FUNDAMENTALS OF NURSING · STUDY GUIDE

Exam 6 Study Guide

This guide covers chapters 11 and 12. Chapter 11 is medication administration: what the body does to a drug, what a safe order looks like, the rights and checks, the technique for each route and injection, and the dosage math. Chapter 12 is mobility: how to move patients without hurting them or yourself, how to position for a purpose, and how immobility damages every system. Every calculation below was run and checked. Set each one up with dimensional analysis before you look at the steps.

WHAT THIS GUIDE COVERS

- Chapter 11 · absorption, distribution, metabolism and excretion, half life and steady state, peak and trough, drug effects, generic names, complete orders and order types, controlled substance schedules, the rights, three checks and identifiers, BCMA and high alert drugs, oral, sublingual, enteral tube, transdermal, eye, ear, nasal, inhaled, rectal and vaginal routes, needles, angles and sites, insulin mixing, heparin, Z track, conversions, dimensional analysis, IV rates and error response.
- Chapter 12 · center of gravity and base of support, safe patient handling equipment, stand and pivot transfers, moving up in bed and logrolling, Fowler's, orthopneic, supine, prone, lateral, Sims and Trendelenburg positions, pressure points and devices, exercise types, ROM and joint movements, early mobility and activity intolerance, immobility hazards by system, pressure injury staging, VTE, weight bearing terms, gait belts, canes, walkers, crutch fit and gaits, and stairs.

CHAPTER 11

Medication Administration

Read it in full: **Chapter 11 in the textbook**. Practice it in the lab: **Dose Calculation Bench** and **Route and Injection Coach**.

What to know

Pharmacokinetics is what the body does to a drug (ADME); **pharmacodynamics** is what the drug does to the body. **Absorption**: IV skips it; IM absorbs faster than subcutaneous; poor perfusion slows injections. **Distribution**: only unbound drug is active, so low albumin means

more effect. **Metabolism**: mostly the liver; oral drugs face the **first pass effect**. **Excretion**: mostly the kidneys; a low eGFR lets drugs accumulate, so older adults and people with kidney disease often need lower doses.

Onset, peak and duration time the effect. The **half life** is the time for the level to fall by half; steady state and clearance each take about four to five half lives. Narrow range drugs (digoxin, lithium, phenytoin, vancomycin, aminoglycosides, warfarin by INR) need levels: a **trough** just before a dose, a **peak** at the expected high. Effects include therapeutic, side, adverse, toxic, allergic (up to anaphylaxis) and idiosyncratic. Know food interactions: grapefruit with some statins, vitamin K foods with warfarin, tyramine with MAO inhibitors.

Use **generic names** (lowercase). Stems help: -olol beta blockers, -pril ACE inhibitors, -sartan ARBs, -statin, -prazole, -cillin. A complete order has the patient, date and time, drug, dose, route, frequency, an indication for PRN orders and the prescriber's signature. Types: routine, PRN, single, STAT (immediately, often within 15 to 30 minutes), now, standing order or protocol. Verbal orders are for urgent cases, written and read back. Clarify anything incomplete, out of range or unsafe before giving; the nurse is responsible for every drug given.

Controlled substances are scheduled I to V. Schedule II includes morphine, oxycodone, hydromorphone, fentanyl and methadone; IV includes lorazepam, alprazolam and zolpidem. Counts are exact, waste is witnessed by a second licensed nurse at the time, discrepancies are reported before staff leave, and suspected diversion goes up the chain of command.

The **rights**: patient (two identifiers stated by the patient, never the room), drug, dose, route, time (time critical drugs within 30 minutes; others commonly within 1 to 2 hours), documentation (after giving, never before), reason, response, assessment (apical pulse before digoxin, BP before antihypertensives, RR and sedation before opioids, potassium before loop diuretics, glucose before insulin), and the right to refuse and to education. The **three checks** compare the label with the MAR when removing, when preparing and at the bedside. Open unit doses at the bedside and stay until oral drugs are swallowed.

High alert medications cause serious harm when given in error: insulin, anticoagulants, opioids, concentrated electrolytes, chemotherapy, neuromuscular blockers and sedation agents. Use an

independent double check, standard concentrations and smart pump libraries. Potassium is **never IV push**; it is diluted and infused (commonly no faster than 10 mEq per hour on a general unit, per policy). BCMA helps only when used as designed.

Oral: patient upright, able to swallow, not NPO; read liquids at the bottom of the meniscus at eye level. Never crush enteric coated or extended release forms (ER, XR, SR, CR, LA). Sublingual and buccal drugs bypass first pass and must not be swallowed. Enteral tubes: verify placement (x ray first, then external mark and aspirate pH 5 or below), never add drugs to the feeding bag, flush at least 15 mL before, between and after each drug, and keep the head of the bed at least 30 degrees.

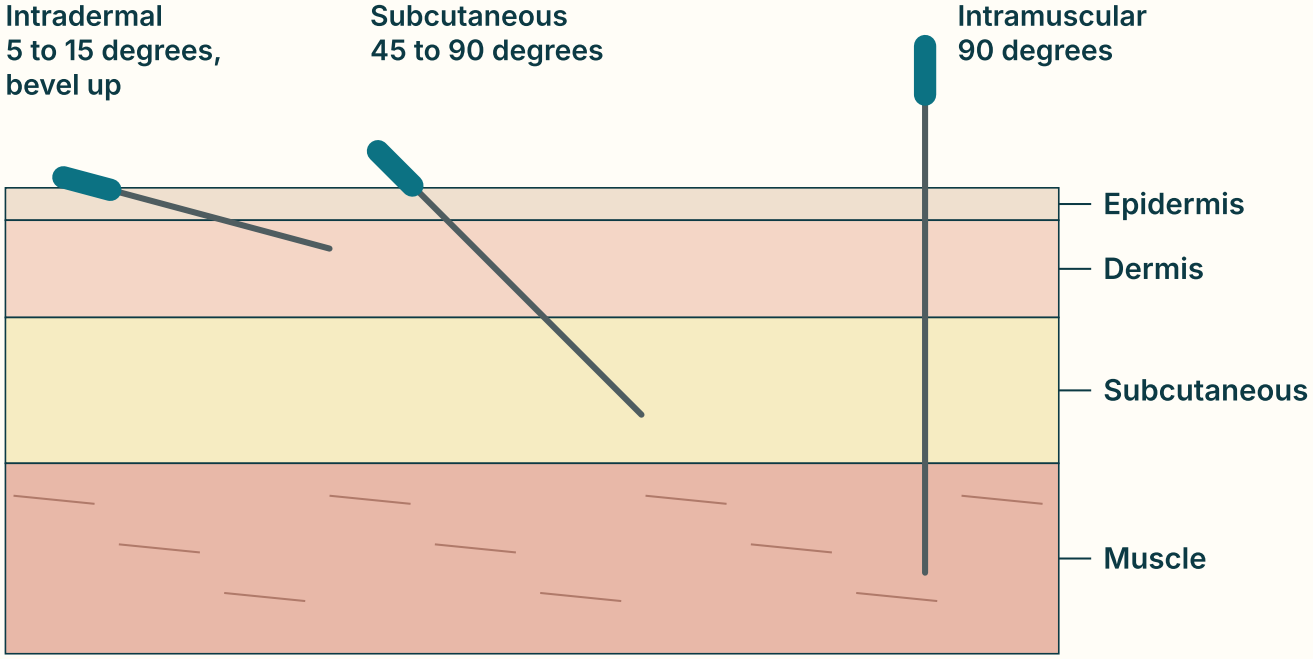
Transdermal: remove the old patch first, clean dry hairless skin, rotate sites, label the patch, avoid heat (raises fentanyl absorption). Eye: drop into the lower conjunctival sac as the patient looks up, press the inner canthus about 1 minute, wait about 5 minutes between drops, drops before ointment. Ear: adults and children over 3, pinna up and back; under 3, down and back. Inhalers: MDI slow deep breath with actuation and a 10 second hold (spacer helps); DPI quick forceful breath and never exhale into it; **bronchodilator before corticosteroid**, rinse after the steroid. Suppository: **left Sims**, past the internal sphincter.

Gauge: higher number, thinner needle. **Intradermal** 5 to 15 degrees bevel up, raises a bleb, no massage; TB skin test read at 48 to 72 hours by induration. **Subcutaneous** 45 to 90 degrees (90 if 2 inches can be pinched). **Intramuscular** 90 degrees. Ventrogluteal is preferred for most adults (heel of hand on the greater trochanter, index finger to the anterior superior iliac spine, inject in the V); vastus lateralis for infants; deltoid up to about 1 mL; avoid dorsogluteal (sciatic nerve). Use a filter needle for ampules. Never recap a used needle.

Insulin: units, insulin syringe or pen, abdomen absorbs fastest, rotate within a region. Mixing regular and NPH: **clear before cloudy** (air into NPH, air into regular, draw regular, then NPH). Never mix glargine or detemir. Roll cloudy insulin. Heparin and enoxaparin: abdomen at least 5 cm from the umbilicus, **no aspiration, no massage**, keep the enoxaparin air bubble. **Z track**: pull skin about 2.5 to 3.5 cm aside, inject at 90 degrees, wait 10 seconds, withdraw, release; no massage.

Conversions: 1 g = 1,000 mg; 1 mg = 1,000 mcg; 1 kg = 2.2 lb; 1 tsp = 5 mL, 1 tbsp = 15 mL, 1 oz = 30 mL. **Dimensional analysis** arranges factors so every unwanted unit cancels. IV pump rate = volume / hours. Gravity rate = (volume x drop factor) / minutes, rounded to whole drops; microdrip is 60 gtt/mL. Leading zero yes, trailing zero no. Ask whether the answer is reasonable; more than 2 or 3 tablets or vials should prompt a recheck.

Errors are mostly system failures. Prevent them with the rights, fewer interruptions, scanning, double checks, knowing your drugs, reconciliation at every transition and listening to the patient ("that pill looks different"). After an error: **assess the patient first**, give any antidote, notify the prescriber and charge nurse, document the facts in the chart, and file an incident report that is never mentioned in the chart. Report near misses too.



Each needle ends in its target layer: a bleb in the dermis, the fat layer, or deep muscle. Ventrogluteal is preferred for most adult IM injections; deltoid takes up to about 1 mL.

Angle sets the depth. The flatter the angle, the shallower the dose: intradermal raises a bleb, subcutaneous reaches fat, and intramuscular goes straight down into muscle.

LOCK THESE IN

- Low albumin raises free drug; low eGFR lets drugs build up; liver disease slows metabolism.
- Trough just before the dose; peak at the expected high; four to five half lives to steady state.
- Clarify before giving: incomplete, out of range, allergy conflict or unsafe for current condition.
- Three checks against the MAR: removing, preparing, bedside. Assess before, evaluate after.
- Potassium never IV push. High alert drugs get an independent double check.
- ID 5 to 15 degrees; subcut 45 to 90; IM 90. Ventrogluteal for adults, vastus lateralis for infants.
- Clear before cloudy. Heparin: no aspiration, no massage.
- After an error: assess the patient first; incident report stays out of the chart.

Key terms and comparisons: injections and routes

Route	Angle and needle	Key rules
Intradermal	5 to 15 degrees, bevel up; 26 to 27 gauge	0.01 to 0.1 mL; bleb; no massage; read TB test at 48 to 72 h
Subcutaneous	45 to 90 degrees; 25 to 31 gauge	About 1 mL; abdomen at least 5 cm from umbilicus
Intramuscular	90 degrees; 22 to 25 gauge, 1 to 1.5 in	Deltoid up to 1 mL; ventrogluteal up to about 3 mL; avoid dorsogluteal
Eye drops	Lower conjunctival sac	Press inner canthus about 1 minute; drops before ointment
Ear drops	Adult up and back; under 3 down and back	Warm to room temperature; stay on side 2 to 5 minutes
Inhaler	MDI slow breath; DPI fast breath	Bronchodilator first; rinse after steroid
Suppository	Left Sims	About 10 cm in adults, past the internal sphincter
Transdermal	Clean, dry, hairless skin	Remove old patch first; rotate; avoid heat

Priority rules: conversions and formulas

Item	Rule
Mass	1 g = 1,000 mg; 1 mg = 1,000 mcg
Weight	1 kg = 2.2 lb; divide lb by 2.2
Household	1 tsp = 5 mL; 1 tbsp = 15 mL; 1 oz = 30 mL
Formula method	Desired / have x quantity
Pump rate	mL / hr = total mL / hours
Gravity rate	gtt / min = (mL x drop factor) / minutes, whole number
Units per hour	mL / hr = (mL / units in bag) x units ordered per hr
Notation	0.5 mg yes; 5.0 mg no; write "units," not U

Worked cases

WORKED CASE 1 · AN ORAL LIQUID

Order: cephalexin 375 mg PO every 6 hours. On hand: 250 mg per 5 mL suspension.

STEP 1 · SET UP

mL = (5 mL / 250 mg) x 375 mg.

STEP 2 · CANCEL AND MULTIPLY

5 x 375 / 250 = 1,875 / 250 = **7.5 mL**.

STEP 3 · CHECK REASONABLENESS

The dose is 1.5 times 250 mg, so 1.5 times 5 mL is right.

MEASURE

Use an oral syringe or read the cup at the bottom of the meniscus at eye level.

WORKED CASE 2 · A WEIGHT BASED DOSE

Order: 20 mg/kg PO for a child who weighs 33 lb. The reference lists a safe range of 10 to 25 mg/kg per dose.

STEP 1 · CONVERT WEIGHT

33 / 2.2 = **15 kg**.

STEP 2 · CALCULATE THE DOSE

20 mg/kg x 15 kg = **300 mg**.

STEP 3 · CHECK THE SAFE RANGE

10 x 15 = 150 mg; 25 x 15 = 375 mg. 300 mg sits inside 150 to 375 mg, so it is safe.

RULE

Convert pounds to kilograms first, and use an independent double check for pediatric doses.

WORKED CASE 3 · IV RATES BY PUMP AND BY GRAVITY

(A) Order: 1,000 mL normal saline over 6 hours on a pump. (B) Order: 500 mL over 4 hours by gravity with a drop factor of 20 gtt/mL.

STEP 1 · PUMP RATE

1,000 mL / 6 hr = 166.67, rounded to **166.7 mL/hr** (or as the pump allows).

STEP 2 · CONVERT TIME FOR GRAVITY

4 hr x 60 = 240 minutes.

STEP 3 · GRAVITY RATE

(500 mL x 20 gtt/mL) / 240 min = 10,000 / 240 = 41.67, rounded to **42 gtt/min**.

RULE

Round only at the end. With 60 gtt/mL microdrip tubing, gtt/min equals mL/hr.

WORKED CASE 4 · A HEPARIN INFUSION AND A DOPAMINE DRIP

(A) Heparin 25,000 units in 500 mL; order 1,200 units/hr. (B) Dopamine 400 mg in 250 mL; order 3 mcg/kg/min for a 70 kg patient.

STEP 1 · HEPARIN CONCENTRATION

25,000 units / 500 mL = 50 units/mL.

STEP 2 · HEPARIN RATE

1,200 units/hr / 50 units/mL = **24 mL/hr**.

STEP 3 · DOPAMINE CONCENTRATION

400 mg = 400,000 mcg; 400,000 / 250 mL = 1,600 mcg/mL.

STEP 4 · DOPAMINE DOSE PER HOUR

3 x 70 = 210 mcg/min; 210 x 60 = 12,600 mcg/hr.

STEP 5 · DOPAMINE RATE

12,600 / 1,600 = 7.875, about **7.9 mL/hr**.

RULE

Both are high alert drugs. Program the pump from its drug library and get an independent double check.

TRAPS PEOPLE FALL INTO

- **Giving a scheduled drug because it is due.** Assess first. Hold and clarify if pulse or pressure makes it unsafe.
- **Asking "Are you Ms. Diaz?"** Have the patient state name and date of birth.
- **Crushing an extended release tablet for a tube.** It dumps the whole dose. Ask pharmacy for another form.
- **Adding drugs to the feeding bag.** Give each drug separately with flushes before, between and after.
- **Forgetting to remove the old patch.** Two patches can cause overdose, especially with fentanyl.
- **Drawing NPH first.** Clear before cloudy: regular first.
- **Massaging after heparin or an intradermal test.** Massage causes bruising or spreads the test solution.
- **Using the dorsogluteal site.** The sciatic nerve is at risk. Use ventrogluteal.
- **Writing "incident report filed" in the notes.** Chart the facts only.

Chapter 11 self-test · ten items

1. An older adult has low albumin and starts a highly protein bound drug. What should the nurse anticipate?

A. A weaker effect from less free drug
B. Faster absorption from the stomach
C. No change, since dose is the same
D. A stronger effect from more free drug

D. A stronger effect from more free drug Only unbound drug is active. Less albumin leaves more drug free.

2. When should a trough level be drawn?

A. Thirty minutes after the dose ends
B. At any time during the shift
C. Just before the next scheduled dose
D. At the expected peak of the drug

C. Just before the next scheduled dose The trough is the lowest level, just before the next dose.

3. An order reads "metoprolol 25 mg PO." What is missing?

A. The drug name
B. The frequency
C. The dose
D. The route

B. The frequency A complete order includes how often the drug is given. Clarify before giving.

4. Before giving digoxin, the apical pulse is 54. What should the nurse do?

A. Hold the dose and notify the prescriber
B. Count the radial pulse for 15 seconds
C. Give the dose and recheck in one hour
D. Give half the dose and document the pulse

A. Hold the dose and notify the prescriber Digoxin is commonly held for an adult apical rate below 60, with the prescriber notified.

5. Which medication requires an independent double check in most facilities?

A. Docusate sodium
B. Insulin glargine
C. Daily multivitamin
D. Oral acetaminophen

B. Insulin glargine Insulin is a high alert drug. A second licensed nurse verifies it independently.

6. Which instruction is correct for eye drops?

A. Give the ointment first and the drops afterward
B. Squeeze the eyes tightly shut right after the drop
C. Drop into the lower sac, then press the inner canthus
D. Drop directly onto the cornea while the eye is open

C. Drop into the lower sac, then press the inner canthus The conjunctival sac receives the drop, and pressure on the nasolacrimal duct limits systemic absorption.

7. A patient uses a bronchodilator and an inhaled corticosteroid. Which is correct?

A. Bronchodilator first, then the steroid
B. Steroid first, then the bronchodilator
C. Either order, as long as one is rinsed
D. Both together in one breath

A. Bronchodilator first, then the steroid The bronchodilator opens airways so the steroid can reach them. Rinse the mouth after the steroid.

8. Two insulins, one clear and one cloudy, are ordered together in one syringe. Which goes into the syringe first?

A. The NPH insulin
B. Either, if rolled first
C. Whichever dose is larger
D. The regular insulin

D. The regular insulin Clear before cloudy keeps the short acting vial free of longer acting insulin.

9. Which site is preferred for a 2 mL IM injection in an adult?

A. Upper outer arm
B. Ventrogluteal
C. Deltoid
D. Dorsogluteal

B. Ventrogluteal The deltoid holds about 1 mL. The ventrogluteal site is free of major nerves and vessels.

10. A nurse discovers a patient received the wrong insulin dose. What is the first action?

A. Call the pharmacy about it
B. Complete an incident report
C. Document it in the notes
D. Check the patient's glucose

D. Check the patient's glucose Assess and protect the patient first, then notify, document and report.

CHAPTER 12

Activity, Mobility and Body Mechanics

Read it in full: **Chapter 12 in the textbook**. Practice it in the lab: **Positioning Planner** and **Mobility Aid Coach**.

What to know

The **center of gravity** of a standing adult is in the pelvis (about the second sacral vertebra). Stability rises with a wide **base of support** and a low center of gravity. Body mechanics: feet shoulder width apart, bend knees and hips (not the waist), keep the load close, face the movement and pivot instead of twisting, use leg and gluteal muscles, push, pull, roll or slide rather than lift, adjust the bed to working height, and get help with a count.

No technique makes manual lifting of an adult safe. Guidance suggests lifting no more than about **35 lb** of patient weight by hand under ideal conditions. **Safe patient handling** programs combine equipment, training and a mobility assessment: gait belts for weight bearing patients who need steadying (not for lifting dependent patients), slide sheets, lateral transfer devices, transfer boards, sit to stand lifts for those who bear some weight and full body lifts for those who cannot.

Stand and pivot transfer: check orthostatic risk, nonskid footwear and lines; place the chair on the patient's **stronger side** at about 45 degrees; lock all wheels; lower the bed and let the patient dangle; apply a gait belt; block the weak knee; rise together on a count and pivot toward the strong side. Moving up in bed: head of bed flat, pillow against the headboard, slide sheet and two caregivers; never pull by the arms. **Logroll** after spinal injury or surgery with at least three staff and a pillow between the legs.

Positions: **Fowler's** (low 15 to 30, semi 30 to 45, Fowler's 45 to 60, high 60 to 90 degrees) for breathing, eating, tube feeding (at least 30, commonly 30 to 45) and raised intracranial pressure (about 30, head midline). **Orthopneic** (tripod) for severe dyspnea. **Supine** for rest and many procedures. **Prone** for hip extension and severe hypoxemia. **Lateral** with a 30 degree tilt to spare the trochanter. **Sims** for enemas, suppositories and draining oral secretions. **Trendelenburg** for central line insertion, not for shock. Modified Trendelenburg (legs up, trunk flat) for hypotension per protocol. Reverse Trendelenburg for reflux.

Pressure points: supine loads the occiput, scapulae, elbows, sacrum and heels (float the heels); sitting loads the ischial tuberosities and sacrum (no ring cushions); lateral loads the ear, shoulder, iliac crest, greater trochanter, knees and ankles; prone loads the face, chest, knees and toes.

Trochanter rolls prevent external hip rotation, hand rolls keep the hand functional and foot boots prevent footdrop. Four raised rails are a restraint.

Special cases: with one diseased lung, put the good lung down to improve oxygenation (except abscess or bleeding). After a posterior hip replacement, no flexion past 90 degrees, no crossing the legs and no internal rotation. After an above knee amputation, prone periods and no pillow under the residual limb after the first day. With hemiplegia, support the weak shoulder.

Exercise types: **isotonic** (joint moves: walking, ROM), **isometric** (no joint movement: quad sets; breathe out to avoid the Valsalva maneuver), isokinetic, aerobic, and flexibility and balance. Adults are advised 150 to 300 minutes of moderate activity a week plus strength work on 2 days. **Active ROM** keeps strength and motion; **passive ROM** keeps motion only. Do ROM at least twice a day, 3 to 5 times per joint, support above and below the joint, stop at resistance or pain, never force.

Joint terms: flexion decreases the angle, extension returns it, hyperextension goes beyond; abduction moves away from the midline and adduction toward it; rotation, circumduction, pronation and supination, dorsiflexion and plantar flexion, inversion and eversion, opposition. Early mobility protocols move patients through levels as soon as they are stable. **Activity intolerance**: heart rate up more than about 20 to 30 or slow to recover, a significant BP drop, dyspnea, SpO2 below target, chest pain, dizziness, pallor or sweating. Stop and rest.

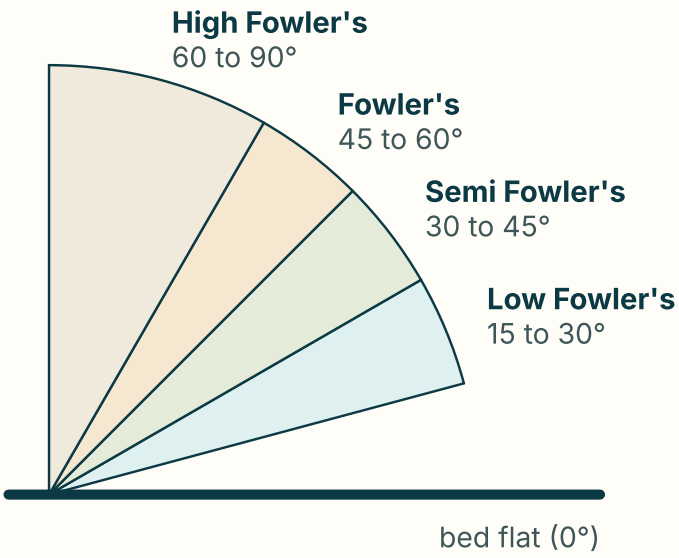
Immobility harms every system: **cardiovascular** (orthostatic hypotension, venous stasis and VTE), **respiratory** (atelectasis, hypostatic pneumonia; turn every 2 hours, cough and deep breathe, incentive spirometer about 10 breaths an hour while awake), **musculoskeletal** (atrophy, disuse osteoporosis, contractures, footdrop), **metabolic** (negative nitrogen balance, calcium loss), **GI** (constipation), **urinary** (stasis, stones, infection), **skin** (pressure injury) and **psychosocial** (depression, delirium). Strength can fall 1 to 3% a day on bed rest.

A **pressure injury** comes from pressure, or pressure plus **shear**, over bone or under a device. Stages: **1** intact nonblanchable erythema (may look purple or darker, or show no redness, in dark skin); **2** partial thickness with exposed dermis or a serum blister; **3** full thickness with visible fat; **4** exposed fascia, muscle, tendon, cartilage or bone; **unstageable** when slough or eschar hides the

base; **deep tissue** injury is persistent deep red, maroon or purple discoloration or a blood blister. Never reverse stage. Reposition at least every 2 hours in bed; chair bound patients shift weight about every 15 minutes. Keep the head of bed at or below 30 degrees when possible, float heels, manage moisture, feed well, and never massage red skin.

VTE includes DVT and PE. **Virchow triad**: stasis, vessel wall injury, hypercoagulability. DVT: one sided leg swelling, pain, warmth and redness (Homans sign is not used). PE: sudden dyspnea, pleuritic chest pain, tachycardia, falling SpO2, anxiety. Prevent with early walking, ankle pumps, fluids, compression devices kept on, and ordered anticoagulants. Never massage a suspected DVT; keep the patient in bed per policy and notify the provider.

Weight bearing terms: non weight bearing, toe touch, partial, as tolerated. Gait belt snug over clothing, not over incisions or tubes; walk on the **weak side**, slightly behind. If the patient falls, ease them to the floor down your leg and protect the head. **Cane**: top at the greater trochanter or wrist crease, held in the hand **opposite** the weak leg, moved forward **with** the weak leg. **Walker**: walker forward, weak leg, then strong leg; push up from the chair arms, not the walker. **Crutches**: pads two to three finger widths below the axilla, elbows flexed 20 to 30 degrees, weight on the hands (axillary pressure causes crutch palsy). Gaits: four point (both legs partial, most stable), three point (one leg non weight bearing), two point, swing to, swing through. Stairs: **up with the good, down with the bad**.



Tube feeding
At least 30, commonly 30 to 45

Raised ICP
About 30, head midline

Ventilator (VAP bundle)
Head of bed 30 to 45

Severe dyspnea
Orthopneic (tripod)

Know the four Fowler's ranges. Many safety rules are an angle: at least 30 for tube feeding and the ventilator bundle, about 30 for raised intracranial pressure.

LOCK THESE IN

- Wide base, low center of gravity, load close, no twisting; slide instead of lift.
- About 35 lb is the manual limit; above that, use equipment.
- Chair on the strong side; lock wheels; dangle first; gait belt.
- Trendelenburg for central line insertion, not shock; legs up for hypotension per protocol.
- Active ROM builds strength; passive keeps motion only; stop at pain.
- Stage 2 dermis, 3 fat, 4 bone or muscle; base hidden = unstageable; maroon intact skin = deep tissue.
- Never massage red skin or a suspected DVT.
- Cane opposite the weak leg; walker then weak then strong; up with the good, down with the bad.

Key terms and comparisons: positions and their purposes

Position	Use	Watch for
Low to high Fowler's	Breathing, eating, tube feeding (30 to 45), raised ICP (about 30)	Sacral shear from sliding down
Orthopneic (tripod)	Severe dyspnea, COPD	Fatigue; pad the table
Prone	Hip extension after amputation; ARDS oxygenation	Face, chest, knee and toe pressure
Lateral (30 degree tilt)	Offloading the sacrum; recovery position	Trochanter if turned a full 90 degrees
Sims (left)	Enemas, suppositories, rectal temperature	Hard with joint limitations
Trendelenburg	Central line insertion; air embolism (left side, head down)	Not for shock; raises ICP
Modified Trendelenburg	Hypotension per protocol	Avoid with head injury or leg fracture
Reverse Trendelenburg	Reflux, obesity, some head and neck surgery	Footboard; orthostatic changes

Priority rules: pressure injury stages and devices

Item	Rule
Stage 1	Intact, nonblanchable redness; check warmth and firmness in dark skin
Stage 2	Partial thickness, dermis or serum blister
Stage 3	Full thickness, fat visible
Stage 4	Fascia, muscle, tendon, cartilage or bone
Unstageable	Base hidden by slough or eschar
Deep tissue injury	Persistent deep red, maroon or purple; blood blister
Cane	Opposite hand; moves with weak leg; top at greater trochanter
Crutches	Two to three finger widths below axilla; weight on hands; elbows 20 to 30 degrees
Three point gait	Crutches and affected leg together, then strong leg
Stairs	Up with the good, down with the bad

Worked cases

WORKED CASE 1 · CHOOSING EQUIPMENT, NOT MUSCLE

Mrs. Ruiz, 71, weighs 95 kg and had a hip replacement yesterday with partial weight bearing allowed. She is lightheaded when sitting up. Two staff plan to "just lift her" to the chair.

STEP 1 · CHECK THE LOAD

95 kg is about 209 lb, far above the roughly 35 lb manual limit.

STEP 2 · ASSESS FIRST

Check orthostatic blood pressure and let her dangle.

STEP 3 · CHOOSE EQUIPMENT

If she can bear some weight and follow directions, a sit to stand lift with a gait belt; if not, a full body lift.

STEP 4 · APPLY THE PLAN

Move toward her stronger side and follow her hip precautions.

RULE

"Two people lifting under the arms" injures staff and risks a fall.

WORKED CASE 2 · STAGING WHAT YOU SEE

Mr. Abara, 85, with incontinence and poor intake, has been in bed 5 days. Braden is 11. Over the sacrum is a 3 cm intact, dark maroon area that does not blanch. His left calf is 3 cm larger than the right and warm.

STEP 1 · STAGE THE SKIN

Intact, persistent maroon discoloration is a **deep tissue pressure injury**, not stage 1.

STEP 2 · READ THE BRADEN SCORE

11 falls in the high risk range (10 to 12).

STEP 3 · FIND THE BIGGER THREAT

One sided calf swelling and warmth suggest DVT, which can become a PE.

STEP 4 · ACT ON THE DVT

Keep him in bed per policy, do not massage the leg, check breathing and SpO2, notify the provider.

STEP 5 · ACT ON THE SKIN

Offload the sacrum with 30 degree tilts, use a redistribution surface, manage incontinence, request a nutrition consult.

RULE

Immobility hazards come in clusters. Assess every system.

WORKED CASE 3 · CRUTCHES AND STAIRS

Mr. Lund, 23, has a right tibia fracture and is non weight bearing on the right. He rests by leaning on the crutch pads and plans to go upstairs "leading with the crutches."

STEP 1 · FIX THE FIT

Pads two to three finger widths below the axillae, weight on the hands, elbows flexed 20 to 30 degrees.

STEP 2 · CHOOSE THE GAIT

Non weight bearing on one leg calls for the three point gait.

STEP 3 · GOING UP

Left (good) leg up first, then the crutches and right leg.

STEP 4 · GOING DOWN

Crutches and right (bad) leg down first, then the left leg.

RULE

Confirm with a return demonstration on stairs before discharge.

WORKED CASE 4 · ASPIRATION DURING TUBE FEEDING

Mr. Feld, 66, on continuous gastrostomy feeding, is found lying flat after his bath, coughing, with new crackles in the right lower lobe.

STEP 1 · RECOGNIZE

Flat during feeding allows reflux and aspiration; the right lower lobe is the usual site.

STEP 2 · ACT

Stop the feeding and raise the head of the bed to at least 30 to 45 degrees.

STEP 3 · ASSESS AND REPORT

Check airway, SpO2 and breathing, suction if needed, notify the provider.

RULE

Pause feeding whenever the patient must lie flat.

TRAPS PEOPLE FALL INTO

- **Thinking good technique makes lifting safe.** Use equipment above about 35 lb of patient weight.
- **Placing the chair on the weak side.** The strong leg leads the pivot, so the chair goes on the strong side.
- **Using Trendelenburg for shock.** It impairs breathing and raises ICP. Raise the legs with the trunk flat per protocol.
- **Turning a full 90 degrees onto the side.** A 30 degree tilt protects the greater trochanter.
- **Calling passive ROM strengthening.** Passive ROM keeps motion but builds no strength.
- **Calling a maroon intact area stage 1.** That is a deep tissue pressure injury.
- **Reverse staging a healing wound.** A healing stage 4 stays a healing stage 4.
- **Holding the cane on the weak side.** Hold it opposite the weak leg and move them together.
- **Resting on the crutch pads.** Axillary pressure causes crutch palsy.

Chapter 12 self-test · ten items

1. Which action best protects the nurse's back when moving a patient?

A. Lifting at arm's length to keep balance
B. Twisting the trunk to face the new direction
C. Bending at the waist with the legs straight
D. Bending the knees and keeping the load close

D. Bending the knees and keeping the load close A low center of gravity, a wide base and a close load reduce strain. Twisting and reaching increase it.

2. A patient with left sided weakness is moving from bed to chair. Where should the chair go?

A. At the foot of the bed
B. On the patient's right side
C. Behind the patient's back
D. On the patient's left side

B. On the patient's right side The chair goes on the stronger side so the strong leg can carry the pivot.

3. Which position is used when inserting a central line in the neck?

A. Reverse Trendelenburg
B. Semi Fowler's
C. Trendelenburg
D. High Fowler's

C. Trendelenburg Head down distends the neck veins and lowers the risk of air embolism.

4. Three days after losing a leg above the knee, a patient asks how to keep the hip from getting stiff and bent. Which position should the nurse teach?

A. Prone for periods each day
B. Residual limb on a pillow
C. High Fowler's all day
D. Knees flexed on a wedge

A. Prone for periods each day Lying prone extends the hip. Propping the limb flexes it.

5. During passive ROM, the patient reports pain in the shoulder. What should the nurse do?

A. Speed up to finish the exercise
B. Ask the patient to relax and continue
C. Stop the movement at that point
D. Push gently past the point of pain

C. Stop the movement at that point Move only to resistance or slight stretch, never to pain. Never force a joint.

6. Which finding is a stage 3 pressure injury?

A. Intact skin with nonblanchable redness
B. Full thickness loss with fat visible
C. Exposed bone at the base of the wound
D. A shallow open area with exposed dermis

B. Full thickness loss with fat visible Stage 3 shows fat. Stage 2 shows dermis; stage 4 shows bone or muscle.

7. A wound base is covered with yellow slough so the depth cannot be seen. How is it classified?

A. Stage 3
B. Deep tissue injury
C. Stage 2
D. Unstageable

D. Unstageable When slough or eschar hides the base, the depth cannot be judged.

8. A patient on bed rest has a swollen, warm left calf. What should the nurse avoid?

A. Massaging the swollen calf
B. Notifying the provider
C. Keeping the patient in bed
D. Checking the oxygen level

A. Massaging the swollen calf Massage could dislodge a clot and cause a pulmonary embolism.

9. A patient with right leg weakness uses a cane. How should it be held?

A. In the right hand, moved with the right leg
B. In the left hand, moved with the left leg
C. In the left hand, moved with the right leg
D. In the right hand, moved after both legs

C. In the left hand, moved with the right leg The cane goes opposite the weak leg and moves forward with it.

10. A patient on crutches is going down stairs. What moves first?

A. The crutches and the affected leg
B. The crutches by themselves
C. Both legs together, then crutches
D. The unaffected leg by itself

A. The crutches and the affected leg Down with the bad: crutches and the affected leg lead going down.

ONE PAGE

Cram sheet

Chapters 11 and 12 on one page. Work one calculation of each type before you read the rules.

Medications

Item	Rule
ADME	Absorption, distribution, metabolism, excretion
Levels	Trough before dose; peak at expected high; 4 to 5 half lives to steady state
Complete order	Patient, date, time, drug, dose, route, frequency, PRN reason, signature
Three checks	Removing, preparing, at the bedside; two identifiers
Hold and clarify	Allergy conflict, unsafe vital signs, out of range dose, incomplete order
High alert	Insulin, anticoagulants, opioids, concentrated electrolytes; double check; no IV push potassium
Enteral	Placement; separate drugs; flush 15 mL or more before, between, after
Angles	ID 5 to 15; subcut 45 to 90; IM 90
Sites	Ventrogluteal adults; vastus lateralis infants; deltoid up to 1 mL
Insulin and heparin	Clear before cloudy; heparin no aspiration, no massage
Math	1 kg = 2.2 lb; mL/hr = mL / hr; gtt/min = mL x DF / min
After an error	Assess patient, notify, document facts, incident report kept out of chart

Mobility

Item	Rule
Body mechanics	Wide base, low center of gravity, load close, no twisting
Manual limit	About 35 lb; otherwise equipment
Transfer	Strong side, wheels locked, dangle, gait belt
Logroll	Three or more staff; spine straight
Fowler's	Low 15 to 30; semi 30 to 45; Fowler's 45 to 60; high 60 to 90
Feeding	Head of bed at least 30, commonly 30 to 45
ROM	Twice daily, 3 to 5 times, support joint, stop at pain
Immobility	Orthostasis, VTE, atelectasis, contractures, constipation, stones, pressure injury
Turning	At least every 2 h in bed; weight shift about every 15 min in a chair
Stages	1 red intact; 2 dermis; 3 fat; 4 bone; unstageable; deep tissue
Devices	Cane opposite; walker, weak, strong; crutches below axilla, weight on hands
Stairs	Up with the good, down with the bad

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