

**Vanderbilt University Medical Center**  
**Emergency General Surgery Service**  
Surgical Residency Rotation and Curriculum

**UNIT 3      FLUID AND ELECTROLYTE HOMEOSTASIS**

---

**UNIT OBJECTIVES:**

1. Demonstrate an understanding of normal fluid and electrolyte homeostasis.
2. Demonstrate the ability to maintain homeostasis by recognizing and correcting fluid and electrolyte derangements.

**COMPETENCY-BASED KNOWLEDGE OBJECTIVES:**

1. Describe body water distribution and its compartmentation.
2. Indicate the normal electrolyte distribution of cell water and extracellular fluid to include the following:
  - a. Normal sodium and water distribution and metabolism
  - b. Clinical estimation of salt and water balance
  - c. Maintenance requirements
3. Outline the normal electrolyte content of body fluids such as blood, extracellular fluid (ECF), urine, saliva, gastric juice, bile, pancreatic fluid, and succus entericus.
4. Identify water and electrolyte changes in response to various stress situations such as:
  - a. Diseases, particularly acute abdominal conditions with external loss (vomiting, diarrhea), third space, and bleeding
  - b. Operative therapy
  - c. Non-operative therapy (such as small bowel obstruction, pancreatitis, colitis, etc.)
5. Analyze water and electrolyte disorders affecting the hospitalized elderly by discussing the etiology and treatment of such conditions as:
  - a. Water overload
  - b. Plasma volume depletion
  - c. Changes in serum sodium levels
  - d. Changes in serum potassium levels
6. Integrate physiology of electrolytes with renal disease by discussing:
  - a. Inappropriate antidiuretic hormone (ADH or vasopressin)
  - b. Oliguria (Pre, Renal, Post)
  - c. Principles of and indications for dialysis
7. Distinguish between fluid and electrolyte abnormalities: preoperatively, intraoperatively, and postoperatively.

**COMPETENCY-BASED PERFORMANCE OBJECTIVES:**

1. Use patient fluid balance data as general measures of fluid homeostasis.
2. Estimate the patient's state of sodium and water balance by history and physical examination in the following locations/situations:
  - a. Emergency department and Surgery Admitting area

**Vanderbilt University Medical Center**  
**Emergency General Surgery Service**  
Surgical Residency Rotation and Curriculum

- b. Pre- and post- operative patients
  - c. In conjunction with nutritional considerations in patients on long-term total parenteral nutrition (TPN).
3. Provide fluid and electrolyte orders to nursing staff for such situations as:
- a. Sepsis
  - b. Major surgery requiring transfusion
  - c. Ascites
  - d. Cardiac failure
  - e. Malnutrition
  - f. Fistulas (high output intestinal)
4. Manage patients with hypo- and hyper- kalemia.