



## ***Module 5:***

# **ICU Lab Values**

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## Objectives

Upon completion of this module, the participant will be able to:

- Identify lab values relevant to care for a patient with critical illness
  - Interpret common lab values
  - Discuss implications of lab value changes and impact on activity
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# Important Lab Values for the ICU

- Hgb
- INR
- PTT, aPTT
- Lactate
- CK
- Troponin

## Hemoglobin (Hgb)

- **Description:** Protein responsible for transport of oxygen within the blood.
- **Normal Range:**
  - Female: 12-16 g/dL
  - Male: 14-17 g/dL

# Hemoglobin (Hgb)

## Precautions and considerations

- ↑ - may indicate dehydration & polycythemia (HA, dizzy, blurred vision).
- > 8 gm/dL: Ambulation and self care as tolerated; resistance exercises
- < 8 – 10 gm/dL: essential activities of daily living, assistance as needed for safety; light aerobics, light weights (1-2 lbs)

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# International Normalized Ratio (INR)

- **Description:** Assesses blood clotting time in patients using Warfarin
  - Normal Range: 0.9-1.1
  - Therapeutic Range (may differ based on patient needs): 2.0-3.0
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# International Normalized Ratio (INR)

## **Precautions and considerations**

- If not in therapeutic range, check to see if the patient is therapeutic on another anticoagulant
  - Supratherapeutic ranges: increased risk of bleeding
    - Limit potential falls
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# Partial Thromboplastin Time (PTT) and Activated Partial Thromboplastin Time (aPTT)

- **Description:** Measures clotting time for patients on Heparin
- Normal Ranges:
  - PTT: 20-35 seconds
  - aPTT: 0.3-0.7 U/mL
- Therapeutic Ranges (vary based on patient goals):
  - PTT: 1.5-2.5x normal range (60-80 sec)
  - aPTT: 70-120 U/mL



# Partial Thromboplastin Time (PTT) and Activated Partial Thromboplastin Time (aPTT)

## **Precautions and considerations**

- Increased risk of bleeding if range is greater than specified by therapeutic range
- Sub-therapeutic: Consider holding therapy until therapeutic if patient is at high risk for DVT or PE

# Lactate

- **Description:** Concentration of lactic acid in the blood as a result of anaerobic metabolism when oxygen delivery is insufficient to meet metabolic demands
- Elevated in patients with sepsis
- Normal range:
  - Unstressed, non-ICU patient: 0.5- 1.0 mmol/L
  - ICU patient: <2.0 mmol/L

# Lactate

- **Precautions and considerations**

- Hyperlactatemia: 2-4 mmol/L
- Excessive muscle activity will elevate lactate
- No formal parameters; consider limiting activity to light exercise (ROM) in patients with hyperlactatemia, and holding activity when >4 mmol/L

# Creatinine Kinase (CK)

- **Description:** Measurement of creatinine kinase (CK) levels in the blood
- Elevates after myocardial infarction, skeletal muscle injury, strenuous exercise
- **Normal Range: 30-170 U/L**
  - Male (adult): 52-336 U/L
  - Female (adult): 38-176 U/L

# Creatinine Kinase (CK)

- **Precautions and considerations**

- Elevate 4-6 hours after MI, peaks 12-24 hours after MI, and clears after 48-72 hours
- Activity should be limited or held when CK trend is rising
- Activity can continue once CK trends down toward normal range

# Troponin

- **Description:** Protein involved in muscle contraction; used as a diagnostic marker for heart disorders and myocardial infarction
- Elevates after MI
- Normal Range: 0.04 mcg/L

# Troponin

## Precautions and considerations

- Troponin enzyme begins rising at 8 hours after MI, peaks at 12-16 hours, return to normal within 1 week
- Troponin  $>.2$  mcg/L indicates myocardial damage
  - Hold activity until 24 hours AFTER troponins peak and begin trending down

## References

- Andersen L, Mackenhauer J, Roberts J, Berg K, Cocchi M, Donnino M. Etiology and therapeutic approach to elevated lactate. *May Clin Proc.* 2013; 88 (10): 1127-1140.
- Acute Care Section APTA. Lab values interpretation resources. 2013.