Need to Know Lab Values

Labs	*Normal Ranges*	
Sodium	136-145	Na^+ swells the body
Potassium	3.5-5	K^+ pumps the heart
Chloride	98-106	Cl^- maintains serum osmolarity
Calcium	9-10.5	Ca contracts the muscles & maintains bone density
Magnesium	1.3-2.1	Mg^+ 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	Nonspeccific ingestion & phagocytosis of microorganisms & foreign proteins
Neutrophils	Bands: 250-500	Immature neutrophils
Lympho-cytes	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)	
Apnea	Absence of breathing for several seconds
Arteriosclerosis	A thickening or hardening of the arterial wall that's often associated with aging
Atelectasis	The collapse of all of part of a lung
Atherosclerosis	The build up of plaque in coronary arteries around the heart (is a type of arteriosclerosis)
Basal Metabolic Rate (BMR)	The minimum amount of energy required to maintain body functions in the resting, awake state
Bradypnea	Abnormally slow breathing (<10 BPM)
Borborygmus	Increased high-pitched bowel sounds, especially loud, gurgling sounds, result from increased motility of the bowel
Bruits	"Swooshing" sounds over the abdominal aorta, the renal arteries, & the iliac arteries
Cachexia	Physical wasting
Cardiac Index	Can be calculated by dividing cardiac output by the body surface area; Normal range is 2.8-4.2
Cardiac Output	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
Catabolism	The breaking down of substances from complex to simple, resulting in a release of energy
Chyme	Semiliquid product of digestion that travels from the stomach through the intestines
Contractility	The ability of atrial & ventricular muscle cells to shorten their fiber length in response to electrical stimulation
Coronary Artery Disease	Narrowing of the arteries by atherosclerosis, spasms, or congenital malformations
Dual X-Ray Absorptiometry (DXA)	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= osteporosis
Dysphagia	Difficulty swallowing
ECG/EKG	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
Guaiac-based Fecal Occult Blood Test	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
Hemoptysis	The presence of blood in the sputum

Need to Know Vocab (cont)	
Hypercapnia	Abnormally high levels of CO^2 in the blood (>45 mmHg in arterial blood), may have respiratory depression when supplemental oxygen levels are too high
Hyperlipidemia	Elevation of plasma cholesterol, triglycerides, or both
Hyperventilation	Over-expansion of the lungs, characterized by rapid & deep breaths; CO^2 levels increase & alkalosis happens
Hypoventilation	Under-expansion of the lungs, characterized by shallow, slow respirations
Ischemia	Reduced blood flow
Kwashiorkor	Lack of protein accompanied by fluid retention
Macronutrients	Nutrients that are needed in large amounts
Marasmus	A protein & caloric deficiency
Mean Arterial Pressure	Factors that influence MAP include: Total blood volume (viscosity), Cardiac output (HR x Stroke volume), & Size & integrity of the vascular bed, especially in capillaries
Metabolism	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
Micronutrients	Nutrients that are needed by the body in limited amounts
Osteomalacia	Bone loss & softening caused by lack of calcification; Cause = lack of vit D
Osteoporosis	Chronic disease of cellular regulation in which bone loss causes significant decreased density & possible fracture; Caused by: lack of Ca^+ & estrogen or testosterone
Peripheral Artery Disease	Is a result of systemic atherosclerosis; Is a chronic condition in which partial or total arterial occlusion decreases perfusion to the extremities
Peripheral Vascular Disease	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
Peristalsis	Wavelike muscular movement through the digestive tract

Need to Know Vocab (cont)	
Postural Drainage	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
Preload	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
Pulse Deficit	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
Pulse Intensity	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
Pulse Pressure	The difference between the systolic & diastolic values
Renin-Angiotensin System	Regulates BP & fluid balance through vasoconstriction & excretion or reabsorption of sodium
Sequential Compression Devices	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
Stroke Volume	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
Tachypnea	Increased respiratory rate of >24 BPM in an adult with quick shallow breaths

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%
	6 L/min	44%
Simple Face Mask	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

Sensory Perception	1. Completely limited	2. Very limited	3. Slightly limited	4. No impairment
Moisture	1. Constantly moist	2. Very moist	3. Occasionally moist	4. Rarely moist
Activity	1. Bedfast	2. Chairfast	3. Walks Occasionally	4. Walks frequently
Mobility	1. Completely immobile	2. Very limited	3. Slightly limited	4. No limitations
Nutrition	1. Very poor	2. Probably inadequate	3. Adequate	4. Excellent
Friction & Shear	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*
Stage 1	Intact, nonblistered skin with nonblanchable erythema, or persistent redness in area that has been exposed to pressure
Stage 2	Partial thickness wound that involves epidermis &/or dermis, but does not extend below the level of the dermis
Stage 3	Full thickness wound that extends into the subcutaneous tissue, but does not extend through the fascia to bone, muscle, or connective tissue
Stage 4	Full thickness wound, but deeper than stage 3; involves exposure of muscle, bone, or connective tissue

Pressure Injury Stages (cont)

Unstag-eable	Full thickness wound where the amount of necrotic tissue in th wound bed makes it impossible to asses the depth of the wound or any involvement of underlying structures
Suspected Deep Tissue injury	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^{o}F
Respirations	12-20
Oxygen Saturation	>95%
Systolic Blood Pressure	90-<120
Diastolic Blood Presure	60-<80

Glasgow Coma Scale

Response	*Level of Arousal*	*Points*
Eye Opening	Spontaneous	4
	To verbal command	3
	To pain	2
	None	1
Verbal	Oriented	5
	Confused but able to answer questions	4
	Inappropriate responses, words discernible	3
	Incomprehensible speech	2
	None	1
Motor	Obeys Commands	6
	Purposeful movement to painful stimulus	5
	Withdrawals from pain	4
	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*
Crackles (coarse)	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
Crackles (fine)	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
Pleural Friction Rub	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)			
Rhonchi	Lower-pitched, coarse, continous 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
Stridor	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 epiglottis, croup, a foreign body lodged in the airway, or a laryngeal tumor	Trachea & large airways
Wheeze	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	
Chronic Pain	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

Pain (cont)	
Acute Pain	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
Referred Pain	Originates in 1 area but hurts in another area, such as pain from a myocardial infarction
Radiating Pain	Extends from the source to an adjacent are of the body; Ex: GERD- pain in stomach radiates up the esophagus
Visceral Pain	Arises from the organs of the body & occurs in conditions such as appendicitis, pancreatitis, inflammatory bowel disease, bladder distention, & cancer
Somatic Pain	Results from injury to skin, muscles, bones, & joints. Occurs in conditions such as sunburn, lacerations, fractures, sprains, arthritis, & bone cancer
Neuropathic Pain	Results from nerve injury, & the pain continues even after the painful stimuli are gone
Phantom Pain	Occurs when the brain continues to recieve messages from the area of an amputation
Psychogenic Pain	Pain that is perceived by an individual but has no physical cause