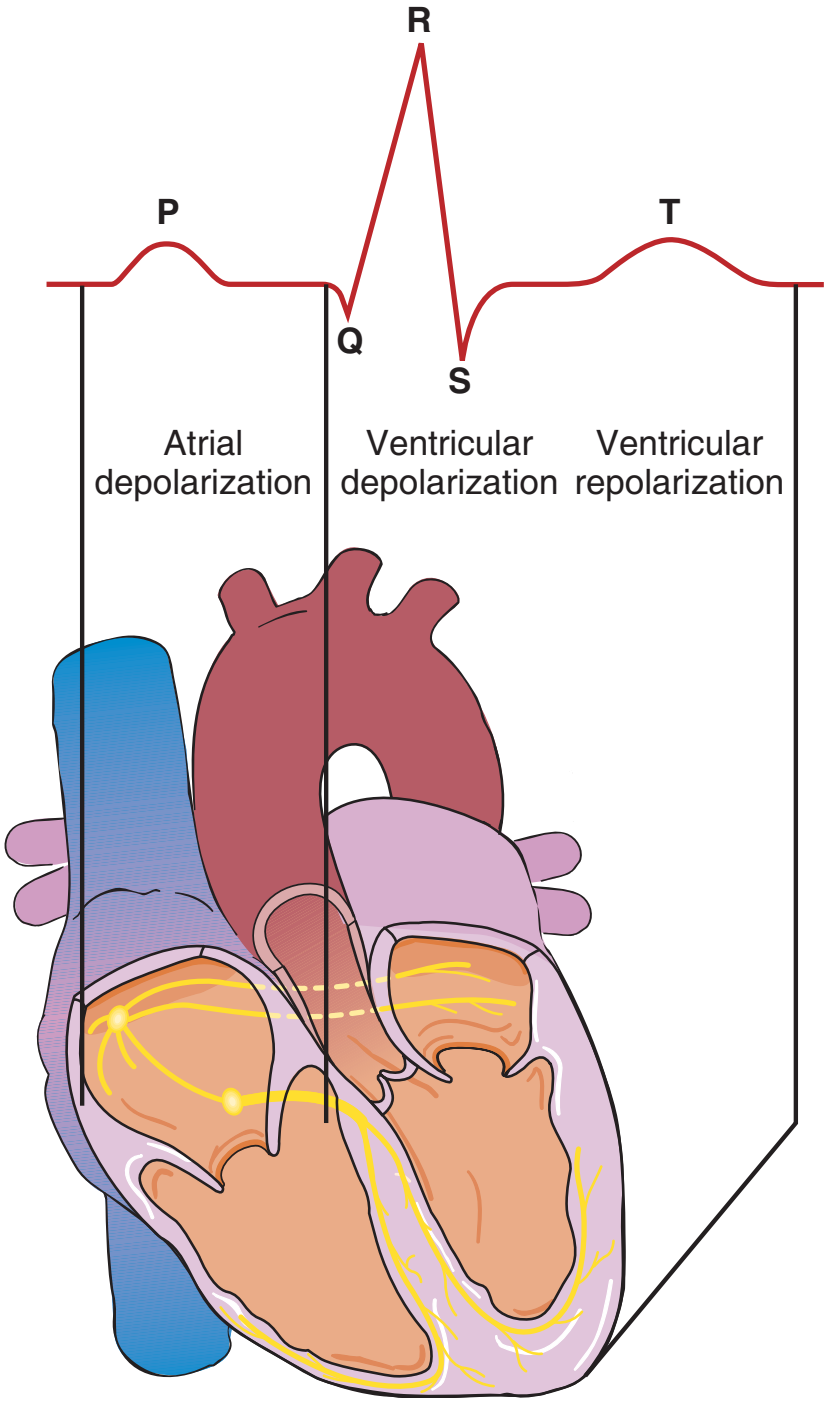
Pulmonary ventricular stroke index.....5–10 g/beat/m^2
Stroke index (SI).....40–50 mL/beat/m^2
Stroke volume (SV) .....70–130 mL/beat
Superior vena cava mean pressure (SVC) .....2–6 mm Hg
Systemic vascular resistance (SVR) .....900–1600 dyn/s/cm^{-5}
Systemic venous oxygen saturation (SVO_2) 60%–80%

Note: Reference ranges for Hemodynamic Valves vary according to brand of laboratory assay materials used. Check normal reference ranges from your facility's laboratory when evaluating results.

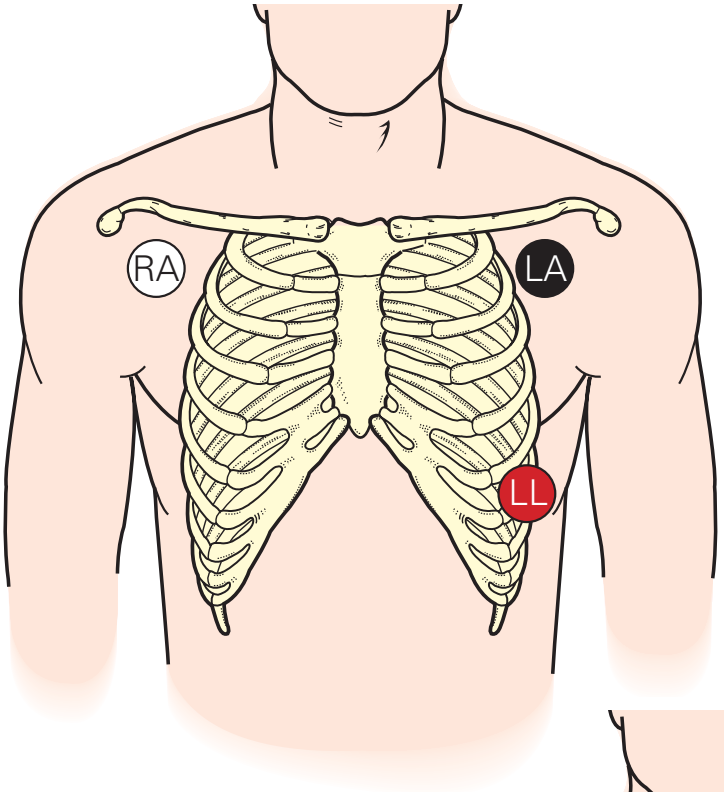
Basic ECG Interpretation

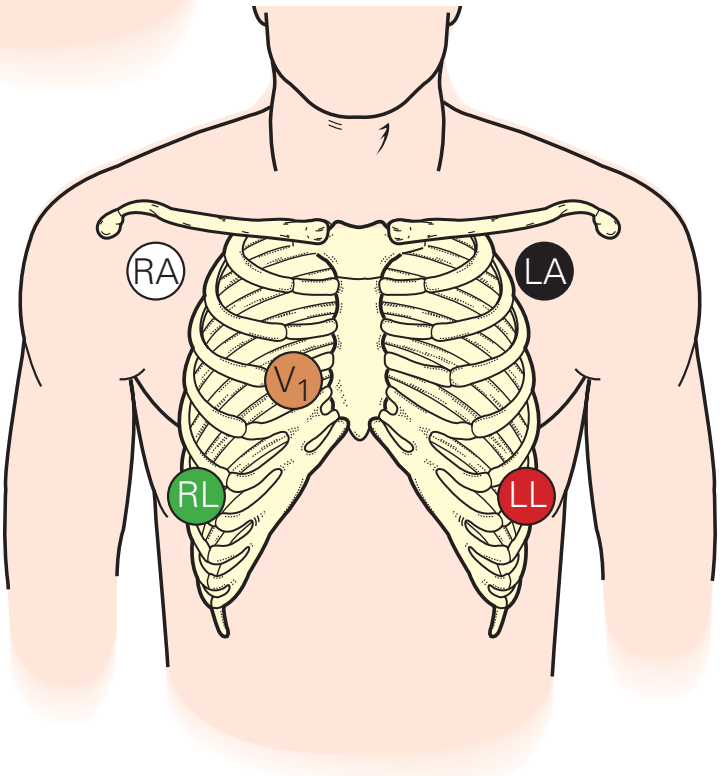
Electrical Conduction of the Heart—Related to the PQRST



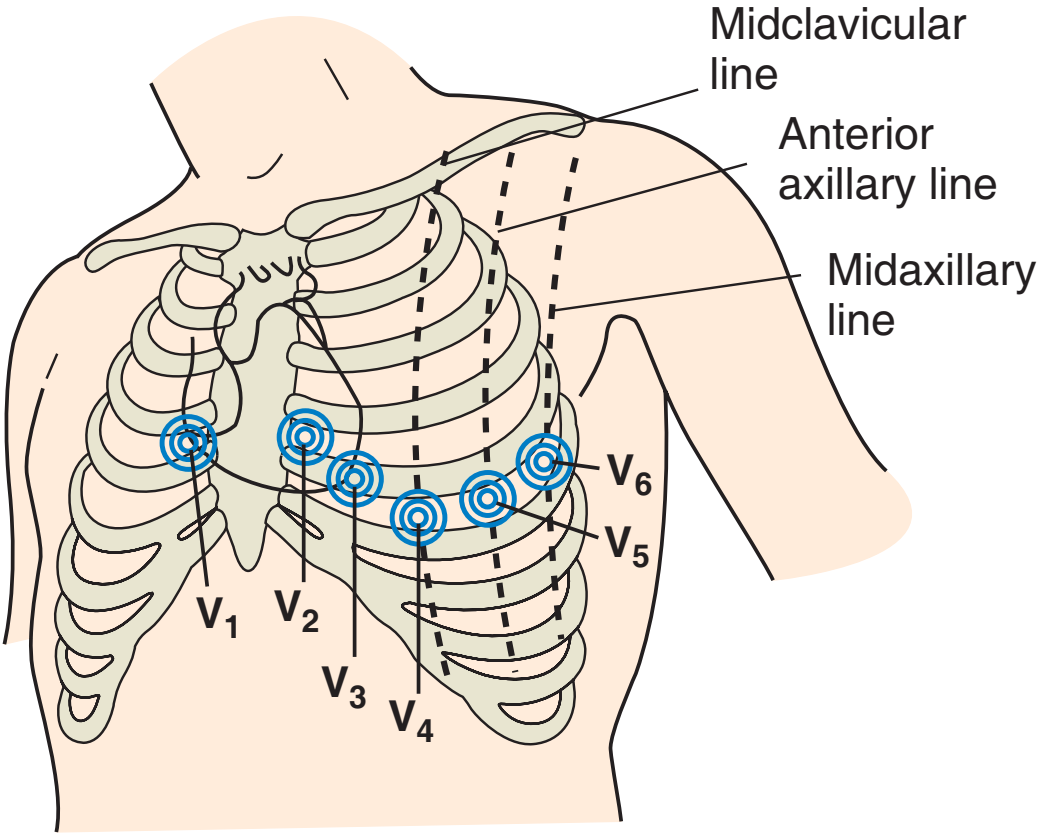


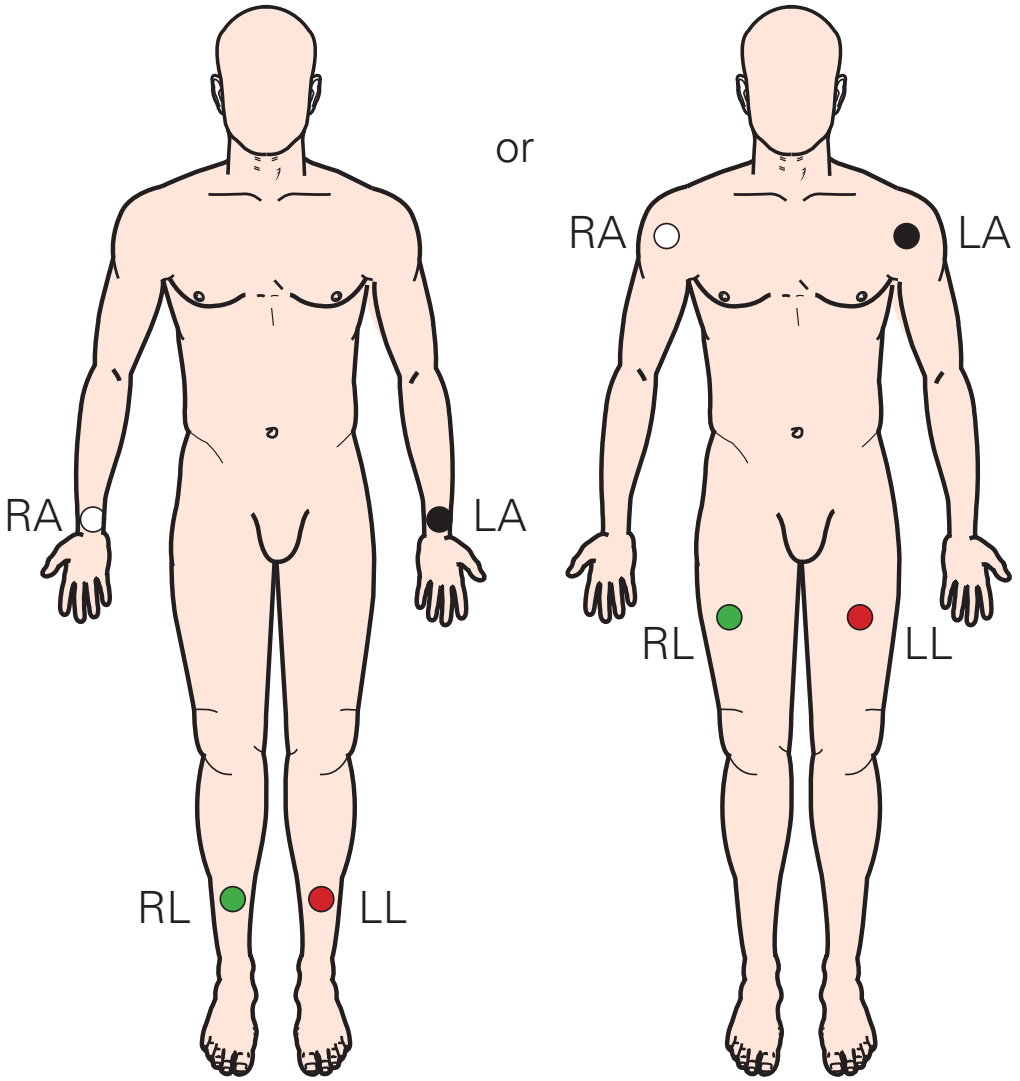
Standard Lead Placement: 3 and 5 Wire-Cable Systems





Standard Chest and Limb Lead Placement: 12-Lead





Common Abbreviations Associated with ECG

NSR normal sinus rhythm
SB sinus bradycardia
ST sinus tachycardia
A-fib atrial fibrillation
A-flutter atrial flutter
VT ventricular tachycardia
VF ventricular fibrillation
PVC premature ventricular complex
PAC premature atrial complex
PJC premature Junctional complex
PSVT paroxysmal supraventricular tachycardia
SVT supraventricular tachycardia

Normal Cardiac Rhythm Parameters

NSR	60 and 100 bpm
SB	<60 bpm
ST	> 100 bpm
QRS	0.06–0.10 seconds
PR Interval	0.12–0.20 seconds
Atrial rate, inherent	60–100 bpm
Junctional rate, inherent	40–60 bpm
Ventricular rate, inherent	20–40 bpm

Systematic Approach to ECG Assessment

Rate	Is it normal (60–100), fast (> 100), or slow (<60)?
Rhythm	Is it regular, irregular?
P waves	Are they present? Are they 1:1 with the QRS?
PRI	Is it normal (0.12–0.2 sec)? Does it remain consistent?
QRS	Is it normal (0.06–0.10 sec) or is it wide (> 0.10 sec)?
Extra	Are there any extra or abnormal complexes?

Analyzing the P-R Interval (PRI)

- PRI is consistent, and normal, between 0.12 and 0.20 sec (3–5 small boxes): This is considered a normal PRI.
- PRI is <0.12 sec (3 small boxes): consider Junctional rhythm.
- PRI is longer than 0.20 sec (5 small boxes), it remains consistent in length from PRI to PRI: Consider 1° AV block.
- Progressive lengthening of PRI until a QRS is dropped: Consider 2° AV block type-I (Mobitz I or Wenckebach).
- Consistent PRI, however, there are additional P waves that do not precede a QRS complex: Consider 2° AV block type-II (Mobitz II).
- PRI is not consistent, nor is there any correlation between the P wave and the QRS: Consider 3° AV block (complete heart block).

Analyzing the QRS Complex

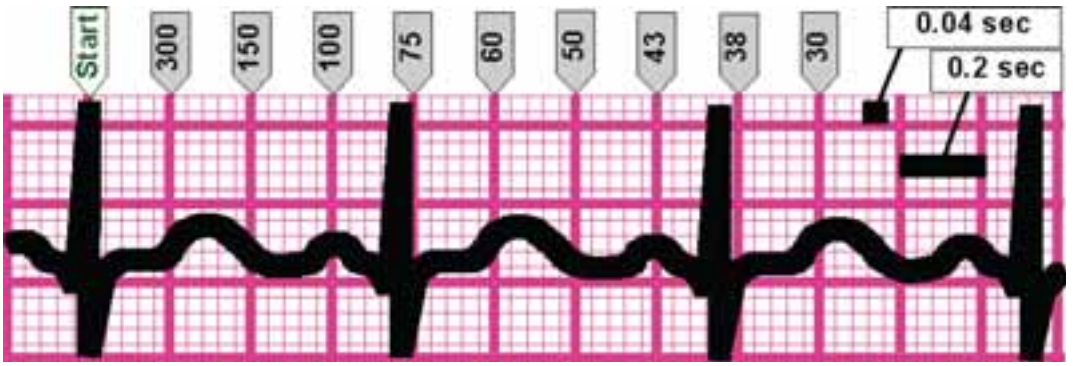
- QRS ≤ 0.10 sec: Considered normal.
- QRS> 0.10 sec, "wide and bizarre": Consider ventricular ectopy.
- QRS> 0.10 sec (2.5 small boxes), with notched or "rabbit ears" appearance: Consider BBB (see differentiating right and left BBB).
- QRS preceded by 1–2 very narrow "spikes": Consider pacemaker.

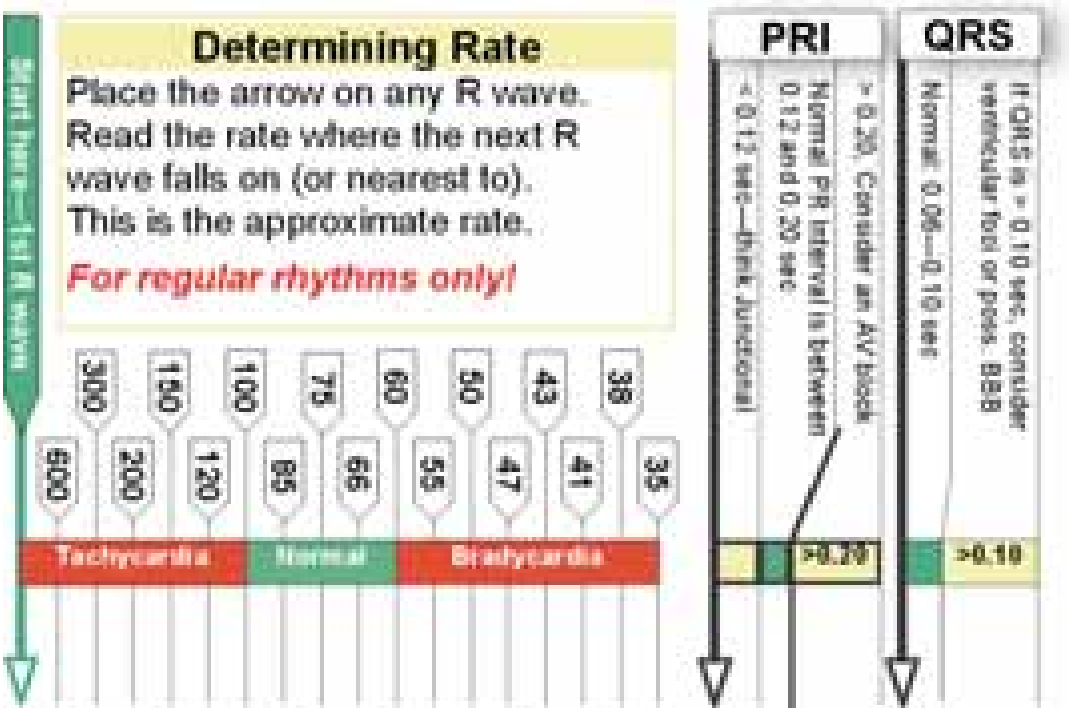
Rates and Measurements

Do one of the following methods:

- Count the number of QRS complexes within a 6-second strip and then multiply that number by 10.
- Memorize the sequence, **300-100-150-75-60-50**. Start with the first R wave that falls on a heavy line. Using the memorized sequence, count each subsequent heavy line until you come to the next R wave; this is the approximate rate (see below).
- Divide the number of ***large*** boxes between 2 R waves into 300.
- Divide the number of ***small*** boxes between 2 R waves into 1500.

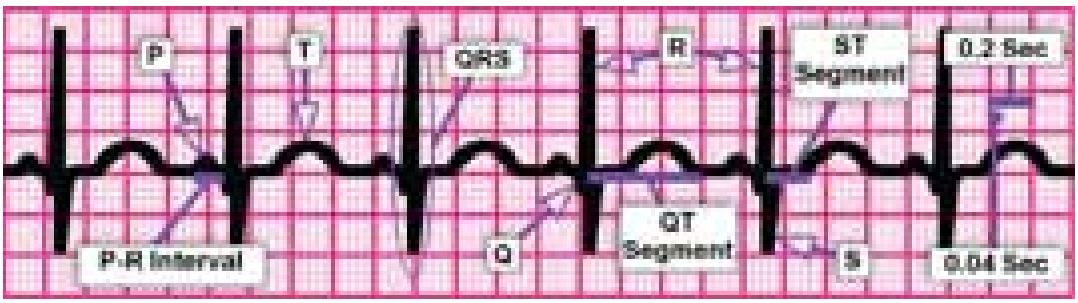
Irregular rhythms should be counted for an entire minute.





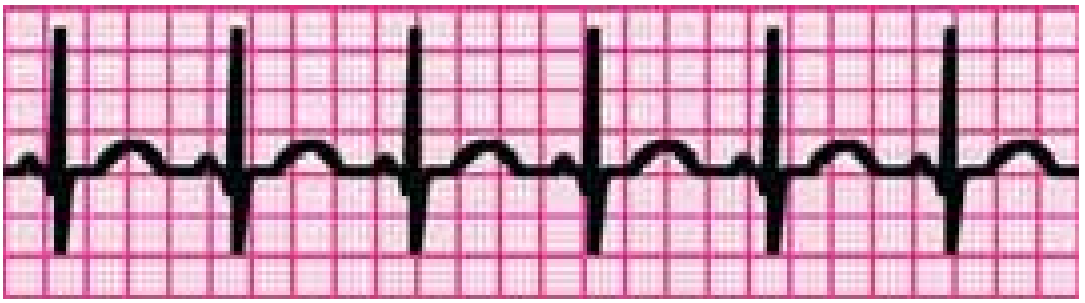
ECG Rhythms

Components of the PQRST



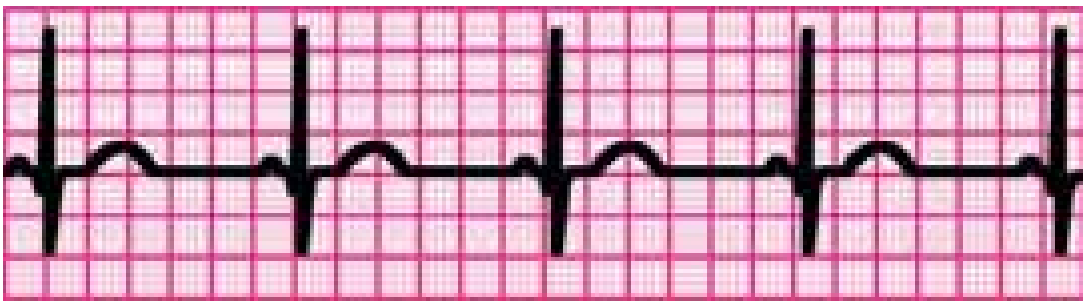
P Wave . . . . . .Atrial depolarization
QRS . . . . . .Ventricular **DE**polarization
T wave . . . . . .Ventricular **RE**polarization

Normal Sinus Rhythm



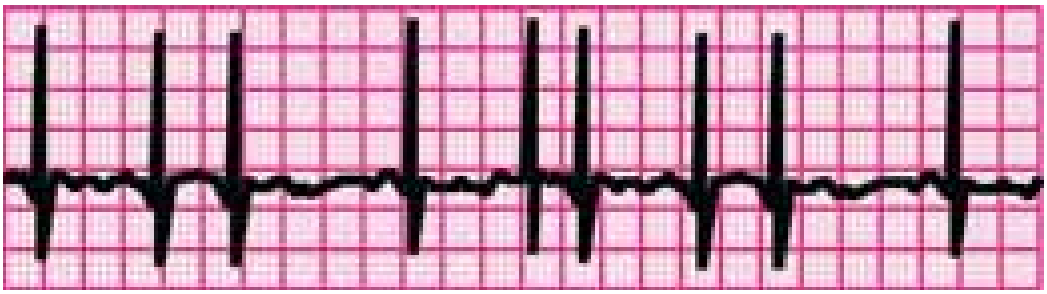
Rate . . . . . .60–100 bpm
Rhythm . . . . . .Normal (upright and uniform)
P Waves . . . . . .Present
PRI . . . . . .Normal (0.12–0.20 sec)
QRS . . . . . .Normal (0.06–0.10 sec)

Sinus Bradycardia



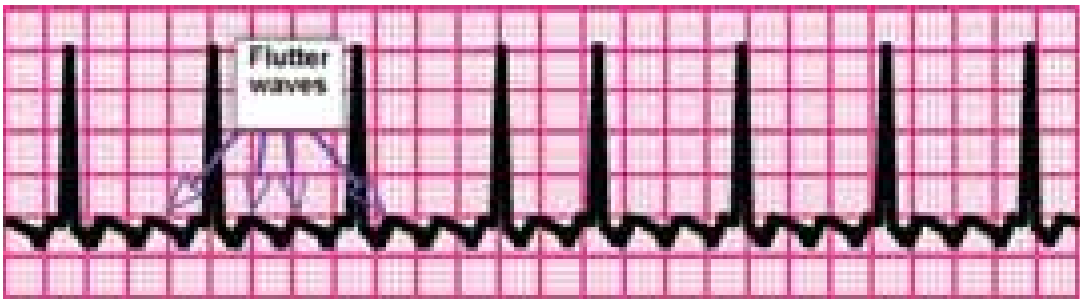
Rate . . . . . .Slow (<60 bpm)
Rhythm . . . . . .Regular
P Waves . . . . . .Present
PRI . . . . . .Normal (0.12–0.20 sec)
QRS . . . . . .Normal (0.06–0.10 sec)

Atrial Fibrillation



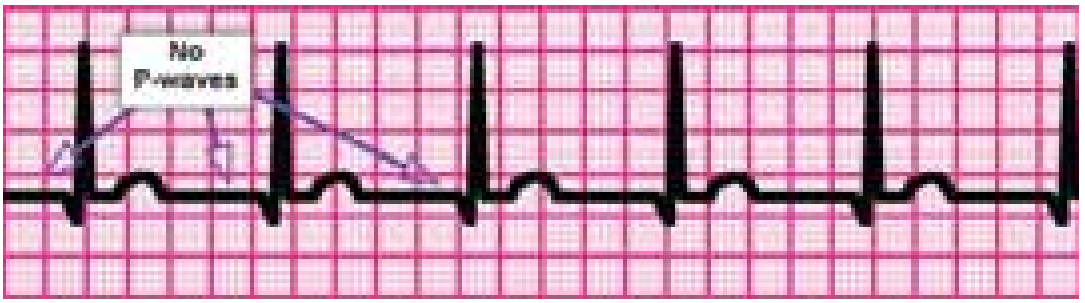
Rate . . . . . .Atrial: 350 bpm or greater; Ventricular: slow or fast
Rhythm . . . . . .Irregular
P Waves . . . . . .None (nondiscernible)
PRI . . . . . .Nondiscernible
QRS . . . . . .Normal (0.06–0.10 sec)

Atrial Flutter



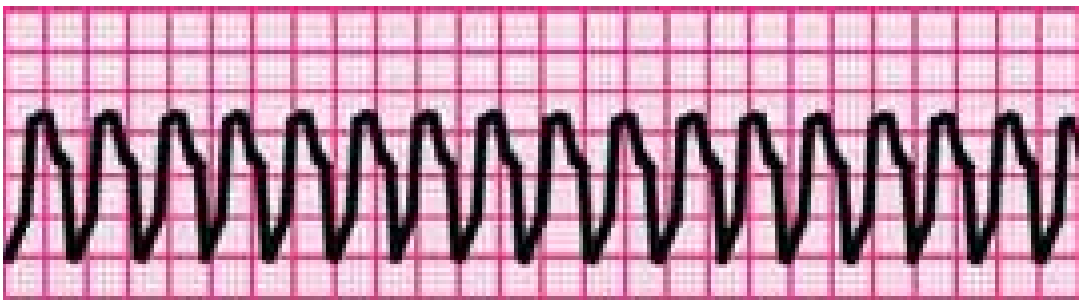
Rate . . . . . .Atrial: 250–350; Ventricular: slow or fast
Rhythm . . . . . .Usually regular
P Waves . . . . . .Flutter waves → "saw tooth" pattern
PRI . . . . . .Variable
QRS . . . . . .Normal (0.06–0.10 sec)

Junctional Rhythm



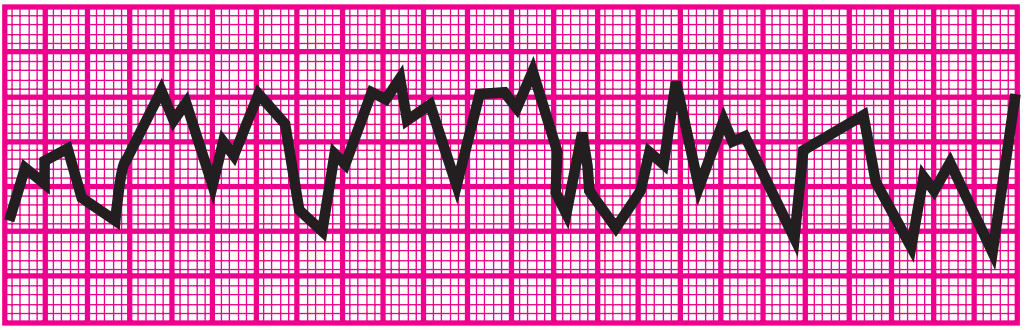
Rate . . . . . .40–60 bpm
Rhythm . . . . . .Regular
P Waves . . . . .None, retrograde, inverted, or buried in the QRS
PRI . . . . . .None, short, or retrograde
QRS . . . . . .Normal (0.06–0.10 sec)

Ventricular Tachycardia



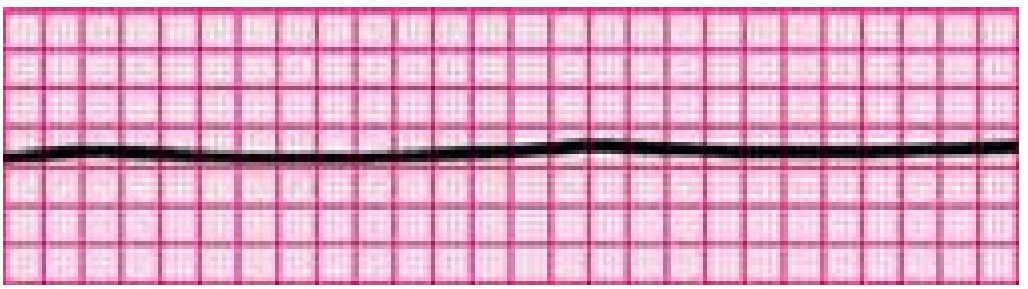
Rate . . . . . .100–250 bpm
Rhythm . . . . . .Regular
P Waves . . . . . .Not present
PRI . . . . . .Not present
QRS . . . . . .Wide and bizarre (> 0.10 sec)

Ventricular Fibrillation



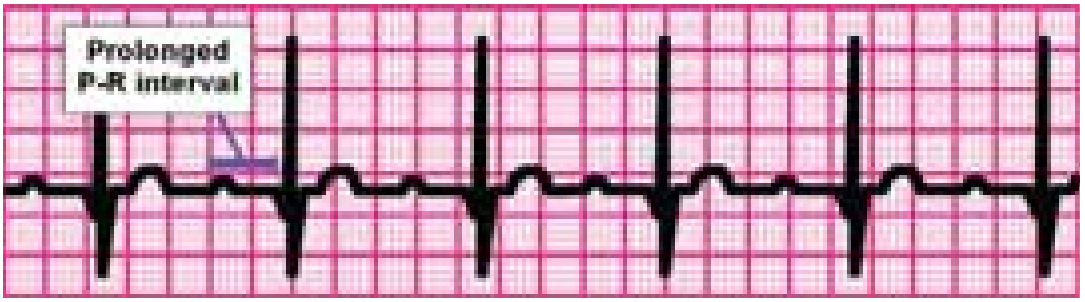
Rate . . . . . .VF rate is 350–450 (no Ps or QRSs)
Rhythm . . . . . .**Completely chaotic and disorganized**
P waves . . . . . .None
P-R . . . . . .N/A
QRS . . . . . None

Asystole



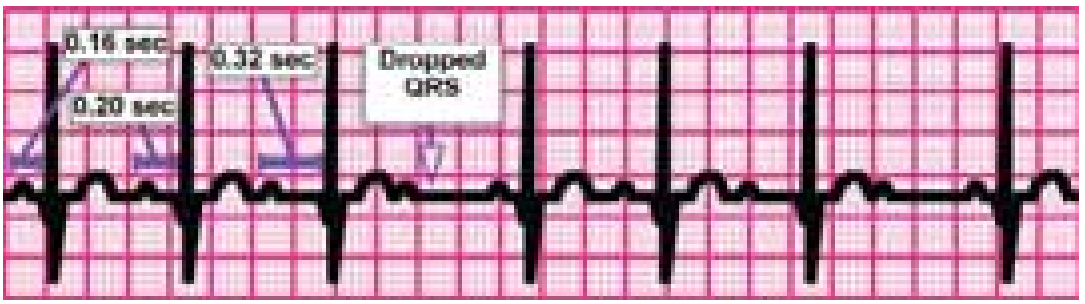
Rate . . . . . .None
Rhythm . . . . . .None
P Waves . . . . . .None
PRI . . . . . .None
QRS . . . . . .None

1° AV Block



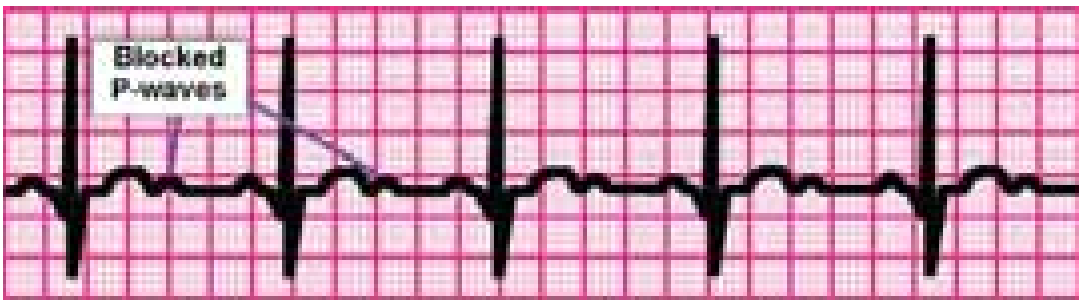
Rate . . . . . .Depends on rate of underlying rhythm
Rhythm . . . . . .Regular
P Waves . . . . . .Present, one **P** for every **QRS**
PRI . . . . . .Prolonged: > 0.20 sec
QRS . . . . . .Normal (0.06–0.10 sec)

2° AV Block (Mobitz Type-I, Wenckebach)



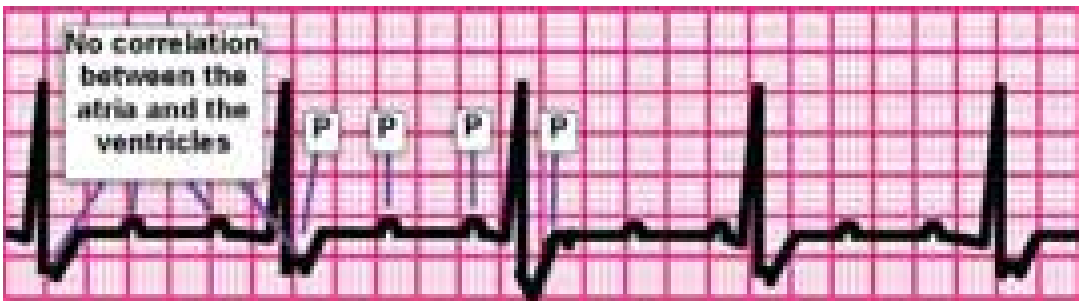
Rate . . . . . .Depends on rate of underlying rhythm
Rhythm . . . . . .Irregular
P Waves . . . . . .Present
PRI . . . . . .Gets progressively longer until a QRS is dropped
QRS . . . . . .Normal (0.06–0.10 sec)

2° AV Block (Mobitz Type-II)



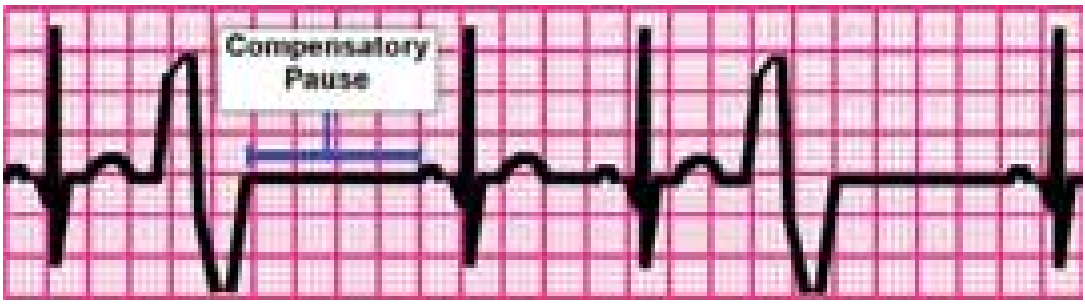
Rate . . . . . .Atrial rate usually 60–100 bpm; faster than ventricular rate
Rhythm . . . . . .Atrial regular; Ventricular irregular
P Waves . . . . . .More Ps than QRSs
PRI . . . . . .Unblocked Ps usually have a normal PR interval
QRS . . . . . .Normal, but may also be wide

3° AV Block (Complete Heart Block)



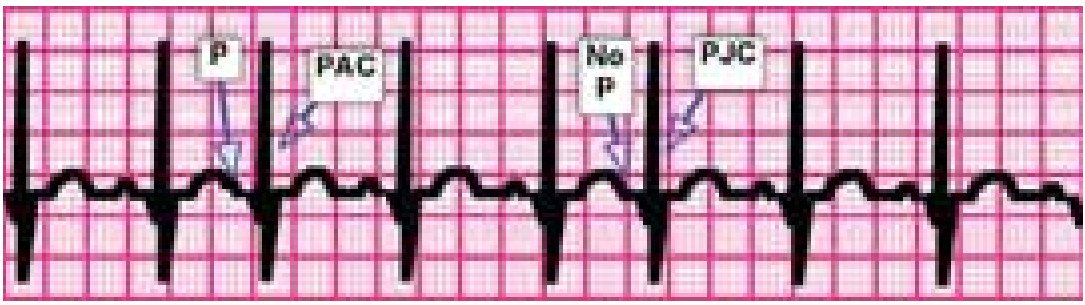
Rate . . . . . .**Atrial** 60–100 bpm; **Ventricular** 20–40 bpm
Rhythm . . . . . .Both ventricular and atrial are usually regular
P Waves . . . . . .More Ps than QRSs; No correlation
PRI . . . . . .Varies greatly
QRS . . . . . .Usually wider than 0.10 sec

Premature Ventricular Complex (PVC)



Rate . . . . . .Depends on rate of underlying rhythm
Rhythm . . . . . .Irregular whenever the PVC occurs
P Waves . . . . . .None associated with PVC
PRI . . . . . .None associated with PVC
QRS . . . . . .Wide and bizarre (> 0.10 sec)

Premature Atrial and Junctional Complex



Rate . . . . . .Depends on rate of underlying rhythm
Rhythm . . . . . .Irregular whenever a PAC or PJC occurs
P Waves . . . . .Present in **PAC,** but may be hidden in the T wave.
Not present in **PJC**
PRI . . . . . .Varies in **PAC**. Not present in **PJC**
QRS . . . . . .Normal (0.06–0.10 sec)

Metric Conversions

Weight		Temperature		Height		
lbs	kg	°F	°C	cm	in	ft/in
300	136.4	**212**	**100** boil	142	56	4′ 8″
275	125.0	107	42.2	145	57	4′ 9″
250	113.6	106	41.6	147	58	4′ 10″
225	**102.3**	105	40.6	150	59	4′ 11″
210	**95.5**	104	40.0	152	60	5′ 0″
200	**90.9**	103	39.4	155	61	5′ 1″
190	**86.4**	102	38.9	157	62	5′ 2″
180	**81.8**	101	38.3	160	63	5′ 3″
170	**77.3**	100	37.8	163	**64**	5′ 4″
160	**72.7**	99	37.2	165	**65**	5′ 5″
150	**68.2**	**98.6**	**37.0**	168	**66**	5′ 6″
140	**63.6**	98	36.7	170	**67**	5′ 7″
130	**59.1**	97	36.1	173	**68**	5′ 8″
120	**54.5**	96	35.6	175	**69**	5′ 9″
110	**50.0**	95	35.0	178	**70**	5 ′10″
100	**45.5**	94	34.4	180	**71**	5 ′11″
90	40.9	93	34.0	183	**72**	6′ 0″
80	36.4	92	33.3	185	73	6′ 1″
70	31.8	91	32.8	188	74	6′ 2″
60	27.3	90	32.1	191	75	6′ 3″
50	22.7	**32**	**0** freeze	193	76	6′ 4″
40	18.2			196	77	6′ 5″
30	13.6					
20	9.1					
10	4.5					
5	2.3					
2.2	**1**					
2	0.9					
1	**0.45**					

lb = kg × 2.2	**or**	kg = lb × 0.45
°F = (°C × 1.8) + 32	**or**	°C = (°F – 32) × 0.556
Inches = cm × 0.394	**or**	cm = inches × 2.54

TOOLS/
INDEX

Volume		Weight	
1 tsp	5 mL	1 mg	1000 mcg
1 tbsp	15 mL	1 gram	1000 mg
1 oz	30 mL	1 grain	60 mg
1 cup	240 mL	1 kg	2.2 lb
1 pint	473 mL	1 liter of water	1 kg
1 quart	946 mL	1 oz	28 g

Common Equivalents and Formulas

- Convert ounces to cc or mL: **Multiply** number of ounces by 30
- Convert cc or mL to ounces: **Divide** number of mL by 30

1 cc equals	1 mL	Large soda (22 oz)	660 mL
1 oz equals	30 mL	Coffee mug (8 oz)	240 mL
8 oz juice glass	240 mL	Milk carton (4 oz)	120 mL
Small (12 oz) soda	360 mL	Popsicle (3 oz)	90 mL
Medium (16 oz) soda	480 mL	Jell-O cup (4 oz)	120 mL

Equivalents Specific to Your Institution

Body Surface Area (BSA)

Using cm and kg:	Using inches and lbs:
$\sqrt{\frac{\text{Ht (cm)} \times \text{Wt (kg)}}{3600}}$	$\sqrt{\frac{\text{Ht (in)} \times \text{Wt (lbs)}}{3131}}$

Waist-to-Hip Ratio

- Measure the circumference of the waist at its narrowest point with the stomach relaxed.
- Measure the circumference of the hips at their fullest point where the buttocks protrude the most.
- Divide the circumference of the waist by the circumference of the hips.
  - **Women** should have a waist-to-hip ratio ≤ 0.8
  - **Men** should have a waist-to-hip ratio ≤ 0.95

Frequently Used Phone Numbers

Overhead Code:	**99/Blue:**
Security:	**Emergency ext:**
Admitting:	
Blood Bank:	
Burn Unit:	
CICU (CCU):	
Chaplain—Pastor:	
Computer Help (IS, IT):	
CT (Computed Tomography):	

(Continued text on following page)

Frequently Used Phone Numbers *(continued)*

Dietary—Dietician:	
ECG—12-Lead:	
Emergency (ED):	
ICU:	
Interpreter Services:	
Laboratory:	
Maintenance—Engineering:	
Med-Surg:	
MRI (Magnetic Resonance Imaging):	
Nutrition—Food Services:	
OT (Occupational Therapy):	
PACU (Recovery):	
Pediatrics:	
Pharmacy (Rx):	
Poison Control:	**USA—1-800-222-1222**
PT (Physical Therapy):	
Respiratory (RT):	
Social Services:	
Speech Language Pathology (SLP):	
Supervisor—Manager:	
Surgery—Inpatient (OR):	
Surgery—Day/Outpatient:	
Telemetry Unit:	
X-Ray:	

Community Resources

Abuse/Assault—Physical/Sexual	
■ Children	
■ Women	
■ Rape/Sexual	
■ Men	
■ Elderly	
Abuse—Substance	
■ Alcohol	
■ Drug	
Communicable Disease Programs	
■ AIDS	
■ Hepatitis	
■ TB	
Food/Clothing	
■ Food Kitchen	
■ Meals on Wheels	
■ Salvation Army	
Shelters/Homeless	
Mental Health	
■ Suicide	
Medical/Hospitals	
■ State Program	
■ Dept. of Health	
■ Free Clinics	
Teen/Children	
■ Immunization	
■ Pregnancy	
■ Runaway	

Cultural Diversity in Health Care

Note: Within the United States there are more than 400 ethnocultural groups, making it impossible to include cultural characteristics for all of them. The cultural groups selected for inclusion in this book met at least one of the following criteria: (a) the group has a large population in the United States, (b) the group is relatively new in its migration status, (c) the group is widely dispersed throughout the United States, (d) little is written about the group in the health-care literature, or the group holds a significant minority or disenfranchised status.

Selected References:

Purnell, L, and Paulanka, B: Guide to Culturally Competent Health Care. F.A. Davis, Philadelphia, 2005

Guidelines for a Positive Cultural Interaction

- Be aware that culture has a strong influence on an individual's interpretation of and responses to health care.
- Assess Pt's depth of understanding of English and use an interpreter whenever needed.
- Ask Pts how they like to be greeted and what name they prefer.
- Identify who makes decisions: Pt, spouse, children, etc.
- If unsure, ask Pts specific questions regarding their culture.
- Be open-minded, accepting, and willing to learn.

American Indian

Communication: Primary language varies from tribe to tribe, but most younger generations are bilingual (English and their native language). Greetings should be formal. Long periods of silence are normal. Talking loud is rude. Physical contact from strangers is unacceptable; however, shaking hands is okay. Respect personal space, as it is generally greater than that of European-Americans.

Health-care Practices: A lot of questioning during an assessment may foster mistrust. Illness is unacceptable; older Pts, even when seriously ill, must be encouraged to rest.

Diet and Nutrition: Food has major significance beyond nourishment, but is not generally associated with promoting health or illness. Corn is a staple. Diet may be deficient in vitamin D due to high incidence of lactose intolerance.

Pain Management: Most individuals are stoic and will not ask for pain meds; it is believed that pain should be endured.

Death and Dying: Autopsy and organ donation are unacceptable to traditional American Indians.

Taboos and Disrespect: Direct eye contact and/or pointing of finger may be disrespectful.

Arab Heritage

Communication: Primary language is Arabic. Speech may be loud, expressive, and involve gesturing, with an emphasis placed on nonverbal communication; avoid misinterpreting as anger or confrontation. Title is important; ask how Pt or family prefers to be addressed. Shaking hands (right hand only) is okay, but males should not *initiate* a handshake with a female.

Health-care Practices: Same-gender health-care provider is strongly preferred. Reluctant to share sensitive medical information with someone other than family and friends.

Diet and Nutrition: Pork, pork products, and alcohol are prohibited by Muslims; medications should not contain alcohol. Bread should accompany all meals. Pass food to Pt only with your right hand. During Ramadan, fasting is required from sunup until sundown.

Pain Management: Most individuals are stoic around strangers; take cues from family members regarding patient discomfort. Pain medication is acceptable.

Death and Dying: Pts should face Mecca (NE from the U.S.) when death is imminent. Autopsy (if needed), organ donation, and transplant are acceptable.

Taboos and Disrespect: The left hand is used for toileting and is considered dirty.

Asian Heritage

Note: *C, J, K, and V refer to **C**hinese, **J**apanese, **K**orean, and **V**ietnamese.*

Communication: Primary language varies with country. Greetings should be formal (C, J, K, V). Direct eye contact (C, J, K) or invasion of personal space (C, J) may cause uneasiness. Touch only when necessary (C, J, V). Shaking hands is okay (J, K), but males should not *initiate* a handshake with females (V).

Health-care Practices: Same-gender health-care provider is strongly preferred by women (C, K, V). Assumption of the sick role is highly tolerated and long recuperation is encouraged (J). May seek traditional, alternative treatment first, prior to accepting Western medicine (C, J, K, V). Likely to refuse blood transfusions (V).

Diet and Nutrition: Rice is a staple (J, K, V) and is included in every meal throughout the day, including snacks (J). Tofu is a staple (C). High intake of sweets may account for high incidence of tooth decay (J). High incidence of lactose intolerance (J, K, V) and iron-deficiency anemia (V). Prefer beverages without ice (C).

Pain Management: May be reluctant to accept or request pain medication (J, K).

Death and Dying: Responsibility for any special arrangements falls to the eldest son (J, K). Mourning can be elaborate by Western standards (J) and include offerings of food and money (C, J). The concept of advanced directives may be confusing (J). Strong desire to die at home (V). Unlikely to consent to an autopsy (V) and organ donation or transplantation may be unacceptable (J, K, V).

Taboos and Disrespect: Open discussion about serious illness and death (J), addiction (J), mental illness (J), direct eye contact (C, J, V), pointing (V), chopsticks stuck upright in food (C), touching the head (V), placing feet upon desk or table (V).

Bosnian Heritage

Communication: Primary language is Serbian. Older and traditional Pts expect formal greetings. Females maintain eye contact with other women but not with men. Physical contact between genders is not exhibited in public. Shaking hands (right hand only) is okay, but males should not *initiate* a handshake with a female. Asking too many questions may cause apprehension.

Health-care Practices: High value placed on cleanliness. Same-gender health-care provider is strongly preferred. Most consider it shameful to accept Medicaid.

Diet and Nutrition: Pork, pork products, and alcohol are prohibited by Muslims; medications should not contain alcohol. Pass food to Pts only with your right hand. During Ramadan, fasting is required from sunup until sundown.

Pain Management: Most individuals are stoic; take cues from family members regarding Pt discomfort. Pain medication is acceptable.

Death and Dying: Patients should face Mecca (NE from the U.S.) when death is imminent.

Taboos and Disrespect: The left hand is used for toileting and is considered dirty.

Cuban Heritage

Communication: Primary language is Spanish. Speech tends to be loud and fast by western standards, and direct eye contact is acceptable during conversation. Greetings should be formal. Shaking hands and casual contact are okay, but necessity to touch private areas during an assessment may need to be explained.

Health-care Practices: Language is the biggest barrier to health care and many may seek traditional, alternative treatment first; otherwise, Western medicine openly accepted. Blood transfusion is generally acceptable.

Diet and Nutrition: Yams, yuca, plantains, and grains are a staple. High incidence of lactose intolerance. Being overweight is seen as positive, healthy, and sexually attractive.

Pain Management: Pain is expressed openly as verbal complaints, moaning, and crying. Explaining that pain medication promotes healing will help Pts to accept pain medication more easily.

Death and Dying: Bereavement is expressed openly and mourning may be elaborate by Western standards. Organ donation is generally acceptable.

Taboos and Disrespect: Cutting an infant's hair or nails before the age of 3 months is believed to cause blindness and deafness.

Filipino Heritage

Communication: Primary language is Pilipino, but starting in the third grade, all education is taught in English. Adults should be greeted formally. Prolonged eye contact is avoided with a figure of authority or a person who is older. Meanings are embedded in nonverbal communication. Male health-care workers should avoid prolonged eye contact with younger females, as it may be interpreted as flirting. Close, personal space should be respected.

Health-care Practices: High value placed on personal cleanliness. May seek traditional, alternative treatment first; otherwise, Western medicine openly accepted. Assumption of the sick role is highly tolerated and family members readily care for the Pt.

Diet and Nutrition: High incidence of lactose intolerance. Cold drinks, fruit juice, and tomatoes are avoided in the morning to prevent stomach upset.

Pain Management: More stoic by Western standards. Pain medication may need to be encouraged.

Death and Dying: Many are resistant to discussing advanced directives or living wills. Cremation is acceptable, but organ donation is not.

Taboos and Disrespect: Planning one's death is viewed as tempting fate.

Haitian Heritage

Communication: Primary languages are French and Creole. Greetings should be formal and shaking hands is okay. Haitians are very expressive with their emotions, including loud animated speech. Do not misinterpret loud speech as anger. Eye contact with authority figures is avoided, but otherwise acceptable. Casual touching is a common gesture and is not considered inappropriate.

Health-care Practices: It is common for Haitians to use traditional and Western practitioners simultaneously. Privacy is highly regarded; therefore, family should not be used for interpretation. Expect a large number of visitors for Haitian Pts. Nursing homes for the elderly are not acceptable to the family.

Diet and Nutrition: Yogurt, cottage cheese, and runny egg yolks are not eaten, and Pts may refuse non-Haitian hospital food. Being overweight is normal compared to Western standards.

Pain Management: Pain manifests outwardly with moaning and facial expressions. Many Haitians have a very low pain threshold.

Death and Dying: Haitians prefer to die at home. Mourning is highly emotional and expressive by Western standards. Organ donation and transplantation are generally not acceptable.

Taboos and Disrespect: Homosexuality is taboo.

Mexican Heritage

Communication: Primary language is Spanish. Emphasis is placed on verbal communication. Greetings should be formal. Older generations may regard direct eye contact as disrespectful, but most younger generations do not. Shaking hands is okay, but physical contact during an assessment may need to be explained.

Health-care Practices: Assumption of the sick role is highly tolerated and family members readily take on the Pt's responsibilities. Blood transfusion is acceptable.

Diet and Nutrition: Rice, beans, and tortillas are staples. Being overweight is seen as positive.

Pain Management: Explaining that pain medication promotes healing will help Pts to accept pain medication more easily.

Death and Dying: Expect to have many visitors when death is imminent. Electric candles may be used when family wants lighted candles near the Pt. Organ donation and transplantation, cremation, and autopsy are generally not acceptable.

Taboos and Disrespect: Direct eye contact with older generation.

Puerto Rican Heritage

Communication: Primary languages are Spanish and English. Speech is fast by Western standards. Greetings should be formal. Older generations may regard direct eye contact as disrespectful, but most younger generations encourage it. Shaking hands is encouraged. Women of older generations may require a larger personal space when interacting with men. Many enjoy sharing personal information and expect the same in return from health-care workers while developing a professional relationship.

Health-care Practices: Women may need to consult their husband prior to signing a consent. Many are reluctant to receive or donate blood. Same-gender health-care provider may be requested. Many combine traditional, folk, and Western medicine.

Diet and Nutrition: Rice and beans are a staple. Being overweight is a sign of health and wealth.

Pain Management: Many tend to be loud and outspoken when expressing pain. Pain medication is openly accepted. Older generations may not understand the concept of a pain scale.

Death and Dying: Seek out the head of the family (usually the eldest son or daughter) for notification of a deceased Pt. Grieving may be loud and expressive by Western standards. Cremation is rarely practiced and autopsy is considered a violation of the body. Organ donation is regarded as highly positive.

Taboos and Disrespect: Open communication about physical ailments and sexuality is taboo. Addressing Pt or family with terms such as “honey” or “sweetheart” may be considered disrespectful. Refusing food from family members may be regarded as personal rejection.

Russian Heritage

Communication: Primary language is Russian. Greetings should be formal. Direct eye contact and touching are acceptable, independent of age and gender. Until trust is established, Pts may be standoffish toward health-care workers.

Health-care Practices: News of a critical or terminal illness is believed to make the condition worse. Cupping is a form of suction cup–like therapy used to treat a multitude of respiratory illnesses. It produces bruising on the back, which may be misinterpreted as a sign of abuse. Many have an elevated fear of contracting HIV/AIDS from blood donation and transfusion.

Diet and Nutrition: Bread is a staple in every meal. Diets are high in fat and sodium. Pts generally do not prefer cold drinks.

Pain Management: More stoic by Western standards and are not likely to ask for pain medication. Health-care workers may need to encourage pain medication and explain that it will enhance healing.

Death and Dying: Expression of grief is variable. Families prefer to be told of impending death before telling the patient. It is appropriate to discuss do-not-resuscitate (DNR) orders with the family and Pt. Most prefer hospice care.

Taboos and Disrespect: No significant cultural taboos noted.

Basic English-to-Spanish Translation

English Phrase	Pronunciation	Spanish Phrase
Introductions—Greetings		
Hello	**oh**-lah	Hola
Good morning	**bweh**-nohs **dee**-ahs	Buenos días
Good afternoon	**bweh**-nohs **tahr**-dehs	Buenos tardes
Good evening	**bweh**-nahs **noh**-chehs	Buenas noches
My name is	*meh* **yah**-*moh*	Me llamo

(Continued text on following page)

Basic English-to-Spanish Translation *(continued)*

English Phrase	Pronunciation	Spanish Phrase
I am or the nurse	soy lah en-fehr-**meh**-ra	Soy la enfermera
What is your name?	**koh**-moh seh **yah**-mah oo-**stehd**?	¿ Cómo se llama usted?
How are you?	**koh**-moh eh-**stah** oo-**stehd?**	¿Como esta usted?
Very well	*mwee b'* yehn	Muy bien
Thank you	**grah**-s'yahs	Gracias
Yes, No	**see**, noh	Sí, no
Please	pohr fah-**vohr**	Por favor
You're welcome	deh **nah**-dah	De nada
Assessment—Areas of the Body		
Head	kah-**beh**-sah	Cabeza
Eye	**oh**-hoh	Ojo
Ear	oh-**ee**-doh	Oído
Nose	nah-**reez**	Nariz
Throat	gahr-**gahn**-tah	Garganta
Neck	**kweh**-yoh	Cuello
Chest, Heart	**peh**-choh, koh-rah-**sohn**	Pecho, corazón
Back	eh-**spahl**-dah	Espalda
Abdomen	ahb-**doh**-mehn	Abdomen
Stomach	eh-**stoh**-mah-goh	Estómago
Rectum	**rehk**-toh	Recto
Penis	**peh**-neh	Pene
Vagina	vah-**hee**-nah	Vagina
Arm, Hand	**brah**-soh, **mah**-noh	Brazo, Mano
Leg, Foot	**p'yehr**-nah, **p'yeh**	Pierna, Pie

Basic English-to-Spanish Translation *(continued)*

English Phrase	Pronunciation	Spanish Phrase
Assessment—History		
Do you have...	**T'yeh**-neh oo-**stehd**...	¿Tiene usted...
■ Difficulty breathing?	di-fi-kul-**thad** pah-reh-spee-**rahr**	¿Dificultad para respirar?
■ Chest pain?	doh-**lohr** en-el-**peh** cho	¿Dolor en el pecho?
■ Abdominal pain?	doh-**lohr** ab-doh-mee-**nahl**	¿Dolor abdominal?
■ Diabetes?	dee-ah-**beh**-tehs	¿Diabetes?
Are you...	ehs-**tah**	¿Esta...
■ Dizzy?	mar-eh-**a**-dho(dha)	¿Mareado(a)?
■ Nauseated?	kohn **now**-say-as	¿Con nauseas?
■ Pregnant?	¿ehm-bah-rah-**sah**-dah?	¿Embarazada?
Are you allergic to any medications?	¿ehs ah-**lehr**-hee-koh ah ahl-**goo**-nah meh-dee-**see**-nah?	¿Es alergico a alguna medicina?
Assessment—Pain		
Do you have pain?	**T'yeh**-neh oo-**stehd** doh-**lohr**?	¿Tiene usted dolor?
Where does it hurt?	dohn-deh leh **dweh**-leh?	¿Donde le duele?
Is the pain...	es oon doh-**lor**...	¿Es un dolor...
■ Dull?	**Leh**-veh	¿Leve?
■ Aching?	kans-**tan**-teh?	¿constante?
■ Crushing?	ah-plahs-**than**-teh?	¿Aplastante?
■ Sharp?	ah-**goo**-doh?	¿Agudo?
■ Stabbing?	ah-**poo**-nya-lawn-teh	¿Apuñalante?
■ Burning?	Ahr-**d'yen**-the?	¿Ardiente?

(Continued text on following page)

Basic English-to-Spanish Translation *(continued)*

English Phrase	Pronunciation	Spanish Phrase
Does it hurt when I press here?	Leh dweh-**leh** kwahn-doh leh ah-pree-eh-toh ah-**kee**?	¿Le duele cuando le aprieto aqui?
Does it hurt to breath deeply?	S'yen-teh oo-**sted** doh-lor **kwahn**-doh reh-spee-rah pro-foon-dah-**men**-teh?	¿Siente usted dolor cuando respira profundamente?
Does it move to another area?	Lh doh-**lor** zeh moo-eh-veh a oh-tra **ah**-ri-ah?	¿El dolor se mueve a otra area?
Is the pain better now?	S'**yen**-teh al-**goo**-nah may -horr-**ee**-ah	¿Siente alguna mejoria?

Communication with a Non-Verbal Patient

Pain 1 2 3 4 5 6 7 8 9 10

Yes	No	Thank you
Cold	Hot	Sick
Thirsty	Hungry	

Please Bring:

- Blanket
- Eyeglasses
- Dentures
- Hearing Aids

Empty:

- Bed Pan
- Urinal
- Trash

Raise—Lower:

- Head
- Legs

Oral Care	Bath	Shower
TV	Lights	On / Off

TOOLS/ INDEX

Symbols and Abbreviations

a̅	before
α	alpha
β	beta
@	at
#	pound, quantity
″	inch
Ⓡ	right
Ⓛ	left
Ⓑ	bilateral
↑	increase
↓	decrease
ψ	psychiatric
∅	none, no
△	change
/	per or divided by
<	less than
>	greater than
°	degrees
Rx	treatment, prescription
μ	micro
AAA	abdominal aortic aneurysm
ABC	automated blood count
ABD	abdominal (dressing)
ABG	arterial blood gas
AC	before meals (a.m.), antecubital
ACE	angiotensin-converting enzyme
ACS	acute coronary syndrome
AD	right ear, Alzheimer's disease
ADA	American Diabetic Association
ADH	antidiuretic hormone
ADL	activities of daily living
ADR	adverse drug reaction
AED	automated external defibrillator
AFB	acid-fast bacillus
AHA	American Heart Association
AKA	above knee amputation
ALOC	altered level of consciousness

Symbols and Abbreviations *(continued)*

AMI . . . . . .acute myocardial infarction
APAP . . . . . .abbrev. for acetaminophen
AP . . . . . .anterior to posterior
aPTT . . . . . .activated partial thrombo plastin time
AS . . . . . .left ear
ASA . . . . . .abbrev. for aspirin
AU . . . . . .both ears
AV . . . . . .atrioventricular
BBB . . . . . .bundle branch block
BCC, BCCa . . . . . .basal cell carcinoma
BE . . . . . .barium enema, base excess
b.i.d. . . . . . .twice a day
BKA . . . . . .below knee amputation
BM . . . . . .bowel movement
BMI . . . . . .body mass index
BPM, bpm . . . . . .beats per minute
BS . . . . . .blood sugar, bowel sounds
BSA . . . . . .body *or* burn surface area
BUN . . . . . .blood urea nitrogen
BVM . . . . . .bag-valve mask
$\bar{c}$ . . . . . .with
°C . . . . . .degrees Celsius, centigrade
C & S or CS . . . . . .culture and sensitivity
Ca^{++} . . . . . .calcium
CA . . . . . .cancer
CAD . . . . . .coronary artery disease
CBC . . . . . .complete blood count
CBG . . . . . .chemical blood glucose
CHB . . . . . .complete heart block
CHF . . . . . .congestive heart failure
CI . . . . . .cardiac index
Cl^{-} . . . . . .chloride
CNS . . . . . .central nervous system
CO . . . . . .carbon monoxide, cardiac output
CO_2 . . . . . .carbon dioxide
COBS . . . . . .chronic organic brain syndrome

Symbols and Abbreviations *(continued)*

COPD . . . . . .chronic obstructive pulmonary disease
CP . . . . . .chest pain, cerebral palsy
CPAP . . . . . .continuous positive airway pressure
CSF . . . . . .cerebrospinal fluid
CSM . . . . . .circulation sensory and motor
CT . . . . . .computed tomography
CV . . . . . .cardiovascular
CVA . . . . . .cerebrovascular accident
CVC . . . . . .central venous catheter
CVP . . . . . .central venous pressure
CX . . . . . .circumflex coronary artery
D5W . . . . . .5% dextrose in water
DBP . . . . . .Diastolic BP
DC, d/c . . . . . .discontinue, direct current
DIC . . . . . .disseminated intravascular coagulopathy
DKA . . . . . .diabetic ketoacidosis
dL . . . . . .deciliter
DM . . . . . .diabetes mellitus
DO_2 . . . . . .O_2 delivery
DVT . . . . . .deep vein thrombosis
ECG or EKG . . . . . .electrocardiogram
ED . . . . . .emergency department (ER)
EFM . . . . . .electronic fetal monitoring
EMS . . . . . .emergency medical services
ESR . . . . . .erythrocyte sedimentation rate
ET . . . . . .endotracheal
ETOH . . . . . .Abbrev. for alcohol
ETT . . . . . .endotracheal tube
°F . . . . . .degrees Fahrenheit
Fe . . . . . .iron
FFP . . . . . .fresh frozen plasma
FHR . . . . . .fetal heart rate
Fr, fr . . . . . .French
GCS . . . . . .Glasgow Coma Scale
GI . . . . . .gastrointestinal
gtt . . . . . .drop

Symbols and Abbreviations *(continued)*

GU . . . . . genitourinary
H & H . . . . . hemoglobin and hematocrit
h, hr . . . . . hour
H^+ . . . . . hydrogen ion
HA . . . . . headache
HCl . . . . . hydrogen chloride
HCO_3 . . . . . carbonic acid
Hct . . . . . hemoglobin
HELLP . . . . . hemolysis, elevated liver enzymes, low platelets
Hgb . . . . . hemoglobin
HOB . . . . . head of bed
HS . . . . . hour of sleep (night time)
HTN . . . . . hypertension
IBC . . . . . iron binding capacity
IBD . . . . . irritable bowel disease
IBS . . . . . irritable bowel syndrome
IBW . . . . . ideal body weight
ICP . . . . . intracranial pressure
ICS . . . . . intercostal space
ID . . . . . intradermal
IDDM . . . . . insulin-dependent diabetes mellitus
IM . . . . . intramuscular
INR . . . . . international normalized ratio
IO . . . . . interosseous
I/O . . . . . intake & output
IV . . . . . intravenous
IVC . . . . . inferior vena cava
IVF . . . . . IV fluid
IVP . . . . . IV push
IVPB . . . . . IV piggyback
J . . . . . joule
JVD . . . . . jugular vein distention
K^+ . . . . . potassium
KB . . . . . knife blade (scalpel)
KCl . . . . . potassium chloride
kg . . . . . kilogram
LAD . . . . . left anterior descending

Symbols and Abbreviations *(continued)*

LAT . . . . . .lateral
LBBB . . . . . .left bundle branch block
LLQ . . . . . .left lower quadrant
LMA . . . . . .laryngeal mask airway
LNMP . . . . . .last normal menstrual period
LOC . . . . . .level of consciousness
LPM . . . . . .liters per minute
LR . . . . . .lactated Ringer's
LTC . . . . . .left to count
LUQ . . . . . .left upper quadrant
mA . . . . . .milliampere
MAP . . . . . .mean arterial pressure
MAR . . . . . .medication administration record
mcg . . . . . .microgram
mEq . . . . . .milliequivalent
mg . . . . . .milligram
Mg^{++} . . . . . .magnesium
$MgSO_4$ . . . . . .magnesium sulfate
MH . . . . . .malignant hyperthermia
MI . . . . . .myocardial infarction
min . . . . . .minute, minimum
mL . . . . . .milliliter
mm . . . . . .millimeter
mm Hg . . . . . .millimeter of mercury
MRI . . . . . .magnetic resonance imaging
MRSA . . . . . .methicillin-resistant *Staph. aureus*
MS . . . . . .morphine, musculoskeletal, multiple sclerosis
MSO_4 . . . . . .morphine sulfate
MVA . . . . . .motor vehicle accident
Na^+ . . . . . .sodium
NAD . . . . . .no apparent/acute distress
$NaHCO_3$ . . . . . sodium bicarbonate
NG . . . . . .nasogastric
NGT . . . . . .nasogastric tube
NI . . . . . .nasointestinal
NIDDM . . . . . .non-insulin-dependent diabetes mellitus
NPA . . . . . .nasopharyngeal airway

Symbols and Abbreviations *(continued)*

NPO . . . . . .nothing by mouth (nil per os)
NRB . . . . . .nonrebreather
NS . . . . . .normal saline
NSAID . . . . . .nonsteroidal anti-inflammatory drug
NSR . . . . . .normal sinus rhythm
NTG . . . . . .nitroglycerin
NTP . . . . . .nitroglycerin paste
n/v . . . . . .nausea and vomiting
O_2 . . . . . .oxygen
OD . . . . . .overdose, right eye
OPA . . . . . .oropharyngeal airway
OPP . . . . . .organophosphate
OS . . . . . .left eye
OT . . . . . .occupational therapy
OTC . . . . . .over the counter
OU . . . . . .both eyes
oz . . . . . .ounce
$\overline{p}$ . . . . . .after
PAC . . . . . .premature atrial complex
PaO_2 . . . . . partial pressure of oxygen in arterial blood
PAP . . . . . .pulmonary artery pressure
PCW . . . . . .pulmonary capillary wedge pressure
PE . . . . . .pulmonary embolism, edema
PEA . . . . . .pulseless electrical activity
PEEP . . . . . .positive end-expiratory pressure
PET . . . . . .positron emission tomography
pH . . . . . .potential of hydrogen
PICC . . . . . .peripherally inserted central catheter
PIH . . . . . .pregnancy-induced hypertension
PJC . . . . . .premature junctional complex
PMI . . . . . .point of maximal impulse
PO . . . . . .per os (by mouth, orally)
PPD . . . . . .purified protein derivative (TB skin test)
PPF . . . . . .plasma protein fraction
PRBC . . . . . .packed red blood cells
PRI . . . . . .PR interval
prn . . . . . .as needed

Symbols and Abbreviations *(continued)*

PSA . . . . . .prostate-specific antigen
PSI . . . . . .pounds per square inch
PSVT . . . . . .paroxysmal supraventricular tachycardia
PT . . . . . .prothrombin time, physical therapy, or patient
PTT . . . . . .partial thromboplastin time
PVC . . . . . .premature ventricular complex
PVD . . . . . .peripheral vascular disease
q, Q . . . . . .every
q.i.d. . . . . . .four times per day
q.o.d. . . . . . .every other day
R . . . . . .regular (insulin)
RBBB . . . . . .right bundle branch block
RCA . . . . . .right coronary artery
RL . . . . . .Ringer's lactate
RLQ . . . . . .right lower quadrant
ROM . . . . . .range of motion, rupture of membranes
RSI . . . . . .rapid sequence intubation
RT . . . . . .respiratory therapy, right
RUQ . . . . . .right upper quadrant
$\overline{s}$ . . . . . .without
SaO_2: . . . . . .oxygen saturation
SBP . . . . . .systolic BP
SC or SQ . . . . . .subcutaneous
SCC . . . . . .squamous cell carcinoma
SI . . . . . .stroke index
SLP . . . . . .speech language pathology
SOB . . . . . .shortness of breath
SpO_2 . pulse oximeter measurement of blood oxygen saturation
ss . . . . . .signs and symptoms
STD . . . . . .sexually transmitted disease
SV . . . . . .stroke volume
SVC . . . . . .superior vena cava
SVO_2 . . . . . .systemic venous oxygen saturation
SVR . . . . . .systemic venous resistance
T . . . . . .temperature
TB . . . . . .tuberculosis
TCP . . . . . .transcutaneous pacing

Symbols and Abbreviations *(continued)*

TF . . . . . .tube feeding
TIA . . . . . .transient ischemic attack
t.i.d. . . . . . .three times per day
TPN . . . . . .total parenteral nutrition
TPR . . . . . .temperature, pulse, respirations
TVP . . . . . .transvenous pacing
u, U . . . . . .unit
UA . . . . . .urinalysis
UO . . . . . .urine output
URI . . . . . .upper respiratory infection
UTI . . . . . .urinary tract infection
VAD . . . . . .vascular access device
VO_2 . . . . . .O_2 consumption
VRE . . . . . .vancomycin-resistant *Enterococcus*
VRSA . . . . . .vancomycin-resistant *Staph. aureus*
WBC . . . . . .white blood count
WC . . . . . .wheelchair
WPW . . . . . .Wolff-Parkinson-White

Medication/Treatment Record (make photocopies for multiple Pts)													
Med/Treatment ↓	Time →	Scheduled Medications/Treatments									Assessment		
											HR	RR	BP

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