

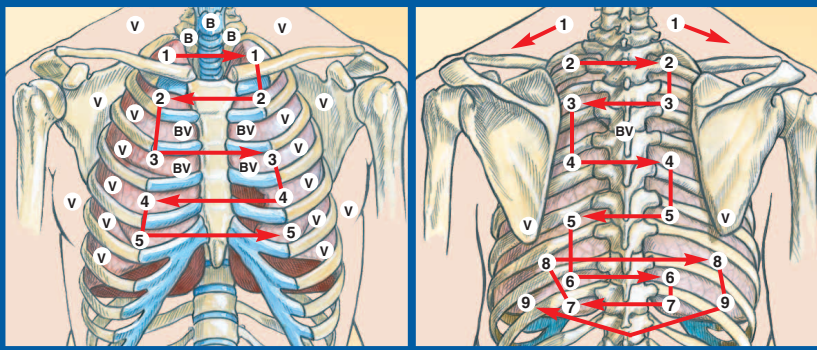
NURSING

ASSESSING LUNG SOUNDS

To auscultate lung sounds, move the diaphragm of your stethoscope according to the numbers on the corresponding diagram.

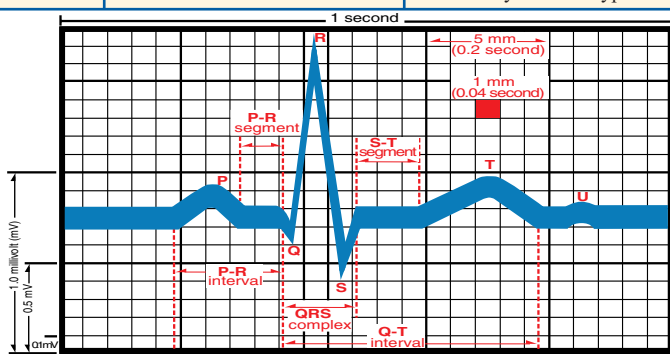
There are three normal breath sounds.

- (B) **Bronchial breath sounds**-loud, harsh, high pitched.
Heard over trachea, bronchi (between clavicles and midsternum), and over main bronchus.
- (BV) **Bronchovesicular breath sounds**-blowing sounds, moderate intensity and pitch.
Heard over large airways, on either side of sternum, at the Angle of Louis, and between scapulae.
- (V) **Vesicular breath sounds**-soft breezy quality, low pitched.
Heard over the peripheral lung area, heard best at base of lungs.



NORMAL EKG PATTERN

COMPLEX	NORMAL LENGTH OF TIME	WHAT IT REPRESENTS
P wave	<.12 sec	depolarization of atria-preparation for contraction
PR interval	.12 to .2 sec	time for impulse to spread from atria to ventricles
QRS complex	0.04 to 0.11 sec	depolarization of the ventricles
ST segment	-0.5 and +1.0 mm below and above the baseline	completion of ventricular depolarization
QT interval	up to 0.43 sec	electrical systole
T wave	<5 mm in amplitude	repolarization of ventricles
U wave		sometimes follows T wave may indicate hypokalemia



CARDIAC ENZYMES

ENZYME	NORMAL	OCCURS AFTER ACUTE ISCHEMIC EVENT	PEAKS
CK-MB Creatine kinase-myocardial muscle	0-7 U/L fraction of total CK	4 to 6 hrs	18 to 24 hrs
LDH ₁ Lactic dehydrogenase	29-37% 0.15 to 0.40 fraction of total	48 hrs	4 to 6 days
LDH ₂	42-48% 0.20 to 0.45 fraction of the total	48 hrs	4 to 6 days
SGOT, AST Aspartate aminotransferase	7 to 27 U/L	8 to 12 hrs	48 hrs

ADVENTITIOUS LUNG SOUNDS

SOUND	CHARACTERISTICS	LUNG PROBLEM
Crackles	popping, crackling, bubbling, moist sounds on inspiration	pneumonia, pulmonary edema, pulmonary fibrosis
Rhonchi	rumbling sound on expiration	pneumonia, emphysema, bronchitis, bronchiectasis
Wheezes	high-pitched musical sound during both inspiration and expiration (louder)	emphysema, asthma, foreign bodies
Pleural Friction Rub	dry, grating sound on both inspiration and expiration	pleurisy, pneumonia, pleural infarct

ARTERIAL BLOOD GAS ANALYSIS (ABGs)

pH	7.35 to 7.45
PaCO ₂	35 to 45 mm Hg
HCO ₃	22-26 mEq/L

A quick method of analysis:

Look at the pH first. Draw an arrow if it is low or high. An arrow indicating low (↓) means acidosis. An arrow indicating high (↑) means alkalosis. Next, look at the respiratory indicator (PaCO₂). Draw an arrow if it is low or high.

Interpretation: If the arrows are in the opposite direction, the problem is respiratory in nature-either resp. acidosis or resp. alkalosis. Next, look at the metabolic indicator (HCO₃). Draw an arrow if it is low or high.

Interpretation: If the pH arrow and the metabolic arrow are in the same direction, the problem is of metabolic in nature-either metab. acidosis or metab. alkalosis.

Additional analysis: *Compensation* is present if the arrows of PaCO₂ and HCO₃ are opposite. *Partial compensation* is present if the arrows of PaCO₂ and HCO₃ point in the same direction.

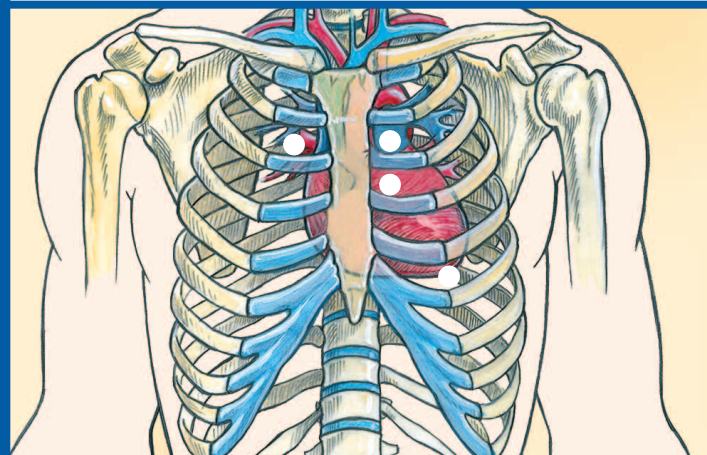
GRADING OF HEART MURMURS

- Grade I** Faint; heard after nurse has concentrated
- Grade II** Faint murmur heard immediately
- Grade III** Moderately loud, not associated with thrill
- Grade IV** Loud and may be associated with a thrill
- Grade V** Very loud; associated with thrill
- Grade VI** Very loud; heard with stethoscope off chest, associated with thrill

HEART SOUNDS

Heart sounds produced by valve closure are best heard where blood flows away from the valve instead of directly over the valve. The white circled areas on the corresponding diagram indicate optimal placement of the stethoscope for auscultating heart sounds.

- The systolic phase begins with the first heart sound (S1), the closure of the mitral and tricuspid (AV) valves.
- The diastolic phase begins with the second heart sound (S2), the closure of the aortic and pulmonic (semilunar) valves.



CRANIAL NERVES (CN)

CRANIAL NERVE	TYPE	FUNCTION	ASSESSMENT
I Olfactory	sensory	smell	identify familiar odors with each nare separately
II Optic	sensory	vision	Snellen chart, examine ocular fundus with ophthalmoscope, assess light reflex
III Oculomotor	motor parasympathetic	extraocular eye movement, elevation of eyelid pupil constriction	assess EOM with 6 cardinal positions of gaze cover/uncover test assess constriction with light
IV Trochlear	motor	extraocular eye movement	same as CN III
V Trigeminal Ophthalmic branch	sensory	somatic sensations of cornea and face	palpate temporal and masseter muscles teeth clenched
Maxillary branch	sensory	somatic sensations of face, oral cavity, anterior 2/3 of tongue, teeth	test corneal reflex, touch forehead, cheeks, and chin with cotton wisp
Mandibular branch	sensory motor	somatic sensation lower face mastication	symmetrical comparisons bite down or chew
VI Abducens	motor	lateral eye movement	look to 'right and left'
VII Facial	motor sensory parasympathetic	facial expression taste, anterior 2/3 of tongue salivation	smile, frown, puff cheeks identify taste assess for saliva
VIII Vestibular	sensory	equilibrium	observe balance
Cochlear	sensory	hearing	hearing acuity, Weber & Rinne test
IX Glosso-pharyngeal	sensory motor	taste, post. 1/3 of tongue, pharyngeal sensation swallowing	identifies taste test gag reflex, use tongue blade, note rise of uvula with "ahhh"
X Vagus	sensory motor parasympathetic	sensation in pharynx, larynx, and external ear swallowing thoracic and abdominal visceral activity	test same as CN IX test same as CN IX draw pencil line toward umbilicus
XI Spinal accessory	motor	neck and shoulder movement	push chin against hand, shrug shoulder
XII Hypoglossal	motor	tongue movement	move tongue side to side against a tongue depressor

SYMPTOM ANALYSIS

When assessing a client's problem, remember all these areas to help the client describe the problem fully. Using the mnemonic device, PQRST, a systematic and thorough assessment is possible by considering all of the following areas.

P Provocative/Palliative

What causes it? What makes it better? What makes it worse?

Q Quality/Quantity

How does it feel, look, or sound, and how much of it is there?

R Region/Radiation

Where is it? Does it spread?

S Severity Scale

Does it interfere with ADL? How does it rate on a severity scale of 1 to 10?

T Timing

When did it begin? How often does it occur? Is it sudden or gradual? How long does an episode of the symptom last?

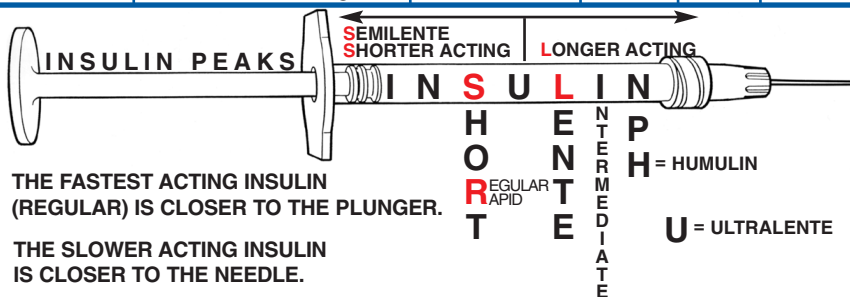
GLASGOW COMA SCALE (GCS)

A neurologic assessment scale that provides objective measurement of level of consciousness, pupil reaction, and motor activity. The total of the three scores can range from 3 to 15. A client who is oriented, opens the eyes spontaneously, and follows commands scores a 15. A client in a deep coma would score a 3. The first GCS score becomes the baseline. Future scores indicate trends or changes in neurologic status.

MEASURE	RESPONSE	SCORE
Eye response	opens spontaneously	4
	opens to verbal command	3
	opens to pain	2
	no response	1
Motor response	reacts to verbal command	6
	reacts to painful stimuli	
	identifies localized pain	5
	flexes and withdraws	4
	assumes flexor posture	3
Verbal response	assumes extensor posture	2
	no response	1
	is oriented and converses	5
	is disoriented but converses	4
	uses inappropriate words	3
	makes unintelligible sounds	2
	no response	1

INSULIN TYPES AND ACTION TIMES

ACTION	TYPE OF S.C. INSULIN	APPEARANCE	ACTION IN HOURS		
			Onset	Peak	Duration
Short	Regular	clear	1/2-1	2-4	5-8
	Semilente	cloudy	1-1.5	2-8	8-16
Intermediate	NPH	cloudy	1-2	6-12	18-26
	Lente	cloudy	1-3	6-12	18-26
Long	Protamine zinc	cloudy	4-6	18-24	28-36
	Ultralente	cloudy	4-6	14-24	36
Premixed	70% NPH & 30% regular	cloudy	1/2	2-12	18-24



PRESSURE SORE STAGING

Stage I

Nonblanchable erythema that remains red 30 min. after pressure has been relieved. Epidermis remains intact.

Stage II

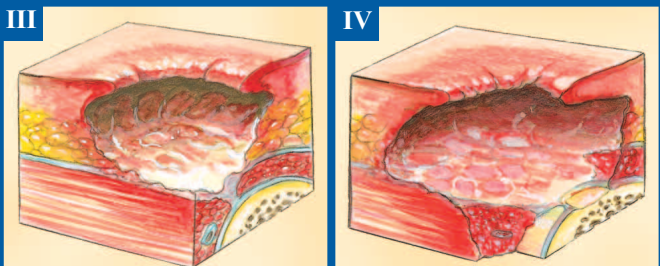
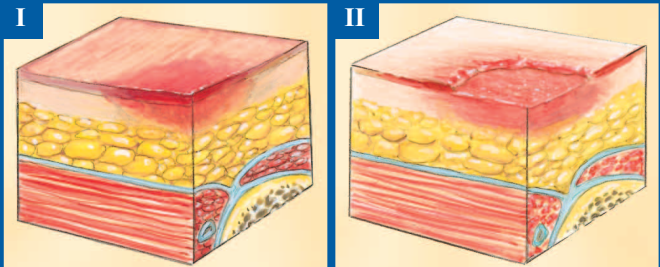
Epidermis is broken, lesion is superficial and there is partial-thickness skin loss.

Stage III

Full-thickness skin loss down through the dermis which may include subcutaneous tissue.

Stage IV

Full-thickness skin loss extending into supportive structures, such as muscle, tendon, and bone.



MUSCLE STRENGTH

- 5 Normal strength. Muscle is able to move through a full range of motion (ROM) against gravity and applied resistance.
- 4 Muscle is able to move through a full ROM against gravity but with weakness to applied resistance.
- 3 Muscle is able to move actively against gravity alone.
- 2 Muscle is able to move with support against gravity.
- 1 Muscle contraction is palpable and visible.
- 0 Muscle contraction or movement is undetectable.

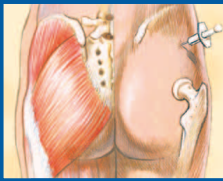
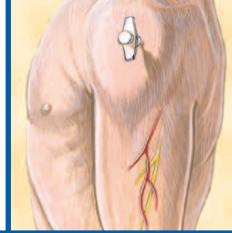
COMMON MEDICAL ABBREVIATIONS

ABG	arterial blood gas
a.c.	before meals
ADL	activities of daily living
ad lib	as desired
AP	anteroposterior
A&P	anterior and posterior
ASHD	arteriosclerotic heart disease
AV	arteriovenous, atrioventricular
b.i.d.	twice a day
bpm	beats per minute
c	with
CAD	coronary artery disease
cc	chief complaint, cubic centimeter
cm	centimeter
C&S	culture and sensitivity
CSF	cerebrospinal fluid
CT	computed tomography
cu	cubic
DIC	disseminated intravascular coagulation
DSA	digital subtraction angiography
FUO	fever of undetermined origin
g, gm	gram
gr	grain
gt, gtt	drop, drops
HS	at bedtime, hour of sleep
ICS	intercostal space
IU	international unit
kg	kilogram
KVO, KO	keep vein open, keep open
KUB	kidneys, ureters, and bladder
l	liter
lb	pound
LUQ	left upper quadrant
M	molar
m	meter, minim
μ	micron
mEq	milliequivalent
mg	milligram
μg	microgram
ml	milliliter
μl	microliter
mm	millimeter
NPO	nothing by mouth
OTC	over the counter
oz	ounce
p.c.	after meals
PERRLA	pupils equal, round, reactive to light and accommodation
P.O.	by mouth
prn	as needed, whenever necessary
PTCA	percutaneous transluminal coronary angioplasty
q	every
qh	every hour
q2h	every 2 hours
q.i.d.	four times a day
RLQ	right lower quadrant
R/O	rule out
ROM	range of motion
RUQ	right upper quadrant
Rx	prescription
s	without
SC, SQ	subcutaneous
subq	subcutaneous
SI	International System of Units
SOB	short of breath
ss	one-half
stat	immediately
sx	symptoms
T&C	type and crossmatch
t.i.d.	three times a day
TPR	temperature, pulse, respirations
tsp	teaspoon
UA	urinalysis
ung, ungt	ointment
URI	upper respiratory infection
UTI	urinary tract infection

INTRAMUSCULAR INJECTION SITES

MID-DELTOID AREA

The recommended boundaries of the injection area form a rectangle bounded by the lower edge of the acromion process on the top to a point on the lateral side of the arm opposite the axilla or armpit on the bottom. Avoid the acromion and humerus, as well as the brachial veins and arteries. Limit the number of injections here as the area is small and cannot tolerate repeated injections or large quantities of medications >1 ml.

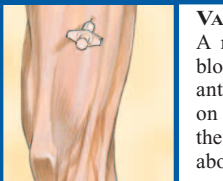
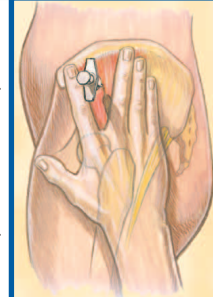


POSTERIOR GLUTEAL AREA (DORSOGLUTEAL)

The most common site for injections. Restrict injections to that portion of the gluteus medius which is above and outside of a diagonal line drawn from the greater trochanter of the femur to the posterior superior iliac spine.

VENTROGLUTEAL AREA

A good site as it is removed from major nerves and vascular structures. Palpate to find the greater trochanter, the anterior superior iliac spine and the iliac crest. When injecting into the left side of the patient, place the palm of the right hand on the greater trochanter and the index finger on the anterior superior iliac spine. Spread the middle finger posteriorly away from the index finger as far as possible along the iliac crest, as shown in the drawing. A "V" space or triangle between the index and middle finger is formed. The injection is made in the center of the triangle with the needle directed slightly upward toward the crest of the ilium. (When injecting into the right side of the patient, use your left hand for placement).

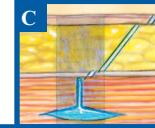
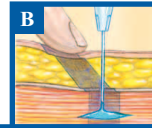
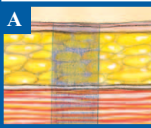


VASTUS LATERALIS AREA

A relatively safe injection site free from major nerves and blood vessels. This injection area is bounded by the mid-anterior thigh on the front of the leg, the mid-lateral thigh on the side, a hand's breadth below the greater trochanter of the femur at the proximal end and another hand's breadth above the knee at the distal end.

Z-TRACK TECHNIQUE

A Z-track technique is used for administering any irritating fluid to 'seal' medication in the muscle. Figure A shows the normal tissue before the injection. As in figure B, retract the tissue, insert the needle, administer medication, remove the needle, and release tissue. Note in figure C, the tissue relationships after the angled Z-tract left by the needle.



5 P'S OF CIRCULATORY CHECKS

P

Pain
Pallor
Paralysis
Paresthesia
Pulse

EDEMA

Assess by placing thumb over the dorsum of the foot or tibia for 5 seconds

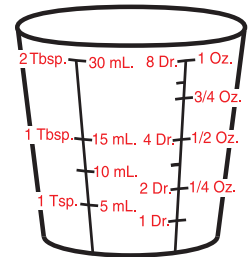
- 0 No edema
- 1+ Barely discernible depression
- 2+ A deeper depression (less than 5 mm) accompanied by normal foot and leg contours
- 3+ Deep depression (5 to 10 mm) accompanied by foot and leg swelling
- 4+ An even deeper depression (more than 1 cm) accompanied by severe foot and leg swelling

PULSES

Peripheral pulses should be compared for rate, rhythm, and quality. Pulses are graded as follows:

- 0 Absent
- +1 Weak and thready
- +2 Normal
- +3 Full
- +4 Bounding

DOSAGE CUP



CALCULATING I.V. DRIP RATE

The physician's order states: 1,000 ml LRS to infuse over 8 hours. The administration set delivers 15 drops per milliliter. What should the drip rate be?

Use the equation:

$$\frac{\text{Total no. of ml}}{\text{Total no. of min}} \times \text{drip factor} = \text{drip rate}$$

Set up the equation using the given data:

$$\frac{1,000 \text{ ml}}{8 \text{ hr} \times 60 \text{ min.}} \times 15 \text{ gtt/ml} = X \text{ gtt/min}$$

After multiplying the number of hours by 60 minutes in the denominator of the fraction, the equation is:

$$\frac{1,000 \text{ ml}}{480 \text{ min}} \times 15 \text{ gtt/ml} = X \text{ gtt/min}$$

After dividing the fraction, the equation is:

$$2.08 \text{ ml/min} \times 15 \text{ gtt/ml} = X \text{ gtt/min}$$

The final answer is 31.2 gtt/min, which can be rounded to 31 gtt/min. The drip rate is 31 drops per minute.

I.V. FLOW RATES

Vary with the type of administration set and the manufacturer.

Mgf.	Drops/cc	Drops/minute to infuse (GTTs)				
		24 hr	20 hr	10 hr	8 hr	6 hr
1,000ml		24	50	100	125	166
cc/hr		42	50	100	125	166
Abbott	15	10	12	25	31	42
Baxter Healthcare	10	7	8	17	21	28
Cutter	20	14	17	34	42	56
IVAC	20	14	17	34	42	56
McGaw	15	10	12	25	31	42

HOUSEHOLD/APOTHECARY/METRIC EQUIVALENTS

Household	Apothecary	Metric
Volume		
---	= 15-16 minims	= 1 milliliter(ml)*
1 tsp	= 1 fld. dram	= 4-5 ml
1 Tbs	= 3-4 fld. drams	= 15-16 ml
1 cup	= 8 fld. ounces	= 240 ml
1 pint	= 16 fld. ounces	= 480 ml
1 quart	= 32 fld. ounces	= 960 ml
Weight		
---	= 1 grain	= 60-65 mg
---	= 15-16 grains	= 1 gram
---	= 1 dram	= 4 grams
2.2 pounds	= ---	= 1 kg
Length		
1 inch	= ---	= 2.54 cm
39.37 inches	= ---	= 1 meter

CONVERSION FACTORS

Weight			C ^o	F ^o
1 gr	= 60-65mg		37.0	98.6
1 mg	= 1000 mcg		37.8	100
1 Gm	= 1000 mg	= 15 gr	38.4	101.1
1 kg	= 1000 Gm	= 2.2 lb	39	102.2
Volume				
1 ml*	= 15 or 16 minims		39.6	103.3
5 ml	= 1 fld. dr	= 1 tsp		
15 ml	= 4 fld. dr	= 1 tbsp		
30 ml	= 8 fld. dr	= 1 ounce		
* ml and cc are equivalent				
			°F = (°C x 1.8) + 32	
			°C = (°F-32) ÷ 1.8	

COMPLETE BLOOD COUNT (CBC) AND DIFFERENTIAL

CBC COMPONENT	ADULT	
	Male	Female
Red blood cells (RBC)	4.5 - 6.2 mm ³	4.2 - 5.4 mm ³
Hematocrit (Hct)	40 - 54%	37 - 47%
Hemoglobin (Hgb)	13.5 - 18 g/dl	12 - 16 g/dl
Red blood cell indices		
MCV (mean corpuscular vol)	80 - 94 μm³	84 - 99 μm³
MCH (mean corpuscular Hgb)	26 - 34 pg	
MCHC (mean corpusc. Hgb conc)	32 - 36%	
White blood cells (WBC)	5,000 - 10,000/mm ³	
Differential WBC		
Neutrophils	48-77% (3,000 - 7,500/mm³)	
Bands	3 - 8% (150 - 700/mm ³)	
Eosinophils	1 - 4% (50 - 400/mm³)	
Basophils	0 - 1% (25 - 100/mm ³)	
Monocytes	1 - 9% (100 - 500/mm³)	
Lymphocytes	25 - 40% (1,500 - 4,500/mm ³)	
T lymphocytes	60 - 80% of lymphocytes	
B lymphocytes	10 - 20% of lymphocytes	
Platelets	150,000 - 450,000/mm³	

SERUM ELECTROLYTES

ELECTROLYTE NORMAL ADULT RANGE	CONDITIONS WITH ABNORMAL FINDINGS	
	INCREASED	DECREASED
Calcium 4.5 to 5.5 mEq/L	resp. acidosis, ATN, bacteremia, chronic hepatic disease	GI malabsorption, alkalosis, burns, cachexia, celiac disease, chronic renal disease, diarrhea
Potassium 3.5 to 5.3 mEq/L	acidosis, adrenocortical insufficiency, anemia, anxiety, asthma, burns, dialysis, dysrhythmias, hypoventilation	GI suction, vomiting, diarrhea, intestinal fistulas, ATN, alcoholism, alkalosis, bradycardia, colon cancer, CP, chronic cirrhosis, CHF, Crohn's disease
Sodium 135 to 145 mEq/L	CHF, dehydration, diabetes insipidus, diaphoresis, diarrhea, hypertension, ostomies, toxemia, vomiting	GI malabsorption, diarrhea, ascites in cardiac failure, bowel obstruction, burns, CP, cirrhosis, DM, emphysema
Chloride 97-107 mEq/L	alcoholism, resp. alkalosis, anemia, CHF, dehydration, fever, head trauma	metab. acidosis, burns, CNS disorders, edema, emphysema, G.I. loss

FOUR PRIMARY ASSESSMENT TECHNIQUES

- INSPECTION:** The process of examining the surface of the body and its movements utilizing visual, auditory and olfactory senses for gathering information. Inspection should be purposeful and systematic comparing bilateral body parts, and continues throughout the entire examination.
- PALPATION:** The technique of using touch to gather information about temperature, turgor, texture, moisture, vibrations, and shape. May use light palpation, which is the application of pressure by closed fingers and depressing the skin and underlying structures about 1/2 inch, or deep palpation, using inward pressure to about 1 inch. The client should be provided with privacy, the nurse should have warm hands with short fingernails, and the area of tenderness should be palpated last.
- PERCUSSION:** The art of striking one object with another to create sound, so that one can assess the location, size and density of underlying tissues. The nondominant hand is placed on the area to be percussed with fingers slightly separated and the dominant hand is used as the striking force by exerting a sharp downward wrist movement so that the tip of the middle finger on the dominant hand strikes the joint of the middle finger on the non-dominant hand.
The five percussion tones are: **tympany** - loud, drumlike sound **resonance** - moderate to loud, low-pitch, hollow sound **hyperresonance** - very loud, low-pitch, booming sound **flatness** - soft, high-pitch, flat sound **dullness** - soft to moderate, high-pitch, thud-like sound
- AUSCULTATION:** The act of listening to sounds produced by the body using a stethoscope. The stethoscope has a diaphragm that detects high-pitched sounds best and a bell that detects low-pitched sounds best.
Four characteristics of sound should be noted: **Pitch Loudness Quality Duration**

COAGULATION STUDIES

COAGULATION SCREENING TESTS	
Bleeding Time (Simplate)	3-9 min.
Prothrombin time (PT)	Men: 9.6 to 11.8 sec Women: 9.5 to 11.3 sec
Partial thromboplastin time (PTT)	25-38 sec
Whole-blood clotting time	5 to 15 min
FIBRINOLYTIC STUDIES	
Euglobin lysis	No lysis in 2 h
Fibrinogen split products (FSP):	<10 mcg/ml of FSP
Thrombin time	10 to 15 sec

7 WARNING SIGNS OF CANCER

- C
A
U
T
I
O
N**
- Change in bowel or bladder habits.
 - A sore that doesn't heal.
 - Unusual bleeding or discharge.
 - Thickening or lump in breast or elsewhere.
 - Indigestion or difficulty in swallowing.
 - Obvious change in wart or mole.
 - Nagging cough or hoarseness.

BASIC HEAD TO TOE ASSESSMENT

ASSESSMENT AREA	WHAT TO OBSERVE
General survey	General appearance and behavior, posture, gait, hygiene, speech, mental status, height and weight, hearing and visual acuity, VS, nutritional status
Head and neck	Skull size, shape, symmetry, hair and scalp, auscultate for carotid bruits, clench jaws, puff cheeks, palpate TMJ, use cotton wisp for facial sensations, test EOMs, cover/uncover test, corneal light reflex, Weber and Rinne test, use ophthalmoscope and otoscope, inspect and palpate teeth and gums, test rise of uvula, test gag reflex, test sense of smell and taste, inspect ROM neck, shrug shoulders, palpate all cervical lymph nodes, palpate trachea for symmetry, palpate thyroid gland
Upper extremities	Inspect skin, blanch fingernails, palpate peripheral pulses, rate muscle strength, assess ROM, test DTRs
Posterior thorax	Inspect spine for alignment, assess anteroposterior to lateral diameter, assess thoracic expansion, palpate tactile fremitus, auscultate breath sounds
Anterior thorax	Observe resp. pattern, palpate resp. excursion, auscultate breath sounds, auscultate heart sounds, inspect jugular veins, perform breast exam
Abdomen	Auscultate for bowel sounds, inspect, light and deep palpation, percuss for masses and tenderness, percuss the liver, palpate the kidneys, blunt percussion over CVAs (posterior thorax) for tenderness
Lower extremities	Inspect skin, palpate peripheral pulses, assess for Homan's sign, inspect and palpate joints for swelling, assess for pedal and ankle edema, assess ROM
General neurologic	Test stereognosis-object identification in hands, test graphesthesia-writing on body with closed pen, test two point discrimination, assess temperature perception, inspect gait and balance, assess recent and remote memory, test cerebellar function by finger to nose test for upper extrem, and running each heel down opposite shin for lower extrem, test the Babinski reflex
Follow with genitalia exam if appropriate	

ODOR ASSESSMENT

ODOR	SITE	POSSIBLE CAUSES
Ammonia	Urine	Urinary tract infection
Fecal odor	Vomit Wound site Rectal area	Bowel obstruction Wound abscess Fecal incontinence
Sweet, fruity odor	Oral cavity	Diabetic acidosis
Stale urine odor	Skin	Uremic acidosis
Sweet, heavy odor	Wound drainage	Bacterial (pseudomonas) infection
Musty odor	Within a cast	Infection inside cast
Fetid sweet odor	Trach or mucous	Infection of bronchial tree (pseudomonas bacteria)

NOTE TO STUDENT

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CREDITS

Author: Jill E. Winland-Brown, EdD, MSN, ARNP
Artist: Vincent Perez
Layout: Rich Marino

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