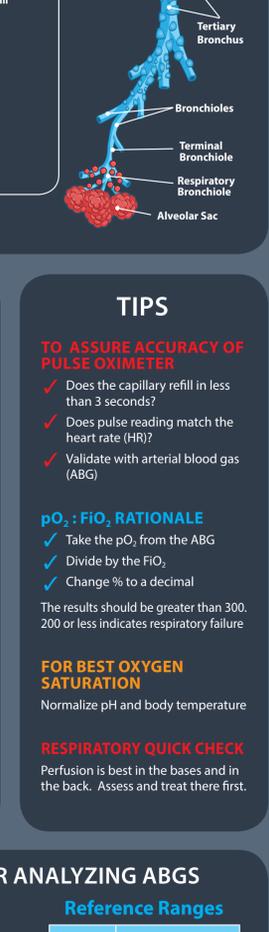
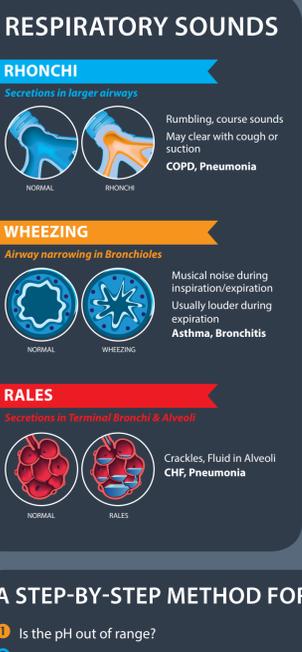


THE ASSESSMENT COMPANION

RESPIRATORY

ANATOMY OF THE LUNGS



RESPIRATORY SOUNDS

RHONCHI

Secretions in larger airways

Rumbling, coarse sounds
May clear with cough or suction
COPD, Pneumonia

WHEEZING

Airway narrowing in Bronchioles

Musical noise during inspiration/expiration
Usually louder during expiration
Asthma, Bronchitis

RALES

Secretions in Terminal Bronchi & Alveoli

Crackles, Fluid in Alveoli
CHF, Pneumonia

TIPS

TO ASSURE ACCURACY OF PULSE OXIMETER

- ✓ Does the capillary refill in less than 3 seconds?
- ✓ Does pulse reading match the heart rate (HR)?
- ✓ Validate with arterial blood gas (ABG)

pO₂ : FiO₂ RATIONALE

- ✓ Take the pO₂ from the ABG
- ✓ Divide by the FiO₂
- ✓ Change % to a decimal

The results should be greater than 300. 200 or less indicates respiratory failure

FOR BEST OXYGEN SATURATION

Normalize pH and body temperature

RESPIRATORY QUICK CHECK

Perfusion is best in the bases and in the back. Assess and treat there first.

A STEP-BY-STEP METHOD FOR ANALYZING ABGS

- 1 Is the pH out of range?
- 2 Is the pCO₂ normal?
- 3 Is the pHCO₂ out of range?
- 4 Match the abnormal result with the pH
- 5 Does the PaCO₂ or HCO₃ go in the opposite direction of the pH?
- 6 Is the pO₂ and SO₂ out of range?

Reference Ranges

pH	7.35–7.45
pCO ₂	35–45 mmHg
HCO ₃	22–26 mEq/L
pO ₂	80–100 mmHg
SO ₂	95–100%

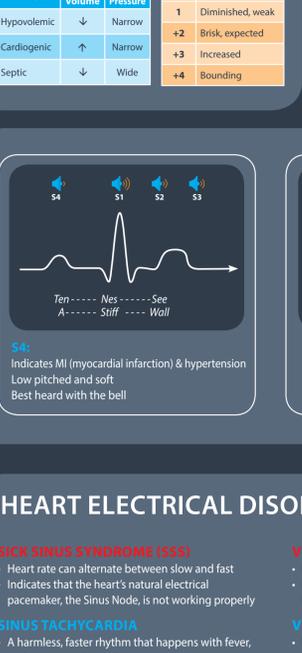
RESPIRATORY ALPHABET SOUP

ABG	Arterial blood gas
CO₂	Carbon dioxide
FiO₂	Fraction of inspired oxygen
HCO₃	Bicarbonate
H₂CO₃	Carbonic Acid
HR	Heart rate
O₂	Oxygen
PO₂	Partial pressure of oxygen
PaO₂	Partial pressure of oxygen in arterial blood
PvO₂	Partial pressure of oxygen in venous blood

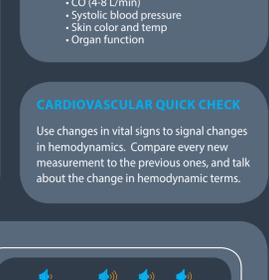
PaCO₂	partial pressure of carbon dioxide in arterial blood
pH	Potential of hydrogen
PvCO₂	Partial pressure of carbon dioxide in venous blood
SO₂	Oxygen saturation
SAO₂	Oxygen saturation in arterial blood
SVO₂	Oxygen saturation in venous blood
TCO₂	Total carbon dioxide content

CARDIOVASCULAR

ANATOMY OF THE HEART



THE HEART WALL



The pericardial space (filled with pericardial fluid)

- Limits the movement of the heart
- Protects it from infections coming from other organs
- Prevents excessive dilation of the heart
- Lubricates the heart

ABNORMAL PULSES

HYALIN, THready PULSE

Cause: Shock

BOUNDING PULSE

Cause: Hyperdynamic phase of sepsis, hypertension

PULSUS ALTERNANS (STRONG, WEAK)

Cause: Severe cardiac dysfunction

PULSUS PARADOXUS

Cause: Mechanical ventilation, Air trapping (asthma, COPD), Cardiac tamponade

SHOCK			PERIPHERAL PULSES		
Shock Type	Pituit Volume	Pulse Pressure	0	1	2
Hypotensive	↓	Narrow	0	Diminished, weak	3
Cardiogenic	↑	Narrow	+2	Brisk, expected	4
Septic	↓	Wide	+3	Increased	5
			+4	Bounding	6

FLUID VOLUME: (PRELOAD)

- CVP (0-8 mmHg)
- PAOP (5-12 mmHg)
- JVD
- Dependent edema
- Capillary refill
- I & O
- Daily weights

RESISTANCE: (AFTERLOAD)

- SVR (800-1400 dynes)
- Diastolic blood pressure
- Skin color and temp
- Capillary refill
- Organ dysfunction

PUMP PERFORMANCE (CARDIAC OUTPUT)

- CO (4-8 L/min)
- Systolic blood pressure
- Skin color and temp
- Organ function

CARDIOVASCULAR QUICK CHECK

Use changes in vital signs to signal changes in hemodynamics. Compare every new measurement to the previous ones, and talk about the change in hemodynamic terms.

HEART ELECTRICAL DISORDERS

SINUS BRADY SYNDROME (SBS)

- Heart rate can alternate between slow and fast
- Indicates that the heart's natural electrical pacemaker, the Sinus Node, is not working properly

SINUS TACHYCARDIA

- A harmless, faster rhythm that happens with fever, excitement, and exercise

ATRIAL FIBRILLATION (AF OR A-FIB)

- Heart rate is irregular and rapid
- Is caused by disorganized signals from the heart's electrical system

ATRIAL FLUTTER (A-F)

- Heart rate is regular and rapid
- Is caused by a single electrical wave that circulates very rapidly in the atrium

JUNCTIONAL RHYTHM

- Occurs when the AV Node takes over as the primary pacemaker site in the heart either because the SA node has failed or the AV Node is going faster and over takes the SA Node
- Junctional rhythm: 40-60 beats per minute
- Accelerated junctional rhythm: 60-100 beats per minute
- Junctional tachycardia: greater than 100 beats per minute

VENTRICULAR TACHYCARDIA (VT)

- Heart rate that is regular and rapid
- Heart beat starts in the lower part of the heart (Ventricles)

VENTRICULAR FIBRILLATION (VF)

- Heart rate that is regular and rapid which cause the Ventricles of the heart to quiver uselessly, instead of pumping blood.
- Causes blood pressure to plummet, cutting off blood supply to the vital organs

PREMATURE "SKIPPED" BEATS are the most common cause of irregular heart rhythms

LONG QT SYNDROME (LQTS)

- Disorder of the electrical system

HEART BLOCK

- Heart rate is too slow
- Caused when the electrical signals from the upper chambers of the heart (Atria) cannot travel to the lower chambers (Ventricles)

SYNCOPE (FAINTING)

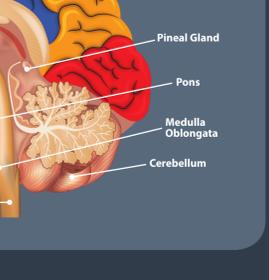
- A heart rhythm disorder that causes fainting or feeling as if one might pass out

GENITOURINARY

ANATOMY OF THE URINARY SYSTEM



NEPHRON



Nephrons are the functional unit of the kidney that produce urine in the process of removing waste and excess substances from the blood. There are about 1,000,000 Nephrons in each human kidney.

GU QUICK CHECK

Decreased urine output could be from dehydration or acute renal dysfunction—check the creatinine clearance.

URINE COLOR INTERPRETATION

- WHITE**: Over hydration
- PALE YELLOW**: Normal
- DARK YELLOW**: Dehydration, vitamins
- AMBER OR HONEY**: Dehydration, vitamins
- ORANGE**: Dehydration, food, vitamins, liver dysfunction

- SYRUP**: Severe dehydration, liver dysfunction
- DARK BROWN**: Severe dehydration, liver dysfunction
- SMOKEY BROWN**: Drugs
- PINK OR RED**: Blood, drugs, food
- BLUE OR GREEN**: Food, bacterial infection, medications

NEUROLOGIC

ANATOMY OF THE BRAIN



5-POINT NEURO CHECK

- 1 Behavior
 - 2 Speech
 - 3 Content
 - 4 Arousability
 - 5 Systolic BP
- BEST** (top) and **WORST** (bottom)

NEURO QUICK CHECK

CONSCIOUS PATIENT watch his/her behavior

UNCONSCIOUS PATIENT watch his/her systolic blood pressure

GASTROINTESTINAL

ANATOMY OF THE GITRACT



- | SMALL INTESTINE | LARGE INTESTINE |
|-----------------|-----------------------|
| 1 Duodenum | 1 Cecum |
| 2 Jejunum | 2 Ascending colon |
| 3 Ileum | 3 Right colic flexure |
| | 3 Transverse colon |
| | 3 Left colic flexure |
| | 3 Descending colon |
| | 3 Sigmoid colon |

HOW DIGESTION WORKS

- MOUTH**: Chewing breaks food into smaller pieces, mixing it with enzymes in your saliva. Starches begin to digest.
- ESOPHAGUS**: The esophagus moves the food from the mouth to the stomach.
- STOMACH**: The food mixes and grinds with gastric juices which help digest proteins and other foods while minimizing harmful bacteria.
- LIVER**: The liver produces bile which is released into the small intestine. It helps to break down fats and fatty acids so they are more easily absorbed.
- GALLBLADDER**: A storage tank for the extra bile produced by the liver, the gallbladder releases the bile into the small intestine when it is needed.
- PANCREAS**: Connected to the top of the small intestine, the pancreas manufactures three important enzymes to digest lipids, carbohydrates, proteins, and nucleic acids. It also produces Insulin which controls the amount of sugar in the blood.
- SMALL INTESTINE**: Most of the nutrients from the food is absorbed through the intestine lining known as the mucosa.
- LARGE INTESTINE**: What is left over from the small intestine travels into the large intestine. Here water, fat soluble vitamins and minerals are absorbed. Living bacteria named Flora break down and extract what small amount of nutrients are left. The waste left over will then exit the body.

BACTERIAL FLORA

- GOOD FLORA**
- BIFIDOBACTERIA**: Bifidobacteria helps to regulate other bacteria, modulate immune responses to invading pathogens, prevent tumor formation and produce vitamins.
 - ESCHERICHIA COLI**: Some strains of Escherichia Coli help to produce vitamin K2 and help to keep bad bacteria in check. Bad strains can cause illness.
 - LACTOBACILLI**: Beneficial strains produce vitamins and nutrients, boost immunity and protect against carcinogens.
- BAD FLORA**
- CAMPYLOBACTER**: Some strains of Campylobacter are most commonly associated with human disease. Infection usually occurs through ingestion of contaminated food.
 - ENTEROCOCCUS FAECALIS**: Can cause endocarditis and epididymitis, urinary tract infections, meningitis, and other infections in humans. Common cause of post-surgical infections.
 - CLOSTRIDIUM DIFFICILE**: Causes colitis by producing toxins that damage the lining of the colon. Most harmful following a course of antibiotics when it is able to proliferate.

GI QUICK CHECK

Absent bowel sounds and abdominal pain signal bowel infarction.

BOWEL SOUNDS

HYPERACTIVE	HYPOACTIVE
Diarrhea	Infarction
GI bleeding	Perforation
Colitis	Ileus
Enteritis	Narcotics
	Surgery

SIGNS OF PERITONITIS

- Pain
- Rebound tenderness
- Diminished bowel sounds
- Taut abdominal muscles
- Nausea / vomiting
- Fever
- Shock
- Respiratory Failure

Condition	HCT	BUN
Dehydration	↑	↑
GI Bleed	↓	Norm
Overhydration	↓	↓

PATHOLOGY

LABS TO WATCH

Basic Metabolic Panel		Complete Blood Count	
	Normal Values		Normal Values
Glucose	70-100 mg/dL	White blood cells (WBC)	4500-10000
Calcium	9.0-10.5 mg/dL	Red blood cells (RBC)	4.2-6.1
Potassium	135-145 mmol/L	Hemoglobin (Hb)	12.1-17.2
Sodium	3.5-5.0 mEq/L	Hematocrit (HCT)	36-50%
CO ₂	23-29 mmol/L	Platelets	150,000-450,000
Chloride	95-103 mEq/L	Mean corpuscular volume (MCV)	80-95
BUN	8-20 mg/dL	Mean corpuscular hemoglobin (MCH)	27-31
Creatinine	0.7-1.2 mg/dL		