University of Al- Mustaqbal

College Of Nursing

Critical Care Nursing

4th stage

semester 1

lecture 2

(Critical Care Environment & Physiological Needs of Critical Ill Patients)

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Introduction

Critically ill patients: are those patients who are at high risk for actual or potential life threatening health problems.

- physiologically unstable and require close monitoring.
- Survival depends on advanced technology + skilled nursing care.
- ICU environment has both **positive and negative** effects.

Lecture objectives:

- Understand ICU environment
- Identify environmental problems
- Explore patient's basic needs
- Develop nursing care plans

Critical Care Environment

- Specialized unit for continuous monitoring and treatment.
- **Physical aspects**: The physical environment of a critical care unit plays a crucial role in both clinical effectiveness and patient/family experience.
- The environment may appear complex or chaotic, it is purposefully designed to support rapid, life-sustaining interventions. **Physical Components**: (monitors, ventilators, infusion pumps, alarms.)
- **Psychological aspects:** ICU environment often leads to **psychological stress**, as patients and their families are typically unprepared for the intensity of care and the unfamiliar setting. **Psychological aspects (**anxiety, confusion, dependency).
- **Nursing role:** balance between technology and patient comfort.

Environmental Problems

Noise

- **Sources:** alarms, staff conversations, visitors.
- **Effects on patients:** The noise level alone is sufficient to cause discomfort and sleep disturbance, stress, delirium. it is a major factor contributing to sensory overload.
- **Effects on staff:** fatigue, reduced concentration.

Lighting

- **Lighting:** constant exposure disrupts circadian rhythm.
- Difficult day/night orientation for patients.

Environmental Modification / Improvement

- Noise reduction: alarm protocols, staff awareness, soundproofing.
- Lighting control: day/night cycles, dim lights at night.
- Comfort & privacy: minimize unnecessary interruptions.
- Family support: scheduled visits, involvement in care.

Basic Physiological Needs (Overview)

Critically ill patients need careful attention to:

1. Sleep
2. Nutrition
3. Mobility
4. Safety

Sleep

Importance of Sleep in Critically Ill Patients

- **Physiological importance:**
  - Promotes tissue healing and cell regeneration
  - Strengthens immune system → lowers risk of infection
  - Regulates hormones (e.g., cortisol, growth hormone)
  - Improves cardiovascular stability and blood pressure control
- **Psychological importance:**
  - Enhances cognitive function, orientation, memory
  - Reduces anxiety, stress, and delirium
  - Improves emotional well-being and coping

Sleep Disturbance in ICU

Sleep disturbances common problem in critically ill patients . The consequences of inadequate sleep include changes in **metabolism and immune response as well as respiratory** dysfunction. These may lead to **delayed healing** and prolong need for mechanical ventilatory support . In addition, sleep disruption has long been thought to be a factor in the **development of delirium** and other sources of morbidity . there are a multitude of reasons including:

1. Environmental:

- Noise (alarms, monitors, staff talking, phones)
- Continuous lighting (bright lights, no day/night cycle)
- Overcrowding of devices and movement of staff

2. Clinical/Nursing interventions:

- Frequent vital sign checks
- Nighttime procedures and lab tests
- Medication schedules (e.g., diuretics at night)

3. Patient-related factors:

- Pain and discomfort
- Anxiety, fear of death or condition worsening
- Mechanical ventilation discomfort

Nursing Strategies to Promote Sleep

1.Environmental modifications:

- Cluster care activities to allow longer rest periods.
- Dimming lights and controlling noise.
- Establish “quiet hours” at night
- Limit unnecessary alarms and conversations near Pt.

2.Patient comfort measures:

- Provide earplugs, eye masks, warm blankets
- Adjust bed and positioning for comfort
- Adequate pain management before sleep

3.Psychological support:

- Reduce anxiety with reassurance and communication
- Allow family presence when possible
- Provide relaxation techniques (music therapy, guided breathing)

4.Pharmacological (if needed):

- ✓ Sedatives or sleep aids only when non-pharmacological measures fail
- ✓ Use with caution to avoid delirium and respiratory depression.

so that the patient is able to obtain at least 2 to 3 hours of uninterrupted sleep at a time.

Nutrition in Critically Ill Patients

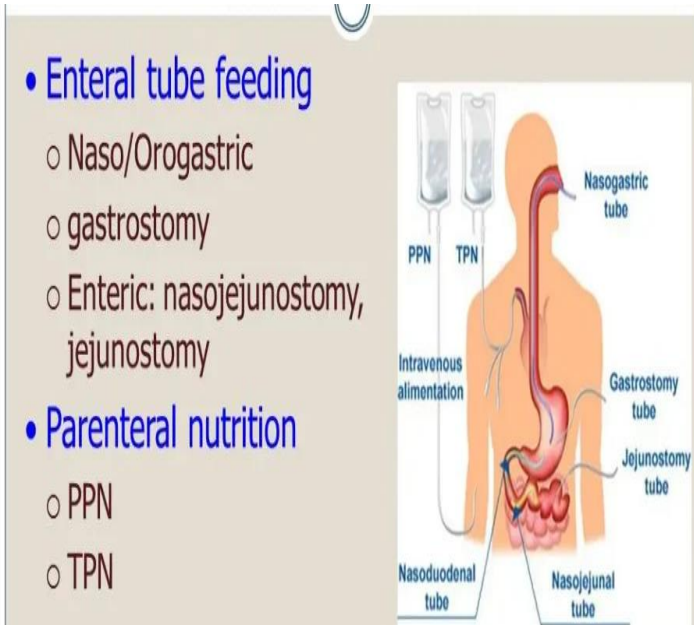
- Critically ill patients often have:
- **Hypermetabolic and catabolic states** (e.g., in trauma, sepsis, burns)
- Increased energy and protein needs
- Risk of **malnutrition**, which can lead to:
  - Delayed wound healing
  - Weakened immune system
  - Muscle wasting
  - Longer ICU/hospital stays
  - Higher mortality

📌 Goals of Nutritional Support

- Provides energy to promote wound healing and recovery.
- Prevents malnutrition.
- Decreased catabolic response to injury
- Improved gastrointestinal function
- Supports immune system, reduces complications, length of hospital stay, and cost of stay

Challenges: sedation, intubation, unconsciousness.

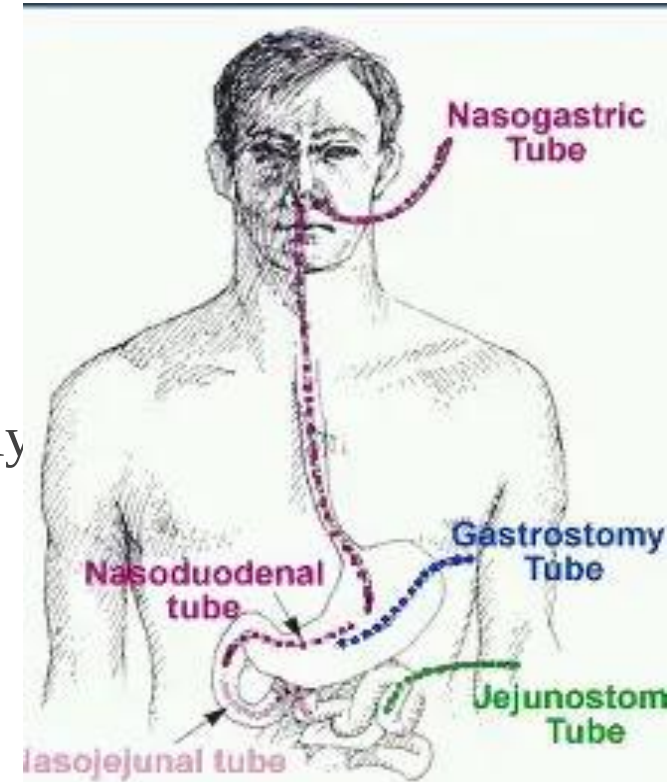
Types of Nutritional Support



- **1. Enteral Nutrition (EN) — First Choice if Gut Works**
- **Delivered via:** Nasogastric (NG), nasojejunal (NJ), gastrostomy (PEG), or jejunostomy (PEJ) tubes.

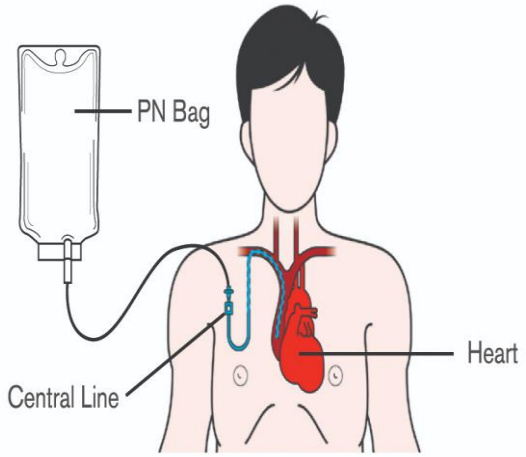
Formulas: high protein, high calorie, immune-enhancing.

- **Advantages:**
  - Maintains gut integrity
  - Lower infection risk compared to TPN
  - Less expensive
- **Start within 24–48 hours** of ICU admission if patient is hemodynamically
- **Monitor for:** Aspiration, tube dislodgment, diarrhea, gastric residuals

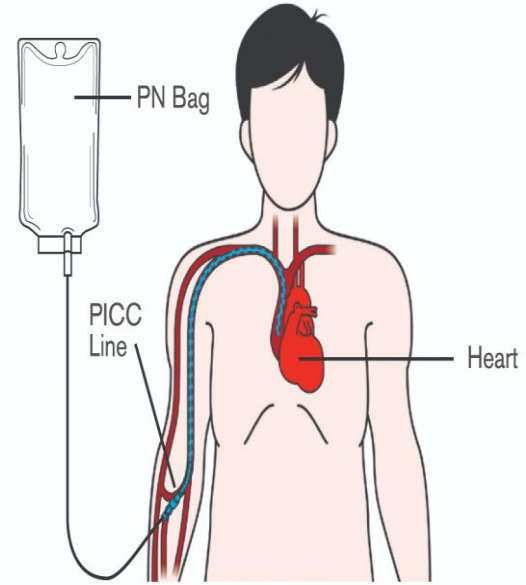


Types of Nutritional Support

- **Parenteral Nutrition (PN) — When EN is Not Possible**
- **Delivered via:** Central venous catheter (TPN) or peripheral line (PPN)
- **Indicated in:**
  - Non-functioning GI tract (e.g., obstruction, ischemia, severe ileus)
  - EN contraindicated or not tolerated
- **Risks:**
  - Infection
  - Hyperglycemia
  - Electrolyte imbalances
  - Liver dysfunction



Picture of a central line



Picture of a PICC line

Image: Agency Rush, UK

Nursing Responsibilities in Nutritional Care

- **1. Monitoring and Documentation**
- Check tube placement (x-ray confirmation, pH check)
- Monitor for aspiration signs (coughing, desaturation)
- Record intake/output
- Assess for GI tolerance: nausea, vomiting, abdominal distension
- Monitor lab values: glucose, electrolytes, BUN, liver enzymes
- **2. Feeding Protocols**
- Follow unit-specific protocols for starting and advancing feed rates
- Hold feedings if patient is unstable or at high aspiration risk
- Maintain head of bed at **30–45°** during and after feeding
- Collaborate with dietitian for feeding plan.

3. Preventing Complications

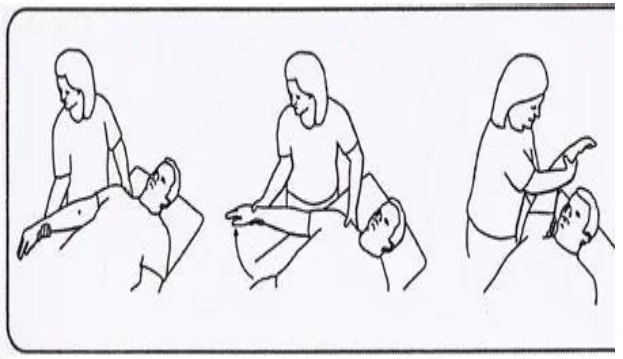
Complication	Prevention/Management
Aspiration	Elevate HOB, check placement
Refeeding Syndrome	Start slow, monitor electrolytes closely
Diarrhea	Check for formula intolerance or infection
Hyperglycemia	Monitor blood glucose, adjust insulin as needed
Infection	Aseptic technique, central line care, Maintain tube hygiene (flush before and after meds/feeds)

Mobility

- critically ill patients often experience **limited or no mobility** due to sedation, mechanical ventilation, neuromuscular weakness, or underlying conditions. **Prolonged immobility** can lead to multiple complications, and **early mobilization** is now recognized as a key part of ICU care.
- **Complication of immobility**

Complication	Description
Pressure Ulcers	Skin breakdown due to unrelieved pressure, especially over bony prominences
Deep Vein Thrombosis (DVT)	Blood clots due to venous stasis and lack of movement in lower limbs
Pneumonia	Reduced lung expansion and secretion clearance → risk of ventilator-associated pneumonia (VAP)
Muscle Wasting	Muscle atrophy and weakness from disuse, especially in ICU-acquired weakness
Delirium & Depression	Immobility can worsen mental status and contribute to ICU delirium
Constipation/Urinary Retention	Reduced peristalsis and bladder tone from inactivity

Nursing Interventions to Promote Mobility and Prevent Complications

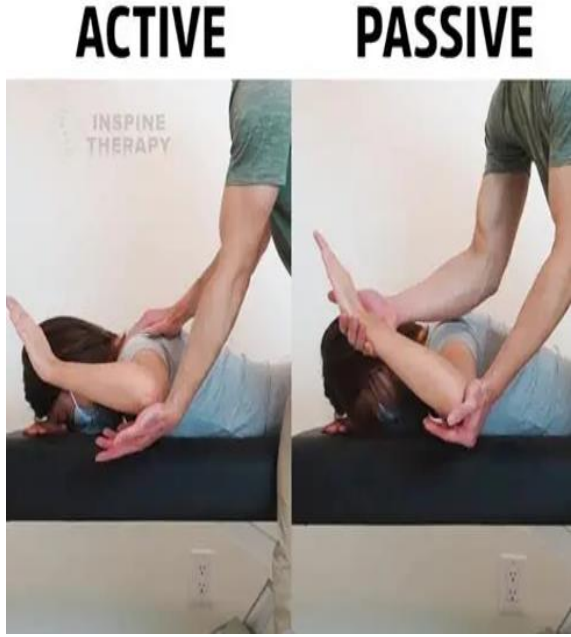


1. Repositioning Every 2 Hours

- Prevents pressure ulcers and promotes circulation
- Use pillows, foam wedges to offload pressure
- Document position changes and skin checks

2. Passive and Active Range of Motion (ROM) Exercises

- **Passive ROM** for unconscious or paralyzed patients (nurse-assisted)
- **Active ROM** for alert patients who can move independently
- Prevents joint stiffness, contractures, and venous stasis



3. Encourage Early Mobilization

- Start as soon as the patient is hemodynamically stable
- **Work with physiotherapist teams**
- Progress from sitting up in bed → sitting on edge → standing → walking
- Mobilization can reduce ICU delirium, improve outcomes.

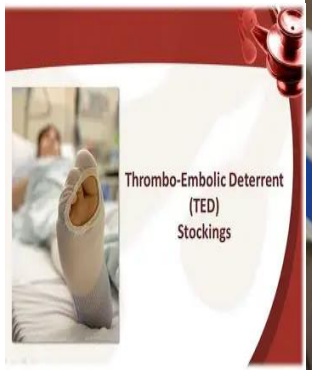
Nursing Interventions to Promote Mobility and Prevent Complications

4. Use Special Mattresses and Cushions

- Pressure-relieving surfaces (e.g., air, gel, or alternating pressure mattresses)
- Heel protectors and seat cushions for long-term bed/chair-bound patients
- Reduces shear and friction

5. DVT Prophylaxis

- Apply **SCDs (sequential compression devices)** or **TED** (Thrombo-Embolic Deterrent Stockings)
- Administer anticoagulants (e.g., enoxaparin, heparin) as prescribed
- Monitor for signs of DVT: redness, swelling, pain in limbs



6. Respiratory Interventions

- Encourage deep breathing and coughing
- Use **incentive spirometry**
- Help with position changes to aid lung expansion

7. Collaborative Care

- Work with physiotherapists and occupational therapists
- Involve family (if appropriate) in passive movements and positioning

Safety

- **Patient safety** is a top priority in critical care nursing to prevent complications and promote recovery.
- In the critical care setting, patients are often vulnerable due to altered consciousness, invasive devices, complex treatments, and limited mobility.

Common Safety Risks in Critical Care

Risk	Description
Falls	Patients may be disoriented, weak, or on sedatives, increasing fall risk
Tube/Line Dislodgement	Accidental removal of IVs, catheters, endotracheal tubes, NG tubes, etc.
Equipment Accidents	Faulty, misused, or disconnected devices (ventilators, infusion pumps)
Infections (HAIs)	From invasive lines , poor hand hygiene, or lack of asepsis
Alarm Fatigue	Staff may become desensitized to frequent alarms, delaying responses
Self-Harm/Interference	Patients may pull lines/tubes due to agitation or delirium

Nursing Interventions to Promote Safety

1. Fall Prevention

- Raise **side rails** (at least 2, avoid full restraints unless necessary)
- Keep **call light within reach** at all times
- Use **bed/chair alarms** for high-risk patients
- Ensure **bed is in lowest position**, wheels locked

2. Tube and Line Safety

- **Secure all tubes and lines** properly (e.g., IV lines, Foley, ETT)
- Monitor for signs of **dislodgement or leakage**
- Educate family to **avoid touching or moving devices**

Nursing Interventions to Promote Safety

3.Equipment Safety

- Perform **regular equipment checks** (infusion pumps, ventilators, monitors)
- Ensure **emergency equipment** (e.g., ambu bag, suction) is available and working
- **Label all lines** and verify medication compatibility
- Keep wires and cords **organized** to avoid tripping hazards or tangling

4. Infection Control

- Practice **strict hand hygiene** before and after patient contact
- Use **aseptic technique** for all procedures (e.g., line insertion, suctioning)
- Follow **bundle protocols** to prevent:
  - **CLABSI** (central line-associated bloodstream infection)
  - **CAUTI** (catheter-associated UTI)
  - **VAP** (ventilator-associated pneumonia)

Nursing Interventions to Promote Safety

5. Environmental Safety

- Keep room **clutter-free**
- Use **non-slip flooring** and dry surfaces
- Remove unnecessary furniture or obstacles

6. Family and Patient Education

- Explain safety measures to the **family and patient**
- Educate on **risks of pulling tubes** or moving without help
- Involve family in **monitoring changes** and alerting staff
- Provide **emotional support** to reduce agitation and confusion

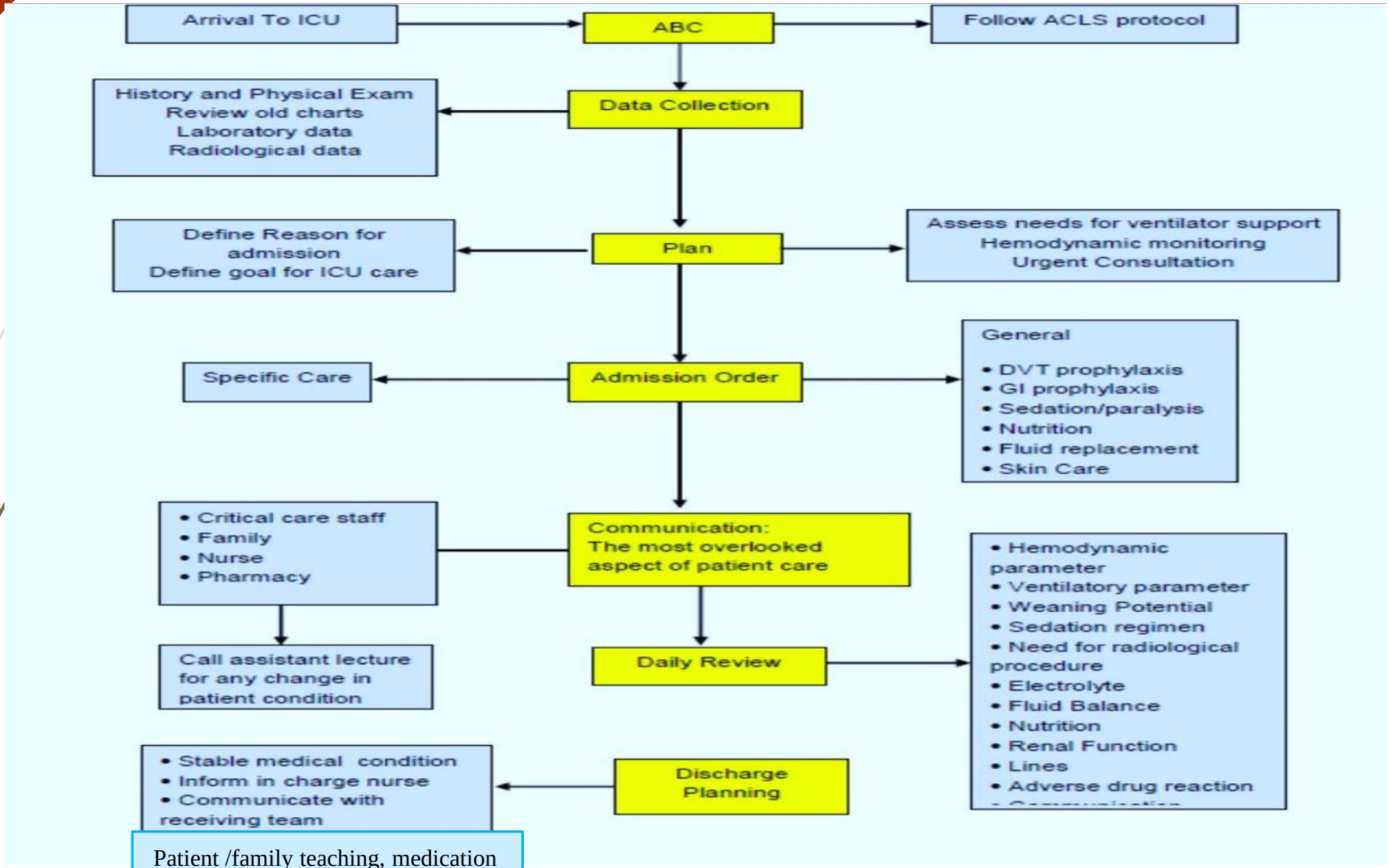
7. Monitor for Delirium or Agitation

- Reorient patients frequently
- Use **sedation protocols** and minimize medications that cause confusion
- Encourage use of hearing aids, glasses, or familiar objects

Family Needs:

- Receiving assurance
- Remaining near the patient
- Receiving information
- Being comfortable
- Having support available

Admission –discharge plan to critical care

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