

### Need to Know Lab Values

Labs	Normal Ranges	
Sodium	136-145	Na <sup>+</sup> swells the body
Potassium	3.5-5	K <sup>+</sup> pumps the heart
Chloride	98-106	Cl <sup>-</sup> maintains serum osmolarity
Calcium	9-10.5	Ca contracts the muscles & maintains bone density
Magnesium	1.3-2.1	Mg <sup>+</sup> mellows the muscle
Albumin	3.5-5	Used to determine liver function; tells how much protein the body is getting
Creatinine	(M)= 0.6-1.3; (F)=0.5-1.1	Is excreted by the kidneys; >1.3 = bad kidneys
BUN	10-20	Urea is a by-product of protein metabolism; tests kidney function
Glucose	74-106	Hypogly = Brain die
RBC	(M)= 4.7-6.1; (F)= 4.2-5.4	Low = anemia, renal disease, vitamin B deficiency
Hemoglobin	(M)= 14-18; (F)= 12-16	<7 = blood transfusion
Hematocrit	(M)= 42-52; (F)= 37-47	Low = over-hydrated; high = dehydrated
Platelets	150,000-400,000	AsaParin, CloPidogrel
WBC	5,000-10,000	High = infection/trauma
Basophils	25-100	Releases histamines, kinins, & heparin in areas of tissue damage; Causes signs & symptoms of inflammation
Neutrophils	Segs: 2,500-8,000	Nonspecific ingestion & phagocytosis of microorganisms & foreign proteins
Neutrophils	Bands: 250-500	Immature neutrophils
Lymphocytes	1,000-4,000	
Monocytes	100-700	Destruction of bacteria & cellular debris; matures into macrophage
Eosinophils	50-500	Releases vasoconstrictive amines during allergic reactions & in response to parasitic infection

### Need to Know Vocab

Term	Definition
Adventitious Lung Sounds	Abnormal sounds that originate in the lungs & airways
Afterload	the pressure or resistance that the ventricles overcome to eject blood through the semilunar valves & into the peripheral blood vessels
Anabolism	The use of energy to change simple materials into complex body substances & tissue
Anti-embolism Hose (TED hose)	Tightly fitting elastic stockings that are used to promote blood flow of venous return & prevent edema in the lower extremities, DVT, venous stasis, & pulmonary embolism



### Need to Know Vocab (cont)

<i>Apnea</i>	Absence of breathing for several seconds
<i>Arteriosclerosis</i>	A thickening or hardening of the arterial wall that's often associated with aging
<i>Atelectasis</i>	The collapse of all of part of a lung
<i>Atherosclerosis</i>	The build up of plaque in coronary arteries around the heart (is a type of arteriosclerosis)
<i>Basal Metabolic Rate (BMR)</i>	The minimum amount of energy required to maintain body functions in the resting, awake state
<i>Bradypnea</i>	Abnormally slow breathing (<10 BPM)
<i>Borborygmus</i>	Increased high-pitched bowel sounds, especially loud, gurgling sounds, result from increased motility of the bowel
<i>Bruits</i>	"Swooshing" sounds over the abdominal aorta, the renal arteries, & the iliac arteries
<i>Cachexia</i>	Physical wasting
<i>Cardiac Index</i>	Can be calculated by dividing cardiac output by the body surface area; Normal range is 2.8-4.2
<i>Cardiac Output</i>	Calculated by multiplying the heart rate in bpm times the stroke volume in liters per beat; is the amount of blood pumped from the left ventricle each minute
<i>Catabolism</i>	The breaking down of substances from complex to simple, resulting in a release of energy
<i>Chyme</i>	Semiliquid product of digestion that travels from the stomach through the intestines
<i>Contractility</i>	The ability of atrial & ventricular muscle cells to shorten their fiber length in response to electrical stimulation
<i>Coronary Artery Disease</i>	Narrowing of the arteries by atherosclerosis, spasms, or congenital malformations
<i>Dual X-Ray Absorptiometry (DXA)</i>	Measures bone mineral density; Spine & hip are most often assessed on a central DXA; Calculates T-score (0= healthy, -1 to -2.5= osteopenia, & <-2.5= osteoporosis)
<i>Dysphagia</i>	Difficulty swallowing
<i>ECG/EKG</i>	A recording of the electrical current generated by the heart during depolarization & repolarization; Test results are interpreted for HR & rhythm, lack of blood supply, abnormalities of conduction system, & arrhythmias
<i>Guaiaac-based Fecal Occult Blood Test</i>	Tests for blood in the stool; more likely to yeild a false positive than fecal immunochemical test due to requiring an active component of guaiac
<i>Hemoptysis</i>	The presence of blood in the sputum



### Need to Know Vocab (cont)

<i>Hypercapnia</i>	Abnormally high levels of CO <sup>2</sup> in the blood (>45 mmHg in arterial blood), may have respiratory depression when supplemental oxygen levels are too high
<i>Hyperlipidemia</i>	Elevation of plasma cholesterol, triglycerides, or both
<i>Hyperventilation</i>	Over-expansion of the lungs, characterized by rapid & deep breaths; CO <sub>2</sub> levels increase & alkalosis happens
<i>Hypoventilation</i>	Under-expansion of the lungs, characterized by shallow, slow respirations
<i>Ischemia</i>	Reduced blood flow
<i>Kwashiorkor</i>	Lack of protein accompanied by fluid retention
<i>Macronutrients</i>	Nutrients that are needed in large amounts
<i>Marasmus</i>	A protein & caloric deficiency
<i>Mean Arterial Pressure</i>	Factors that influence MAP include: Total blood volume (viscosity), Cardiac output (HR x Stroke volume), & Size & integrity of the vascular bed, especially in capillaries
<i>Metabolism</i>	The process of chemically changing nutrients, such as fats & proteins, into end products that are used to meet the energy needs of the body or stored for future use, thereby helping maintain homeostasis
<i>Micronutrients</i>	Nutrients that are needed by the body in limited amounts
<i>Osteomalacia</i>	Bone loss & softening caused by lack of calcification; Cause = lack of vit D
<i>Osteoporosis</i>	Chronic disease of cellular regulation in which bone loss causes significant decreased density & possible fracture; Caused by: lack of Ca <sup>+</sup> & estrogen or testosterone
<i>Peripheral Artery Disease</i>	Is a result of systemic atherosclerosis; Is a chronic condition in which partial or total arterial occlusion decreases perfusion to the extremities
<i>Peripheral Vascular Disease</i>	Includes disorders that change the natural flow of blood through the arteries and veins of the peripheral circulation, causing decreased perfusion to body tissues; is an umbrella term
<i>Peristalsis</i>	Wavelike muscular movement through the digestive tract



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### Need to Know Vocab (cont)

<i>Postural Drainage</i>	A therapeutic way to position a patient to use gravity to help mobilize respiratory tract secretions; Improves ventilation & perfusion & normalizes the functional residual capacity of the lungs
<i>Preload</i>	The degree of myocardial fiber stretch at the end of diastole & just before contraction; Is determined by the amount of blood returning to the heart from both sides
<i>Pulse Deficit</i>	When a patient's radial pulse is slower than the apical pulse because of cardiac contractions that are weak or ineffective at pumping blood to the peripheral tissues & extremities
<i>Pulse Intensity</i>	The strength of the pulse with each beat; Described as normal (able to palpate with normal pressure), diminished (weaker than expected/difficult to palpate), absent (unable to palpate), or bounding (may be able to see pulsation; does not disappear with palpation); rated on a scale of 0-3 with 0 being absent & 3 being Bounding
<i>Pulse Pressure</i>	The difference between the systolic & diastolic values
<i>Renin-Angiotensin System</i>	Regulates BP & fluid balance through vasoconstriction & excretion or reabsorption of sodium
<i>Sequential Compression Devices</i>	Inflatable sleeves that wrap around the legs of patients & are attached to an air source that inflates & deflates, creating a massaging action for the lower extremities
<i>Stroke Volume</i>	The amount of blood ejected by the left ventricle during each contraction; A decrease in SV can result from an increase in afterload without the benefit of compensatory mechanisms, thus leading to a decrease in cardiac output
<i>Tachypnea</i>	Increased respiratory rate of >24 BPM in an adult with quick shallow breaths

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Oxygenation Devices		
Device	Flow Rate	Percentage of Oxygen
Simple Nasal Cannula	1 L/min	24%
	2 L/min	28%
	3 L/min	32%
	4 L/min	36%
	5 L/min	40%
Simple Face Mask	6 L/min	44%
	5 L/min	40%
	6 L/min	45%
	7 L/min	50%
	8 L/min	55%
	>8 L/min	60%
Partial Rebreather Mask	6-15 L/min	70-90%
Trach Mask	Similar to Nasal Cannula	
Face Tent	Rate & Oxygen % Vary	
Venturi Mask	4-12 L/min	24-60%
High-Flow Nasal Cannula	20-60 L/min	Up to 100%
Nonrebreather Mask	10-15 L/min	60-100%

Morse Fall Scale	
Item	Scale
1. History of falling; immediate or within 3 months	No - 0
	Yes - 25
2. Secondary diagnosis	No - 0
	Yes - 15
3. Ambulatory aid	Bed rest/nurse assist - 0
	Crutches/cane/walker - 15
	Furniture - 30
4. IV/Heparin Lock	No - 0
	Yes - 20
5. Gait/Transferring	Normal/bedrest/immobile - 0
	Weak - 10
	Impaired - 20

Morse Fall Scale (cont)	
6. Mental status	Oriented to own ability - 0
	Forgets limitations - 15
Low Risk = 0-24; Moderate Risk = 25-44; High Risk = 45+	

Braden Scale				
<b>Sensory Perception</b>	1. Completely limited	2. Very limited	3. Slightly limited	4. No impairment
<b>Moisture</b>	1. Constantly moist	2. Very moist	3. Occasionally moist	4. Rarely moist
<b>Activity</b>	1. Bedfast	2. Chairfast	3. Walks Occasionally	4. Walks frequently
<b>Mobility</b>	1. Completely immobile	2. Very limited	3. Slightly limited	4. No limitations
<b>Nutrition</b>	1. Very poor	2. Probably inadequate	3. Adequate	4. Excellent
<b>Friction &amp; Shear</b>	1. Problem	2. Potential problem	3. No apparent problem	

To be placed at moderate risk a patient must score 12-14, to be placed at low risk a patient must score 15-16

Pressure Injury Stages	
Stage	Characteristics
1	Intact, nonblistered skin with nonblanchable erythema, or persistent redness in area that has been exposed to pressure
2	Partial thickness wound that involves epidermis &/or dermis, but does not extend below the level of the dermis
3	Full thickness wound that extends into the subcutaneous tissue, but does not extend through the fascia to bone, muscle, or connective tissue
4	Full thickness wound, but deeper than stage 3; involves exposure of muscle, bone, or connective tissue



### Pressure Injury Stages (cont)

<i>Unstageable</i>	Full thickness wound where the amount of necrotic tissue in the wound bed makes it impossible to assess the depth of the wound or any involvement of underlying structures
<i>Suspected Deep Tissue injury</i>	An area of intact skin that is purple/maroon or a blood filled blister; The true depth of damage is not readily apparent on initial inspection

### Normal Ranges for Vital Signs

Vital Sign	Range
Pulse	60-100 bpm
Temperature	96.4-99.6°F
Respirations	12-20
Oxygen Saturation	>95%
Systolic Blood Pressure	90-<120
Diastolic Blood Pressure	60-<80

### Glasgow Coma Scale

Response	Level of Arousal	Points
<i>Eye Opening</i>	Spontaneous	4
	To verbal command	3
	To pain	2
<i>Verbal</i>	None	1
	Oriented	5
	Confused but able to answer questions	4
<i>Motor</i>	Inappropriate responses, words discernible	3
	Incomprehensible speech	2
	None	1
	Obeys Commands	6
	Purposeful movement to painful stimulus	5
	Withdrawals from pain	4
<i>Abnormal (spastic) flexion, decorticate posture</i>	Abnormal (spastic) flexion, decorticate posture	3
	Extensor rigid response, decerebrate posture	2
	None	1

Fully alert & oriented people score 15 pts. A score of <7 reflects a patient who is comatose.

### Breath Sounds

Breath Sound	Character	Association	Site
<i>Crackles (coarse)</i>	Lower-pitched, coarse, rattling sounds caused by fluid or secretions in large airways; likely to change with coughing or suctioning	Bronchitis, pneumonia, tumors, pulmonary edema	Right & left lung bases
<i>Crackles (fine)</i>	Popping, discontinuous sounds caused by air moving into previously deflated airways; sounds like hair being rolled between fingers near the ear; "Velcro" sounds late in inspiration usually associated with restrictive disorders	Asbestosis, atelectasis, interstitial fibrosis, bronchitis, pneumonia, chronic pulmonary disease	Right & left lung bases
<i>Pleural Friction Rub</i>	Loud, rough, grating, scratching sounds caused by the inflamed surfaces of the pleura rubbing together; often associated with pain on deep inspirations; heard in lateral lung fields	Pleurisy, TB, pulmonary infarction, pneumonia, lung cancer	Anterior lateral thorax



### Breath Sounds (cont)

<b>Rhonchi</b>	Lower-pitched, coarse, continuous snoring sound; arise from the large airways; both inspiration & expiration	Thick tenacious secretions, sputum production, obstruction by a foreign body, tumors	Over the trachea & bronchi, but can be referred to all lung fields
<b>Stridor</b>	Intense, high-pitched & continuous monophonic wheeze or crowing sound, loudest during inspiration when airways collapse due to lower internal lumen pressure; often heard without the aid of a stethoscope	Turbulent airflow in upper airway, may be indicative of serious airway obstruction from epiglottitis, croup, a foreign body lodged in the airway, or a laryngeal tumor	Trachea & large airways
<b>Wheeze</b>	Squeaking, musical, continuous sounds associated with air rushing through narrowed airways, may be heard without stethoscope, Arise from the small airways, Usually do not clear with coughing, Heard on expiration	Inflammation, bronchospasm (bronchial asthma), edema, secretions, pulmonary vessel engorgement (as in cardiac "asthma")	All lung fields

### Pain

<b>Chronic Pain</b>	Postoperative pain that persists >3 months & pain (not following surgery) lasting >6 months; It interferes with daily functioning & is accompanied by distress on a continuing basis
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### Pain (cont)

<b>Acute Pain</b>	Lasts <3-6 months, depending on specific circumstances can be caused by a pH alteration, which results in depletion of oxygen to tissue, pressure on tissues, over stretching of body cavities with fluid or air, or external injury to tissues
<b>Referred Pain</b>	Originates in 1 area but hurts in another area, such as pain from a myocardial infarction
<b>Radiating Pain</b>	Extends from the source to an adjacent are of the body; Ex: GERD- pain in stomach radiates up the esophagus
<b>Visceral Pain</b>	Arises from the organs of the body & occurs in conditions such as appendicitis, pancreatitis, inflammatory bowel disease, bladder distention, & cancer
<b>Somatic Pain</b>	Results from injury to skin, muscles, bones, & joints. Occurs in conditions such as sunburn, lacerations, fractures, sprains, arthritis, & bone cancer
<b>Neuropathic Pain</b>	Results from nerve injury, & the pain continues even after the painful stimuli are gone
<b>Phantom Pain</b>	Occurs when the brain continues to receive messages from the area of an amputation
<b>Psychogenic Pain</b>	Pain that is perceived by an individual but has no physical cause

