DEPARTMENT OF SURGERY

GENERAL SURGERY

RESIDENCY PROGRAM

CURRICULUM

&

GOALS AND OBJECTIVES
A. Curriculum Goals and Objectives for Surgical Residents

Our curriculum goals were structured as summary goals descriptive of the desired outcomes of surgical education. When competencies are viewed in conjunction with objective criteria, one has a combination of indicators of what is essential for resident learning, and one can employ these essentials in implementing the instructional program.

The broad educational areas in our resident curriculum, for which competencies and instructional criteria exist, are these:

- Integration of theory and practice
- Application of surgical skills
- Increasing expertise in care for elderly patients
- Use of critical thinking
- Exercise of ethical judgment
- Use of appropriate communication
- Recognition of teaching responsibilities
- Development of management abilities
- Teaching and learning for a lifetime

The general competency areas for residents, in which residency programs are required by the Accreditation Council for Graduate Medical Education (ACGME), to define specific knowledge, skills, and attitudes are the following organizing principles. These areas are specified throughout our curriculum and assessment instrumentation for day-to-day documentation of resident performance.

Patient Care that is compassionate, appropriate, and effective for the treatment of health problems and promotion of health

Medical Knowledge about established and evolving biomedical, clinical, and cognate sciences and application of this knowledge to patient care.

Practice-Based Learning and Improvement that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

Interpersonal and Communication Skills that result in effective information exchange and teaming with patients, their patients’ families, and other health professionals

Professionalism as manifested through commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Surgical residents are expected to maintain high standards of ethical behavior, demonstrate a commitment to continuity of patient care, demonstrate sensitivity to age, gender and culture of patients and other health care professionals.

Systems-Based Practice as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

Expected Outcomes Expressed as Program Goals

It is important to consider that the educational areas and organizing principles listed above identify the content divisions that are critical for the comprehensive educational and professional preparation of a surgeon. We regard these goals and objectives as the competency-based structure of our curriculum. A competency-based education program, anchored by this structure,
creates an educational back-up system of knowledge, skills, and attitudes that are helpful in assuring the public that a program graduate is competent to practice.

When these learning objectives have been met, the expected outcome is that core competencies, describing the abilities made possible by a professional education, can be performed acceptably. The twelve competencies listed below specify what the resident should know, be able to do, or have an attitude about at the completion of a defined point during or immediately upon completion of surgical training.

At the completion of training, the resident can:

- Make sound ethical and legal judgments appropriate for a qualified surgeon.
- Respect the cultural and religious needs of patients and their families, and provide surgical care in accordance with those needs.
- Manage surgical disorders based on a thorough knowledge of basic and clinical science.
- Utilize appropriate skill and demonstrates manual dexterity appropriate for their level of training in those surgical techniques required of a qualified surgeon.
- Use critical thinking when making decisions affecting the life of a patient and the patient's family.
- Collaborate effectively with colleagues and other health professionals.
- Teach and share knowledge with colleagues, residents, students, and other health care providers.
- Teach patients and their families about the patient's health needs.
- Be committed to scholarly pursuits through the conduct and evaluation of research.
- Be prepared to manage complex programs and organizations.
- Provide cost-effective care to surgical patients and families within the community.
- Value lifelong learning as a necessary prerequisite to maintaining surgical knowledge and skill.

General Surgery Curriculum

Anatomy

Unit Objectives:

- Demonstrate knowledge of anatomy that is pertinent to the practice of surgery.
- Apply knowledge of anatomy to the diagnosis and treatment of patients, both in and out of the operating room.

Competency-Based Knowledge Objectives:

Junior Level:

1. Outline the general concepts of anatomy and its subdivisions, including:
   a. Gross anatomy
   b. Cellular and subcellular anatomy
   c. Molecular biology
2. Compare the organization, characteristics, and functions of the tissues and their components within each organ system, including:
   a. Skin
   b. Circulatory system
   c. Nervous system
   d. Musculoskeletal system
   e. Respiratory system
   f. Digestive system
   g. Urinary system
   h. Reproductive system
   i. Organs of special sense

3. Review, identify, and delineate the vulnerable anatomical structures encountered in common general surgical operations such as:
   a. Venous and arterial access in infants
   b. Catheterization
   c. Colonoscopy
   d. Cricothyrotomy
   e. Mastectomy
   f. Inguinal hernia repair
   g. Cholecystectomy
   h. Cardiac procedures
   i. Aortic aneurysm repair
   j. Insertion of Swan-Ganz catheter
   k. Insertion of chest tubes
   l. Application of leg cast
   m. Appendectomy
   n. Burr holes
   o. Vagotomy and pyloroplasty
   p. Colectomy
   q. Renal transplant
   r. Thyroidectomy
   s. Resection of the liver
   t. Urinary procedures Recognize those anatomic structures commonly encountered in other surgical subspecialties, such as:
      u. Orthopedics
      v. Otolaryngology
      w. Neurosurgery
      x. Gynecology
      y. Urology

4. Discuss the differences in visualization of organ structures by various technologies, such as:
   a. Routine radiograms
   b. Contrast studies
   c. Computed axial tomography (CAT) scans
   d. Ultrasound
   e. Magnetic resonance imaging (MRI) scans
   f. Angiograms
   g. Positron emission tomography (PET) scans

5. List and access the source materials for anatomic references, guides for exposure, and the anatomic aspects of common general surgical procedures.
6. Describe the anatomic aspects of conception, human development, normal embryology, and common developmental anomalies encountered in general surgery, such as:
   a. Pelvic inflammatory disease
   b. Appendicitis in pregnancy
   c. Omphalomesenteric remnants
   d. Diaphragmatic hernia
   e. VATER syndrome
   f. Tracheoesophageal fistula
   g. Biliary atresia
   h. Malrotation
   i. Gastrochisis
   j. Urachal cyst
   k. Imperforate anus
   l. Trisomy 18
   m. Tetralogy of Fallot
   n. Atrioseptal defect

7. Differentiate between the following anatomic terms:
   a. Topographic anatomy
   b. Radiographic anatomy
   c. Supination
   d. Pronation
   e. Dorsal
   f. Ventral
   g. Median plane
   h. Midsagittal plane
   i. Coronal plane

8. Describe the anatomic changes due to aging on a gross, cellular, and molecular level with special emphasis on the following organs: eyes, bone, brain, GI tract, lungs, kidneys, reproductive system, and vascular system. Senior Level:

   1. Summarize the embryologic explanations for the common major birth anomalies.

   2. Define and describe the anatomic aspects of even the most complex general surgical operations such as:
      a. Repair of an abdominoperineal aneurysm
      b. Whipple procedure
      c. Pneumonectomy
      d. Abdominoperineal resection
      e. Liver resection
      f. Liver transplantation
      g. Bilateral radical neck dissection
      h. Gastric bypass

   3. Interpret various imaging technologies to derive anatomic information.

**Competency-Based Performance Objectives:**
Integrate knowledge of anatomy into the following:

1. The diagnosis of general surgical disease

2. Explanations to patients and families regarding:
   a. Embryologic causes of disease
   b. Planning of surgical procedures
c. Progress of disease  
d. Explanation of complications

3. The performance of surgical procedures appropriate for the level of training

4. Postoperative management of the patient, including long-term follow-up

5. The planning of procedures for different age groups, such as split thickness skin grafts (depending upon the thickness of the skin), and care for fracture of the wrist

**Physiology**  
**Unit Objectives:**

- Demonstrate knowledge of normal and disturbed human physiology causing surgical diseases.
- Demonstrate knowledge of the effects of age, as reflected in the newborn, infants, children, and the older patients on the physiologic functions of the major organ systems.
- Apply physiological knowledge to the clinical and operative management of surgical diseases.

**Competency-Based Knowledge Objectives:**

1. Describe concepts of normal physiology, including:
   a. Fundamental processes of cell differentiation and growth  
   b. Endocrine and autocrine control of genetics and development  
   c. Normal pregnancy, embryology, and parturition  
   d. Concept of homeostasis and cellular mediators  
   e. Biochemistry of normal nutrition and metabolism  
   f. Fluid mechanics and dynamics  
   g. Homeostasis, coagulation, thrombogenesis, fibrinosis  
   h. Excretory and regulatory renal function  
   i. Biomechanics of normal respiration and gaseous exchange  
   j. Wound healing and inflammatory response  
   k. Oncogenesis  
   l. Neuroendocrine control of development of secondary sexual characteristics, breasts  
   m. Neurophysiology of pain  
   n. Response to sepsis  
   o. The immune response  
   p. Cellular division, telomeres, apoptosis

2. In each of the above systems, identify physiologic variations in geriatric, pediatric, immunosuppressed, and pregnant patients.

3. Indicate the normal values of commonly applied clinical tests.

4. Describe the applications of physiologic principles to surgical monitoring and therapy, including the following approaches:
   a. Application of Swan-Ganz catheters  
   b. Ventilator management  
   c. Renal function studies  
   d. Noninvasive vascular testing  
   e. Interpretation of results of the common metabolic panel blood tests  
   f. Interpretation of electrocardiogram (EKG), cardiac echograms and other cardiac function studies
g. Interpretation of a nutritional profile
h. Endocrine function studies

5. Describe how aging affects the tests listed in the section immediately above.

6. Describe the abnormal physiology of complex diseases or entities such as:
   a. Cardiac failure
   b. Renal failure
   c. Pulmonary failure
   d. Immunosuppression
   e. Malignancy
   f. Intestinal obstruction
   g. Malnutrition
   h. Cardiopulmonary bypass
   i. Advanced age

7. Analyze the aspects of aging within each organ system that can alter the surgeon’s approach to care of the elderly patient, to include consideration of:
   a. Genetic factors (e.g., alterations in DNA synthesis and chromosomal functioning)
   b. Cumulative cellular damage (e.g., changes from free radicals and radiation)
   c. Errors in protein synthesis
   d. Alterations in the immune system
   e. Effects of endogenous steroid hormones
   f. The cross-linkage theory (resulting in loss of elasticity, increased tissue brittleness)
   g. Apoptosis
   h. Telomere function

Competency-Based Performance Objectives:

1. Interpret laboratory tests and clinical findings based upon physiologic concepts.

2. Manage patients with surgical illnesses and/or major physiologic disruptions such as:
   a. Liver failure
   b. Malnutrition
   c. Renal failure/bowel obstruction
   d. Hemorrhage
   e. Cardiopulmonary failure
   f. Electrolyte imbalance
   g. Endocrine disorders such as multiple endocrine neoplasia (MEN)
   h. Sepsis
   i. Shock
   j. Immunosuppression
   k. Diabetes
   l. Advanced age

3. Adapt treatment plans to reflect physiologic variations in pediatric, geriatric, and pregnant patients.

4. Utilize clinical findings, laboratory tests, and hemodynamic measurements to alter patient physiology.

5. Adjust treatment plans in response to abnormal physiologic values.

6. Identify and formulate treatment plans for improved nutrition.
7. Interpret hemodynamic monitoring and adjust treatment to restore homeostasis:
   a. Insert and maintain arterial venous and central lines.
   b. Monitor catheters.

8. Solve problems interfering with normal hemostasis.

9. Analyze pulmonary function tests, solve problems causing abnormal respiration, and
delineate weaning parameters.

**Fluid and Electrolyte Homeostasis**

**Unit Objectives:**

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

**Competency-Based Knowledge Objectives:**

1. Describe body water volumes and distribution.

2. Indicate the normal electrolyte distribution of cell water and extra cellular fluid to include
the following:
   a. Sodium
   b. Potassium
   c. Chloride
   d. Bicarbonate
   e. Calcium
   f. Magnesium
   g. Phosphate

3. Outline the normal electrolyte content of body fluids such as blood, extra cellular fluid
(ECF), urine, saliva, gastric juice, bile, and pancreatic fluid.

4. Identify water and electrolyte changes in response to various stress situations such as:
   a. Diseases, including trauma and burns
   b. Operative therapy
   c. Non-operative therapy

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. Describe the role of the following hormones in fluid and electrolyte homeostasis:
   a. Vasopressin (ADH)
   b. Renin
   c. Angiotensin (ACTH)
   d. Aldosterone
   e. Steroids
   f. Adrenocorticotropic hormone

7. Apply the physiology of water and sodium imbalance to the following:
   a. Salt and water depletion (depletion of extra cellular fluid volume [ECFV])
b. Salt and water excess (expansion of ECFV)
c. Hyponatremia (hypo-osmolarity)
d. Hypernatremia (hyperosmolarity)

8. Explain the treatment for water and sodium imbalance, including the use of and complications from diuretics and fluid restrictions.

9. Summarize normal potassium physiology, the causes and consequences of depletion and excess, and the treatment for potassium imbalance.

10. Discuss the complexities of calcium, phosphorus, and magnesium excesses and deficiencies in such situations as:
   a. Metastatic breast cancer
   b. Hepatic failure
   c. Hyperparathyroidism
   d. Milk-alkali syndrome
   e. Eclampsia

11. Illustrate treatments for high or low calcium, phosphorus, and magnesium in the instances listed directly above.

12. Discuss the changes that affect water and sodium regulation, related to patient age and renal maturity, to include:
   a. Concentrating ability
   b. ADH secretion
   c. Ability to conserve sodium
   d. Secretion of atrial natriuretic peptide

13. Outline the pathophysiology of fluid and electrolyte problems in cardiac, aortic, and peripheral revascularization, including reperfusion injury.

**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
   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. Burns
   c. Major surgery requiring transfusion
   d. Ascites
   e. Cardiac failure
   f. Malnutrition
   g. Fistulas (high output intestinal)
   h. Hypertrophic pyloric stenosis

4. Coordinate orders involving nutrition, acid-base, and electrolyte problems.

5. Apply fluid and electrolyte principles to the following special applications:
a. Neonates
b. Infants
c. Geriatric patients
d. Cardiac bypass patients

6. Manage outpatients and inpatients with hypo- and hyper- kalemia.

7. Manage patients with hypo- and hyper- calcemia

**Acid-Base Homeostasis**

**Unit Objectives:**

Demonstrate an understanding of the biochemistry and physiology of acid-base homeostasis.

- Demonstrate the ability to diagnose and effectively treat complex disorders of acid-base balance.

**Competency-Based Knowledge Objectives:**

1. Explain hydrogen ion biochemistry and physiology to include:
   a. The Henderson-Hasselbalch equation
      i. Ventilatory component (pCO2)
      ii. Renal component (HCO3-)
   b. Hydrogen ion production and disposal
   c. Buffering systems
      i. Acute (bicarbonate)
      ii. Chronic (bone, renal, and pulmonary)

2. Relate the biochemistry of membrane gas exchange using the example of gases exchanging over the alveolar/capillary interface.

3. Explain the physiology of hydrogen ion production and renal excretion of hydrogen ions.

4. Describe renal bicarbonate reabsorption and regeneration.

5. Summarize the contributions of the skeleton, kidneys, and lungs in maintaining a normal pH.

6. Classify metabolic acidosis, including "anion gap" and hyperchloremic acidosis.

7. Identify specific causes of metabolic acidosis.

8. Given values for pH, pCO2, and HCO3-, distinguish between compensated and uncompensated metabolic acidosis, respiratory acidosis, metabolic alkalosis, respiratory alkalosis, and mixed abnormalities; derive a differential diagnosis for each.

9. Explain age-associated changes that may occur in certain respiratory and renal regulatory processes that are known to maintain normal pH. How does aging affect:
   a. Ability to hyperventilate in response to acute metabolic acidosis
   b. The kidney’s response to an acid load (Describe recovery of the blood pH.)
10. List disorders, common in elderly patients that contribute to acid-base disturbances. Explain the mechanisms that can lead to acid-base disturbances associated with:
   a. Heart failure
   b. Anemia
   c. Sepsis
   d. Renal disease
   e. Pulmonary disease
   f. Diabetes mellitus

11. Identify specific acid-base disturbances in elderly patients caused by such frequently used drugs as:
   a. Salicylates
   b. Diuretics
   c. Laxatives

12. Relate metabolic alkalosis to the following:
   a. Chloride-responsive alkalosis
   b. Chloride-resistant alkalosis
   c. Paradoxic aciduria

13. Predict the importance of primary diseases and their complications to the evaluation of patient risk for:
   a. Shock
   b. Bowel obstruction
   c. Sepsis

14. Analyze the acid-base problem and its cause in specific clinical situations, and determine an appropriate course of therapy for the following conditions:
   a. "Medical" problems such as:
      i. Diabetic ketoacidosis
      ii. Lactic acidosis
      iii. Renal tubular acidosis
      iv. Renal insufficiency
      v. Respiratory failure
   b. "Surgical" problems such as:
      i. Pyloric stenosis
      ii. Gastric outlet obstruction
      iii. Fistulas
      iv. Ureteroileal conduit
      v. Shock

15. Why are disturbances of acid-base balance common in elderly patients? Explain by discussing the implications of:
   a. Impaired homeostatic mechanisms
   b. High prevalence of drug use and disease

16. Summarize the adverse effects of acid-base disturbances on the following body systems:
   a. Central nervous system / intracranial pressure
   b. Renal physiology
   c. Pulmonary physiology

**Competency-Based Performance Objectives:**

1. Diagnose and treat acid-base disturbances of all types.
2. Diagnose and treat complex and combined problems in acid-base disturbances as a component of overall care.

3. Manage complex situations in the intensive care unit where acid-base abnormalities coexist with other metabolic derangements, including:
   a. Fluid and electrolytes
   b. Total parenteral nutrition
   c. Renal disease
   d. Pulmonary disease
Metabolism

Unit Objectives:

- Demonstrate an understanding of the metabolic basis of substrate utilization and the disease states caused by specific alterations in intermediary metabolism.
- Demonstrate the ability to apply this understanding of metabolism by integrating it with direct application to the management of patients.

Competency-Based Knowledge Objectives:

Section 1: Energy

1. Describe the principles of energy conversion to mechanical work and the efficiency of energy conversion and thermal balance.
2. Define basic energy units such as the calorie and the kilocalorie.
3. Discuss the routes of heat loss and their relationship to energy balance.
4. Relate oxygen consumption and carbon dioxide production to thermogenesis, energy production, and measurement of energy balance by indirect calorimetry.
5. Explain the respiratory quotient, its usefulness in determining substrate utilization patterns, and its relationship to respiratory function.
6. Define basal and resting metabolic rates and their relationship to body weight, size, age, and sex.
7. Predict daily energy requirements using metabolic rate equations.
8. Discuss the effects of ambient temperature, injury, burn, infection, pain, fear, anxiety, and starvation on energy requirements.
9. Integrate the above knowledge with prediction equations to estimate metabolic demands of critically-ill patients (e.g., the Harris-Benedict Equation).
10. Discuss how different substrates (carbohydrates, fats, and proteins) contribute to specific disease processes.

Section 2: Temperature and Fuel Homeostasis

1. Describe how the brain controls body temperature and alters temperature set point in response to stress and other factors.
2. Describe the mediators that influence temperature set point and the febrile response; explain their relation to changes in oxygen consumption.
3. Explain the differences between endogenous, exogenous, and bacterial pyrogens. Summarize their relation to post-traumatic fever and other disease processes resulting in fever.

Section 3: Hormonal Control of Body Fuels

1. Identify the hormones responsible for storage and mobilization of energy. Describe their effects.
2. Explain the metabolic effects of glucagon and insulin on protein, fat, and carbohydrate metabolism.

3. Explain the effects of catecholamine release during stress and the results of these effects on metabolism of glucose, fat, and protein as well as heat production.

4. Summarize the causes of negative nitrogen balance following injury, and explain the role of glucocorticoids on protein metabolism.

5. Discuss the systemic effects of corticosteroids on the body's response to injury and infection.

6. Describe the function of growth hormone and thyroid hormone as anabolic or catabolic mediators.

Section 4: Intermediary Metabolism

1. Explain the processes involved in carbohydrate metabolism, including glycogen synthesis and degradation, glycolysis, and gluconeogenesis.

2. Summarize the following metabolic processes:
   a. Protein synthesis and degradation
   b. Role of alanine and glutamate in deamination
   c. Urea cycle

3. Explain the metabolism of lipids, including:
   a. Synthesis
   b. Catabolism
   c. Formation of ketone bodies
   d. Role of the tricarboxylic acid cycle

4. Describe the role of macrophages and cytokines in response to stress and metabolism.

5. Summarize the metabolic responses to short-term starvation that maintain euglycemia.

6. Identify the changes in fuel oxidation and substrate utilization that occur during fasting.

7. Describe the alanine and Cori cycles, and relate them to alterations in renal, hepatic, and cardiopulmonary function during adaptation to long-term starvation.

8. Explain the routes of nitrogen loss during starvation, injury and infection. Describe the effects of glucose, fat, and protein on nitrogen metabolism in these situations.

9. Describe the changes in body composition that occur with:
   a. Bed rest
   b. Complicated and uncomplicated operations
   c. Trauma
   d. Sepsis

10. Explain how protein metabolism is affected by hormonal regulators. Summarize its relationship to oxygen consumption, temperature regulation, and energy balance.

11. Summarize the hormonal regulation of gluconeogenesis after trauma and during critical illness.
12. Describe the caloric contribution of endogenous substrates, and analyze the association between tissue loss and weight loss.

13. Compare the differences between the alterations in intermediary metabolism occurring with hypothermia and intense exercise with those in trauma, infection, and prolonged critical illness.

Section 5: Implications for the Elderly Patient

1. Describe the changes in calorie requirements, basal metabolic rate, and fat stores in elderly patients.

2. Discuss impaired glucose tolerance and renal excretion in the elderly patient.

3. Name specific vitamin and mineral deficiencies in older people and their causes and effects.

4. Describe the problem with decreased total body water and its impact in the elderly patient.

5. What is the prevalence and cause of protein-calorie malnutrition in the geriatric population; what is the impact on abdominal surgery?

6. How does the temperature set point differ in elderly patients, and how does the presentation of peritonitis differ?

Competency-Based Performance Objectives:

1. Determine daily energy requirements of critically-ill patients using established formulas accounting for varied metabolic demands.

2. Utilize metabolic cart and indirect calorimetry to calculate metabolic needs in similar patients. Discuss the efficacy and limitations of this method.

3. Calculate nitrogen balance status in critically-ill patients, and alter metabolic supply and demand to establish positive balance.

Nutrition Unit Objectives:

- Demonstrate a working knowledge of the methods of nutritional assessment and routes of nutritional support.
- Demonstrate an understanding of the metabolic consequences of surgical disease and the need for nutritional support.
- Demonstrate an understanding of the unique nutritional concerns for specific clinical conditions.

Competency-Based Knowledge Objectives:

1. Discuss risk factors contributing to malnutrition in the hospitalized patient, including:
   a. Low nutritional reserve
   b. Extensive preoperative studies
   c. Lack of oral (PO) intake secondary to underlying disease
   d. High stress conditions
2. Summarize the characteristics of the indicators for nutritional assessment, including:
   a. Weight loss greater than 10% of body weight
   b. Serum albumin less than 3.4 gm/dl
   c. Impaired immunologic response: anergic response and total lymphocyte count (TLC) less than 1500/cc
   d. Specific physical signs

3. Analyze methods of nutritional assessment using:
   a. Pertinent history
   b. Anthropomorphic measurements
   c. Laboratory measurements
   d. Immunologic measurements

4. Analyze and be prepared to explain potential problems associated with primary nutritional problems affecting older people, including:
   a. Protein-energy undernutrition
   b. Vitamin deficiencies
   c. Trace mineral deficiencies
   d. Obesity

5. Explain methods of calculating energy requirements, including:
   a. Simple estimate (resting: 20 kcal/kg-d; moderate stress: 30 kcal/kg-d; severe stress: 40 kcal/kg-d)
   b. Harris-Benedict Equation
   c. Nitrogen balance
   d. Basal metabolic cart

6. Analyze the metabolic responses to starvation and stress/trauma.

7. Provide general guidelines for determining nutritional composition:
   a. Non-protein calorie to protein ratio
   b. Protein requirements
   c. Carbohydrate/fat balance
   d. Ventilation issues (effect on respiratory quotient)

8. Summarize factors that can lead to problems in elderly patients, resulting from effects of mild vitamin deficiencies, especially in those institutionalized elderly patients that are associated with:
   a. Cognitive impairment
   b. Poor wound healing
   c. Anemia
   d. Bruising
   e. Increased risk of infections
   f. Increased risk of developing certain cancers

9. Discuss the indications, contraindications, and benefits of enteral feedings: describe sites of delivery and potential complications and their treatment.

10. Discuss the indications, contraindications, and disadvantages of parenteral feeding; describe the details of initiating total parenteral nutrition (TPN), monitoring delivery, and managing potential complications.

11. Summarize content and rationale for special formulations used in patients with:
   a. Congestive heart failure
   b. Liver failure
c. Renal failure
d. Respiratory failure
e. Glucose intolerance

12. Explain recent advances in surgical nutrition, including:
   a. Role of glutamine
   b. Role of arginine
   c. Growth factors
   d. Omega-3 fatty acids

13. Analyze the potential implications of nutritional deficiencies in certain disease states, and define the role of nutritional components in preventing acquired and malignant disease.

14. The following examples are conditions that can result from protein-energy undernutrition. Discuss the significance of each to the elderly surgical patient:
   a. Cognitive dysfunction
   b. Decreased muscle strength
   c. Pressure sores
   d. Altered thyroid function

**Competency-Based Performance Objectives:**

1. Perform nutritional assessment of hospitalized patients.

2. Select appropriate methods of nutritional support, and provide necessary monitoring.

3. Calculate nutritional requirements for patients with:
   a. Malignancy
   b. Stress/trauma
   c. Pancreatitis
   d. Enterocutaneous fistula

4. Insert internal and parenteral tubes and lines.

5. Manage nutritional support in patients with specific clinical conditions listed above.

6. Recognize and correct the subtle caloric and vitamin imbalances in patients receiving TPN.

7. Perform operative gastrostomies, jejunostomies, and percutaneous endoscopic gastrostomies.

8. Recognize and treat complications of internal and parenteral feeding, including:
   a. Diarrhea
   b. Dehydration
   c. Line sepsis
   d. Fatty metamorphosis of liver
   e. Glucose intolerance

9. Become familiar with the use of the “SCALES” protocol for evaluating risk of malnutrition in elderly patients, using these variables:
   a. Sadness
   b. Cholesterol level
   c. Albumin level
   d. Loss of weight
e. Eating problems
f. Shopping and food preparation problems

Hematology
Unit Objectives:

• Demonstrate knowledge of the physiology of hematopoiesis and the cellular constituents of blood.
• Demonstrate an understanding of how common hematologic disorders affect the surgical patient.
• Demonstrate an understanding of the normal and abnormal mechanisms of hemostasis, coagulation, and fibrinolysis.
• Demonstrate a familiarity with hypercoagulable states and their implications for care of surgical patients.
• Demonstrate an understanding of transfusion therapy, its indications, and potential complications.

Competency-Based Knowledge Objectives:
Section One: Blood Physiology

1. Describe the fundamental components of hematopoiesis, including the development of lymphocytes and hematopoietic cells from multipotent cells.
2. Discuss the structure, function, production, and degradation of hemoglobin.
3. Discuss the structure, function, lifespan, metabolic activity, and degradation of red blood cells (RBC's).
4. Outline and compare the common congenital and acquired anemias, such as those associated with:
   a. Decreased RBC production
   b. Excessive RBC destruction, including hemoglobinopathies
5. Briefly discuss polycythemia and implications for surgical patients.
6. Describe hemoglobin S disease (sickle cell disease), and understand the implications of this and related disorders for surgical management.
7. Discuss the fundamental roles of the following in inflammation, immune response, and infection:
   a. Granulocytes (polymorphonuclear leukocytes [PMN's], basophiles, eosinophils)
   b. Lymphocytes
   c. Monocytes
8. Discuss platelet production and physiology, and relate these to common problems such as autoimmune thrombocytopenia (ITP).
9. Discuss the effect of common drugs on hemostasis.

Section Two: Hemostasis, Coagulation, and Fibrinolysis

1. Discuss the phases of normal hemostasis, including:
   a. Primary hemostasis (vasoconstriction and platelet aggregation/activation)
b. Secondary hemostasis (activation of the coagulation cascade and formation of a fibrin clot).

2. Categorize the fundamental cellular and molecular events involved in platelet activation.

3. Identify and describe the endogenous procoagulants and anticoagulants in blood.

4. Diagram the intrinsic, extrinsic, and common coagulation pathways and their sites of activation.

5. Describe and explain the delicate interaction of the following forces in the control of coagulation:
   a. Blood flow
   b. Endothelium
   c. Thrombomodulin
   d. Fibrinolysis

6. Discuss indications for and methods of conducting common tests of coagulation and hemostasis, such as:
   a. Partial-thromboplastin time (APTT)
   b. Prothrombin time (INR)
   c. Thrombin time
   d. Bleeding time
   e. Platelet aggregation studies

7. Indicate the mode of action and site of action for the following common drugs affecting blood clotting:
   a. Heparin
   b. Coumadin
   c. Aspirin and other non-steroidal anti-inflammatory drugs (NSAID’s)

8. Identify congenital coagulopathies and summarize considerations made in the diagnosis and management in patients with these disorders undergoing elective surgery.

9. Identify and discuss pathophysiology and the management of common acquired disorders of coagulation (coagulopathies) associated with stress, trauma, surgery, and co-morbid disease, including:
   a. Disseminated intravascular coagulation (DIC)
   b. Dilutional thrombocytopenia
   c. Mechanical circulation
   d. Vitamin K deficiency
   e. Uremia
   f. Liver failure
   g. Hypothermia

10. Differentiate between the features, diagnosis, and management of the known hypercoagulable states, including:
    a. Protein C deficiency
    b. Protein S deficiency
    c. Antithrombin III deficiency
    d. Antiplatelet antibody production
    e. Factor V Leiden

11. Discuss various aspects of pharmacologic therapy to modify hemostasis, including:
    a. Agents which affect platelet function
b. Heparin
c. Coumarin-type drugs
d. Hirudin
e. Epsilon aminocaproic acid and other antifibrinolytic agents

12. Describe methods to reverse or modify the activities of heparin and coumarin-type drugs.

13. Discuss management of the anticoagulated patient referred for elective surgery.

14. Discuss fibrinolytic therapy, indications and complications.

Section Three: Transfusion Therapy

1. Discuss the clinical and economic rationale for blood component transfusion therapy.

2. Briefly describe the method of preparing, handling, and use of additives for the following blood components:
   a. RBC’s
   b. Platelets (PLT’s)
   c. Fresh frozen plasma (FFP)
   d. Cryoprecipitate
   e. Granulocytes
   f. Factor concentrates

3. Point out the indications for blood component transfusion at your hospital consistent with National Institutes of Health (NIH) consensus recommendations.

4. Understand the elements of informed consent for blood transfusion.

5. Discuss factors that influence the decision to transfuse.

6. Explain the principles of blood typing and transfusion therapy, including indications and complications to include the following:
   a. Major and minor blood group antigens and their laboratory evaluation
   b. Blood components and indications for transfusion
   c. Risks of transfusion, diagnosis, and therapy of transfusion complications
   d. Indications for and methods of autotransfusion and autologous blood donation
   e. Complications resulting from blood transfusion, including relative risk of viral infections

7. Explain the significance of the following:
   a. Major and minor blood group antigens
   b. Role of autoantibodies
   c. Difference between blood screening, typing, and compatibility testing

8. Discuss cardinal features of the following immediate transfusion reactions, including their diagnosis and management:
   a. Febrile
   b. Allergic
   c. Hemolytic

9. Assess the incidence and risk of transfusion-related infections such as:
   a. Acquired Immune Deficiency Syndrome (AIDS)
   b. Cytomegalovirus (CMV)
   c. Hepatitis
10. Define the methods, indications, and benefits of autologous blood donation.

11. Illustrate the application of erythropoietin, granulocyte-colony-stimulating factor, and similar agents to the surgical patient with co-morbid disease.

12. Explain the mechanics, application, and limitations of intraoperative autotransfusion.


Section Four: Hematologic Considerations in Elderly Patients

1. Describe changes in the hematopoietic and coagulation systems associated with aging.

2. List chronic diseases that influence the hematopoietic or coagulation systems that are prevalent in elderly patients.

3. List common drugs prescribed to elderly patients who are prone to alter hematopoietic reserve or coagulation.

Competency-Based Performance Objectives: Combining Sections One through Four

1. Outline a cost-effective strategy to identify preoperative patients at risk for abnormal bleeding based on:
   a. History of bleeding diathesis
   b. Magnitude of surgery
   c. Potential for vascular involvement

2. Evaluate patients with known hematologic disorders.

3. Recommend and perform preoperative, intraoperative, and postoperative interventions to minimize morbidity in patients with hematologic disorders.

4. Diagnose and definitively treat unexpected intra- and post-operative hemorrhage.

5. Assess risks and perform vascular access procedures in patients with anemic, Neutrogena, and coagulopathic disorders.

6. Recognize and treat immediate transfusion reactions.

7. Discuss with patient and family the risks, benefits, and alternatives to blood component transfusion.

8. Participate in the surgical care of patients undergoing splenectomy, liver biopsy, and nodal staging for hematologic disease.

9. Identify patients at risk for developing deep venous thrombosis (DVT) and prophylaxis against DVT, using pharmacologic and mechanical methods.

10. Manage patients on chronic anticoagulation therapy who require elective surgery.

11. Discuss pathophysiology of hemoglobin S disease (sickle cell disease) and its surgical implications.
12. Manage patients with hemoglobin S disease requiring surgery.

13. Manage patients on fibrinolytic therapy.

Clinical, Laboratory, and Surgical Pathology
Unit Objectives:

- Demonstrate an understanding of the pathogenesis of benign and malignant surgical disease.
- Develop competency in the diagnosis and management of human organ pathology.
- Demonstrate a working understanding of the principles of surgical pathology.
- Demonstrate competence in the acquisition and interpretation of surgical specimens.
- Apply clinical and laboratory data to diagnose disease processes and to institute appropriate disease management.

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Section One: Clinical Pathology

Competency-Based Knowledge Objectives:

1. Describe the basic principles of:
   a. Pathogenesis of reversible and irreversible cell injury
   b. Acute and chronic inflammatory responses
2. Discuss the pathogenesis, clinical significance, signs and symptoms, and therapy for:
   a. Derangements of normal wound healing
   b. Fluid and hemodynamic derangements including shock, edema, congestive heart failure
   c. Disorders of coagulation and hemostasis, including complications of: hemorrhage, disseminated intravascular coagulation (DIC), deep venous thrombosis (DVT), pulmonary embolism (PE)
   d. Disorders of the immune system, especially hypersensitivity reactions and autoimmune disease
   e. Infectious diseases involving bacteria, viruses, fungi, or parasites
   f. Neoplastic disease

Competency-Based Performance Objectives:

1. Recognize the early signs and symptoms and initiate therapy for the following:
   a. Alterations of normal wound healing including infection and disruption
   b. Fluid and hemodynamic derangements
   c. Disorders of coagulation and hemostasis
   d. Disorders of the immune system
e. Infectious diseases involving bacteria, viruses, fungi, or parasites
f. Neoplastic disease
2. Participate in deciding the appropriate surgical procedure for benign and malignant disease.
3. Monitor patients for possible postoperative complications and institute appropriate diagnostic studies and therapy for such conditions as:
   a. Wound infections
   b. Atelectasis/respiratory compromise
   c. Cardiac dysrhythmias/myocardial infarction
   d. Ileus
   e. Urinary retention
   f. Deep venous thrombosis/pulmonary embolus
   g. Systemic infection
4. Teach medical students and more junior residents about basic pathologic principles while on rounds and in the operating room.

Section Two: Laboratory Pathology

Competency-Based Knowledge Objectives:

1. Describe appropriate containers for storing blood and other body fluids during laboratory transport to sites where common serum chemistry studies are to be performed.
2. Discuss the relative sensitivity, specificity, and accuracy of common laboratory studies.
3. Demonstrate competency in interpreting:
   a. Abnormal urinalysis
   b. Abnormal thyroid function studies
   c. Steroid suppression tests
4. Outline the standard components of a coagulation profile, including the common clinical conditions associated with their abnormalities.
5. Identify significant components for each of the following:
   a. A complete blood count
   b. The meaning of "left shift"
   c. Common clinical conditions causing elevations in each component
6. Analyze causes for artificially abnormal laboratory values, including:
   a. Specimen hemolysis
   b. Impact of hyperglycemia
   c. Impact of hypoalbuminemia
7. Identify potential adverse effects of repeated phlebotomies, and discuss potential remedies for the following concerns:
   a. Patient pain
   b. Anemia
   c. Thrombophlebitis
   d. Arterial thrombosis
   e. Patient and hospital costs
8. Discuss the typical presentation of microbiologic data, and the importance of the following:
   a. Specimen identification and timing of sample
b. Organism identification
c. Drug sensitivity profile
d. Minimum inhibitory concentration
e. Beta-lactam resistance
f. Resistance
g. Colonization
h. Contaminated specimen

9. Explain the importance of laboratory quality control in the hospital and outpatient setting. Clarify the meaning of role reference laboratory.

Competency-Based Performance Objectives:

1. Identify the indications for routine preoperative laboratory studies, recognize clinically significant abnormalities, and provide appropriate management.

2. Manage the postoperative course of patients, using relevant laboratory studies (including their indication, relevance to clinical condition, and continued need).

3. Manage the anticoagulation status of patients using heparin and Coumadin, while considering the patient's prothrombin time (PT) and partial thromboplastin time (PTT).

4. With the assistance of medical consultation, investigate and diagnose a new coagulation defect in a surgical patient.

5. Modify patient's infectious disease treatment plan using data from a microbiology report.

Section Three: Surgical Pathology

Competency-Based Knowledge Objectives:

1. Discuss the indications, contraindications, and limitations of the following biopsy techniques:
   a. Fine-needle aspiration (FNA)
   b. Stereotactic biopsy
c. Core biopsy
d. Incisional biopsy
e. Excisional biopsy

2. Explain the methods of handling and transporting tissue obtained by the methods listed above.

3. Describe the role of needle aspiration in the diagnosis and management of:
   f. Breast pathology
g. Thoracic pathology
h. Abdominal pathology
i. Thyroid pathology
j. Head and neck malignancy

4. Discuss principles and indications for the following methods of tissue preparation:
k. Hematoxylin and eosin stains
l. Immunohistochemistry
m. Specific stains (enolase, argentaffin)
n. Polymerase chain reaction

5. Discuss the use and interpretation of genetic analysis of neoplastic tissue, including:
o. Ploidy status
p. Mitotic activity
q. Cell-cycle phase

Competency-Based Performance Objectives:

1. Perform FNA, core, incisional, and excisional biopsies; and discuss the results and implications of each with the attending surgeon, the pathologist, and then the patient.

2. Review and discuss the details of a surgical pathology report with the attending surgeon.

3. Discuss intraoperative gross findings, and guide differential diagnosis formulation with the surgical pathologist and surgical team.

4. Review intraoperative frozen section and postoperative permanent section histology with the surgical pathologist and surgical team.

5. Participate in autopsies performed for deaths following acquired disease and trauma.

6. Participate in a multidisciplinary conference including surgeon, pathologist, radiologist, and oncologist by discussing pertinent patient history, operative findings, pathophysiology, and proposed treatment.

Surgical Infections
Unit Objectives:

- Demonstrate an understanding of the principles of infection, acquisition, diagnosis, and treatment.
- Demonstrate an understanding of the typical presentation and treatment of common surgical infections.
- Demonstrate an understanding of methods used to minimize infectious complications in surgical patients.
- Demonstrate an understanding of techniques to minimize risk of viral infection spread, including hepatitis and HIV/AIDS.

Competency-Based Knowledge Objectives:
Section One: Mechanisms of Infection, Surgical Hazards, and Epidemiology

1. Discuss the mechanisms of infection acquisition in surgical patients, to include: 1) mode of transmission, 2) patient risk factors, and 3) methods of prevention:
   a. Community—acquired
   b. Procedure—related
   c. Nosocomial

2. Explain the role of bacterial inoculum and virulence as well as local and systemic adjuvant factors that contribute to infection and abscess formation.
3. Discuss how the host defenses of dissemination, inflammation, and loculation participate in the coordinated inflammatory response to infection and subsequent abscess formation.

4. Demonstrate an understanding of and correct technique for hand washing as the single most important method for preventing infectious disease transmission.

5. Analyze the infectious disease risks to which patients and surgeons are exposed, considering the most common infections and the use of universal precautions to minimize disease transmission.

6. Understand the operating room wound classification system as it applies to infection rate surveillance.

7. Understand the role and purpose of hospital surveillance and/or infection control management groups.

8. Understand the impact of “surgeon-related” factors to surgical infections such as: length of operation, handling of tissues, electrocautery, choice of suture, hair clippings.

9. When elderly persons mount a “significant fever” of 38.5°C (101°F) or greater, severe life-threatening bacterial infection is oftentimes present. Summarize the factors involved in and frequency of occurrence of the following factors in the febrile elderly patient:
   - Altered mental status
   - Leukocytosis
   - Rapid change in functional status
   - Appetite
   - Respiratory rate
   - Serum glucose
   - Serum sodium

10. More than half of the occurrences of bacteremia in persons 65 and older are hospital acquired. Discuss the significance of the following organisms to elderly patients who, as a group, experience increased infection associated with morbidity and mortality:
    - Gram-positive cocci (coagulase-negative staphylococci, Staphylococcus aureus, enterococci)
    - Gram-negative bacilli (E. coli, Klebsiella species)

11. Explain the older adult’s susceptibility to pneumonia, summarizing effects of the following factors:
    - Age-related changes in pulmonary reserve (e.g., alterations in lung volumes, elasticity, compliance ventilation)
    - Diminished cough
    - Airway collapse
    - Comorbid conditions (interfering with gag reflexes and ciliary transport)
    - Aspiration of oropharyngeal flora
    - Hematogenous spread of microbes

Section Two: Surgical Infections

1. Describe the mode of transmission, diagnosis, and treatment of typical infections seen in surgical patients, including:
   - Those common to all patients (pneumonia, urinary tract infections [UTI], skin infections)
   - Those uniquely cared for by surgeons (complex soft tissue, diabetic foot ulcers, postoperative abdominal abscesses, dehiscences)
2. Suggest common sources of postoperative fever; outline a diagnostic approach and proposed plan of intervention.

3. Differentiate between the following types of postoperative pneumonia, discussing patient risk factors, unique diagnostic clues, and treatment strategies:
   a. Non-ventilatory-associated
   b. Ventilatory-associated
   c. Aspiration-acquired

4. Demonstrate an understanding of intra-abdominal abscesses, paying particular attention to:
   a. Etiology
   b. Bacterial participation
   c. Surgical management
   d. Therapy failure

5. Differentiate cellulites, lymphangitis, lymphadenitis, and fasciitis from cutaneous abscess; describe the management of each.

6. Discuss the pathophysiology, diagnosis, and treatment of necrotizing fasciitis with special attention to risk factors and physical examination findings.

7. Outline the Advanced Trauma Life Support (ATLS) guidelines for tetanus prophylaxis; describe treatment principles for Clostridium tetani infection.

8. Summarize characteristics of those fungal infections of surgical significance, differentiating between community-acquired, nosocomial, and opportunistic infections.

9. Describe the RNA and DNA viruses of surgical significance, indicating their prevalence and modes of transmission.

10. Outline the management strategies for the diagnosis and treatment of infected catheters, implantable devices, and surgical hardware.

Section Three: Use of Antibiotics in Surgery

1. Summarize indications for prescribing prophylactic antibiotics associated with:
   a. Clean procedures (hernia, vascular, thyroid)
   b. Clean-contaminated procedures (GI, GU, Oropharyngeal)
   c. Contaminated procedures
   d. Implantable devices
      i. Vascular grafts
      ii. Orthopedic hardware
      iii. Soft tissue implants and synthetic reinforcements (breast, hernia)

2. Analyze situations where prophylactic antibiotics are discouraged:
   a. Burns
   b. Post-splenectomized patient
   c. Early aspiration

3. Discuss the importance of timing and dosing for prophylactic antibiotic use; analyze antibiotic use in older patients, and analyze potentially adverse consequences of their use.

5. Summarize the method by which microbiologic data are gathered, interpreted, and applied to altering antibiotic choice, dose, and duration.

6. Discuss the mechanism of action, mechanism of resistance, applications, side effect profile, and costs of the following antimicrobials:
   a. Penicillins and derivatives
   b. Cephalosporins
   c. Vancomycin
   d. Erythromycin and derivatives
   e. Metronidazole
   f. Quinolones
   g. Aztreonam
   h. Sulfonamides
   i. Anti-fungal agents
   j. Aminoglycosides
   k. Anti-virals

7. Demonstrate an understanding of the general pharmacology of antibiotics, pharmacologic changes that occur in the septic patient, and describe the effect of local environment on volume of distribution and protein binding.

**Competency-Based Performance Objectives:**

1. Appropriately diagnose and treat common infections seen in surgical patients.

2. Make an appropriate and timely diagnosis for simple and complex infections in the postoperative patient; alter therapy as dictated by clinical, radiologic, and microbiologic response.

3. Competently diagnose and treat necrotizing fasciitis, and Clostridium perfringens infections.

4. Prepare patients for elective surgery by providing effective parenteral and enteral prophylactic antibiotics when indicated.

5. Coordinate the treatment of aggressive soft tissue infections to include:
   a. Early operative debridement and re-debridement as necessary
   b. Urinary and fecal diversion when necessary
   c. Antibiotic management
   d. Postoperative critical care, including fluid and nutrition management

6. Identify sources of implantable device infection; confirm diagnosis; and appropriately treat such infections.

7. Practice the effective use of universal precautions, including meticulous hand washing to minimize infection transmission risk from health care professional (HCP) to patient, and vice versa.

8. Contact the office of epidemiology, infection control, or the resident supervisor when breaches in techniques of universal precautions have been committed.
9. Work with members of the infectious disease specialty team in the management of complex surgical wounds.

Wound Healing

Unit Objectives:

- Demonstrate an understanding of the physiology of wound healing.
- Demonstrate the ability to manage complex wound care in a variety of settings.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe the physiological process of normal wound healing, including the healing relationship to:
   a. Anatomy
   b. Physiology
   c. Biology
   d. Biochemistry
   e. Microbiology
   f. Immunology
   g. Molecular Biology

2. Explain the effect of the following factors on wound healing:
   a. Nutrition
   b. Pathologic metabolic states (including diabetes mellitus)
   c. Hematologic status
   d. Radiation
   e. Immune response
   f. Growth factors
   g. Super oxide radical formation
   h. Pharmacologic manipulation
   i. Infection/sepsis
   j. Chemotherapeutics
   k. Trauma

3. Describe the steps of normal of wound healing, including:
   a. Inflammation
   b. Proliferation
   c. Remodeling
   d. Epithelialization
   e. Contracture/contraction

4. Discuss the pathophysiology of delayed wound healing due to microbial physiology, virulence, and host defenses.

5. Differentiate between the pathophysiology of thermal, chemical, and electrical burns.

6. Discuss the principles of aseptic technique in uncomplicated cases related to the following procedures:
   a. Incision making
   b. Debridement
   c. Wound closures
   d. Dressings, splints, and casts
7. Describe the common chemical agents which are classically discussed in relation to burns and their antidotes.

8. Explain the principles of wound care as they relate to:
   a. Debridement
   b. Traumatic wounds
   c. Burn wounds
   d. Chronic wounds
   e. High-pressure injection injury
   f. Medication infiltration

9. Summarize the principles of wound protection and subsequent healing using:
   a. Dressings
      i. Occlusive
      ii. Non-occlusive
      iii. Alginates
      iv. Casting
   b. Other wound dressing materials
      i. Collodium
      ii. Petroleum gauze
      iii. Xeroform
      iv. Scarlet Red
      v. Dakin’s solution
      vi. Acetic acid solution
      vii. Silvadene, sulfamylon
      viii. Iodine, Bacitracin
   c. The concept of “moist wound healing”
   d. Adjunctive therapies: hyperbaric oxygen, electrical stimulation, vacuum assisted wound management, pulse irrigation

10. Discuss potential problems in complicated wound healing, including such challenges as snake, animal, insect, and human bites; electric burns; deep space infections of the hand; penetrating wounds; and radiation.

11. Define and describe the causes of postoperative wound complications such as:
    a. Dehiscence
    b. Evisceration
    c. Fasciitis and abscess formation

12. Discuss the concept of the reconstructive ladder.

13. Describe the microbiology of gangrene and necrotizing fasciitis.

14. Explain the principles associated with the selection of appropriate incisions applying surgical anatomy to include:
    a. Blood supply
    b. Lines of tension
    c. Access
    d. Strength
    e. Cosmesis/aesthetic

15. Describe the rationale for selection of appropriate wound closure and reconstruction as it relates to wound healing in:
a. Primary and delayed primary closure  
b. Secondary healing  
c. Skin graft, split and full thickness  
d. Local flaps  
e. Regional flaps  
f. Microvascular flaps  
g. Composite grafts

16. Assess the properties and uses of different types of suture material, including those that are absorbable and non-absorbable.

17. Analyze the therapeutic options for treatment of abnormal or delayed wound healing because of:  
a. Host resistance  
b. Infection  
c. Diabetes mellitus  
d. Radiation  
e. Ischemia

18. Discuss treatment choices for the following wound healing problems:  
a. Dehiscence  
b. Infection  
c. Hernia

19. Identify the resources needed to assist with wound healing outside the hospital and outline methods for resource acquisition to include home health care and equipment rental.

20. Describe the use of pressure relief devices and beds to prevent pressure ulcerations.

21. Differentiate between fetal wound healing and adult wound healing. Discuss the possible applications of fetal wound healing.

Competency-Based Performance Objectives:  
Junior Level:

1. Provide basic care to wounds from abrasions and small lacerations, including acute debridement, closure, and dressing placement.

2. Provide care for complex traumatic injuries considering:  
a. Management of hemorrhage  
b. Acute pain control  
c. When to explore operatively  
d. Debridement  
e. Acute closure or coverage  
f. Secondary reconstruction

3. Evaluate the progress of wound healing.

4. Apply all types of dressings and casts.

5. Make and close common incisions in the outpatient clinic, outpatient emergency department, and in the operating room.

6. Remove casts and complex dressings.

8. Debride and care for wounds of low to intermediate complexity, including traumatic injuries.

9. Apply all types of complex dressings, including body casts.

10. Make and close incisions of low to intermediate complexity.

11. Debride complex wounds and provide postdebridement care of such wounds.

12. Manage wounds of low to intermediate complexity, and alter therapy as indicated.

13. Perform complex procedures for the closure of difficult wounds, including various local and regional skin flaps and grafts.

14. Manage the care of various complex wound complications such as dehiscence, wound infections, and incisional hernias.

15. Analyze the use and need for complex reconstructive flaps and grafts; (e.g., application of the "reconstructive ladder").

Wound Healing in Elderly Patients
Unit Objectives:

- Demonstrate an understanding of the pathophysiological impact that aging imposes on wound healing.
- Demonstrate the ability to manage complex and chronic wounds in older patients.

Competency-Based Knowledge Objectives:

1. Describe the process of normal wound healing in older patients, highlighting the differences from the adult and child with respect to:
   a. Physiology
   b. Microbiology
   c. Immunology

2. Explain the effect of the following factors on wound healing in older patients:
   a. Nutrition
   b. Metabolic state (including diabetes mellitus)
   c. Collagen deposition
   d. Pharmacologic manipulation
   e. Physical activity/mobility

3. Explain the principles of wound care as they relate to chronic wounds.

4. Define and describe the causes of postoperative wound complications such as:
   a. Dehiscence
   b. Evisceration
   c. Fasciitis

5. Describe the rationale for selection of appropriate wound closure and reconstruction as it relates to geriatric wound healing in:
a. Primary and delayed primary closure
b. Secondary healing
c. Skin graft, split and full thickness
d. Local flaps
e. Regional flaps
f. Microvascular flaps and transfers
g. Tissue substitutes and adjuncts

6. Analyze the therapeutic options for treatment of abnormal or delayed wound healing in elderly patients because of:
   a. Host resistance
   b. Infection
   c. Diabetes mellitus
   d. Ischemia

7. Identify the resources needed to assist with chronic wound healing outside the hospital and outline methods for resource acquisition to include home health care and equipment rental.

8. Describe the use of pressure relief devices and beds to prevent pressure ulcerations.

Competency-Based Performance Objectives:

1. Provide basic care to chronic wounds and pressure ulcers, including acute debridement and dressing placement.

2. Identify the clinical stages of pressure ulceration.

3. Evaluate the progress of wound healing.

4. Apply all types of dressings and casts.

5. Remove casts and complex dressings.

6. Perform wound debridement, and be able to provide postdebridement care to debrided wounds.

7. Perform procedures for the closure of difficult wounds in older patients, including frequently used local and regional skin flaps and grafts.

8. Manage the care of various complex wound complications such as dehiscence, wound infections, and incisional hernias.

9. Analyze the pros and cons of complex reconstructive options in older patients’ chronic wounds.

10. Be able to instruct other health care professionals in basic evaluation, prevention, and dressing care of chronic wounds or pressure ulcers.

Shock, Resuscitation, and Surgical Critical Care

Part A: Shock and Resuscitation

Unit Objectives:
- Demonstrate an understanding of the pathophysiology of shock, common surgical etiologies, and its categorizations.
- Demonstrate an understanding of the mechanisms and pathophysiology of cardiopulmonary arrest.
- Demonstrate the ability to manage the treatment of shock and cardiopulmonary arrest.

**Competency-Based Knowledge Objectives:**

1. Define shock, categorize it based upon type, explain the etiology and pathophysiology of each type of shock:
   a. Cardiogenic
   b. Hypovolemic
   c. Distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated)
   d. Obstructive (cardiac tamponade, tension pneumothorax, pulmonary embolus)

2. Summarize the clinical presentation and hemodynamic parameters associated with each type of shock using clinical terms, such as heart rate, respiratory rate, and blood pressure and filling pressures.

3. Propose an algorithm for diagnosing and initiating treatment for each shock type.
   a. Cardiogenic
   b. Hypovolemic
   c. Distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated)
   d. Obstructive (cardiac tamponade, tension pneumothorax, pulmonary embolus)

4. Discuss the pathophysiology, including the mechanism of arrest, for each of the following situations:
   a. Acute myocardial infarction
   b. Acute dysrhythmia
   c. Congestive heart failure
   d. Hypovolemic shock (blood loss, dehydration)
   e. Burns
   f. Hemorrhagic shock (non-traumatic)
   g. Septic shock
   h. Anaphylactic shock (envenomation, drug related)
   i. Acute adrenal insufficiency
   j. Penetrating or blunt trauma
      i. Tension pneumothorax
      ii. Pericardial tamponade
      iii. Hemorrhagic shock
   k. Hypothermia
   l. Substance abuse
   m. Electrical injury
   n. Suffocation
   o. Acute stroke

5. Explain the indications for and the pharmacokinetics of each of the following drugs:
   a. Lidocaine j. Vasopressin
   b. Digoxin k. Nitroglycerin
   c. Metoprolol l. Amrinone
   d. Diltiazem m. Milrinone
   e. Pronestyl n. Levophed
   f. Amiodarone o. Phenylephrine
   g. Dopamine p. Epinephrine
   h. Dobutamine
   i. Adenosine(Adenocard®)
6. Summarize the indication and appropriate technique for cardiac support, pressors, and Circulatory Assist Devices (IABP, LVAD, RVAD).
7. Outline the signs and symptoms of acute airway obstruction and define the appropriate intervention in adult and pediatric patients.
8. Outline the surgical housestaff role on the "code team."
9. Explain the physiological impact of mechanically assisted ventilation on the cardiovascular/respiratory system.
10. Analyze methods for initiating and maintaining ventilator/weaning support.
11. Describe the indications and potential complications for the following surgical interventions:
   a. Bag mask ventilation, endotracheal intubation (oral and nasal)
   b. Cricothyrotomy
   c. Thoracostomy tube
   d. Central venous catheter
   e. Peripheral vein cutdown
   f. Arterial line
   g. Pulmonary artery catheter
   h. Diagnostic peritoneal lavage (DPL)
   i. Resuscitative thoracotomy
   j. Pericardiocentesis
   k. Thoracentesis
   l. Ultrasound
   m. Wound exploration
12. Review the importance of serial physical examinations, hemodynamic monitoring, and serial laboratory evaluations, including urine output and lactic acidosis, in assessing patient response to specific resuscitation treatment.
13. Outline the clinical and laboratory indications for transfusion of the following blood products:
   a. Packed red cells
   b. Fresh frozen plasma
   c. Platelets
   d. Cryoprecipitate
   e. Whole blood
   f. Specific clotting factor concentrates (VIII, IX, XII)
   g. Recombinant erythropoietin
14. Analyze the potential complications from use of the above products.
15. Older patients represent a special population, presenting key differences in emergency situations. Analyze and use examples to describe the significance of the following characteristics that are more frequent in the older patient:
   a. Vague, imprecise symptoms
   b. Atypical disease presentation
   c. Co-morbidity
   d. Polypharmacy (multiple organ specific physician input)
   e. Possibility of cognitive impairment
   f. Diagnostic tests with different normal values (age adjustments for normal values)
   g. Likelihood of decreased functional reserve
   h. Inadequate social support systems
16. Describe the role and indications (if any) for the following products in acute resuscitation:
   a. Recombinant activated Protein C
   b. Albumin
   c. Hespan and similar products
17. Assess the indications, guidelines, and potential complications of the following cardiovascular drugs:
   a. Dopamine
   b. Dobutamine
   c. Phenylephrine
d. Vasopressin
e. Epinephrine
f. Norepinephrine
g. Amrinone
h. Nitroglycerine
i. Esmolol
j. Nipride
k. Diltiazem

18. Analyze and explain factors involved in blood pressure overestimation in the older patient (pseudohypertension, arteriosclerosis, arm size cuff discrepancies).

Competency-Based Performance Objectives:

1. Complete and pass Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), and Fundamentals of Critical Care Support (FCCS) training.
2. Manage the unconscious patient (seizure).
3. Serve on the code team and the trauma team.
4. Recognize and manage airway obstruction.
5. Perform endotracheal and nasotracheal intubation.
6. Use disposable airway equipment, (e.g., bags, and gloves) as transmissible infection precautions.
7. Perform cricothyrotomy and tracheostomy.
8. Manage mechanical ventilator equipment.
10. Manage carbon monoxide poisoning.
11. Diagnose cardiac arrest and rhythm disturbances
12. Apply closed chest cardiac massage (CPR).
13. Perform closed chest defibrillation.
14. Perform venous access procedures, including subclavian and jugular and femoral vein catheterizations and saphenous vein cut down.
15. Determine the indication, dosage, contraindications, and method of administration of the following medications:
   a. Morphine
   b. Lidocaine and Procainamide
c. Propranolol
d. Atropine
e. Diltiazem
f. Epinephrine and norepinephrine
g. Dopamine and dobutamine
h. Amrinone
i. Adenosine (Adenocard ®)
j. Cardiac glycosides
k. Nitroglycerin and nitroprusside
l. Furosemide, Mannitol, Bumex, Diamox
m. Sodium bicarbonate
n. Calcium
o. Amiodarone
p. Labetalol

16. Estimate volume requirements in acute trauma, burns, and hemorrhage; and institute replacement therapy.
17. Control external blood loss.
18. Perform pulmonary artery catheterization, including determining catheter position by pressure wave recording and electrocardiogram (EKG).
19. Manage cardiogenic and septic shock.
20. Use pneumatic antishock garments.
Part B: Surgical Critical Care

Unit Objectives:

- Demonstrate knowledge of the principles associated with the diagnosis and management of critically ill patients, including knowledge of simple and complex multiple organ system normalities and abnormalities.
- Demonstrate the ability to appropriately diagnose and treat patients with interrelated system disorders in the intensive care unit.

Competency-Based Knowledge Objectives:

Junior Level:
Complete the coursework and testing to obtain Basic and Advanced Cardiac Life Support (BCLS and ACLS) and Fundamental Critical Care Support (FCCS) and Advanced Trauma Life Support (ATLS) certification.

Section One: Administration

1. Define and describe the role of the surgeon in the critical care setting to include these aspects:
   a. Unit administration/management (surgeon as unit director)
      i. Triage of patients
      ii. Economic concerns
      iii. Data collection and computer usage
      iv. Infection control and total quality management (TQM) issues
      v. Ethical concerns (consent, durable power of attorney, living wills)
      vi. Local laws for referral to Medical Examiner
   b. Management/consultation for specific surgical conditions
   c. Coordination of multidisciplinary consultants relating and interpreting information between non-surgical consultants

2. Identify and outline criteria for admitting patients to the intensive care unit (ICU) to include:
   a. Medical indications (related to specific diseases, e.g., pulmonary, cardiac, renal)
   b. Surgical indications directly related to specific surgical illness

3. Identify and outline criteria for discharging patients from the ICU, to include:
   a. Medical indications
   b. Surgical indications
   c. Patients unacceptable for ICU (e.g., futile care, do not resuscitate [DNR] orders)

4. Identify and explain the considerations surgeons must make when working with consultants in managing critical care situations.

5. Identify potential Organ, Tissue Donor candidates, as well as the hospital specific procedure for contacting families for potential donation.

Section Two: General Pathophysiology--Body as a Whole

1. Describe the normal physiologic response to a variety of insults such as sepsis, trauma, or surgery by associating the adaptation of the following systems from their pre-stress to post-stress states:
   a. Respiratory
   b. Metabolic
   c. Hemodynamic
   d. Endocrine
   e. Renal

2. Describe the concept of the Systemic Inflammatory Response Syndrome (SIRS).

3. Describe prophylactic measures routinely used in critical care such as:
a. Gastrointestinal (GI) bleeding prophylaxis, including neutralizing, inhibitory compounds, and surface agents
b. Prophylactic antibiotics (demonstrate differences between true prophylaxis, empiric and therapeutic uses)
c. Pulmonary morbidity prophylaxis (incentive spirometry)
d. Prophylaxis against venous thromboembolic events
e. Aseptic technique
f. Universal precautions
g. Skin care protocols
h. Guidewire catheter changes for work-up of fever or change in clinical status

4. Discuss the pharmacotherapeutics of drugs used for support and treatment of the critically ill patient with emphasis on 1) mode of action, 2) physiologic effects, 3) spectrum of effects, 4) duration of action, 5) appropriate doses, 6) means of metabolism or excretion, 7) complications, and 8) cost:
   a. Vasopressors
   b. Vasodilators
c. Inotropic agents
d. Bronchodilators
e. Diuretics
   f. Antibiotics/antifungal agents
      i. Distinguish between empiric, therapeutic, and prophylactic
      ii. Demonstrate knowledge of classes of anti-infectives
g. Antidysrhythmics
   h. Antihypertensives
      Predict applicability of different classes in a particular situation:
      i. Use of beta blockers in hypertensive tachycardic patient
      ii. Use of ace inhibitors in hypertensive patient with congestive heart failure
      iii. Use of calcium channel blockers in hypertensive patient with angina

5. Outline the indications and methods for providing nutritional support by completing the following activities:
   a. Discuss indications, selection of formulations, cost, route of administration of parenteral versus enteral forms of nutrition
   b. Explain complications of parenteral and enteral routes of feeding as well as select methods to avoid the complications
   c. Interpret findings associated with abnormalities in levels of glucose, chloride, sodium, phosphate, magnesium, trace metals/elements, and vitamins in the critically-ill patient receiving enteral or parenteral feedings; prepare recommendations for elderly patients under these same conditions
   d. Estimate protein calorie requirements for patients of varying degrees of illness, and be able to analyze adequacy of nutritional support using commonly obtainable laboratory values

6. Outline the principles of postoperative fever with respect to causes, empiric diagnostic modalities, and specific therapy. How useful are these principles when considering the elderly patient?

7. Describe, apply, and revise appropriate treatment interventions based upon analysis of changes in the patient's clinical and laboratory parameters:
   a. Adjustment of intravenous fluids with respect to expected stress response, including metabolic, hormonal, cardiovascular, and renal responses to replacement of fluid losses (Describe association between high levels of stress hormones and alterations of glucose metabolism remembering: does not volume resuscitate patients with excessive amounts of glucose.)
b. Efficacy of prophylactic measures for PE, stress ulceration and infection
c. Adequacy of nutritional support in a patient with multiple sites of protein losses (e.g., fistulas, drain sites, or metabolic stressors [infection, acute lung injury {ALI}, hyperthermia, respiratory failure])
d. Analysis and treatment of postoperative fever and methods of treatment
e. Events leading to and responsible for initiation of ventilatory support
f. Differentiate low cardiac output, hypotensive/hypertensive states in terms of preload, pump, or after load
g. Analysis and treatment of seizures or acute change in mental status, including the role of:
   i. ABC’s (airway, breathing, circulation); draw electrolytes/blood-urea-nitrogen (BUN)/ creatinine/glucose/calcium, magnesium
   ii. Glucose/thiamine intravenously
   iii. Evaluate medication record for new drugs or interactions (Ativan, Versed, phenobarbital, Dilantin [not applicable in the acute event])
h. Analysis and treatment of acute respiratory failure from changes in the airway, pump, or lung

8. Review the management and diagram a plan for the care of the critically ill surgical patient with multiple medical problems such as:

9.  
   a. Cardiac dysrhythmias
   b. Pulmonary insufficiency from airway, bellows (pump), or parenchymal problems
   c. Acute/chronic renal failure with hemodynamic instability or need of specific fluid therapy (TPN), renal replacement therapy, high output GI fistulas
   d. Diabetes mellitus and its special problems in the realm of nutritional support
   e. Hemodynamic instability in the face of acute/chronic renal or pulmonary insufficiency

Section Three: Airway-Respiration

1. Describe the commonly used indications for initiation of ventilation support, including:
   a. Indications and commonly acceptable values for initiation of mechanical ventilation
   b. Evaluation of airway
   c. Evaluation of adequacy of thoracic pump (muscle strength)
   d. Evaluation of lung parenchymal characteristics (arterial blood gases and chest x-ray)
   e. Analysis of commonly used pulmonary values (e.g., tidal volume [Vt], maximum ventilatory volume [MVV], compliance static and dynamic, functional residual capacity [FRC], PEEP, auto PEEP, airway pressures)
   f. Indications and commonly acceptable values for weaning from mechanical ventilation

2. Review respiratory physiology, and describe the specific pathology involved in ventilation and perfusion deficits.

3. Discuss the association of airway obstruction with age, giving consideration to each of the following:
   a. Repeated disruption of the balance of inflammatory mediators and humoral protection (elastase and antielastase, oxidant and antioxidant)
   b. Neutrophil recruitment
   c. Tissue repair culminating in inflammatory lung destruction
   d. Accumulated environmental oxidant injuries

4. Analyze and compare the principles of ventilator mechanics, including modes of ventilation, triggering mechanisms, and possible uses.

5. Describe the pathophysiology of acute lung injury (ALI, with spectrum from mild to severe ALI, also known as ARDS) and the management of the long-term ventilator-dependent patient to include:
   a. Pneumonias (aspiration or nosocomial)
   b. Acute renal failure
   c. Cardiac failure
   d. Prevention of malnutrition or restitution of body stores
e. Systemic Inflammatory Response syndrome (SIRS, MODS- Multiple Organ Dysfunction Syndrome the most severe form known as MSOF- Multi-System Organ Failure)
f. Sepsis
g. Skin care problems
h. Physical therapy (maintenance of muscle mass and function, prevention of contractions)
i. Psychological support for both patient and family

6. Review management of the following complex respiratory problems:
   Mechanically ventilated patient with:
   i. Areas of differing compliance
   ii. Bronchopleural or bronchoesophageal fistula
   iii. Borderline cardiac reserve (non-compliant left ventricle, recent myocardial infarction, valvular dysfunction)

7. Explain why otherwise healthy elders may be more vulnerable to poor outcomes from diseases affecting diffusion (producing lower oxygen levels, e.g., pneumonia, COPD). Consider these factors in your explanation:
   a. Heart rate
   b. Ventilatory response to hypoxia
   c. Ventilatory response to hypercapnia

8. Analyze the pros and cons of the use of the following drugs to improve respiratory function:
   a. Bronchodilators (aerosols vs. parenteral medications)
   b. Membrane stabilizing agents (cromolyn sodium, steroids)
   c. Diuretics
   d. Venodilators
   e. Analgesics and sedatives
   f. Mucolytics

Section Four: Circulation

1. Describe and compare the following cardiac function parameters:
   a. Preload
   b. After load
   c. Myocardial contractility

2. Define the information obtained from the use of the following invasive/non-invasive monitoring devices. Specify: 1) which information is directly/indirectly measured or calculated, 2) the accuracy and 3) cost of obtaining the information, and 4) review the hemodynamic principles associated with the use of each device:
   a. Arterial catheters
   b. Central venous catheters
   c. Swan-Ganz catheters
   d. Intracranial pressure monitors
   e. End tidal carbon dioxide monitors
   f. Pulse oximetry
   g. Peripheral nerve stimulators (for testing adequacy of neuromuscular blockade)
   h. Foley catheters
   i. Intestinal pH monitors
   j. Bioelectric impedance

3. Outline the protocols for definition of patterns and management of hemodynamically unstable patients, and analyze the selection of appropriate therapy by completing these activities:
   a. Predict improvements in hemodynamic status with manipulation of definable variables, including fluid and drug therapies.
b. Detect and revise therapies based on the use of invasive/non-invasive monitoring devices.

4. Review cardiac function and hemodynamic monitoring from the following standpoints. Interpret changes in accuracy of values obtained from hemodynamic monitoring devices in:
   a. Patients with severe pulmonary insufficiency who have low compliances or high PEEP
   b. Patients with severe valvular insufficiency/stenosis
   c. Various shock states (hypovolemic, septic, spinal, or cardiogenic)
   d. High dose vasopressors

5. Summarize the effects of appropriate volume and drug therapies to manipulate the cardiovascular system in the following patients:
   a. Hypovolemic hypotensive patient
   b. Hypotensive euvoletic patient
   c. Hypotensive hypervolemic patient
   d. Hypotensive oliguric patient
   e. Hypotensive, hypervolemic oliguric patient
   f. Hypovolemic oliguric patient
   g. Hypotensive, oliguric hypoxic patient

6. Discuss the significant patient characteristics in a geriatric population associated with increased risk of thromboembolic disease, including:
   a. Underlying congestive heart failure
   b. Prolonged immobility before surgery
   c. Paralysis
   d. Previous DVT
   e. Hypercoagulable states (due to malignancy or coagulation factor deficiency)

Section Five: Renal

1. Review acid-base and electrolyte abnormalities common in critically-ill patients.
2. Identify, define, and classify the major categories of acid-base disturbance (metabolic acidosis and/or alkalosis, respiratory acidosis and/or alkalosis) in the context of the patient's altered physiology. Cite common clinical scenarios for their appearance:
   a. Metabolic acidosis (hypovolemic shock, chloride excess resuscitation, occultischemia)
   b. Metabolic alkalosis (contraction alkalosis excessive diuretic use)
   c. Respiratory acidosis
   d. Respiratory alkalosis (early sign of sepsis vs. ventilator complication)
3. Discuss the identification and correction of complex acid-base problems such as choice of intravenous fluids for electrolyte replacement in the:
   a. Hyperchloremic, metabolically-acidotic patient
   b. Hypochloremic, metabolically-alkalotic patient
   c. Stuporous, dehydrated, hyponatremic patient
   d. Stuporous dehydrated hypernatremic patient
   e. Patient with central diabetes insipidus
   f. Hyponatremic, volume overloaded patient with carbon dioxide retention

Section Six: Neurologic

Describe the initial evaluation, ongoing, acute monitoring and long-term management of possible neurologic or behavioral abnormalities occurring in the ICU setting:

   a. Seizures
   b. Coma
   c. Stroke
   d. Multifactorial effects of “postoperative confusion”
e. Delirium  
f. Brain death

Section Seven: Gastrointestinal/Hepatic
Discuss specific fluid compositions and the effect of the losses of such fluids as gastric, pancreatic, biliary, and succus entericus from intestinal fistulas of various levels. (Fluid should be described in terms of volume, electrolyte composition, and replacement fluid of choice.)

Senior Level:

Section Eight: Administration

1. Describe the criteria for predicting preoperatively the patient's need for critical care, including:
   a. Pre-existing disease states (cardiac, pulmonary, or renal)
   b. Operation-specific requirements for postoperative intensive care management
2. Review and interpret the relationships of physicians, nurses, and administrators in managing patients assigned to the ICU.
3. Discuss the value of an interdisciplinary approach to health care for the critically ill, elderly surgical patient. Include consideration of these groups/disciplines, working together:
   a. Surgery
   b. Nursing staff
   c. Family-friends as caregivers
   d. Physical therapy
   e. Medical consultants
   f. Pharmacy
   g. Religion
   h. Social work
   i. Hospital administration
4. Identify new modes of intensive care therapeutics by completing the following activities:
   a. Predict and analyze the need for a new technology.
   b. Formulate a plan for the institution of new technologies or therapeutics.
   c. Critique and revise applicability of new technologies or therapeutics on a cost: benefit ratio.
5. Summarize the following moral and ethical problems encountered in the ICU:
   a. The need for organ donation and the identification of potential donors
   b. Decisions about whom to resuscitate and to what degree
   c. Care for the mentally incapacitated or incompetent patient
   d. Dealing with a difficult family and futility of care
   e. Identifying and interacting with alternate religious/cultural beliefs

Section Nine: General Pathophysiology--Body as a Whole

1. Discuss the use of sepsis severity scores.
2. Distinguish between the major characteristics of septic shock and hypovolemic shock:
   a. Summarize initial evaluation and presentation
   b. Analyze therapeutic options
   c. Revise therapeutic options based on clinical parameters obtained from monitoring devices
3. Explain the concepts of tissue oxygen supply and demand. Demonstrate the contributions from the following components:
   a. Calculate oxygen delivery
   b. Calculate oxygen consumption
c. Analyze the effect of cardiac output and varying preload, pump, and after load to oxygen delivery
d. Analyze the contributions of hemoglobin and percent of saturation on oxygen delivery
e. Explain the changes in tissue oxygen delivery and uptake related to pH, temperature, 2, 3-diphosphoglyceride (DOG)

4. Discuss the evaluation and treatment of the following bleeding disorders:
   a. The role of blood vessels, platelets, fibrin cascade, and degeneration in normal hemostasis
   b. Disseminated intravascular coagulopathy (DIC), defining common causes and therapy
   c. Thrombocytopenia as a failure of production, accelerated destruction, or dilution
   d. Hemophilia A
   e. Von Willebrand's disease
   f. Idiopathic thrombocytopenia purpura (ITP) and thrombotic thrombocytopenia purpura (TTP) as causes of thrombocytopenia (compare and contrast)
   g. Heparin or Coumadin therapy misapplication
   h. Advanced liver disease
   i. The role of Protein C, S, and lupus circulating anticoagulant and their roles in bleeding disorders

5. Outline the unique problems of the following surgical subspecialties in critical care management:
   a. Neurosurgery
   b. Urology
   c. Orthopedics
   d. Pediatric surgery
   e. Cardiac surgery
   f. Thoracic surgery
   g. Burns
   h. Trauma

6. Discuss management of the overall hospital course of the patient with altered physiologic states:
   a. Preoperative considerations specific to their disease
   b. Operative considerations specific to their disease
   c. Postoperative considerations specific to their disease

7. Outline the nutritional and metabolic components for a patient with specific disease states.

Section Ten: Renal
Discuss the physiologic principles and define specific management aspects associated with the following complex acid-base problems:

1. Renal tubular acidosis (differentiate between Type I and II)
2. Management of high output loss states from the gastrointestinal tract in a patient with poor cardiac function
3. Management of volume excess states associated with eunatremia or hyponatremia

Section Eleven: Gastrointestinal/Hepatic
Review and summarize the management of hepatic and renal failure, including:

1. Utility/disutility of disease-specific nutritional formulations
2. Adjustment or elimination of toxic substances (antibiotics, contrast material, narcotics)
3. Current means for support of renal failure, high dose diuretics, continuous veno-venous hemofiltration (CVVH), continuous veno-venous hemodialysis (CVVHD), dialysis (peritoneal and hemodialysis)
Section Twelve: Endocrine

Describe and specify therapy for the following endocrine-related problems associated with critical care:

1. Hypothyroidism / hyperthyroidism
2. Hyperparathyroidism / hypoparathyroidism (changes in calcium and magnesium values)
3. Adrenal cortical excess (Cushing’s disease and syndrome)
4. Adrenal cortical deficiency states (Addison’s disease)

Competency-Based Performance Objectives:

Junior Level:

1. Provide initial evaluation and management of the critically-ill postoperative patient.
2. Institute the following therapeutic interventions:
   a. Manage fluid orders
   b. Determine ventilator settings
   c. Order pharmacologic support drugs
   d. Determine the need for and duration of antibiotic therapy
3. Obtain ACLS, FCCS, and ATLS certification.
4. Perform the following procedures:
   a. Orotracheal and nasotracheal intubation, nasogastric and bladder intubation
   b. Arterial catheter insertion
   c. Central venous and pulmonary artery catheter insertion
   d. Placement of tube thoracotomy
   e. Cricothyrotomy
   f. Pericardiocentesis
5. Serve on code and trauma team.
6. Manage critically ill patients in the intensive care unit:
   a. Determine need for ventilation and select situation appropriate airway and initial ventilator settings
   b. Compute initial and ongoing fluid requirements
   c. Analyze need for operative intervention
   d. Initiate rehabilitation process after stabilization of injuries, including:
      i. Attention to possible altered body habitus
      ii. Requirements for special devices (physical, occupational, or speech therapy)
      iii. Maintain nutritional status
      iv. Provide support, interaction, and information for the family
   e. Establish intravenous access and maintain with appropriate sterile techniques for evaluation of fever
   f. Determine need for ongoing ICU management
   g. Identify appropriate antibiotic therapy distinguishing between prophylactic, empiric, and therapeutic uses
   h. Monitor hemodynamic data

Senior Level:

1. Direct all surgical management of patients in the ICU, including taking direct responsibility for admission and discharge.
2. Manage invasive monitoring catheters, interpret the data obtained, and manipulate the hemodynamic variables toward calculated goals.
3. Manage the following situations:
   a. Multiple organ system failure; providing support for failing, failed, or normal organs
b. Life threatening surgical infections (e.g., ascending cholangitis, ascending myonecrosis or gangrene)
c. Hypovolemic shock
d. Renal failure
e. Nutritional failure
f. Liver failure
4. Place emergency transvenous / transthoracic access for cardiac pacing.
5. Perform emergency thoracotomy.
6. Manage the nutritional and metabolic components of the patient's illness.
7. Serve on code and trauma teams as a team leader.
8. Construct a caregiver assessment to include caregiver preparedness, needs, and signs of strain. Consider caregiver emotional support and actual physical care of the patient.
9. Analyze the special need for caregiver support systems when the patient is elderly.

Trauma

Unit Objectives:

- Demonstrate an understanding of the pathophysiologic effect of blunt and penetrating trauma.
- Demonstrate the ability to effectively manage the surgical care of a patient with complex multisystem injuries.
- Demonstrate knowledge of, and the ability to manage, a variety of healthcare services for trauma patients such as pre-hospital transportation, emergency department care, in-hospital care, and rehabilitation.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe the anatomy, and physiology of all body systems affected by trauma, including the initial functional evaluation of the:
   a. Central nervous system
   b. Cardiovascular system
   c. Pulmonary system
   d. Gastrointestinal system
   e. Genitourinary system
   f. Extremity function
   g. Nutritional status
2. Review the anatomy, physiology, and pathology applicable to the general management of trauma patients, including:
   a. Central nervous system
   b. Musculoskeletal system
   c. Hand/forearm
   d. Ear, nose, and throat
   e. Ophthalmology
3. Outline the basic techniques of evaluation and resuscitation of trauma patients using the American College of Surgeons (ACS) Advanced Trauma Life Support (ATLS) protocol.
4. Specify the trauma services needed for initial evaluation and resuscitation in the hospital setting. Categorize appropriate pre-hospital or emergency medicine system levels of care.
5. Discuss wound care management in the emergency department and other settings. Outline the management of the following drains and tubes: nasogastric tube (NGT), urinary bladder catheter, chest tube (CT), central venous line (CVL), arterial line (AL).
6. Explain the characteristics of basic surgical skill, including:
a. Sterile technique
b. Incisions
c. Wound closures
d. Knot tying
e. Handling of tissues
f. Selection/use of operating instruments
g. Universal precautions

7. Discuss the management of trauma involving the musculoskeletal system, including the need for casts, splints, and traction.

8. Summarize basic critical care management principles.

9. Analyze pharmacological support for trauma, resuscitation, and intensive care unit patients.

10. Identify the management principles for a trauma patient in the intensive care unit.

11. Outline the factors associated with rehabilitation as they apply to initial and early patient care.

12. Discuss the indications for, and the provision of, nutritional support for elderly patients sustaining trauma.

13. Outline the indications for such basic surgical procedures as:
   a. Laparotomy
   b. Debridement of injured tissues
c. Ultrasound
d. Medical antishock trousers (MAST)
e. HARE traction splint
f. Splinting
g. Diagnostic peritoneal lavage (DPL)
h. Thoracotomy/thoracostomy
   i. Hemorrhage control

14. Discuss the primary causes/mechanisms of injury in the following list that contribute to making trauma the fifth leading cause of death in those aged 65 and older:
   a. Falls
   b. Motor vehicle crashes
c. Pedestrian injuries
d. Burns
e. Domestic abuse

Senior Level:

1. Explain trauma preventive measures, both medical and legal (e.g., the use of helmets and seat belts).
2. Describe and explain the mechanics/ballistics associated with various wounding agents.
3. Discuss the management of associated medical conditions seen in the trauma patient such as diabetes, chronic obstructive pulmonary disease, hypertension, coronary artery disease, and HIV.
4. Identify the indications for emergency operative procedures such as burr holes, cricothyrotomy, insertion of cardiopulmonary assist devices, and resuscitative thoracotomy.
5. Formulate a plan for rehabilitation to return the trauma patient to full functional life.
6. Define abdominal compartment syndrome. Describe how to measure intra-abdominal pressures and develop a treatment plan to treat abdominal compartment syndrome.
8. Analyze the transfer of a patient to an appropriate facility utilizing air medical services.
9. Discuss the availability and use of institutional and community support services for trauma patients such as social work, home health care, and vocation rehabilitation (physical and occupational therapy).
10. Discuss the management of a trauma service, including the training of its members in emergency medicine services, emergency department, operating room, intensive care, and rehabilitation.

11. Outline the economic impact of the following aspects of patient care:
   a. Vocational rehabilitation
   b. Nursing homes
   c. Insurance
   d. Diagnostic-related groups (DRG's) associated with management of trauma
   e. Billing and coding
   f. Managed care

Competency-Based Performance Objectives:

Junior Level:

1. Complete an ACS ATLS course as a provider.
2. Participate in trauma evaluation, resuscitation, operative management, and intensive care unit (ICU) supervision of a multiply-injured patient.
3. Evaluate the patient to determine quality of emergency medical service (EMS) care.
4. Insert a variety of tubes:
   a. Endotracheal
   b. Thoracostomy
   c. Intravenous
   d. Intra-arterial
   e. Diagnostic peritoneal lavage (DPL)
   f. Urinary bladder catheter
   g. Nasogastric tube
5. Apply and remove all types of dressings and splints, including the vacuum pack dressing.
6. Make and close a variety of incisions and tie knots using sterile technique.
7. Evaluate critical care parameters and make decisions, under direct supervision, regarding change in care.
8. Direct the evaluation of an acutely-injured patient to include resuscitation and the decision for operation.
9. Assess nutritional needs and institute necessary nutritional support.
10. Formulate rehabilitation plans for trauma patients.
11. Monitor the trauma patient in the intensive care unit, suggesting changes in management as indicated.
12. Manage pharmacologic treatment plans for patients during resuscitation and in the critical care unit.
13. Perform basic surgical procedures such as:
   a. Laparotomy
   b. Wound debridement
   c. Application of traction devices for both head and extremities

Senior Level:

1. Coordinate EMS activities for initial trauma management to include instructional programs.
2. Manage penetrating wounds through understanding the injury potential of wounding mechanisms.
3. Provide management for pre-existing disease states in injured patients with appropriate consultation.
4. Perform all operative and management procedures for trauma to the chest, abdomen, extremities, and head with direct supervision.
5. Supervise central line placement, cricothyrotomy, CT, DPL, and ultrasound by junior house staff.
6. Direct rehabilitation plans with appropriate consultation.
7. Organize hospital resources to provide services for trauma patients and direct patient flow in the emergency department, the operating room, and the intensive care unit.
8. Provide appropriate referrals for vocational rehabilitation, nursing home services, and physical rehabilitation.
10. Practice the principles of damage control surgery in severely-injured patients.

Transplant Surgery
Part A:
Unit Objectives:

- Demonstrate an understanding of general immunological principles and their application to surgical practice.
- Demonstrate an understanding of the principles of care for patients with abnormal immune function who are undergoing general surgery procedures.
- Demonstrate an understanding of the emerging field of molecular biology and the novel immune therapies having potential application to clinical surgery.

Competency-Based Knowledge Objectives:

Section One: General Immunologic Principles

1. Describe the basic concepts of the human immune system, including:
   a. Cells involved in host defense
   b. Central roles of lymphocytes and macrophages
   c. Their derivation from pluripotent stem cells
2. Summarize the major activities of the macrophage, its products of secretion, and its role as the antigen-presenting cell (APC).
3. Describe the ontogeny, function, and role in cellular immunity and graft rejection of the T-lymphocyte; demonstrate understanding of the T-cell receptor and its interaction with the human leukocyte antigen (HLA) complex.
4. Summarize the events in T-cell activation, including the roles of CD4+ and CD8+ cells and the release of involved interleukins.
5. Explain the development, differentiation, and function of B-lymphocytes in the formation of antibodies; outline and describe the functional anatomy of an immunoglobulin molecule.
6. Describe the immune functions of the spleen, liver, thymus, and bone marrow; summarize the impact of their manipulation on the immune system.
7. Describe immunological changes which occur in the elderly patient compared to a younger patient.

Section Two: Defenses against Infection

1. Describe the resident flora, mechanical barriers, local hormones, and chemicals of the epithelium in the following tracts involved in the body’s defenses against infection:
   a. Gastrointestinal
   b. Respiratory
   c. Genitourinary
2. Describe the body's response to infection when:
   a. There has been no prior antigenic contact
   b. There has been prior contact
      i. Passive and active immunization
ii. T-cell memory activation
3. Explain the therapeutic and prophylactic roles of intravenous immunoglobulin and viral vaccines.
4. Distinguish between several known congenital and acquired immunodeficiency states, including sepsis and severe burns.
5. Describe tests of cellular immune integrity, including skin and laboratory tests of lymphocyte function.

Section Three: Clinical Immunology

1. Describe the mechanism of action and potential side effects of current immunosuppressive agents; state the rationale for their use and timing in transplantation and in other medical applications:
   a. Prednisone
   b. Cyclosporine
   c. Azathioprine
   d. Tacrolimus (FK506)
   e. Mycophenolate mofetil (RS6144)
   f. Monoclonal antibody (Moab) use for induction
2. Differentiate between agents used to treat acute transplant rejection:
   a. Steroids
   b. Radiation therapy
   c. Poly- and monoclonal antibodies
5. Outline an approach to the management of infection in immunocompromised patients resulting from:
   a. Iatrogenic immunosuppression secondary to drugs
   b. Natural immune deficiency states
   c. Impaired immunity secondary to cancer
6. Formulate a plan for management of immunosuppression in patients with severe surgical morbidity or complications.

Section Four: Trends in Immunology and Molecular Biology

1. Recognize new and investigational immunosuppressive drugs used for nontransplant medical conditions.
2. Summarize the current rationale and clinical status of novel oncologic treatments using biologic modifiers and immunomodulation; analyze their potential limitations and side effects.
3. Explain the manipulation of gene transplantation and describe several clinical applications currently being investigated.
4. Discuss the growing importance of molecular biology and the basic techniques of recombinant DNA technology to investigate problems in immunology, oncology, and pathology.
5. Explain the significance of transgenic animals, their creation, and potential application to experimental and clinical transplantation.

Competency-Based Performance Objectives:

1. Participate in the perioperative management of immunosuppressive agents in chronically-medicated patients undergoing general surgery.
2. Plan and perform elective surgery in immunosuppressed patients with attention to minimizing infectious risks; perform emergent surgical intervention (treatment of perforated viscous) in similar high-risk patients.

3. Optimize patients' immune state secondary to systemic compromise following major surgery, burns, trauma, and malnutrition.

4. Recognize and treat wound infections and other complex disorders in chronically immunosuppressed patients undergoing elective and emergent surgery.

5. Monitor drug levels and side effects in immunosuppressants.

6. Participate in the care of patients receiving immunostimulatory medications (e.g., IV immunoglobulin [IVIG], granulocyte stimulating factor).

7. Describe differences in survival rate which occur in elderly patients compared to younger patients. Consider the following factors:
   a. Differences in work-ups that occur in elderly patients.
   b. Complications in elderly versus younger patients

Part B: Organ Transplantation

Unit Objectives:

- Demonstrate an understanding of the history of clinical transplantation and interpret the guidelines for preparing patients for organ transplantation.
- Demonstrate a working understanding of the fundamental immunologic principles governing organ transplantation and immunosuppression.
- Demonstrate understanding of the potential metabolic, physiologic, and malignant side effects of immunosuppressants.

Competency-Based Knowledge Objectives:

Section One: Background / Preparation

1. Demonstrate a working knowledge of the history and evolution of clinical transplantation, including:
   a. Early vascular surgery
   b. Concept of tolerance
   c. First successful organ transplants
   d. Introduction of immunosuppressive agents

2. Describe the anatomic and biologic terms associated with organ transplantation, donor and recipient relationships, and grafting between species.

3. Explain the human leukocyte antigen (HLA) complex, including its genetic location and composition, pattern of inheritance, and the difference between Class I and II antigens of the major histocompatibility complex (MHC). Consider these aspects:
   a. Serological determination HLA
   b. Molecular methods of HLA
   c. Crossmatching

4. Discuss the role of tissue typing in the identification and preparation of patients for organ transplantation to include:
   a. Natural, pre-formed antibodies
   b. Acquired antibodies
   c. The role of panel reactive antibody (PRA) (sensitization)
   d. The effect of tissue typing compatibility on graft survival

5. Discuss advanced age as a positive consideration in solid organ transplantation by considering the importance of:
   a. Physiologic status vs. absolute age in years
   b. Rates of organ rejection and its severity among the elderly
   c. Elderly compliance with medical regimens
d. Extended life expectancy
6. Compare the 5-year survival for patients aged 60 and older receiving a renal transplant with those undergoing dialysis.
7. Define the criteria for organ and tissue donation; apply these criteria to critically ill patients.
8. Explain the clinical definition of brain death, including a discussion of the available laboratory and radiologic studies to support the clinical criteria.
9. Analyze and formulate a plan for management of the organ donor.
10. Outline the development of organ preserving solutions and techniques, and describe the currently practiced methods for handling and storing vascularized organs.

Section Two: Clinical Transplantation

1. Discuss the current method for the allocation of organs for transplantation, including consideration of the need, availability, and philosophical biases surrounding organ donation. (Be prepared to utilize the algorithm for assigning organs based on the results of HLA typing, PRA, blood type, age, and time-waiting.)
2. Explain the united organ sharing (UNOS) method for assigning organs to potential recipients. Discuss how local procurement agencies function to optimize the donor organ pool and facilitate coordination of organ harvesting and their subsequent distribution.
3. Analyze and outline the indications for kidney, pancreas, heart, and lung transplant; relate the relative frequency of these operations as well as rates of patient and graft survival.
4. Specify the various drug schemes for induction, maintenance, and rejection therapy, including new "rescue" therapies.
5. Describe the mechanism of action, dosing schedule, and side effects of the following immunosuppressive drugs:
   a. Azathioprine
   b. Prednisone
   c. Anti-lymphocyte globulin
   d. Cyclosporine
   e. Anti-T3 monoclonal antibody
   f. Tacrolimus (FK506)
   g. Anti IL-2R Moab
   h. Mycophenolate mofetil
   i. Rapamycin
6. Analyze the short- and long-term risks of chronic immunosuppression:
   a. Opportunistic infections
   b. Cardiovascular problems
   c. Autoimmune diseases
   d. Lymphoproliferative disease
   e. Rejection
7. Evaluate the diagnostic maneuvers to detect hyperacute, acute, and chronic organ rejection.

Competency-Based Performance Objectives:

1. Evaluate potential candidates for living-related and cadaveric vascularized organ transplantation, including:
   a. Clinical suitability
   b. Strength of social support
   c. Expected graft and patient survival
2. Participate in the pre- and post-operative surgical management of patients after vascularized organ transplant.
3. Assist/perform kidney, pancreas, and heart transplantation.
4. Participate in the perioperative management of immunosuppressive drug therapy, including monitoring drug levels and treating potential toxicities.

5. Participate in the evaluation of patients suspected of organ rejection to include:
   a. Laboratory and radiologic testing
   b. Administration of immunosuppressive (IS) agents
   c. Following patients for potential acute and chronic side effects

6. Participate in the preparation and handling of multiple organ harvest in the brain dead patient.

7. Define suitability characteristics of organs for transplantation.

8. Formulate a response to these ethical questions:
   a. Should an individual with renal disease, who is 70-75 years old, have access to the scarce resource of cadaver kidneys?
   b. Should the surgeon reasonably consider renal transplantation in older recipients when the nephrologist contends that dialysis is the preferred method of treatment?

9. Manage postoperative surgical complications, including wound infection, anastomotic stenoses and leaks, and lymphocele formation.

Surgical Oncology

Unit Objectives:

- Demonstrate understanding of the biology, pathology, diagnosis, treatment, and prognosis of neoplastic diseases.
- Demonstrate proficiency in diagnosis, preparation, operative treatment, and total management of the cancer patient, including long-term follow-up care.
- Understand surgical options of curative and palliative care for cancer patients.
- Understand the network of community resources and their functions, available to patients at end of life.

Competency-Based Knowledge Objectives:

Junior Level:

1. Discuss frequency/death rates of the top five benign and malignant neoplasms in men, women, and children in the United States.
2. Describe trends of increasing, decreasing, and high incidence for certain solid neoplasms.
3. Explain the implications of the heterogeneous cellular makeup of most solid neoplasms with reference to clinical behavior and response to adjuvant treatment.
4. Discuss the mechanisms of cellular apoptosis and the potential feasibility for therapeutic applications.
5. Identify genetic factors associated with neoplastic disease in regard to known proto-oncogenes.
7. Summarize the tenets of tumor biology, including the biochemical events of invasion and metastasis; describe the natural history of these lesions.
8. Identify and differentiate between the diagnostic features of benign versus malignant neoplasms (gross and microscopic).
10. Describe the characteristics of the various staging systems and explain their use in evaluating malignant neoplasms.
11. Outline the appropriate usage of tumor markers, tumor excretory metabolites, and diagnostic cytologic techniques.
12. Describe the principles of surgical technique for operative procedures designed for cure of malignant diseases and their application to endoscopic operative techniques.

13. Summarize the nutritional requirements for cancer patients, and describe how they differ from those recommended for a healthy patient.

14. Describe indications for curative versus palliative treatment, and formulate therapeutic plans for each approach.

15. Outline the status of the current predominant investigative work in cancer immunotherapy.

16. Explain the rationale for the use of heat shock proteins in conjunction with immunology.

17. Summarize current techniques of genetic screening for cancer.

18. Describe the biologic rationale, mechanisms, and current status of gene therapy for malignancy.

19. Describe the enzymatic determinants of prognosis for epithelial derived cancers and their biologic sources.

20. Discuss the economic and psychosocial issues associated with malignant disease, and analyze how they affect the management of patients with cancer, including:
   a. Ethics of cancer management
   b. Rehabilitation
   c. Home care resources
   d. Patient support groups
   e. Family support groups
   f. Enterostomal therapy
   g. Cost containment
   h. Pre-admission procedures and authorization
   i. Conservation of in-patient resources
   j. Special problems of the elderly
   k. Tumor registry data

21. Identify available social service and community agency resources to address the issues listed in #20 above.

Senior Level:

1. Apply clinical screening for common malignancies. Recognize typical presentations and clinical manifestations for different types of neoplasms.

2. Describe the stimuli for and the biologic events in angiogenesis and the potential therapeutic implications thereof.

3. Discuss the known facts relative to tumor suppressive genes and the implications of mutations.

4. Stage specific neoplasms both clinically and pathologically, include the tumor, nodes, and metastasis system (TNM).

5. Relate tumor staging to prognosis.

6. Describe differences in presentation, treatment, and outcomes for malignancy in older patients.

7. Compare each applicable treatment modality to the prognosis for tumors within the scope of general surgery.

8. Apply post-treatment screening / surveillance for common malignancies.

9. Discuss the known facts relative to tumor recurrence after local resection of a primary lesion of the breast and colon with regard to survival.

10. Identify margins of resection and how this relates to local recurrence.

11. Describe the indications for and actions of pharmacologic support in the postoperative state.

12. Describe the indications and means for implementing nutritional support in the pre- and post-operative cancer patient.

13. Explain the fundamental principles of radiation oncology and detail its application as a primary therapy for the treatment of selected benign and malignant lesions.
14. Summarize the indications and appropriate modalities for adjuvant therapy within the scope of general surgery, including chemotherapy, radiation therapy, immunotherapy, and gene therapy.

15. Describe radioimmunoguided surgery (RIGS) and its clinical applications.

16. Explain the rationale and methodology employed in lymphatic mapping and sentinel node biopsies along with the expected level of positive findings.

17. Understand the surgical options for venous access and oncologic care, and their risks/complications.

18. Describe the criteria and necessary procedures for intraoperative monitoring of cardiovascular and pulmonary functions of the cancer patient.

19. Analyze and explain a holistic approach to the treatment of patients with cancer.

20. Analyze the medical preparation of patients for cancer surgery to include the correction of metabolic and nutritional deficits.

21. Indicate the potential alterations in pulmonary function in the elderly patient which may affect preoperative preparation and postoperative management.

22. Identify the indications of anticipated need in elderly patients for:
   a. Postoperative urinary tract decompression
   b. Nutritional support
   c. Thromboembolism prophylaxis

23. Define and apply the criteria for palliative versus curative treatment plans.


25. Apply proper clinical and demographic data to the tumor registry.

26. Outline the indications for and initiate requests for appropriate consultation.

27. Demonstrate a working knowledge of prior research milestones, current research efforts, and cancer research methodology.

Competency-Based Performance Objectives:

Junior Level:

1. Perform a complete history and physical examination on patients with cancer.
2. Formulate an appropriate differential cancer diagnosis, and record an independent, written diagnosis for each cancer patient assigned.
3. Excise benign lesions of skin, dermal appendages, and breast. Demonstrate proper wound care and follow-up management.
4. Excise skin cancers, demonstrating proper wound margins and appropriate wound closure and follow-up management.
5. Close wounds following major resections.
6. Manage colostomies and ileostomies.
7. Design an appropriate nutritional support program for a cancer patient both pre- and post-operatively.
8. First assist on colostomies, ileostomies, and wedge resections of lung and liver.
9. Perform lymph node biopsies, breast biopsies, and procedures of similar magnitude.
11. Interpret frozen section slides with supervision.
12. Perform nutritional assessments and plan nutritional support programs.
13. Perform feeding gastrostomies and tube jejunostomies.
14. Record clinical and pathological correlations by presenting the clinical picture and operative findings on each assigned cancer patient.
15. Perform all varieties of endoscopy (upper and lower gastrointestinal) and bronchoscopy.

Senior Level:
1. Demonstrate the capability for independent function in all aspects of cancer patient management, including palliative care planning.

2. Prepare and defend the preoperative assessment plan for the elderly patient in preparation for:
   a. Gastric resection
   b. Colon resection
   c. Pancreatic resection (Whipple Procedure)
   d. Mastectomy

3. Stage specific neoplasms clinically and pathologically using the TNM system.

4. Prepare patients medically for cancer surgery, including correction of nutritional and metabolic deficits.

5. Specify and prepare management plans for nutritional support in the elderly patient. Indicate differences to be expected in requirements compared to patients less than 50 years of age.

6. Assess the need and institute appropriate monitoring both pre- and post-operatively.

7. Use appropriate support from pharmacologic agents.


9. Perform colostomies, colostomy closures, and bowel anastomoses of all types.

10. Demonstrate proficiency in the use and interpretation of operative and endoscopic ultrasonography.

11. Demonstrate proficiency in fine-needle and core biopsies of the breast.

12. Demonstrate proficiency in endoscopic ultrasonography for detection of hepatic metastases and depth of invasion of colorectal lesions.

13. Demonstrate proficiency in gamma probe-directed or dye-directed sentinel lymph node biopsy for breast cancer and melanoma.

14. Assume responsibility for managing the psychosocial aspects of neoplastic disease.

15. Perform, with appropriate supervision, major resections in neck, chest, abdomen, breast, and extremity, including complex operative procedures (e.g., Whipple procedures, construction of ileal loop bladder, major neck dissections, segmental and lobar hepatic resections).

16. Utilize appropriate social agencies and support groups in cancer patient management.

17. Assume teaching responsibilities for junior residents as assigned.

18. Use laser therapy, photodynamic therapy, and cryotherapy when indicated, observing proper precautions.

19. Participate in a multidisciplinary tumor board.

**Breast Disease in the Elderly Patient**

**Competency-Based Knowledge Objectives:**
The resident should be able to:

1. Articulate currently accepted guidelines for breast cancer screening in the elderly patient.

2. Describe the demographics of breast cancer in the elderly.

3. Describe currently accepted surgical treatment.

4. Discuss the use of adjuvant chemotherapy.

5. Describe the barriers that prevent adequate treatment in some elderly women.

6. Discuss appropriate modification of cancer therapy in the frail elderly woman.

7. Discuss the diagnostic evaluation of an elderly male with a breast lump.

8. Discuss the treatment of male breast cancer.

9. Discuss the role of hormonal therapy in older patients.

**Endocrine Surgery**

*Note:* Endocrine surgery differs from many other areas of surgery in that there are not simple "junior level" cases and more complicated "senior level" cases. Most endocrine surgery cases are
considered "senior level," primarily because the cases are infrequent and it takes three or four years before a resident has seen enough cases to be familiar with the variety of clinical presentations. Within endocrine surgery there are diseases which are relatively common and others which, although they be interesting, are exceptionally rare. Detailed knowledge of those latter diseases should not be the province of the resident who should focus only on the more common entities.

Unit Objectives:

- Demonstrate knowledge of endocrine anatomy and physiology, both normal and pathological.
- Demonstrate the ability to apply this knowledge to the surgical care of patients.

Competency-Based Knowledge Objectives:

1. Describe the normal anatomy, histology, physiology, and pertinent biochemistry of the following organs:
   a. Thyroid gland
   b. Parathyroid gland
   c. Hypothalamus
   d. Pituitary gland
   e. Endocrine pancreas
   f. Adrenal glands
   g. Gastrointestinal tract as an endocrine organ
   h. Gonads as endocrine organs

2. Discuss fully the secretion and the control thereof of the following:
   a. Thyroxine and thyroid stimulating hormone
   b. Parathyroid hormone
   c. Adrenocorticotropic hormone (ACTH)/cortisol
   d. Insulin/glucagon
   e. Catecholamines (epinephrine, norepinephrine, dopamine)
   f. Gastrin/secretin/cholecystokinin
   g. Serotonin/histamine
   h. Estrogen/progesterone/testosterone (and their releasing factors)
   i. Oxytocin/vasopressin
   j. Growth hormone
   k. Melanocyte stimulating hormone
   l. Prolactin
   m. Motilin/gastric inhibitory peptide/enteroglucagon/vasoactive intestinal peptide
   n. Somatostatin

3. Summarize the following aspects of endocrine pathology:
   a. The criteria for the diagnosis of malignancy
   b. Chromosomal abnormalities as a screening/diagnostic tool
   c. The unique characteristics about the clinical epidemiology of patients with sporadic versus familial disease
   d. Define and differentiate multiple endocrine neoplasia (MEN) type I, MEN II, and familial non-MEN syndromes
   e. Fine-needle aspiration biopsy
   f. DNA ploidy

4. Explain the integrated concept of clinical neuroendocrinology, the cells and organs of the amine precursor uptake decarboxylase (APUD) system, and the known clinical endocrine syndromes.

5. Outline the approach to the surgical management of diseases of the endocrine systems:
   a. Is the treatment of each disease primarily surgical or medical?
   b. Is surgical treatment different for benign versus malignant disease?
c. Is surgical treatment curative or palliative?
d. Is surgical treatment directed at the target organ or primary organ?
e. What role does lesion localization play in endocrine disorders?

6. Discuss the pathophysiology, clinical presentation, work-up, and treatment of the following diseases:
   a. A solitary thyroid nodule
   b. A multinodular thyroid gland
   c. Thyrotoxicosis
   d. Primary, secondary, and tertiary hyperparathyroidism
   e. Insulinoma/glucagonoma/vipoma
   f. Zollinger-Ellison syndrome
   g. Gastrointestinal carcinoid tumors
   h. Endogenous hypercortisolism (Cushing's syndrome vs. Cushing's disease; secondary to pituitary, adrenal, and ectopic causes)
   i. Pheochromocytoma
   j. Primary hyperaldosteronism
   k. The incidentally discovered adrenal mass
   l. Galactorrhea
   m. Gigantism/dwarfism

7. Discuss the preoperative preparation/management of the following:
   a. Hypercalcemic crisis
   b. Thyroid "storm"
   c. Grave's disease/Hashimoto's disease
   d. Pheochromocytoma
   e. Hyperaldosteronism
   f. Endogenous hypercortisolism
   g. Insulinoma/gastrinoma
   h. Carcinoid syndrome
   i. Adrenal insufficiency crisis

8. Outline the differential diagnosis of:
   a. Hypercalcemia
   b. Hypoglycemia
   c. Hypergastrinemia
   d. Elevated serum thyroxine level
   e. A decreased sensitive thyroid stimulating hormone (TSH) level
   f. Elevated ACTH levels

9. Discuss corticosteroid administration for elderly patients for diseases more common in that population. Explain the following disease entities as they relate to problems in the elderly patient:
   a. Cushing's syndrome
   b. Exogenous hypercortisolism
   c. Chronic alcohol abuse
   d. Chronic intake of self-administered “arthritis pills”

10. Discuss the surgical approaches to:
    a. The left adrenal gland
    b. The right adrenal gland
    c. The anterior pituitary gland
    d. The head of the pancreas
    e. The body/tail of the pancreas
    f. The inferior parathyroid glands
    g. The superior parathyroid glands
    h. A retrosternal goiter

11. Identify and discuss areas of endocrine surgery in which patient management is controversial and areas in which change is taking place, including:
    a. Zollinger-Ellison syndrome
    b. Thyrotoxicosis
c. Genetic screening for neuroendocrine syndromes
d. Minimally invasive parathyroidectomy

12. Summarize key physiologic alterations of the neuroendocrine system that occur with normal aging. Include explanation of these alterations that can occur with advancing age:
a. Plasma noradrenaline concentrations increase
b. Steady decrease in aldosterone secretion
c. Plasma renin activity declines
d. Plasma cortisol levels significantly increase

13. Summarize significant issues in the management of anesthesia in endocrine surgery, including:
a. Airway management during neck surgery
b. Cardiovascular manipulation during thyroid and pheochromocytoma operations
c. Special attention to electrolyte management

14. Critique the role of the following developments in the surgical management of endocrine problems:
a. Localizing modalities (e.g., metaiodobenzylguanine [MIBG], sestamibi, selective venous sampling, intraoperative tumor localization, rapid parathyroid hormone [PTH] assays)
b. Diagnostic assays (e.g., sensitive TSH, C-peptide, fine needle aspiration)

Competency-Based Performance Objectives:

Junior Level:

1. Complete a preliminary evaluation of patients suspected of having endocrine disease to include:
a. Focused history
b. Family history
c. Physical examination
d. Appropriate relevant diagnostic studies

2. Participate in the pre- and post-operative care of patients undergoing endocrine surgery.

3. Observe endocrine surgery cases.

4. Perform a detailed evaluation of patients with suspected endocrine disease.

5. Manage the pre- and post-operative care of patients with endocrine disease, under supervision.

6. Observe and assist in surgery of the thyroid, parathyroid and adrenal glands, as well as those of the pancreas.

7. Spend quality time working under the direct supervision of a cytopathologist in the surgical pathology laboratory.

Senior Level:

1. Develop a comprehensive plan for the surgical management of endocrine disease.

2. Perform or assist in the performance of adrenal, pancreas, thyroid, and parathyroid surgery.

3. Evaluate patients with complex endocrine disease and present a differential diagnosis.

4. Perform surgery on the adrenals, pancreas, thyroid, and parathyroids.

5. Independently manage the diagnosis, pre- and post-operative care, and surgery for a variety of endocrine surgery cases.

6. Understand the indications for minimally invasive parathyroidectomy.

Abdominal Surgery

Unit Objectives:
• Demonstrate an understanding of the anatomy, physiology, pathophysiology, and presentation of diseases of the abdominal cavity and pelvis.
• Demonstrate the ability to formulate and implement a diagnostic and treatment plan for diseases of the abdomen and pelvis that are amenable to surgical intervention.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe the embryological development of the peritoneal cavity and the positioning of the abdominal viscera.
2. Diagram the anatomy of the abdomen including its viscera and anatomic spaces:
   a. Musculoskeletal envelope
   b. Lesser sac
   c. Subphrenic spaces
   d. Morrison's pouch
   e. Foramen of Winslow
   f. Pouch of Douglas
   g. True pelvis
   h. Lateral gutters
   i. Contents of the retroperitoneum
   j. Major lymph node groups and their drainage
3. Surgical outcome is dependent on coexistent disease. Describe changes in the following organ systems that result from the aging process
   a. Heart
   b. Lung
   c. Kidney
   d. Brain
   e. Hematopoietic system
   f. Gastrointestinal tract
4. Explain absorption and secretory functions of the peritoneal surfaces and the diaphragm.
5. Describe the anatomy of the omentum and its role in responding to inflammatory processes.
6. Assess the following signs associated with the acute abdomen and describe their pathophysiology:
   a. Referred pain
   b. Rebound tenderness
   c. Guarding
   d. Rigidity
7. Specify characteristics of the history, physical examination findings, and mechanism of visceral and somatic pain for the following processes:
   a. Acute appendicitis
   b. Bowel obstruction
   c. Perforated ulcer
   d. Ureteral colic
   e. Diffuse peritonitis
   f. Biliary colic
8. List possible distinctions in the presentation and examination of the elderly patient with the following causes of acute abdomen:
   a. Perforated viscus
   b. Cholecystitis
9. Discuss the differences in the physiologic response to stress in the geriatric patient.
10. Explain the mechanism of referred pain in:
    a. Ruptured spleen
    b. Biliary colic
c. Basilar pneumonia
d. Renal colic
e. Pancreatitis
f. Inguinal hernia

11. Discuss the following causes of paralytic ileus:
   a. Postoperative electrolyte imbalance
   b. Retroperitoneal pathology
   c. Trauma
   d. Extraperitoneal disease (central nervous system, lung)

12. Illustrate use of the following diagnostic studies in the work-up of each process in #7 and #10 above:
   a. Laboratory evaluation
   b. Urinalysis
   c. Plain x-rays
   d. Contrast gastrointestinal (GI) studies
   e. Ultrasound
   f. Computed axial tomography (CAT)
   g. Biliary studies
   h. Renal studies

13. When considering the possibility of wound complications:
   a. What are the risk factors for abdominal wound infection?
   b. What are the contributing factors for abdominal wound dehiscence and evisceration?
   c. What are the usual clinical presentations and timing?
   d. What is the incidence of wound infection in surgeries involving the biliary tree, upper GI tract, and colon?
   e. List wound complications that are more problematic in the elderly patient.

14. Identify the anatomic locations for the following intra-abdominal abscesses; name disease process(es) associated with each:
   a. Left subphrenic space
   b. Right subphrenic space
   c. Subhepatic space
   d. Lesser sac
   e. Interloop
   f. Pelvis
   g. Left paracolic gutter
   h. Right paracolic gutter
   i. Psoas muscle

15. Differentiate between the conditions favoring percutaneous drainage versus operative drainage for each of the abscesses in #14. Describe the safest and most effective approach using each technique.

16. Differentiate between the following intestinal fistulas and the organs to which they most often communicate:
   a. Esophageal
   b. Gastric
   c. Enteric (including duodenal)
   d. Colonic

17. Explain the formation of fistulas in each of the following disease processes or factors:
   a. Operative complications (bowel injury with abscess formation)
   b. Inflammatory bowel disease
   c. Acute pancreatitis
   d. Foreign body or prosthetic material
   e. Malignancy

18. Explain the role of a fistulogram in the diagnosis of intra-abdominal fistulas and abscesses.

19. List the factors that prevent healing of a fistula.
20. Summarize the conditions favoring operative versus non-operative treatment for fistulas listed in #16.

21. Describe the anatomy, clinical presentation, and complications of non-operative management for these hernias:
   a. Direct and indirect inguinal, femoral, and obturator
   b. Sliding hiatal
   c. Paraesophageal
   d. Ventral
   e. Umbilical
   f. Spigelian
   g. Paraduodenal
   h. Richter’s
   i. Lumbar and Petit
   j. Parastomal
   k. Diaphragmatic
      i. Posterolateral (Bochdalek)
      ii. Anterior (Morgagni)
      iii. Traumatic
   l. I. Internal

22. Name the hernia types that are most common in elderly patients, and explain how they may become problematic.

23. Define a Richter’s hernia and describe its clinical presentation.

24. Define a sliding hernia and describe its repair.

25. Differentiate between incarceration and strangulation.

Senior Level:

1. Summarize the surgical procedures available for repair of the hernias listed in #21 above.
2. Outline the uses of prosthetic material and management of infection for incisional or recurrent hernias involving prosthetic material.
3. Construct a plan for the diagnosis and potential for surgical repair of the following congenital abdominal wall defects:
   a. Gastrochisis
   b. Omphalocele
   c. Diastasis Recti
4. Discuss the management of umbilical hernia in infants.
5. Describe the indications for contralateral exploration in the repair of an inguinal hernia in an infant.
6. Explain the operative approaches for each of the following, including laparoscopic:
   a. Abdominal cavity: liver/biliary tract, spleen, small bowel, large bowel, and pelvis
   b. Retroperitoneal organs: kidneys, pancreas, adrenal glands, abdominal aorta
   c. Thoracoabdominal aorta
   d. Pericardial sac
7. Outline the techniques for wound closure (including type of suture material) for each of the incisions named in #6 immediately above.
8. Describe the use and method of placement of retention sutures.
9. Explain the rationale for and mechanics of techniques of peritoneal dialysis in:
   a. Renal failure
   b. Management of peritoneal infections or pancreatitis
10. Assess the treatment of secondary peritoneal infections due to peritoneal dialysis catheters.
11. Describe the pathophysiology and treatment of ascites in:
    a. Malignancy
    b. Hepatic disease: cirrhosis, Budd Chiari Syndrome
    c. Chylous leak
d. Pancreatic leak  
e. Cardiac disease  
f. Renal disease  
g. Bile leak

12. Explain the indications for use and complications of peritoneo-venous shunts.

13. Describe the etiology, manifestations, and treatment of:
   a. Desmoid tumors  
   b. Rectus sheath hematoma  
   c. Retroperitoneal fibrosis

14. Describe the more common retroperitoneal tumors, sarcomas, and liposarcomas. (What are their clinical presentations, treatments, and prognoses?)

Competency-Based Performance Objectives:

Junior Level:

1. Perform, record, and report complete patient evaluation and assessment.
2. Evaluate and diagnose the acute abdomen.
3. Assist with hernia repairs in the groin or umbilicus, demonstrating a basic understanding of the anatomy and surgical repair.
4. Interpret the following in coordination with attending radiologists and staff:
   a. Acute abdominal series (identify free air, small bowel obstruction, ileus, colonic pseudo-obstruction, volvulus; the presence of ascites, atelectasis vs. pneumonia)
   b. Upper GI series
   c. Barium enema (identify neoplasms, signs of ischemia)
   d. Abdominal ultrasound and CT scans
5. Evaluate and institute management of abdominal wound problems, including:
   a. Infection
   b. Evisceration
   c. Fasciitis
   d. Dehiscence
6. Coordinate pre- and post-operative care for the patient with the acute abdomen.
7. Institute drainage for abdominal wall fistula and protection of surrounding structures, especially skin.
8. Assist in closure of abdominal incisions; exhibit competency in suture technique.

Senior Level:

1. Open and close abdominal incisions of all varieties.
2. Treat wound complications such as infections and evisceration. Use retention sutures appropriately.
3. Assist with thoracoabdominal and retroperitoneal exposures for access to kidneys, pancreas, aorta, iliac arteries.
4. Perform laparotomy for acute abdomen, demonstrating a systematic approach for determination of the etiology of the process via a systematic abdominal exploration and appropriate measures for its management (e.g., acute appendicitis, small bowel obstruction, perforated peptic ulcer [the 5th year resident should be able to guide the more junior resident through the case]).
5. Perform more complex laparotomies involving diffuse peritonitis in the septic patient (e.g., a gangrenous or severely inflamed gallbladder or perforated diverticulitis requiring resection).
6. Coach a junior resident through the repair of simple hernia (indirect inguinal or umbilical). (The chief resident should be able to perform repair of any of the hernias mentioned earlier in the text.)
7. Provide appropriate surgical drainage for any intra-abdominal abscess.
8. Serve as an effective surgical team leader.

Alimentary Tract and Digestive System

Unit Objectives:

- Demonstrate an understanding of the anatomy, physiology, and pathophysiology of the alimentary tract and digestive system.
- Demonstrate the ability to manage problems of the alimentary tract and digestive system that are amenable to surgical intervention.

Competency-Based Knowledge Objectives:

Junior Level:

1. Define the basic scientific principles of the alimentary tract and digestive system diseases to include:
   a. Anatomy, embryology, and biochemistry of the gastrointestinal (GI) tract
      i. Embryologic development of primitive foregut and hindgut and its appendages, including normal rotation and fixation
      ii. Histology of alimentary tract, including differentiation of cell types
      iii. Anatomy of alimentary tract from esophagus to anus with emphasis on systemic blood supply, portal venous drainage, neural-endocrine axis, and lymphatic drainage
      iv. Abdominal anatomy, explaining its relationship to lower thorax, retroperitoneum, and pelvic floor
      v. Mucosal transport, including mechanism of absorption of nutrients and water
      vi. Sites of electrolyte and acid-base regulation
   b. GI physiology
      i. Physiology of deglutition and phases of digestion
      ii. Neuroendocrine control of GI secretion and motility
      iii. Regional controls of mucosal secretion and absorption (neural and hormonal)
      iv. Enterohepatic circulation
      v. Neuromuscular control of defecation
      vi. Digestion of sugars, fats, proteins, vitamins, and cofactors
      vii. Rates of mucosal turnover
      viii. Nutritional needs of surgical patients
      ix. Normal secretory rates for the stomach, small bowel, biliary tree, and pancreas
   c. Normal bacterial flora and their concentrations in the upper and lower GI tract
   d. Immunologic properties of the GI tract and how this barrier is affected by: trauma, sepsis, burns, malnutrition, and chronic disease
   e. Principles of intestinal healing
      i. Normal GI tissue integrity and strength and how this relates to healing of anastomoses
      ii. Effects of suturing and stapling techniques of the gut

2. Explain and give examples for the following aspects of gastrointestinal diseases:
   a. Infections inside and outside the GI tract from esophagus to anus, including the peritoneum
   b. Embryologic abnormalities of the GI tract, including:
      i. Strictures
      ii. Stenoses
      iii. Webs
iv. Atresias  
v. Duplications  
vi. Malrotations  
c. Congenital and acquired abnormalities of gut motility  
d. Neoplasia of the GI tract  
e. Ulceration of the proximal and distal GI tract  
f. Causes of GI obstruction  
g. Causes of paralytic ileus  
h. Causes of GI hemorrhage  
i. Causes of GI perforation  
j. Causes of abdominal abscess formation or secondary peritonitis  
k. Short gut and malabsorptive conditions  
l. Acute and chronic mesenteric ischemia  
m. Portal hypertension and venous thrombosis  
n. Inflammatory bowel diseases  
o. Causes of an acute abdomen  
p. Management of intestinal ostomies  
q. Traumatic injury to abdominal viscera  
r. Ischemic bowel  

3. Discuss some of the more common diseases of the esophagus in elderly patients, to include:  
a. Motility disorders  
b. Esophageal injuries  
c. Diverticular disease  
d. Inflammatory disease  
e. Gastroesophageal reflux  
f. Tumors (benign and malignant)  

4. Outline the essential characteristics of routine and highly specialized diagnostic evaluation of the alimentary tract, including:  
a. History  
i. Pain  
ii. Nausea/emesis  
iii. Bowel function  
iv. Prior episodes  
v. Past surgical history  
b. Physical examination:  
i. Inspection  
ii. Auscultation  
iii. Percussion  
iv. Palpation  
c. Radiologic examinations, including:  
i. Barium swallow  
ii. Upper GI Series with small bowel follow-through  
iii. Enteroclysis  
iv. Ultrasound  
v. Transesophageal echo  
vi. Computerized Tomography  
vii. Magnetic Resonance Imaging  
viii. Barium enema  
ix. Angiograms  
 x. Nuclear scans for bleeding or to evaluate for Meckle's diverticulum  
d. Fiberoptic endoscopy  
e. Rigid anoscopy and sigmoidoscopy  
f. Tests of GI function including:  
i. Manometry  
ii. pH measurement
iii. Gastric analysis (basal and stimulated)
iv. Radioisotope clearance studies
   1. Technetium 99m
   2. Technetium HIDA (hepatic 2,6-dimethyliminodiacetic acid) dynamic biliary imaging
v. Gastric emptying studies
vi. Transit times
vii. Hormonal determinations
viii. Absorption

5. Summarize current medical management and its potential limitations; explain the role of surgical intervention when management fails in the following:
   a. Peptic ulcer disease
   b. Esophageal varices
   c. Upper and lower GI bleeding
   d. Gastroparesis
   e. Inflammatory bowel disease
   f. Diverticulitis

Senior Level:

1. Specify the pathophysiology of multisystem problems of the alimentary tract and digestive system, including neurohumoral and hormonal interactions.
2. Explain the physiologic rationale for the following gastrointestinal operations:
   a. Vagotomy
   b. Pyloroplasty
   c. Gastric resection for ulcer disease and reconstructive techniques
   d. Small bowel resection with anastomosis
   e. Ostomy formation
   f. Resection of GI tract segments with nodes for tumors
   g. Bypass of GI tract segments for resectable tumors
   h. Drainage of pancreatic cysts (internal vs. external)
   i. Drainage of abdominal and retroperitoneal abscesses (percutaneous vs. operative)
3. Detail the standard intraoperative techniques and alternatives associated with each of the above operations.
4. Explain the indications and contraindications for diagnostic and therapeutic endoscopy of the alimentary tract.
5. Assess alternatives to surgical intervention in the management of complex diseases of the alimentary tract and digestive system such as:
   a. Short gut syndrome
   b. Achalasia
   c. Barrett's esophagus
   d. Intestinal polyposis
   e. Inflammatory bowel disease
   f. Seropositive status for H. pylori
   g. Multifocal atrophic gastritis in the elderly
6. Discuss the surgical ramifications of the following statement: "The expectation of more frequent vague gastrointestinal complaints by the elderly patient may delay presentation with significant illness and diagnosis."
7. Summarize the preoperative, intraoperative, and postoperative management of complex diseases of the alimentary tract and digestive system, including:
   a. Re-operative abdomen
   b. Failed peptic ulcer and reflux operation
   c. Management of post-gastrectomy syndromes
   d. High output GI fistulas
e. Inflammatory bowel disease with strictures, pouches, ostomies, and perineal fistulas
f. Recurrent colon malignancy
g. Carcinomatosis

Competency-Based Performance Objectives:

Junior Level:

1. Evaluate emergency department or clinic patients who present with problems referable to the GI tract.
2. Serve as assistant to the primary surgeon during operations of the esophagus, stomach, small intestine, colon, and anorectum.
3. Perform less complicated surgical procedures such as:
   a. Gastrostomy
   b. Meckel's diverticulectomy
   c. Appendectomy
   d. Hemorrhoidectomy
   e. Anal fissurectomy and fistulectomy
   f. Incision and drainage of perirectal abscesses
4. Accept responsibility for (under the guidance of the chief resident and attending surgeon) the postoperative management of:
   a. Nasogastric tubes
   b. Intestinal tubes
   c. Intra-abdominal drains
   d. Intestinal fistulas
   e. Abdominal incisions (simple and complicated)
5. Evaluate and manage nutritional needs (enteral and parenteral) of surgical patients until normal GI function returns.
6. Provide follow-up care to the surgical patient in the outpatient clinic or surgical office.

Senior Level:

1. Perform initial consultation for inpatients with problems of the GI tract; develop differential diagnosis and initiate treatment plan.
2. Assist the chief resident and attending staff with complex digestive system cases.
3. Perform, under appropriate supervision, GI operations, including:
   a. Vagotomy
   b. Pyloroplasty
   c. Gastric resection and reconstructive techniques
   d. Small bowel resection with anastomosis
   e. Drainage of pancreatic cysts
   f. Drainage of abdominal and retroperitoneal abscesses
   g. Lysis of adhesions
   h. Repair of enterotomies
   i. Colon resection
   j. Creation of ostomies
4. Develop diagnostic and therapeutic endoscopy skills such as:
   a. Diagnostic esophagogastroduodenoscopy
   b. Endoscopic control of GI bleeding
   c. Percutaneous endoscopic gastroscopy
   d. Dilation of intestinal strictures
   e. Assist with endoscopic retrograde cholangiopancreatography (ERCP)
   f. Diagnostic colonoscopy
   g. Polypectomy
5. Select and interpret appropriate pre- and post-operative diagnostic studies.
6. Assist junior residents in the diagnosis, surgical management, and follow-up care of patients with diseases of the alimentary tract and digestive system.
7. Coordinate intervention of multiple specialties that may be involved in management of complex GI problems such as:
   a. Variceal hemorrhage
   b. Biliary obstruction
   c. Chronic varices
   d. Inflammatory bowel disease
   e. Chronic abdominal pain
   f. Chronic constipation
   g. Localized and advanced malignancies
8. Perform appropriate reoperative laparotomy for a variety of gastrointestinal problems.
9. Supervise postoperative care of GI and digestive tract surgical patients.

Liver, Biliary Tract and Pancreas

Unit Objectives:
- Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the liver, biliary tract, and pancreas.
- Demonstrate the ability to manage disease and injury of the liver, biliary tract, and pancreas amenable to surgical intervention.

Competency-Based Knowledge Objectives:

Junior Level:

Liver and Biliary Tract

1. Describe the anatomy of the liver and biliary system, including commonly found variations.
2. Describe the physiology and function of liver and biliary system to include:
   a. Glucose metabolism
   b. Protein synthesis
   c. Coagulation
   d. Drug metabolism
   e. Reticuloendothelial system
   f. Function of bile in fat metabolism
3. Explain the formation of bile, its composition, and its function in digestion. Describe the pathophysiology of gallstone formation.
4. Correlate bile formation and composition with disease states affecting the biliary system such as gallstone formation and biliary obstruction.
5. Discuss the enterohepatic circulation of bile.
6. Outline the work-up and differential diagnosis of the jaundiced patient.
7. Identify the most significant determinants of mortality in elderly patients following cholecystectomy.
8. Discuss various types of liver cysts (echinococcal or hydatid, nonparasitic) and the appropriate management of each.
9. Discuss the principal characteristics of and the treatment for the following:
   a. Metastatic lesions to the liver
   b. Primary malignancies of liver and biliary tree
   c. Benign tumors of the liver
10. Summarize the etiologies and management of pyogenic and amebic hepatic abscesses.
11. Explain types of infectious hepatitis (A, B, C) with:
1. Describe the anatomy of the pancreas, including regional vascular anatomy.
2. Summarize changes that occur in the anatomy of the pancreas with aging by considering:
   a. Duodenal C loop
   b. Head of the pancreas
   c. Atrophy of pancreas
   d. Pancreatic ductal anatomy
3. Discuss the physiology of the pancreas, including endocrine and exocrine function and hormonal regulation.
   a. Endocrine--islet cells
      i. Alpha (Glucagon)
      ii. Beta (Insulin)
      iii. Delta (Somatostatin)
      iv. Non-Beta (pancreatic polypeptide)
   b. Exocrine--acinar cells
      i. Lipase
      ii. Amylase
   c. Hormonal regulation
      i. Secretin--bicarbonate secretion
      ii. Cholecystokinin--enzyme secretion
4. Explain the pathophysiology of pancreatitis to include:
   a. Common etiologies such as:
      i. Gallstones
      ii. Alcohol related
      iii. Trauma
      iv. Medications
      v. Postoperative
      vi. Post endoscopic retrograde cholangiopancreatography (ERCP)
      vii. Idiopathic
   b. Diagnosis, evaluation, and medical management
   c. Role of peritoneal lavage
   d. Complications of pancreatitis, such as:
      i. Adult respiratory distress syndrome (ARDS; Acute lung injury-ALI also used)
ii. Hypovolemia
iii. Pseudocyst
iv. Abscess
v. Sterile pancreatic necrosis
vi. Infected pancreatic necrosis
e. Indications for operative management of pancreatitis
f. Management of gallstone pancreatitis with timing of surgery
g. Methods of prognostic assessment

5. Describe the incidence of these diseases in the elderly patient:
   a. Cholelithiasis
   b. Acute gallstone pancreatitis
   c. Pancreatic carcinoma

6. Explain the pathophysiology of carcinoma of the pancreas to include:
   a. Typical history and presentation
   b. Diagnostic evaluation using:
      i. Computed axial tomography
      ii. Ultrasound
      iii. ERCP
      iv. Percutaneous transhepatic cholangiography (PTC)
      v. Arteriography
      vi. Laparoscopy/laparotomy
   c. Indications for:
      i. Operative versus nonoperative biliary drainage
      ii. Percutaneous versus endoscopic stenting
      iii. Resection
      iv. Concomitant gastrojejunalostomy with operative biliary bypass

7. Discuss presentation, evaluation, and management of pancreatic pseudocysts with attention to:
   a. Complications of pseudocysts (hemorrhage, infection, rupture)
   b. Timing of drainage
   c. Percutaneous versus surgical drainage
   d. Indications for external versus internal drainage
   e. Choice of internal drainage procedure

8. Explain the diagnosis and management of pancreatic ascites.

**Liver and Biliary Tract**

1. Analyze alternatives to surgery in the management of gallstones, such as:
   a. Oral dissolution with ursodeoxycholic acid
   b. Extracorporeal shock wave lithotripsy
   c. Endoscopic sphincterotomy

2. Compare laparoscopic versus open cholecystectomy.

3. Analyze the potential significance of finding a filling defect on ultrasonography or liver scan in an elderly patient. Discuss:
   a. Frequency of metastatic cancer vs. primary tumors in liver
   b. Correlation between incidence of gastrointestinal malignancy and increasing age

4. Assess management alternatives for common bile duct stones:
   a. Open versus laparoscopic common bile duct exploration
   b. ERCP

5. Since acute cholecystitis is becoming one of the more common indications for emergency admissions of elderly patients to a surgical service, specify factors contributing to its being a more complex disease in elderly vs. young patients by considering:
   a. Incidence of comorbid disease such as diabetes
   b. Atypical clinical presentation (right upper quadrant pain, fever, leukocytosis)
   c. Signs of sepsis or septic shock
d. Jaundice  
e. Altered mental status  
6. Discuss the pathophysiology of hepatic cirrhosis and portal hypertension to include:  
   a. Various etiologies of cirrhosis (alcohol and hepatitis)  
   b. Differential diagnosis of portal hypertension (prehepatic, hepatic, posthepatic)  
   c. Medical management of ascites, encephalopathy, and other complications of cirrhosis  
   d. Child's classification of cirrhosis and its relationship to prognosis and surgical mortality  
   e. Perioperative management of the cirrhotic patient  
   f. Medical management of bleeding esophageal varices using Vasopressin, Sengstaken-Blakemore tube, sclerotherapy, and transjugular intrahepatic portosystemic shunts (TIPS)  
   g. Surgical management of bleeding esophageal varices to include:  
      i. Selection of operative candidates  
      ii. Appropriate selection of procedures such as:  
         1. Selective and nonselective shunts  
         2. Devascularization procedures  
         3. Esophageal transection  
   h. Surgical management of ascites with peritoneovenous shunts to include patient selection and complications  
7. Discuss Budd-Chiari Syndrome (pathophysiology and management).  
8. Outline indications and contraindications for liver transplantation in adults and children.  
9. Explain factors important to the choice of treatment options for the elderly patient with hepatobiliary disease, including:  
   a. Cardiovascular disease  
   b. Cerebrovascular disease  
   c. Renal insufficiency  
   d. Systemic hypoperfusion  
   e. Curative/palliative procedure  
   f. Quality of life issues  
10. Detail the appropriate surgical management of any selected disorder of the liver or biliary tract.  
11. Analyze the technical details of each surgical procedure and options that may be available with pros and cons of each.  
12. Summarize the common complications associated with surgical management of liver and biliary tract disease.  
13. Summarize the principles of perioperative management of liver and biliary tract disease.  

Pancreas  
1. Describe the etiology, pathophysiology, and management of chronic pancreatitis to include:  
   a. Indications for operative management  
   b. Selection of appropriate operative procedure such as:  
      i. Longitudinal pancreaticojejunostomy (Puestow-Gillesby Procedure)  
      ii. Caudal pancreaticojejunostomy (Duval Procedure)  
      iii. Subtotal pancreatectomy  
      iv. Pancreatoduodenectomy  
   c. Role of celiac ganglion ablation (chemical splanchnicectomy) in pain control  
2. Summarize the common sequelae of chronic pancreatitis to include pain, fat malabsorption, and diabetes.  
3. Discuss diagnosis, evaluation, and surgical management of cystic neoplasms of the pancreas (mucinous and serous cystadenomas; cystadenocarcinoma).
4. Compare the probabilities of coexisting intra-abdominal pathology in elderly vs. younger patients. Consider:
   a. Acute pancreatitis
   b. Mesenteric ischemia
   c. Gangrenous cholecystitis
   d. Perforated viscus

5. Describe the diagnosis, evaluation, and surgical management of the following islet cell tumors of the pancreas:
   a. Gastrinoma (Zollinger-Ellison Syndrome)
   b. Glucagonoma
   c. Somatostatinoma
   d. Insulinoma
   e. VIPoma (Verner-Morrison Syndrome, WDHA Syndrome)

6. Describe the diagnosis and management of pancreas divisum.

7. Outline the appropriate surgical management of disorders of the pancreas to include:
   a. Pancreatoduodenectomy (Whipple Procedure)
   b. Distal pancreatectomy
   c. Total pancreatectomy
   d. Subtotal (distal 95%) pancreatectomy
   e. Longitudinal pancreaticojejunostomy (Puestow Procedure)
   f. Internal drainage of pseudocysts (cystogastrostomy, cystoduodenostomy, Roux-en-Y cystojejunostomy)

8. Explain the technical details of the above procedures, including the options available and the pros and cons of each.

9. Describe the common complications associated with surgical management of diseases of the pancreas.

10. Summarize the principles of perioperative management of diseases of the pancreas.

Competency-Based Performance Objectives:
Junior Level:

Liver and Biliary Tract

1. Perform history and physical examination specifically focused on liver and biliary system.
2. Select and interpret appropriate laboratory and radiologic evaluations in the work-up of the jaundiced patient to include:
   a. Alkaline phosphatase, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), direct and indirect bilirubin, prothrombin time (PT) and partial thromboplastin time (PTT)
   b. Endoscopic retrograde cholangiopancreatography (ERCP)
   c. Percutaneous transhepatic cholangiography (PTC)
   d. Liver-spleen scan
   e. Hepatobiliary nuclear scan (HIDA)
   f. Oral cholescystogram (OCG)
   g. Ultrasound
   h. Computed axial tomography
   i. Arteriography
3. Assist in the perioperative management of patients undergoing hepatobiliary surgery.
4. Assist in management of patients with bleeding esophageal varices including the use of:
   a. Vasopressin
   b. Sengstaken-Blakemore tube
   c. Sclerotherapy
5. Perform uncomplicated hepatobiliary surgery under supervision, such as cholecystectomy, both laparoscopic and open, with operative cholangiography.
6. Assist in more advanced hepatobiliary operations.
Pancreas

1. Perform history and physical examination focused on the pancreas.
2. Select and interpret appropriate laboratory and radiologic examinations in evaluation of pancreatic disease, including:
   a. Serum amylase and lipase
   b. Urinary amylase
   c. Computed axial tomography
   d. Ultrasound
   e. Endoscopic retrograde cholangiopancreatography (ERCP)
   f. Arteriography
3. Assist in management of patient with acute pancreatitis.
4. Assist in perioperative management of patients undergoing pancreatic surgery.
5. Perform minor pancreatic procedures under supervision such as external drainage of pseudocyst or internal drainage via cystgastrostomy.

Senior Level:
Liver and Biliary Tract

1. Perform detailed evaluation of patients with liver and biliary disease and plan appropriate management and operative approach.
2. Perform, under supervision, increasingly complex hepatobiliary surgery:
   a. Laparoscopic cholecystectomy with cholangiography
   b. Common bile duct exploration with choledochoscopy
   c. Biliary drainage procedures, such as:
      i. Choledochoduodenostomy
      ii. Roux-en-Y and loop choledochojejunostomy
      iii. Cholecystojejunostomy
      iv. Sphincteroplasty
   d. Drainage of liver abscess
   e. Peritoneovenous shunts
   f. Complicated cholecystectomy--acute, gangrenous
   g. Simple liver resection
3. Coordinate overall care of patients with hepatobiliary disease including:
   a. Initial evaluation
   b. Appropriate diagnostic studies
   c. Indicated consultations
   d. Operative management
4. Perform complex hepatic and biliary surgery:
   a. Anatomic liver resection
   b. Portosystemic shunts:
      i. Portocaval, end-to-side and side-to-side
      ii. Mesocaval
      iii. Distal splenorenal (Warren)
      iv. Central splenorenal
   c. Complicated procedures on extrahepatic bile ducts for:
      i. Cholangiocarcinoma
      ii. Choledochal cyst
      iii. Benign biliary stricture
   d. Liver transplant
   e. Kasai procedure (hepatoportoenterostomy)
5. Supervise and instruct junior house staff in minor hepatobiliary procedures.

Pancreas
1. Perform detailed evaluation of patients with pancreatic disease and plan appropriate medical and surgical management.

2. Perform increasingly complex pancreatic surgery such as:
   a. Internal drainage of pseudocysts with Roux-en-Y cystjejunostomy
   b. Longitudinal pancreaticojejunostomy (Puestow Procedure)
   c. Distal pancreatectomy
   d. Biliary bypass for carcinoma

3. Coordinate overall care of patients with complex pancreatic disease, including initial evaluation, appropriate diagnostic studies and operative management of:
   a. Pancreatic abscess and infected pancreatic necrosis
   b. Cystadenomas
   c. Periampullary carcinoma
   d. Endocrine tumors of the pancreas

4. Perform complex pancreatic procedures such as:
   a. Whipple resection
   b. Total or Subtotal pancreatectomy
   c. Operative debridement and drainage of pancreatic abscess or infected necrosis
   d. Surgical exploration for islet cell tumors of the pancreas
   e. Local resection for ampullary tumors

5. Supervise and instruct junior house staff in minor pancreatic procedures

Vascular Surgery

Unit Objectives:

- Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the vascular system, including congenital and acquired diseases.
- Demonstrate the ability to surgically manage the preoperative, operative, and postoperative care of patients with arterial, venous, and lymphatic disease.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe human arterial and venous anatomy.
2. Describe basic arterial and venous hemodynamics.
3. Discuss the anatomy, pathology, and pathophysiology of the arterial wall.
4. Review and describe the basic clinical manifestations of the following vascular disorders:
   a. Obstructive arterial disease
   b. Aneurysmal arterial disease
   c. Thromboembolic disease—arterial and venous
   d. Chronic venous insufficiency and lymphatic obstruction
   e. Portal hypertension
   f. Congenital vascular disease
5. Assess patients' vascular systems using appropriate skills in history-taking and clinical examination.
6. Describe the relationship of the following disorders/practices to atherosclerotic vascular disease:
   a. Diabetes mellitus
   b. Hypertension
   c. Renal failure
   d. Congestive heart failure
   e. Hyperlipidemia
   f. Smoking

7. Describe life-threatening signs of vascular disease and indicate when immediate intervention is required.

8. Differentiate between the following diagnostic tools available for assessing vascular disease and explain the relative contribution of each:
   a. Angiography
   b. Computed axial tomographic (CAT) scanning
   c. Magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA)
   d. Duplex scanning (ultrasonography)

9. Analyze and be prepared to explain the following concept: vascular disease, and specifically arterial disease may be diffuse and clinically silent, but it still represents a major threat to the patient.

10. Summarize the etiology and therapeutic options of specific categories of vascular disease:
    a. Venous disease
       i. Varicose vein disease
       ii. Post-phlebitic syndrome
       iii. Thromboembolic disease
       iv. Pulmonary embolism
       v. Portal hypertension
    b. Lymphatic disease
       i. Anatomy of lymphatic system and lymphatic return
       ii. Congenital lymphatic anomalies
       iii. Acquired lymphatic disease
       iv. Operative procedures for correction of lymphatic disease
    c. Arterial disease
       i. Atherosclerosis and its related disorders
       ii. Aortic and other vascular aneurysms
       iii. Inflammatory vascular disease
       iv. Atherosclerotic vascular disease
       v. Arterial embolic disease
       vi. Arteriovenous fistulas or malformations
       vii. Extracranial cerebrovascular disease
       viii. Neurovascular compression syndromes (thoracic outlet syndrome)
       ix. Visceral ischemic syndromes
       x. Renovascular hypertension
       xi. Degenerative arterial disease
       xii. Trauma
       xiii. Interactions of cardiovascular and pulmonary systems
    d. Pathophysiology of peripheral vascular disease
       i. Arterial stenosis
       ii. Aneurysmal disease
       iii. Arteriovenous fistulas (local and cardiac hemodynamic effects)
       iv. Venous thrombosis
    e. Interaction of cardiovascular and pulmonary systems
    f. Miscellaneous
       i. Tumors
       ii. Sympathetic nervous system
       iii. Congenital vascular syndromes
11. Outline the principles of non-invasive laboratory diagnosis; include a description of the role and limitations of the vascular laboratory.
12. Discuss basic principles of Doppler ultrasound in preparation for performing bedside arterial and venous Doppler testing.
13. Outline the principles of care for ischemic limbs.
14. Describe the natural history of medically treated vascular disease in the following categories:
   a. Carotid arterial stenosis
   b. Abdominal aortic aneurysm
   c. Chronic femoral artery occlusion
15. Summarize principles for the preoperative assessment and postoperative care of patients undergoing major vascular surgical procedures.
16. Outline the fundamental elements of nonoperative care of the vascular patient, including the role of risk assessment and preventive measures.
17. Indicate the role of anticoagulant agents, including antiplatelet agents, in the management of patients with vascular disease.
18. Analyze the role of the endothelium in atherosclerosis, thrombosis, and thrombolysis.
19. Describe the hemodynamics and pathophysiology of:
   a. Claudication
   b. Transient ischemic attack (TIA)
   c. Stroke
   d. Mesenteric angina
   e. Angina pectoris
   f. Renovascular hypertension
   g. Arteriovenous (AV) fistula
20. Explain the concept of critical arterial stenosis.
21. Differentiate between acute arterial and acute deep venous occlusion.
22. Discuss the principles of angiography to include the following considerations:
   a. Indications and complications (including contrast-induced renal failure)
   b. Principles and techniques of intraoperative angiography
   c. Principles and techniques of emergency room angiography
23. Discuss the principles of and contraindications for anticoagulation and thrombolytic therapy.
24. Describe the surgically correctable causes of hypertension and their diagnostic modalities.
26. Discuss the mechanics of action and the therapeutic role of the following pharmacologic types of agents:
   a. Vasopressors
   b. Vasodilators
   c. Adrenergic blocking agents
   d. Anticoagulants
   e. Antiplatelet agents
   f. Thrombolytics
27. Illustrate the general principles of vascular surgical technique including:
   a. Vascular control and suturing
   b. Endarterectomy
   c. Angioplasty
   d. Bypass grafting
28. Determine a plan for assessment of operative risk in these categories:
   a. Cardiac
   b. Pulmonary
   c. Renal
   d. Metabolic
   e. Levels of anesthetic risk
29. Discuss clotting factors and how they interact (coagulation cascade).
30. Discuss the role of the following factors in maintaining homeostasis in the coagulation pathways:
   a. Protein S
   b. Protein C
   c. Platelets
   d. Platelet granules
   e. Endothelial cell
   f. Antithrombin III

31. Describe the use of adjunctive measures in the management of patients with vascular disease such as:
   a. Antibiotics
   b. Anticoagulants
   c. Thrombolytic agents
   d. Antiplatelet agents

32. Review the costs associated with providing surgical care to patients with vascular disorders.

Senior Level:

1. Identify and describe vascular anatomy and regional anatomy related to vascular disease.
2. Discuss the broad range of vascular illnesses, including congenital vascular disease and diseases of the venous and lymphatic systems.
3. Explain the physiologic and organic manifestations of vascular disease, such as renovascular hypertension, portal hypertension, and renal failure.
4. Differentiate between the different operative approaches to the vascular system to include:
   a. Incisions and exposure
   b. Handling of vascular tissues
   c. Principles of vascular bypass grafting
   d. Emergency vascular surgery
   e. Reoperative vascular surgery
   f. Principles of endarterectomy
   g. Endovascular techniques
5. Illustrate the operative exposure of the major vessels, including:
   a. Aortic arch
   b. Proximal subclavian
   c. Carotid artery
   d. Descending thoracic aorta
   e. Suprarenal aorta
   f. Infrarenal aorta
   g. Femoral artery
   h. Popliteal artery
6. Outline the indications for operations for claudication, abdominal aortic aneurysm, carotid stenosis, and amputation.
7. Describe the indications for balloon angioplasty and vascular stent placement with its risks and complications.
8. Describe the pathogenesis and complications of aneurysmal disease.
9. Summarize the etiology, microbiology, and treatment of diabetic foot infection.
10. Categorize the prevention and management of operative and postoperative complications, including graft infections, ischemic bowel, graft thrombosis, and extremity ischemia.
11. Outline the manifestation of failing peripheral vascular grafts, contrasting angioplasty with reconstruction and amputation.
12. Discuss the principles of reoperative vascular surgery.
13. Outline procedures for managing vascular surgical emergencies such as acute tissue ischemia or major hemorrhage (traumatic or ruptured aneurysm).
14. Summarize the characteristics of congenital arterial, venous, and lymphatic diseases.
15. Analyze the options for treatment of patients with chronic venous insufficiency and venous ulceration.
16. Demonstrate a basic knowledge of the various types of graft and suture material available.
17. Analyze alternative measures for the diagnosis and management of renovascular hypertension.
18. Discuss alternative operative procedures for the management of portal hypertension.
19. Summarize the surgical techniques available for managing the following vascular disorders:
   a. Abdominal aortic bypass or aneurysmectomy
   b. Carotid stenosis
   c. Femoral-popliteal occlusion
   d. Tibial artery occlusion
20. Analyze the management of complex vascular problems considering the following factors:
   a. Morbidity and mortality
   b. Advanced surgical techniques
      i. Endoscopy
      ii. Microvascular techniques
21. Review critical factors for decision making in vascular surgery:
   a. Risk: reward ratio
   b. Morbidity and mortality probability
   c. Preoperative and postoperative assessment
   d. Non-invasive laboratories, duplex scanning
   e. Role of advanced radiologic techniques: Angioplasty, CT scanning, MRI/MRA imaging
22. Apply the decision making process in analyzing complex vascular diseases, including the following:
   a. Cerebrovascular problems
   b. Mesenteric vascular disease
   c. Renovascular disease
   d. Aneurysmal disease
   e. Lower extremity arterial occlusion
   f. Venous disease
23. Outline the management of prosthetic graft infections, including:
   a. Diagnosis
   b. Use of alternate routes for revascularization
   c. Use of alternative graft materials
24. Summarize complications of common major vascular procedures such as:
   a. Carotid endarterectomy
   b. Aortic reconstruction
   c. Lower extremity vascular reconstruction

Competency-Based Performance Objectives:

Junior Level:

1. Evaluate patients for vascular disease.
2. Demonstrate skill in basic surgical techniques, including:
   a. Knot tying
   b. Exposure and retraction
   c. Knowledge of instrumentation
d. Incisions
e. Closure of incisions
f. Handling of graft material
3. Participate in surgery for varicose vein disease, including:
   a. Ligation and stripping
   b. Management of venous stasis ulcers
   c. Management of venous thrombosis
4. Participate in amputations with specific attention to:
   a. Demarcation levels
   b. Control of toxicity
5. Demonstrate proficiency in venous access procedures.
6. Demonstrate the ability to perform arterial access or arterio-venous access, including:
   a. Incisions
   b. Closure of incision
7. Obtain vascular control of diseased or traumatically occluded blood vessels using:
   a. Vascular clamp
   b. Vessel loop
   c. Balloon occlusion
8. Participate in thromboendarterectomy and thrombectomy.
9. Demonstrate appropriate vascular suture techniques.
10. Evaluate and manage sympathectomy procedures.
11. Perform the preoperative assessment and postoperative care of patients undergoing major vascular surgical procedures.

Senior Level:

1. Demonstrate the appropriate incisions and exposure of:
   a. Abdominal aorta and its major branches
   b. Portal venous system
   c. Peripheral arterial system
   d. Carotid arterial system
   e. Arteriovenous fistula
2. Obtain vascular control of major vessels
   a. Aorta
   b. Vena cava
3. Participate in endarterectomy and bypass grafting.
4. Demonstrate ability to manage graft and suture materials.
5. Perform selected operative procedures or selected parts of the following operative procedures under supervision:
   a. Aortic aneurysm repair
   b. Carotid endarterectomy
   c. Aorto-iliac occlusive disease
   d. Femoral popliteal occlusive disease
   e. Correction of portal hypertension
   f. Peripheral vascular trauma
6. Discuss and demonstrate the role of adjunctive measures in operative procedures including angiography, and thrombolytic therapy.
7. Select and use proper advanced techniques in managing patients with a variety of vascular disorders such as:
   a. Ruptured aortic aneurysm
   b. Central vascular trauma
   c. Supra-renal aortic aneurysm
   d. Renovascular hypertension
   e. Femoral tibial bypasses
8. Perform alternative methods of bypass grafting such as:
a. Extra-anatomic bypass, principles and techniques
b. Indirect revascularization
c. In situ techniques
d. Sequential and composite techniques

9. Manage prosthetic graft infections to include:
   a. Diagnosis
   b. Selection of alternate routes for revascularization
   c. Selection of appropriate graft materials
   d. Timing

10. Manage complications of common major vascular procedures such as:
   a. Carotid endarterectomy
   b. Aortic reconstruction
   c. Lower extremity vascular reconstruction

Vascular Disease in the Elderly

Unit Objectives:

- Demonstrate an understanding of the pathophysiology of vascular diseases in the elderly patient.
- Demonstrate an understanding of the potential variations in the management of vascular diseases between the various age groups of the elderly and the younger population.
- Demonstrate the ability to prepare elderly patients for definitive operative and non-operative interventions, rehabilitation, and discharge planning.

Competency-Based Knowledge Objectives:

Junior Level:

A. Demonstrate knowledge of the pathophysiology of abdominal aortic aneurysm (AAA) in the elderly patient with respect to:

1. Incidence in patients 65-85 years old
2. Annual growth rate and natural history of untreated AAA
3. Incidence of rupture and risk factors associated with increased incidence of rupture
4. Mortality rate of elective AAA replacement in selected elderly patients in comparison with the younger population
5. Mortality rate of emergent AAA replacement in elderly patients in comparison with the younger population
6. Concept of chronological age vs. physiological age and the medical risk factors that increase the risk of AAA replacement such as cardiac disease, pulmonary insufficiency and chronic renal failure
7. Perioperative cardiac screening and optimization of medical condition
8. Preservation of the quality of life following AAA replacement in elderly patients
9. Screening and diagnostic tests for AAA and the association between AAA and iliac, popliteal, and femoral aneurysms
10. Approaches to AAA replacement
11. Concept of endovascular aortic aneurysm replacement and its investigational status

B. Knowledge of the manifestation and management of lower extremity occlusive disease in the elderly patient with respect to:

1. Ability to differentiate the symptoms of arterial claudication from neurogenic or venous claudication
2. Natural history of intermittent claudication; the effects of smoking, diabetes, hypertension, and degree of ischemia upon presentation on the future risk of amputation
3. Role of exercise, risk factor modification, and drug therapy in the management of claudication; their mechanism of action and their limitations
4. Definition of rest pain and the risk of amputation if untreated
5. Different presentation of the elderly patient with single and multilevel arterial disease
6. Interpretation of noninvasive tests used for evaluating lower extremity ischemia:
   a. Arm brachial index (ABI)
   b. Segmental pressures
   c. Toe pressures
   d. Transcutaneous oxygen tension.
7. ABI changes in patients with claudication, rest pain, tissue loss
8. Limitations of the ABI in diabetic patients and the value of toe pressure measurements
9. Predicting healing of an amputation based on noninvasive testing
10. Morbidity, mortality, and ambulation rates after a major amputation in elderly patients
11. Accepted indications for primary amputation in elderly patients
12. Morbidity, mortality and patency rates of the revascularization options for aortoiliac occlusive disease:
   a. Aorto bifemoral bypass
   d. Balloon angioplasty
   b. Axillo femoral bypass
   e. Primary stenting
   c. Femoro femoral bypass
13. The patency rate and limb salvage rate following infrapopliteal revascularization using autogenous veins and prosthetic conduits for:
   a. Femoro-above knee popliteal bypass
   b. Femoro-below knee popliteal bypass
   c. Femoro-tibial bypass
14. Limitations and patency rates of balloon angioplasty in infrainguinal occlusive disease
15. Mortality and morbidity of distal revascularization in octogenarians

C. Demonstrate knowledge of the manifestation and management of carotid disease in the elderly patient with respect to:

1. Significance of stroke as cause of mortality and disability in elderly patients
2. Risk factors for stroke development
3. Changes in stroke incidence with every decade of life
4. Contribution of carotid disease to the incidence of stroke
5. Significance of carotid bruit in elderly patients
6. Proven measures for stroke prevention
7. Advantages and disadvantages of diagnostic methods (duplex ultrasonography, angiography, MRA, intracranial doppler and CT scan)
8. Role of duplex ultrasonography in assessing the degree of carotid disease
9. Measurements of the degree of carotid stenosis based on angiography
10. Natural history of asymptomatic vs. symptomatic carotid disease
11. Benefits of Carotid endarterectomy in symptomatic patients
13. Risk of stroke or death following CEA in asymptomatic patients, patients with TIA, and patients with prior stroke
14. Mortality and morbidity of CEA in octogenarians
15. Limitations of the prospective randomized CEA trials with respect to the octogenarians

Competency-Based Knowledge Objectives:

Senior Level:
A. Demonstrate the ability to provide competent care to elderly patients with AAA with respect to:
1. Management of concomitant intra-abdominal pathology such as cholelithiasis, colonic cancer, renal tumors, and prostatic disease
2. Ability to recognize and treat possible postoperative complications, such as myocardial infarction, distal embolization, and ischemic colitis
3. Importance of preserving pelvic circulation through reperfusion of at least one hypogastric artery, the significance of previous colectomy, and the indications for reimplantation of the inferior mesenteric artery
4. Management of concomitant renovascular occlusive disease, mesenteric occlusive disease, or suprarenal extension of the aneurysmal pathology

B. Demonstrate knowledge of the management of carotid disease in elderly patients with respect to:

1. Effect of ulceration, degree of stenosis, and presenting symptoms on the risk of stroke in patients with symptomatic carotid disease managed medically without CEA
2. Effect of life expectancy and female gender on the benefits of CEA in asymptomatic patients
3. Causes of stroke during CEA
4. Understanding the etiology of recurrent carotid disease and the indications for intervention
5. Causes and management of stroke during and after CEA
6. Investigational role of carotid angioplasty and stinting in the management of carotid disease

Surgical Endoscopy

Unit Objective:
Demonstrate knowledge of and the ability to use a variety of endoscopic instruments in the screening, diagnosis, and treatment of various diseases.

Competency-Based Knowledge Objectives:

Junior Level:

1. Review normal anatomy and physiology of the gastrointestinal tract, airway, mediastinum, and thorax.
2. Demonstrate a working knowledge of the anatomical landmarks in the following organs. Describe and contrast the normal and pathological appearance of the:
   a. Esophagus
   b. Stomach
   c. Duodenum
   d. Small bowel
   e. Colon
   f. Airways
   g. Mediastinum
   h. Thorax
3. Identify the indications for endoscopy and common pathological conditions outlined below:
   a. Esophagus
      i. Classes of esophagitis
      ii. Esophageal varices
      iii. Barrett’s Esophagus
      iv. Neoplasms (benign/malignant)
      v. Ulcers
      vi. Strictures
vii. Infections
b. Stomach
   i. Ulcers: benign/malignant
   ii. Gastric varices
   iii. Gastric polyps: benign/malignant
   iv. Erosive gastritis
   v. Gastric outlet obstruction
   vi. Gastric Bezoar
   vii. Marginal ulcer
   viii. The postoperative stomach
c. Duodenum
   i. Ulcers
   ii. Polyps: benign/malignant
   iii. Inflammatory conditions (Duodenal Crohns)
   iv. Tumors of the duodenum and ampulla of Vater
d. Small bowel
   i. Indications for enteroclysis
   ii. Ileal Crohns
   iii. Angiodysplasia
   iv. Leiomyoma
e. Large bowel
   i. Polyps: benign and malignant; sessile and polypoid
   ii. Diverticulosis/Diverticulitis
   iii. Inflammatory conditions
      1. Ulcerative colitis
      2. Crohns Colitis
      3. Pseudomembranous colitis
      4. Intestinal ischemia
   iv. Tumors: benign and malignant
   v. Melanosus Coli
4. Identify the various anatomical landmarks during endoscopy:
   a. Esophagus - GE jnc/Z-line
   b. Stomach
      i. Cardia
      ii. Fundus
      iii. Body
      iv. Incisura angularis
      v. Antrum
      vi. Pylorus
c. Duodenum
      i. Duodenal bulb
      ii. Duodenal mucosa
      iii. Papilla of Vater
d. Colon
      i. Rectum
      ii. Sigmoid
      iii. Descending
      iv. Splenic flexure
      v. Transverse
      vi. Hepatic flexure
      vii. Ascending colon
      viii. Ileocecal valve
   ix. Cecum, confluence of tinea coli, and appendiceal orifice
5. Describe the fundamental mechanics and physics of endoscopic equipment and accessories (e.g., rigid and flexible scopes, multichannel scopes, types of snares, and biopsy forceps).
6. Be familiar with the routine operation of endoscopes and their support systems, including:
   a. Ability to troubleshoot minor malfunctions
   b. Knowledge of established procedures for cleaning, sterilization, and routine handling

7. Summarize methodological issues in endoscopy to include:
   a. Patient preparation
   b. Intubation
   c. Biopsy techniques
   d. Cytology techniques
   e. Specimen handling
   f. Polypectomies

8. Review surgical journals (e.g., SAGES publications) and other medical and surgical sources of information regarding screening, diagnostic, and therapeutic uses of various endoscopic procedures.

9. Understand the various access techniques for laparoscopic surgery, including:
   a. Veress needle
   b. Closed
   c. Open
   d. Optical trocars
   e. Combination techniques

10. Describe factors that account for the principal physiologic effects and benefits of laparoscopy, including:
    a. Reduced tissue trauma
    b. Carbon dioxide pneumoperitoneum
    c. Use of Helium, Argon, or Nitrous oxide
    d. Gasless laparoscopy

11. Outline the indications for performing diagnostic and therapeutic:
    a. Laryngoscopy
    b. Bronchoscopy
    c. Colonoscopy
    d. Laparoscopy
    e. Choledochoscopy
    f. Esophagagogastroduodenoscopy (EGD)
    g. Proctosigmoidoscopy
    h. Thoracoscopy
    i. Mediastinoscopy

12. Summarize the use of sedatives (conscious sedation) and analgesics during endoscopic procedures, including:
    a. Mode of onset
    b. Principles of monitoring
    c. Side effects
    d. Reversing agents
    e. Monetary considerations

13. Describe potential advantages of thoracoscopy over an open procedure, discussing:
    a. Pain
    b. Length of hospital stay
    c. Tissue trauma
    d. Costs (hospital, disability, additional procedures)
    e. Cosmesis

14. Analyze the purpose of established guidelines for the management of various gastrointestinal disease states as developed by:
    a. Society for Surgery of the Alimentary Tract (SSAT)
    b. Society of American Gastrointestinal Endoscopic Surgeons (SAGES)
    c. American Society for Gastrointestinal Endoscopy (ASGE)

Senior Level:
1. Explain the pathophysiology of disease entities in which proctosigmoidoscopy, rigid or flexible, is indicated, including:
   a. Ulcerative colitis
   b. Crohns Disease
   c. Rectal polyps and tumors
   d. Pseudomembranous colitis
   e. Ischemic colitis
   f. Rectal ulcers
   g. Anorectal tumors
   h. Sigmoid volvulus

2. Differentiate between the following therapeutic maneuvers utilizing the endoscope:
   a. Dilatation
   b. Laser ablation
   c. Endomucosal resection
   d. Sclerotherapy
   e. Electrocautery (bipolar, monopolar, heater probe)
   f. Polyp excision

3. Analyze the use of endoscopes in the diagnosis and treatment of upper and lower gastrointestinal hemorrhage.

4. Assess the complications that may result from flexible endoscopic procedures, including:
   a. Hemorrhage
   b. Perforation and the various causes

5. Determine and categorize the essential features of a wide variety of diseases as seen through the endoscopes listed in #8 above.

6. Evaluate the uses of laparoscopy in surgical procedures to include:
   a. Indications and contraindications
   b. Technical and procedural considerations.
   c. Post-procedure care
   d. Comparison of open and laparoscopic procedures in regards to morbidity and mortality
   e. Complications

7. Understand the significance of laparoscopy and endoscopy in elderly patients:
   a. Elective, corrective action
   b. Sedation
   c. Continuous monitoring
   d. CO2 effects
   e. Length of stay

8. Assess the significance of physiologic effects of Carbon dioxide pneumoperitoneum, including:
   a. Heart rate
   b. Mean arterial blood pressure
   c. Systemic vascular resistance
   d. Central venous pressure
   e. Decrease in venous return
   f. Cardiac output
   g. Cardiac index

9. Identify potential complications of thoracoscopic pulmonary resection, describing the significance of:
   a. Pneumothorax
   b. Air leak
   c. Air embolism
   d. Lung injury
   e. Infection
   f. Equipment malfunction

10. Summarize the legal and ethical issues associated with the use of endoscopic procedures.
Competency-Based Performance Objectives:

**Junior Level:**

1. Observe flexible and rigid endoscopic procedures.
2. Under supervision, manipulate the endoscope for routine endoscopic procedures.
3. Discuss pathological findings and their significance as they relate to the patient's clinical history or condition.
4. Observe and monitor appropriate anesthetic techniques used to sedate the patient.
5. Prepare patients for various routine and elective endoscopic procedures.
6. Under supervision, demonstrate proper cleansing and sterilization of endoscopic instruments.
7. Participate in hands-on experience in rigid sigmoidoscopy in the operating room and in the endoscopic suite or clinic.
8. Distinguish between the indications for use and the preparation methods of the following:
   a. Biopsy
   b. Smears (cytologic)
   c. Culture
   d. Cytology
9. Use the flexible sigmoidoscope under direct supervision, beginning with elective cases.
10. Use models to improve eye-hand coordination and experience with endoscopic instruments, including:
    a. Computer simulators
    b. Trainer boxes
    c. Inanimate models
    d. Animal models
11. Assist in the performance of diagnostic and therapeutic:
    a. Esophagoscopy (rigid and flexible):
    b. Esophagastroduodenoscopy (EGD)
    c. Colonoscopy
    d. Laparoscopy
    e. Bronchoscopy
    f. Thoracoscopy
    g. Mediastinoscopy
    h. Endoscopic retrograde cholangiopancreatography
    i. Operative choledochoscopy

**Senior Level:**

1. Demonstrate, under proper senior supervision, the performance of a rigid proctosigmoidoscopy.
2. Observe, recognize, and interpret normal and abnormal findings by the use of the endoscopic procedures listed in #11 immediately above.
3. Perform flexible sigmoidoscopy under supervision.
4. Perform uncomplicated therapeutic endoscopic maneuvers under direct supervision such as:
   a. Excision of pedunculated colonic polyps
   b. Performance of percutaneous endoscopic gastrostomy (PEG)
5. Perform all portions of esophagscopy, esophagastroduodenoscopy, and colonoscopy under supervision.
6. Perform the following uncomplicated endoscopic procedures independently with supervision available if needed:
   a. Rigid and flexible sigmoidoscopy
   b. Analproctoscopy
7. Initiate and correlate the management of surgical patients who require various endoscopic procedures.
8. Demonstrate knowledge of the indications and contraindications for various medications used at your institution in the preparation and performance of endoscopic procedures.

9. Describe and demonstrate knowledge of the anatomy of the biliary tree as it relates to the use and limitations of the choledochoscope.

10. Assist in therapeutic endoscopic procedures such as:
   a. Sclerotherapy of esophageal varices
   b. Electrocoagulation of upper and lower bleeding lesions
   c. Removal of foreign bodies
   d. Endoscopic polypectomy
   e. Percutaneous gastrostomy

11. Observe and assist in more complicated therapeutic procedures such as:
   a. Coagulation of mucosal ulcers
   b. Palliative treatment of intestinal malignancies
   c. Palliative stent placement

12. Describe the indications for and employ the best use of rigid and flexible bronchoscopy in patients, including:
   a. Evacuation of mucous plugs
   b. Brush biopsy techniques
   c. Collection of bronchoscopic washings for culture and cytology
   d. Removal of foreign bodies from the respiratory tract
   e. Biopsy of endobronchial masses

Minimally Invasive Surgery
(Which is also incorporated into all General Surgery Units)

Unit Objectives:

- Demonstrate an understanding of the applications and risks of minimal access surgery (MAS).
- Demonstrate an understanding of the technical and physiologic principles of minimal access surgical techniques.
- Develop specific technical skills and demonstrate proficiency in performance of basic laparoscopy, laparoscopic cholecystectomy, and other minimal access procedures.
- Synthesize the principles of minimal access surgery into a practice philosophy conducive to the development and evaluation of future surgical techniques.

Competency-Based Knowledge Objectives:

Section One: Overview

1. Differentiate between conventional open and scope-assisted surgery, including:
   a. Anesthetic considerations
   b. Effects of pneumoperitoneum
   c. Cardiovascular stability
   d. Need for team participation
   e. Differences in patient outcome

2. Discuss the physical limitations imposed on the user participating in minimal access surgery, including:
   a. Surgeon fatigue and diminished proficiency over time
   b. Two-dimensional perspective
   c. Visual limitations of scope and monitoring equipment
   d. Crucial importance of patient position and cannula position for optimum exposure

3. Understand strategies to offset the difficulties suggested in #2 above, including:
   a. Proper alignment of eye-camera-instrument axes
   b. Efficient biomechanics
c. Effective use of assistants
d. Appropriate use of other advanced technologies such as endoscopic ultrasound

4. Analyze the factors affecting the decision to select a minimal access approach (as opposed to an open surgical approach) for a particular clinical problem.

5. Explain the concept of the learning curve, and discuss the need for quality control in the education and evaluation of surgical housestaff in developing proficiency in minimal access surgery.

6. Explain the mechanics and principles for safe and effective use of the following equipment/procedures:
   a. Cautery (monopolar and bipolar)
   b. Ultrasonic shears
   c. Laser
   d. Telescopic direction (straight and angled laparoscope)
   e. Insulation technique and hazards
   f. Maintaining visualization of operative field
   g. Dissecting and knot tying

7. Discuss appropriate anesthetic management for minimal access (MA) techniques for surgery involving the abdomen, thorax, and joints and soft tissue spaces.

8. Summarize areas of current investigation in MAS, including:
   a. Virtual reality
   b. Use of robots/robotics
   c. Three-dimensional imaging systems
   d. Dissection techniques for soft tissues

9. Summarize protocols for appropriate cleaning, sterilization, maintenance, and handling of MA equipment.

10. Discuss the potential economic impact of increased utilization of operating room time, advanced equipment, and disposable instruments on health care costs.

Section Two: Basic Laparoscopic Skills

1. Discuss techniques for gaining access to the abdomen, including:
   a. Veress needle
   b. Open (Hassan cannula)
   c. Direct visualization trocars

2. Describe the sequence of steps involved in establishing a pneumoperitoneum, including:
   a. Selection of first puncture site
   b. Initial entry via Veress needle or Hassan cannula
   c. Tests to confirm entry into peritoneum
   d. Initial insufflation
   e. Initial exploration of abdomen
   f. Placement of additional trocars

3. Discuss indications for and limitations of diagnostic laparoscopy, as well as pros and cons of this diagnostic technique compared with other diagnostic modalities such as CT scan or ultrasound.

4. Discuss recognition and management of complications, including major vascular injury, massive Carbon dioxide embolus, or visceral injury.

5. List contraindications for laparoscopic surgery, and be able to explain why these conditions are considered relative or absolute contraindications.

Section Three: Laparoscopic Cholecystectomy (LC)

1. Discuss the indications and contraindications for laparoscopic cholecystectomy.
2. Describe the technical aspects of preparing for and operating on a patient undergoing LC.
3. Identify major considerations for the decisions involved in converting from laparoscopic to open cholecystectomy, including:
   a. Difficulty identifying anatomy (i.e., common duct)
   b. Poor visibility
   c. Hemorrhage control
4. Select management options for handling bile duct injuries, including immediate and delayed diagnosis and treatment.
5. Specify the indications and technique for percutaneous cholangiography, endoscopic ultrasound, and common bile duct exploration (CBDE), including use of choledochoscopy.
6. Discuss management of the patient with common duct stones, including:
   a. Choice of approach (open common duct exploration, versus laparoscopic CBDE, versus LC followed by/preceded by endoscopic stone extraction)
   b. Timing of surgery
   c. Safety and cost-effectiveness of each approach

Section Four: Additional Laparoscopic Procedures

1. Describe current theories, including advantages and disadvantages, regarding the use of laparoscopic anti-reflux procedures and myotomies.
   a. Discuss advantages and limitations of thoracoscopic versus laparoscopic approach for esophagomyotomy.
   b. Discuss indications and contraindications for addition of partial fundoplication to esophagomyotomy.
   c. Describe management of paraesophageal hernia.
2. Outline the potential benefits and limitations to:
   a. Laparoscopy-assisted colectomy
   b. Pre- and trans- peritoneal groin hernia repairs
   c. Laparoscopic ventral hernia repair
   d. Appendectomy
3. Summarize other intra-abdominal laparoscopic procedures currently being performed, including:
   a. Adrenalectomy
   b. Gastrectomy
   c. Splenectomy
   d. Donor nephrectomy

Section Five: Thoracoscopic Procedures

1. Identify the potential applications of thoracoscopic surgery, including:
   a. Pulmonary resection
   b. Lung biopsy
   c. Pleurectomy/decortication
   d. Esophageal surgery
   e. Sympathectomy
2. Discuss anesthetic management of a patient undergoing thoracoscopy.
3. Discuss pros and cons of thoracoscopic versus open surgery for pulmonary disease.

Competency-Based Performance Objectives:

Junior Level:

1. Provide assistance in laparoscopic surgery (e.g., manage camera, first assist).
2. Demonstrate familiarity with laparoscopic equipment, including setup and troubleshooting:
a. Insufflator
b. Camera
c. Video equipment
3. Demonstrate understanding of basic principles of patient positioning and room setup for diagnostic laparoscopy and LC.
4. Perform entry of body cavities using open (Hassan cannula) and closed (Veress needle) access techniques.
5. Recognize when satisfactory pneumoperitoneum has been achieved. Demonstrate familiarity with danger signs (e.g., hypotension, hypercarbia) and appropriate action when patient does not tolerate pneumoperitoneum.
6. Perform MAS procedures of increasing complexity under supervision, including:
   a. Diagnostic laparoscopy
   b. LC
   c. Laparoscopic appendectomy
d. Other procedures not requiring suturing or other advanced techniques
7. Demonstrate facility with laparoscopic suturing and knot-tying using a box trainer or other simulator.
8. Demonstrate the ability to convert from an MA to an open approach in a variety of surgical settings.
9. Perform appropriate preoperative work-up, and supervise postoperative care of patients undergoing laparoscopic procedures.

Senior Level:

1. List equipment needed for complex procedures, select instruments needed, set up room (including patient position) and equipment, troubleshoot equipment when malfunction occurs.
2. Demonstrate facility in endoscopic knot-tying, stapling, and suturing, either in a box-trainer, an animal model, or the operating room.
3. Participate in increasingly complex procedures under supervision, such as:
   a. Laparoscopic hiatal hernia repair
   b. Laparoscopic surgery for achalasia
   c. Laparoscopic splenectomy
d. Laparoscopic inguinal hernia repair
4. Demonstrate understanding of uses of endoscopic ultrasound and other intraoperative adjuncts.
5. Complete additional MIS training as necessary through specialized courses at the home or outside institution to certify one’s proficiency in performing currently practiced and widely accepted procedures.

Neonatal Surgery

Unit Objectives:

- Understand the unique anatomic, pathophysiologic, and genetic conditions that affect the fetus and neonate.
- Learn the principles of stabilization, appropriate preoperative diagnosis, and preparation of the sick neonate.
- Understand the anatomic and physiologic principles which guide successful operative repair of neonatal diseases.
- Learn principles of routine postoperative care and postoperative critical care management.
- Understand how new techniques, such as fetal surgery, may offer alternatives for treatment of certain neonatal diseases.
**Competency-Based Knowledge Objectives:**

**Junior Level:**
Learn the embryology, anatomy and physiology of common neonatal surgical diseases:

1. Describe the cardiac, pulmonary, blood volume, and gastrointestinal changes of post-partum transitional physiology.
2. Describe relevant mechanisms (conductive, convective, evaporative, and radiant) of neonatal thermoregulation.
3. Describe how neonatal renal function (decreased concentrating ability) affects the pharmacokinetics of commonly used drugs and antibiotics.
4. Describe factors influencing neonatal immunologic immaturity and how this increases susceptibility to common neonatal pathogens.
5. Describe appropriate fluid and electrolyte management of the full-term neonate.
6. Describe the nutritional requirements of the full-term neonate, and calculate appropriate enteral and parenteral nutritional support.
7. Describe the embryology of neonatal organ systems and their common congenital anomalies, including:
   a. Craniocervical: dermoid cysts, branchial cleft cysts, and fistulas
   b. Foregut: esophageal atresia/tracheoesophageal fistula, duodenal atresia
   c. Respiratory: cystic adenomatoid malformation, congenital diaphragmatic hernia
   d. Cardiac: common cyanotic and acyanotic cardiac malformations
   e. Midgut: intestinal atresia, malrotation, meconium ileus
   f. Hindgut: Hirschsprung’s disease, imperforate anus, meconium plug syndrome, small left colon syndrome
   g. Body wall defects: gastroschisis, omphalocele, umbilical and inguinal hernias
   h. Renal: ureteral obstruction, vesicoureteral reflux
   i. Lower GU tract: urethral valves, hypospadias
8. Explain the pathophysiology of necrotizing enterocolitis.
9. Describe the arterial and venous anatomy of the neonate.

Diagnose common neonatal problems and describe surgical procedures for their correction:

1. Describe the diagnosis, preoperative evaluation, and management of the common congenital anomalies listed above.
2. Outline the technical principles involved in the following procedures:
   a. Gastrostomy
   b. Colostomy
   c. Inguinal and umbilical herniorrhaphy
   d. Circumcision
   e. Central venous access
3. Explain the perioperative care of neonates, including:
   a. Basic ventilator management
   b. Fluid, electrolyte, and nutritional management
   c. Correction of coagulopathies
   d. Indications for transfusion
   e. Diagnosis of sepsis and antibiotic use

**Competency-Based Performance Objectives:**

**Junior Level:**

1. Perform a comprehensive evaluation of a neonate with suspected surgically correctable conditions.
2. Establish percutaneous venous and arterial access in neonates over 2 kg.
3. Assist or perform under supervision:
   a. Peripheral venous and arterial cutdown access
   b. Placement of umbilical catheters
   c. Placement of central venous access
   d. Tube thoracostomy
   e. Incision and drainage of cysts and abscesses
   f. Hernia reduction

4. Participate in the perioperative care of the neonate by recording appropriate assessments and treatment plans in daily progress notes, including:
   a. Ventilator management
   b. Fluid, electrolyte, and nutritional management
   c. Antibiotic use

5. Complete oral or written examination of topics listed in junior level knowledge objectives.

6. Assist or perform surgical repairs of congenital diseases listed in junior-level knowledge objectives.

Competency-Based Knowledge Objectives:

Senior Level:
The senior-level resident should function as an effective consultant to the nursery, and be able to provide expertise in the evaluation and definitive treatment of elective surgical conditions as well as be able to perform emergent surgical procedures (including but not limited to vascular access, orotracheal intubation, tube thoracostomy, exploratory laparotomy, and exploratory thoracotomy) with little or no immediate supervision. The senior-level resident should be prepared to direct the management of the pediatric surgical service, including the education of junior residents and medical students on surgical clerkships.

Learn the embryology, anatomy, and physiology of basic and advanced neonatal surgical diseases. The resident is responsible for all conditions listed above in junior-level objectives, plus:

1. Describe the pathophysiology and evaluation of:
   a. Respiratory distress
   b. Cyanosis
   c. Gastroesophageal reflux
   d. Jaundice
   e. Bilious emesis
   f. Abdominal distention
   g. Bloody diarrhea
   h. Body wall defects

2. Describe the complications and appropriate treatment of necrotizing enterocolitis.

3. Describe appropriate fluid and electrolyte management of the premature neonate.

4. Describe the nutritional requirements of premature neonates, and calculate appropriate enteral and parenteral nutritional support.

5. Describe the embryology of basic anomalies (listed above) and more complex congenital anomalies, including:
   a. Craniocervical: choanal atresia, cleft lip and palate
   b. Foregut: laryngotracheal cleft, duodenal web and duplication, annular pancreas, preduodenal portal vein, biliary atresia
   c. Respiratory: congenital lobar emphysema and sequestrations
   d. Cardiac: complex cyanotic and acyanotic cardiac malformations
   e. Midgut: intestinal duplication, volvulus, meconium peritonitis
   f. Hindgut: neuronal intestinal dysplasia, total colonic and ultrashort Hirschsprung’s disease, cloacal extrophy
   g. Body wall defects: pentalogy of Cantrell, Jeune’s thoracic dystrophy
   h. Renal: renal agenesis, fusion and ectopia; bladder extrophy, prune-belly
syndrome
i. Lower GU tract: ambiguous genitalia, urogenital sinus abnormalities

Diagnose common neonatal problems and describe surgical procedures for their correction:

1. Describe the diagnosis, preoperative evaluation, operative management, and postoperative care of the congenital anomalies listed above.
2. Describe the immediate care, operative correction, and postoperative management of life-threatening anomalies:
   a. Congenital diaphragmatic hernia
   b. Midgut volvulus
   c. Necrotizing enterocolitis
   d. Gastrochisis
   e. Prune-belly syndrome
3. Describe respiratory support of the neonate, including high frequency ventilation and extracorporeal membrane oxygenation.
5. Describe indications for and technical aspects of endoscopic evaluation of the neonate.
6. Describe indications for and technical aspects of intubation, tube thoracostomy, and percutaneous central venous access in the neonate.

Competency-Based Performance Objectives:

Senior Level:

1. Describe the capabilities and limitations of various diagnostic modalities used in neonatal care.
2. Formulate a care plan for neonates with problems such as:
   a. Respiratory distress
   b. Cyanosis
   c. Gastroesophageal reflux
   d. Jaundice
   e. Biliious emesis
   f. Abdominal distention
   g. Bloody diarrhea
   h. Body wall defects
3. Perform or assist in all major surgical procedures performed on the pediatric surgical service.
4. Personally conduct comprehensive preoperative evaluation and postoperative management for all critically ill neonates, and direct junior residents in the management of routine surgical problems.
5. Complete oral or written examination of topics listed in senior-level knowledge objectives.

Pediatric Surgery

Unit Objectives:

- Understand the unique anatomic, pathophysiologic, and genetic conditions that affect children.
- Learn the principles of stabilization, appropriate preoperative diagnosis, and preparation of the sick child.
- Understand the anatomic and physiologic principles which guide successful operative
repair of pediatric diseases.

- Learn principles of routine postoperative care and postoperative critical care management.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe the development of children in terms of the following criteria:
   a. Weight, length, and head size
   b. Nutritional requirements
   c. Renal function
   d. Hormonal influences on development
   e. Response to stress and infection
2. Classify congenital malformations of the newborn by type, origin, and the need for surgical intervention:
   a. Head and neck: thyroglossal duct cyst, lymphadenopathy, cystic hygroma
   b. Gastrointestinal: pyloric stenosis, appendicitis
   c. Respiratory: tracheal lesions
   d. Abdominal wall defects: omphalomesenteric and urachal malformations
   e. Genitourinary: polycystic kidneys, undescended testis, torsion of the testis
   f. Inborn and genetic errors: trisomy 13, trisomy 18, Down's syndrome
   g. Orthopedic anomalies which commonly occur with other malformations
3. Summarize the basic approach to the diagnosis and management of more common surgical problems of infancy and childhood, such as:
   a. Pyloric stenosis
   b. Perforated appendicitis
   c. Intussusception
4. Identify the technical aspects of the following procedures:
   a. Excision of skin and subcutaneous lesions
   b. Incision and drainage of abscesses
   c. Lymph node biopsy
   d. Chest tube placement
   e. Oral intubation
   f. Herniorrhaphy in older children
5. Describe the fundamental considerations in the pre- and post-operative care of infants and children in the cases listed above.
6. Explain the principles of diagnosis and treatment for common causes of gastrointestinal hemorrhage in the neonate, infant, child, and adolescent.

Competency-Based Performance Objectives:

Junior Level:

1. Evaluate surgical conditions in the pediatric population through a comprehensive history, physical examination, and appropriate diagnostic studies.
2. Participate in the management of simple surgical problems in the pediatric population, including:
   a. Integument
      i. Excision of skin and subcutaneous lesions
      ii. Incision and drainage of abscesses
   b. Head and Neck
      i. Excision of dermoid cysts and small skin lesions
      ii. Lymph node biopsy
   c. Thoracic
i. Chest tube placement
d. Cardiovascular
   i. Central venous catheter placement
   ii. Venous cutdown
   iii. Arterial line placement
e. Gastrointestinal
   i. Pyloromyotomy
   ii. Appendectomy
   iii. Herniorrhaphy (umbilical; inguinal in patients 2 years and up)
f. Genitourinary
   i. Circumcision
   ii. Orchiopexy
g. Gynecology
   i. Oophorectomy, simple
   ii. Vaginoscopy for foreign body or biopsy
h. Musculoskeletal
   i. Ganglion cyst excision
   ii. Excision of supernumerary digit
   iii. Muscle biopsy

3. Develop a working relationship with members of the pediatric intensive care unit in managing postoperative pediatric patients.

**Competency-Based Knowledge Objectives:**

**Senior Level:**
The senior-level resident should function as an effective consultant to the nursery, and be able to provide expertise in the evaluation and definitive treatment of elective surgical conditions as well as be able to perform emergent surgical procedures (including but not limited to vascular access, orotracheal intubation, tube thoracostomy, exploratory laparotomy, and exploratory thoracotomy) with little or no immediate supervision. The senior level resident should be prepared to direct the management of the pediatric surgical service, including the education of junior residents and medical students on surgical clerkships.

Learn the embryology, anatomy, and physiology of basic and advanced neonatal surgical diseases. The resident is responsible for all conditions listed above in junior-level objectives, plus:

1. Explain the approach to surgical management, (i.e., diagnosis, perioperative care, surgical therapy, and postoperative follow-up) of more complex surgical procedures for infants and children such as:
   a. Large skin grafts and musculocutaneous flaps
   b. Thoracotomy for pulmonary resection and vascular cardiac repair
   c. Flexible endoscopy
   d. Antireflux procedure
   e. Bowel resection
   f. Repair of hepatic, biliary, and pancreatic injury
   g. Splenectomy and splenorrhaphy
   h. Management of the seriously injured patient

2. Analyze the pathophysiology, diagnosis, and management options in the treatment of short-gut syndrome.

3. Demonstrate an understanding of the special psychological, social, and education issues confronting selected pediatric trauma/ postoperative patients.

**Competency-Based Performance Objectives:**

**Senior Level:**

1. Evaluate pediatric patients for problems requiring more complex surgical intervention.
2. Participate in preoperative, operative, and postoperative care of more complex problems in pediatric surgery such as:
   a. Integument
      i. Pedicle graft
      ii. Large skin grafts for burns
      iii. Subcutaneous mastectomy
   b. Craniocervical
      i. Branchial cleft and thyroglossal duct cysts
      ii. Cystic hygroma
   c. Thoracic
      i. Laryngoscopy, bronchoscopy, esophagoscopy
      ii. Tracheostomy
      iii. Thoracotomy for biopsy, lung resection
      iv. Diaphragm repair
   d. Cardiovascular
      i. Resection of small vascular cutaneous lesions such as (A-V) malformation, hemangioma, or lymphangioma
      ii. Repair of patent ductus arteriosus
      iii. Repair of aortic anomaly/injury
      iv. Support of a child with extracorporeal membrane oxygenation (ECMO)
   e. Gastrointestinal
      i. Flexible endoscopy
      ii. Antireflux procedure
      iii. Bowel resection for inflammatory bowel disease, intussusception, intestinal duplications
      iv. Hodgkin's staging
      v. Biopsy of tumor (open, laparoscopic or endoscopic)
      vi. Laparotomy for trauma
      vii. Splenectomy (laparoscopic or open), splenorrhaphy
      viii. Repair of hepatic injury, renal and/or bladder injury
      ix. Cholecystectomy (open or laparoscopic)
      x. Omphalomesenteric duct and urachal anomalies
   f. Oncologic
      i. Neuroblastoma
      ii. Wilms' tumor
      iii. Rhabdomyosarcoma
      iv. Teratomas
      v. Germ cell tumors
      vi. Hepatoblastoma
      vii. Sarcomas
      viii. Hodgkin's and non-Hodgkin's lymphomas
      ix. ALL
   g. Genitourinary
      i. Polycystic kidney
      ii. Ambiguous genitalia
   h. Musculoskeletal
      i. Torticollis
      ii.

Otolaryngology and Head and Neck Surgery

Part A: Otolaryngology

Unit Objectives:
Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the ear, nose, and throat pertinent to the practice of general surgery.

Demonstrate the ability to manage ear, nose, and throat problems associated with the practice of general surgery.

Competency-Based Knowledge Objectives:

1. Identify the anatomy and explain the physiology of the ear, nose, oral cavity, and throat.
2. Summarize the essential components of a focused history and physical examination for common otolaryngologic problems.
3. Discuss the significance of the cornerstones of the physical examination, including:
   a. Visual inspection
   b. Auscultation
   c. Palpation
   d. Percussion
4. Analyze the clinical management of ear, nose, and throat (ENT) patients in the intensive care unit (ICU), including:
   a. Respiratory infection management
   b. Airway management
   c. Wound care
5. Describe and compare the pathophysiology of the following common ENT diseases:
   a. Sinusitis
   b. Sialadenitis
   c. Neck abscess
   d. Epiglottitis
6. Describe and explain the pathophysiology of presbycusis as it can be:
   a. Conductive
   b. Metabolic and toxic
   c. Neural
   d. Cochlear
   e. Tumor-related
   f. Age-dependent
7. Explain how physical examination differs for delineation of conductive versus neurosensory hearing loss.
8. Explain the principal causes of simple epistaxis and describe its management.
9. Evaluate patients with facial trauma and develop a treatment plan for the management of:
   a. Fractures
   b. Lacerations
   c. Hemotympanum
   d. Epistaxis
10. Describe the indications for tracheostomy in adults and children.
11. Discuss the indications for biopsy of lesions of the skin of the face, neck, and oral cavity.
12. Compare the use of the following procedures in evaluating ENT problems:
    a. Radiography
    b. Contrast studies
    c. Ultrasound
13. Describe the indications for simple endoscopy and its diagnostic contributions such as:
    a. Nasopharyngoscopy
    b. Direct laryngoscopy
    c. Esophagoscopy
14. Summarize the characteristics of the common neoplasms of the ear, nose, and throat, and describe appropriate surgical intervention.
15. Outline the diagnostic approaches to otolaryngologic neoplasia, including:
    a. Direct visualization
    b. Indirect visualization
c. Use of radiography
d. Fine-needle biopsy

16. Describe diagnostic and therapeutic procedures utilized in treating the following:
   a. Abscess
   b. Neck mass
   c. Oral ulcer
   d. Salivary gland mass

17. Describe and demonstrate methods for removing foreign bodies from the trachea, bronchus, and esophagus.


20. Summarize diagnostic and therapeutic considerations in the management of caustic injury to the mouth, nasopharynx, trachea, and esophagus.

21. Discuss the management of airway in patients with terminal carcinoma of the thyroid and trachea.

22. Describe the signs and symptoms and discuss the health care significance to elderly patients from the pathophysiology of:
   a. Tinnitus
   b. Vertigo
   c. Cerumen impaction
   d. Basilar artery stenosis

**Competency-Based Performance Objectives:**

1. Perform and record a focused ENT history and physical examination.
2. Manage the emergent/elective airway; using visual inspection, radiographic evaluation, indirect invasive and non-invasive visualization techniques (direct speculum and indirect mirror evaluations, direct fiberoptic and rigid evaluations); with consideration for:
   a. Nose, nasal passages
   b. Nasopharynx
   c. Oropharynx
   d. Larynx
   e. Trachea
3. Be prepared to manage airway obstruction as the result of:
   a. Edema
   b. Secretion
   c. Benign and malignant tumors (including, vascular malformations and infectious processes)
   d. Anaphylaxis
   e. Foreign body
4. Evaluate patients with facial trauma, including fractures, lacerations, hemotympanum, and epistaxis.
5. Perform tracheostomy on adults under direct supervision.
6. Perform biopsies of lesions of skin of face, neck, and oral cavity.
7. Perform evaluation of a neck mass, and provide appropriate treatment.
8. Correctly differentiate between the indications for and management of cricothyroidotomy and tracheostomy, demonstrating varying techniques and choice of instrumentation for emergent airway management and ventilation in each.
9. Interpret radiologic examinations of sinuses.
10. Perform simple endoscopy including:
    a. Nasopharyngoscopy
    b. Direct laryngoscopy
    c. Esophagoscopy
11. Evaluate head and neck tumor patients, and be prepared to perform a tumor biopsy.
13. Evaluate radiologic studies of the head and neck, including computed axial tomography (CAT) scanning.
14. Evaluate and treat head and neck abscesses and other masses.
15. Remove esophageal foreign bodies endoscopically.
17. Reconstruct facial and neck defects with transposition and myocutaneous flaps.
18. Manage facial fractures with appropriate consultation.
19. Evaluate and treat caustic injury.
20. Manage airway in patients with terminal thyroid or tracheal carcinoma.

Part B: Head and Neck Surgery

Unit Objectives:

- Demonstrate understanding of the anatomy, physiology, and pathophysiology of the head and neck amenable to surgical intervention.
- Demonstrate the ability to manage surgical problems of the head and neck in a variety of settings.

Competency-Based Knowledge Objectives:

1. Define and discuss the three-dimensional anatomy of the head and neck region with regard to:
   a. Interrelationships of anatomy
   b. Fascial planes
   c. Path and course of cranial nerves
   d. Major arterioles and venous structures
   e. Musculature of face and neck
   f. Anatomy of larynx and cervical trachea
   g. Location of cricothyroid membrane
   h. Cervical anatomy of nasopharynx, pharynx, esophagus (special emphasis on sinuses, eustachian tubes, middle and external ear structures)
2. Describe laryngeal function as it relates to voice production.
3. Describe the interrelationship of pharyngeal and laryngeal function.
4. Identify the bones of the skull, face, and cervical spine. Explain their relationship to major neurologic and neurovascular structures of the head and neck.
5. Analyze predisposing factors for head and neck cancer.
6. Differentiate between neoplastic and non-neoplastic neck masses.
7. Explain the tumor, nodes, and metastases (TNM) classification system for tumors of the head and neck.
8. Prepare a protocol for evaluating intraoral cancer.
9. Outline the principles associated with the repair of avulsion of ear and nose.
10. Indicate how to examine a patient with severe facial laceration to rule out damage to the following:
    a. Lacrimal drainage systems
    b. Parotid gland and duct
    c. Facial nerve
11. Identify and delineate
    a. Pathophysiology of cranial nerve dysfunctions and injuries
    b. Brachial plexus injuries
    c. Anatomy/location of parotid and submandibular ductal drainage systems
12. Define and describe the Le Fort maxillary fracture classification system.

15. Describe the roles of the following diagnostic modalities in the evaluation of head and neck lesions and facial fracture:
   a. Plain x-rays
   b. CT scanning
   c. Sialography
   d. Magnetic resonance imaging (MRI)
   e. Isotope scans
   f. Ultrasound

16. Describe the anatomy of the fascial spaces of the neck and their importance in neck abscesses and infections.

17. Discuss indications for radical and modified radical neck dissection.

18. Distinguish between the following kinds of grafts in the management of head and neck problems:
   a. Split-thickness grafts
   b. Full-thickness skin grafts
   c. Rotational flaps
   d. Free flaps

19. Describe the anatomy and the advantages and disadvantages of regional flaps available for head and neck reconstruction.

20. Compare and contrast the use of the following local flaps:
   a. Advancement
   b. Rotational
   c. Pedicle
   d. Rhomboid (Limberg)
   e. Z-plasty
   f. W-plasty
   g. V-Y advancement

21. Outline the advantages and disadvantages of irradiation, chemotherapy, and resection of neoplastic lesions of the:
   a. Tongue
   b. Floor of mouth
   c. Buccal mucosa
   d. Retromolar trigone
   e. Alveolar ridge
   f. Palate

22. Discuss the frequency of benign and malignant head and neck tumors in the pediatric population.

23. Outline the microbiology and treatment of deep neck abscesses.

24. Explain the techniques of scar revision, including:
   a. Primary excision
   b. Z-plasty
   c. Serial excision
   d. Geometric broken line closure
   e. Use of cosmetics

Competency-Based Performance Objectives:

1. Perform head and neck examinations, including nasopharyngoscopy and fiberoptic direct laryngoscopy.

2. Administer postoperative care (ICU, wards, discharge planning, follow-up appointments, patient/family counseling, home health care) for head and neck patients.

3. Provide emergency airway management, including performance of:
   a. Intubation
b. Emergency cricothyrotomy
c. Emergency tracheostomy

4. Administer treatment for sialadenitis.
5. Diagnose and evaluate infectious illness (viral, bacterial, fungal), acute and chronic, affecting:
   a. CNS
   b. Sinuses
   c. Bones
   d. Soft tissues of face

6. Demonstrate a clear understanding of the pathophysiology of:
   a. Ludwig’s angina
   b. Necrotizing fasciitis of the neck
   c. Mucormycosis of sinus
   d. Epiglottitis
   e. Gustatory sweating (Frye’s syndrome)

7. Perform biopsy of all intraoral lesions.
8. Care for contaminated wounds, including animal bites of face and neck.
9. Assist with incisions for head and neck surgery, including:
   a. Radical neck dissection
   b. Salivary gland surgery
   c. Tracheostomy
   d. Laryngeal/tracheal trauma
   e. Considerations for incisions of previously irradiated tissues

10. Formulate a plan for the management of an unknown primary tumor of the head and neck.
11. Perform fine-needle biopsies.
12. Perform simple operative incisions with supervision (tracheostomy, intubation, simple lesions of head and neck).
14. Perform simple operative incisions without direct supervision.
15. Perform radical neck dissection under direct supervision.
16. Manage postoperative complications, including nerve paralysis and cutaneous fistulas from the aerodigestive tract.
17. Manage trauma to the upper airway.

Neurosurgery

Unit Objectives:

• Demonstrate the ability to recognize neurological or neurosurgical disease or injury so that appropriate consultation/referral can be obtained.
• Demonstrate the ability to manage neurological or neurosurgical problems which require attention prior to, or in conjunction with, consultation or referral.

Competency-Based Knowledge Objectives:

1. Demonstrate knowledge of and skills in neurological examination of patients with neurological or neurosurgical disease or injury so that:
   a. An accurate history can be taken
   b. A sufficient physical examination can be performed
   c. Logical conclusions can be drawn regarding location and nature of neuropathology

2. Apply basic knowledge of the following neuroradiological methods in terms of deciding, after conducting the neurological history and examination, which diagnostic tests or
interventions would provide the least risk and most useful information for subsequent interpretation:

a. Plain skull and spine radiographs
b. Computed axial tomography of the head and spine
c. Magnetic resonance imaging (MRI)

3. Demonstrate an understanding of the management of head injuries to include:
   a. Selection, prioritizing, and performance of resuscitation efforts
   b. Analyzing components and results of baseline neurological examination to determine and evaluate changes in patient neurological status
   c. Treatment of a scalp wound
   d. Initial treatment of compound depressed skull fractures
   e. Management of increased intracranial pressure
   f. Recognition of cerebral herniation syndromes
   g. Initiation, management, and interpretation of intracranial pressure monitoring
   h. Recognition and initial management of post-traumatic intracranial hemorrhage

4. Apply knowledge of cervical and thoracolumbar spine injuries, including:
   a. Means of stabilization of spine (sandbags, tongs, halo)
   b. Recognition of level of injury by neurological deficit found on physical examination
   c. Pathophysiological responses in quadriplegic or paraplegic patient

5. Demonstrate the ability to assess and manage diseases of the cervical and lumbar discs according to:
   a. Anatomical structures involved: disc (cartilage), annulus (ligament), joint capsule, pedicle, nerve root, foramen
   b. Conservative management: traction, rest, physical therapy, and analgesic medications
   c. Selection and usefulness of radiological modalities: plain spine films, CT, MRI, myelography
   d. Indications for surgical management: intractable radicular pain, neurological deficit

6. Demonstrate the ability to describe and diagnose intracranial and intraspinal mass lesions (neoplasm, abscess, hematoma) utilizing:
   a. Signs and symptoms of intracranial and intraspinal mass lesions
   b. Classification of intracranial and intraspinal tumors
   c. Pathophysiology of intracranial and intraspinal abscess
   d. Pathophysiology of cerebral aneurysms and vascular lesions
   e. Pathophysiology of spontaneous intracranial and intraspinal hemorrhage
   f. Pathophysiology of hydrocephalus

7. Summarize several factors to consider when making critical decisions about treatment options for the elderly neurosurgical patient, to include:
   a. Patient views
   b. Quality of life issues
   c. Acceptable risks

8. Demonstrate an understanding of important non-surgical problems and postoperative complications relating to neurosurgery, including:
   a. Closed head injury: problems related to coma, brain swelling, increased intracranial pressure (ICP), ICP monitoring
   b. Spinal cord injury: problems related to paralysis, sensory deficit, roto bed, tongs, halo
   c. Airway and respiratory problems secondary to coma or high cord injury: arterial blood gases, respirator, endotracheal tube, tracheostomy
   d. Vascular problems: hypo- and hyper-tension, cerebral circulation, cerebral ischemia
   e. Bladder problems: secondary to brain, cord, or cauda pathology
   f. Metabolic problems: hypopituitary, hypoadrenal, hyponatremia, water intoxication

9. Clarify and explain the challenge of making an accurate diagnosis for the elderly patient
who exhibits signs of the following disorders. Suggest diagnostic tools for making a
differential diagnosis.
   a. Alterations of consciousness
   b. Personality changes
   c. Focal neurologic deficits to cerebrovascular disease
   d. Senile dementia
10. Discuss ethical and socioeconomic issues relating to neurosurgery (e.g., brain death,
mental incompetence, dysphasia, compensation neuroses, and intractable or chronic
pain).
11. Demonstrate an understanding of the importance of early referral of head and spinal cord
injury patients to rehabilitation services; recognize the potential impact of these services
for long-term prognosis.

Competency-Based Performance Objectives:

1. Perform neurological history and examination of patients at various levels of
   consciousness; obtain appropriate radiologic studies, and plan operative and medical
   management with appropriate supervision.
2. Assist during neurosurgical procedures, gaining exposure to and hands-on experience
   with:
   a. Craniotomy, laminectomy
   b. Hemostasis
   c. Protection of neural tissues
   d. Removal of specific lesions: tumor, abscess, hematoma, disc
   e. Vascular repair: carotid endarterectomy, clipping of aneurysm
   f. Problems related to cerebrospinal fluid circulation: hydrocephalus
   g. Repair/replacement of dura and bone
3. Perform limited neurosurgical procedures under direction such as:
   a. Diagnostic lumbar puncture
   b. Insertion of ICP monitor
   c. Repair of scalp lacerations
   d. Burr hole for sub-dural hematoma
   e. Elevation of simple depressed skull fracture
   f. Application and management of skeletal traction by tongs or halo
4. Manage patients with closed head injuries.
5. Formulate appropriate postoperative care, including:
   a. Address potential complications
   b. Provide information/instructions to patient and family
   c. Prepare a discharge plan
   d. Plan adequate post hospital care

Orthopedic Surgery

Unit Objectives:

- Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the
  musculoskeletal system.
- Demonstrate the ability to manage preoperative, operative, and postoperative care of
  surgical patients with orthopedic disorders in a variety of settings.

Competency-Based Knowledge Objectives:
1. Describe the gross anatomical structures of the skeletal system.
2. Explain the physiology and biochemistry of bone growth and maturation.
3. Describe the function of the specific bones of the body.
4. Analyze the orthopedic role in evaluation of the following:
   a. Musculoskeletal trauma
   b. Inflammatory, infectious, and metabolic disorders (rheumatoid arthritis, systemic lupus erythematosus, pyogenic arthritis, osteomyelitis, osteomalacia, hypothyroidism)
   c. Musculoskeletal tumors
   d. Degenerative conditions (osteoarthritis, traumatic arthritis, osteoporosis)
5. Outline a protocol for the assessment of the skeletal system using appropriate skills of history taking and physical examination.
6. Discuss the use of radiographic imaging such as magnetic resonance imaging (MRI), computed axial tomography (CAT) scan, radionucleotide, arteriography, and plain films in the evaluation and management of the following orthopedic pathology:
   a. Musculoskeletal tumors
   b. Isolated extremity injury
   c. Spinal injury or fracture
   d. Pelvic trauma
   e. Vascular injury
   f. Urologic injury
7. Identify considerations for basic care of patients with acute trauma to the musculoskeletal system, including accurate assessment and documentation of the neurovascular status of all extremities.
8. Discuss specific areas of concern when considering total hip replacement for the elderly patient, including:
   a. Comorbid conditions
   b. Thromboembolic disease
   c. Urinary retention
   d. Bleeding dyscrasias
   e. Occult infections
9. Explain the fundamental principles of management of orthopedic trauma, including:
   a. Compartment pressure problems and use of fasciotomy
   b. Indications and limitations of closed reduction and casting
   c. Indications for open reduction and internal fixation of fractures
   d. Indications and methods for application of skeletal traction
   e. Principles of early mobilization and rehabilitation
   f. Diagnosis and management of fat embolism
10. Explain the management of open fractures, including:
    a. Timing
    b. Stabilization priorities
    c. Irrigation and debridement
    d. Early fixation
    e. Mobilization
11. Discuss the role of arthroscopy in the evaluation and therapy of orthopedic pathology (specifically for the knee).
12. Determine the management of selected congenital and developmental musculoskeletal defects and fractures in children to include:
    a. Epiphyseal fractures: Salter-Harris Classification
    b. Supracondylar elbow fractures in children
       i. Risk of Volkmann’s ischemic contracture
       ii. Role of the vascular surgeon in evaluation and treatment
    c. Supracondylar femur fracture (adjacent role of the vascular surgeon)
    d. Cervical spine congenital deformity versus pseudosubluxation in a young child
    e. Developmental hip dislocation
    f. Talipes equinovarus (club foot)
13. Discuss common causes of deterioration in elderly patients that most frequently lead to the need for total knee replacement. Include: (1) frequency of occurrence, (2) associated medications, (3) pain and degeneration, and (4) quality of life decisions for:
   a. Osteoarthritis
   b. Rheumatoid arthritis
   c. Post-traumatic arthritis
   d. Osteonecrosis of femoral condyles


15. Explain the management of the following kinds of diseases affecting the musculoskeletal system:
   a. Inflammatory diseases (rheumatoid arthritis, systemic lupus erythematosus [SLE], psoriatic arthritis, Reiter's syndrome)
   b. Infectious diseases (septic arthritis, osteomyelitis)
   c. Metabolic diseases (osteomalacia, hyperparathyroidism, hyperthyroidism)

16. Describe the following fracture classifications:
   a. Malgaigne
   b. Complex extremity and soft tissue
   c. Pelvic

17. Diagram gross and roentgenographic characteristics of histological and pathological conditions of the musculoskeletal system, including:
   a. Osteoporosis
   b. Metastatic disease of the skeleton
   c. Primary tumors
   d. Trauma

18. Outline the management of musculoskeletal tumors, including:
   a. Evaluation and staging: Enneking Classification
   b. Selection and performance of appropriate biopsy such as:
      i. Open- versus fine-needle aspiration
      ii. Frozen section versus permanent section
   c. Adjuvant therapy options
      i. Chemotherapy
      ii. Radiation

19. Explain the management of nerve injury associated with musculoskeletal trauma and other pathology, including:
   a. Response of nervous tissue to injury
   b. Evaluation of nerve injury
   c. Transmission of impulses at various points in the peripheral nervous system
   d. Operative repair options

20. Analyze the principal concepts of pain causation and perception.

21. Demonstrate the evaluation of back and leg pain using a standard algorithm.

22. Fractures in the elderly population typically occur as the result of low-energy impacts. Discuss the significance of frequency and outcome of the following disease entities/abnormalities:
   a. Osteoporosis (include gender)
   b. Paget's disease
   c. Infection
   d. Malignancy
   e. Marrow dysplasias
   f. Osteomalacia
   g. Metabolic derangements (hyperthyroidism, hyperparathyroidism)
   h. Elder abuse and neglect

23. Compare the indications and contraindications for joint aspiration.

24. Analyze the indications for and surgical approaches to amputation in the following situations:
   a. Trauma
b. Ischemia
c. Infection
d. Tumors
e. Prostheses

25. Summarize the role of joint replacement in the management of orthopedic pathology.
26. Summarize the characteristics of infection/sepsis secondary to prosthetic implants or orthopedic hardware; discuss treatment strategies.
27. Explain the importance and timing of physical therapy in the care of postoperative orthopedic repairs.
28. Describe the surgical technique utilizing a “clean air” environment, covering these broad aspects of control:
   a. Needs assessment regarding procedure
   b. Consideration of laminar flow systems
   c. Use of ultraviolet light
   d. Operating room traffic
   e. Soft tissue handling
   f. Use of prophylactic antibiotics

Competency-Based Performance Objectives:

1. Perform and record a focused history and physical examination of orthopedic disorders, including:
   a. Trauma
   b. Congenital malformations
   c. Degenerative diseases
   d. Inflammatory processes
   e. Neoplasia

2. Request and interpret appropriate diagnostic imaging and laboratory studies of orthopedic pathology:
   a. Preoperative laboratory evaluation as needed for safe surgical intervention
   b. Plain film analysis (specifically cervical spine and major skeleton films)
   c. CT scan for spinal fracture, pelvis, and extremity injury
   d. MRI spine and knee

4. Triage patients with musculoskeletal injuries in a mass casualty situation.
5. Participate in the management of orthopedic trauma to extremities, including such procedures as:
   a. Splinting closed fractures
   b. Closed reduction of fractures
   c. Reducing dislocations
   d. Applying traction
   e. Applying casts
   f. Débriding and irrigating open extremity fractures
   g. Open reduction and internal fixation of extremity fractures

6. Monitor compartment pressure in orthopedic trauma and begin appropriate therapy, including the performance of fasciotomy, if indicated.
7. Monitor trauma patients for indications of fat embolism syndrome and begin appropriate therapy.
8. Perform joint aspirations in appropriate situations.
9. Participate in diagnostic and therapeutic arthroscopy procedures such as:
   a. Partial meniscectomy (knee)
   b. Arthroscopy of shoulder (diagnostic)

10. Participate in the management of amputations:
    a. Determine amputation level
    b. Perform lower extremity amputation in appropriate cases
c. Direct rehabilitation of an amputee in appropriate cases

11. Participate in the management of musculoskeletal tumors, including:
   a. Planning and performing an incisional biopsy of a soft tissue tumor
   b. Performing preoperative evaluation and staging of soft tissue tumors
   c. Assisting in the planning and resection of soft tissue tumors and considerations for limb salvage


13. Participate in the management of congenital, developmental, and other musculoskeletal deficiencies in children such as:
   a. Cerebral palsy
   b. Myelomeningocele
   c. Muscular dystrophy
   d. Developmental hip/dislocation
   e. Talipes equinovarus

Ophthalmology

Unit Objectives:

- Demonstrate an understanding of the anatomy and function of the eye.
- Demonstrate working knowledge of the pathophysiology of common eye problems relevant to the practice of general surgery.
- Demonstrate the ability to initiate management and arrange appropriate care of eye problems associated with the practice of general surgery.

Competency-Based Knowledge Objectives:

1. Describe the anatomy of the eye and its surrounding structures, including:
   a. Adnexa (lids, tarsal plates, gray line, levator muscles, orbital septum, innervation, vascular supply, nasolacrimal system, orbital bones, lacrimal gland)
   b. Extraocular muscles and innervation
   c. Anterior Segment (conjunctiva, cornea, anterior chamber, iris, lens)
   d. Posterior Segment (ciliary body, vitreous, optic nerve, retina, macula, fovea, choroid)
   e. Retrobulbar Structures (optic nerve, optic canal, chiasm, sella turcica)

2. Diagram and summarize the principles of vision, including:
   a. Refraction caused by lenses (tear film, cornea, lens, vitreous)
   b. Encoding of image (retina, including fovea and macula)
   c. Transmission of image (nerve fiber layer, optic disc, optic nerve, chiasm, optic radiations, occipital lobe)
   d. Muscle control centers (cranial nerves III, IV, VI)
   e. Pupillary control (cranial nerve III and parasympathetic nerves)

3. Explain fundamental ocular physiology by considering the following questions:
   a. How do the adnexal structures ensure that the eye is lubricated and shielded from trauma?
   b. What would a paresis of any of the innervating cranial nerves do to the movement of the eye?
   c. When the cornea is damaged, what effect is there upon comfort or vision? Knowing the innervation of the iris, what information might an anisocoria indicate? What is a Marcus Gunn, afferent pupillary defect, or a Horner's pupil?
   d. What purpose do the ciliary body and the vitreous serve? What do the macula, the fovea, and the optic nerve do?
   e. What difference would it make in the examination of the eye (vision, visual field, and appearance of the nerve) if damage occurred at the site of the optic nerve,
optic canal, optic chiasm, or in a retrochiasmal location?

4. Outline common eye pathology, including:
   a. Trauma to eye, orbit, and supporting structure
      i. Diagnosing a perforated globe
      ii. Indications for referral and repair of a blow out fracture
      iii. Diagnosing a corneal epithelial defect
      iv. Identifying a hyphema
      v. Treatments for severe loss of vision with optic nerve trauma
   b. Infections of the eye (blepharitis, hordeola, chalazia, corneal ulcers, endophthalmitis, conjunctivitis, keratoconjunctivitis, iritis, uveitis)
   c. Burns of the eye (different effects of a thermal, alkali, or acid burn of the cornea)
   d. Anisocoria (Horner’s syndrome, iatrogenic, belladonna induced, diabetic, third cranial nerve, Marcus Gunn, afferent pupillary defect)
   e. Sudden loss of vision (from migraine, traumatic neuropathy, ischemic optic neuropathy, temporal arteritis, optic neuritis, central retinal vein or artery occlusion)
   f. Eye pain (different descriptions of pain from iritis vs. corneal abrasion vs. herpes simplex keratitis)
   g. Eye donation (methods of tissue removal: whole eye and anterior segment)

5. Discuss the following important microbiologic considerations of the eye and its surrounding structures:
   a. Indications for cultures:
      i. Hyperpurulent or unresponsive conjunctivitis
      ii. Neonatal conjunctivitis
      iii. Corneal ulcers
      iv. Localized lid infections
      v. Suspected orbital cellulitis
      vi. Penetrating trauma
   b. Sampling technique
      i. Swab and transport media (acceptable for mild infections)
      ii. Direct culture on agar plates (for more serious disease)
      iii. Spatula scraping and direct agar plating (for corneal ulcers by ophthalmologist)
      iv. Blood cultures for orbital cellulitis
   c. Risks for patients who cannot blink fully (as in eyes drying in intensive care unit)
      i. Predisposes to severe infection
      ii. Possible globe perforation by Pseudomonas or N. gonorrhea

6. Outline the essential elements of a focused eye examination for each of the problems in #5 above to include significant aspects of the following:
   a. History
   b. Visual acuity and confrontational visual fields
   c. External exam (appearance of adnexa)
   d. Anterior segment (cornea, iris, anterior chamber)
   e. Pupillary exam (direct, consensual, indirect, afferent)
   f. Extraocular muscles (ductions, vergences, exotropia, esotropia, convergence)
   g. Posterior segment (including red reflex, direct ophthalmoscopy)

7. Discuss the pros and cons of performing elective or emergency eye operations on elderly patients who also present with comorbidity.

8. What is the level of importance of these elderly patient situations to the outcome of eye surgery?
   a. Renal transplant recipient
   b. Bone marrow transplant recipient
   c. End-stage renal patient
   d. Insulin-dependent diabetes mellitus patient

9. Summarize the criteria for appropriate referral and follow up for the management of common eye problems to include the following questions:
a. Is there information that will help me assess the systemic condition of the patient? (vascular and neurologic information especially important)
b. Is there a vision-threatening problem? (consultation with ophthalmologist is essential if patient is obtunded, does not blink, and there is a developing corneal ulcer)
c. What is the source of the patient’s ocular complaint or condition? Is it acute (inpatient consult) or chronic (outpatient consult)?

10. Explain the principles of management for common eye problems to include the following:
   a. Exposure keratopathy
   b. Conjunctivitis
   c. Herpes simplex keratitis
   d. Iritis
   e. Blow out fracture
   f. Corneal abrasion

11. Describe the etiology (include appropriate racial differences), signs and symptoms of, and primary treatment or rehabilitative strategy for the following disorders as they affect the vision of the elderly population:
   a. Presbyopia
   b. Essential blepharospasm
   c. Ptosis
   d. Glaucoma
   e. Cataracts
   f. Noncicatricial ectropion; entropion
   g. Retinal detachment
   h. Macular degeneration
   i. Diabetic retinopathy
   j. Herpes zoster
   k. Pterygium

12. Determine appropriate surgical management of common eye problems utilizing precepts such as the following:
   a. Indications for repair of blow out fracture
      i. Persistent findings after approximately seven days of symptomatic diplopia, or symptomatic enophthalmos; positive forced traction test
      ii. Possible hypesthesia
      iii. Presence of a fracture by itself is not necessarily an indication
   b. Current controversy and possible therapy for sudden, profound vision loss associated with traumatic optic neuropathy

13. Describe the pathophysiology of uncommon eye problems associated with surgical practice, including:
   a. Tumors of the eye
      i. Retinoblastoma
      ii. Melanoma
      iii. Metastatic
   b. Congenital abnormalities of the eye
      i. Glaucoma
      ii. Cataract
      iii. Exotropia/esotropia

14. Determine the emergency surgical management of eye and orbital injuries, including:
   a. Blow out fracture
   b. Rupture of the globe
   c. Corneal laceration
   d. Corneal foreign bodies
   e. Hyphema
   f. Vitreous hemorrhage

Competency-Based Performance Objectives:
1. Complete a basic history and eye examination.
2. Apply eye dressings or appropriate eye medications for corneal abrasion and corneal perforation or globe rupture.
3. Apply local anesthetic, repair simple eyelid lacerations, and remove foreign bodies.
   a. Diagnose injuries
   b. Review special techniques for repair
   c. Call the ophthalmologist if the following situation(s) exists: laceration involving: margin of lid, levator muscle, canaliculus, or nasolacrimal system
4. Interpret imaging studies in the evaluation of common eye problems such as:
   a. Ocular prosthesis
   b. Ocular foreign body
   c. Blow out fracture
   d. Zygomatic fracture
5. Treat orbital injuries and assign priority in management in a multiple injured patient.
6. Identify appropriate candidates and arrange for eye donation:
   a. Review criteria of the Eye Bank Association of America for donors
      i. Essentially no age limits on donation
   b. Tissue that is "too old" or "too young" for routine transplant may still be useful for emergency repairs or for research
   c. Contagious diseases are contraindications (syphilis, AIDS, Creutzfeldt-Jacob, rabies, death from unknown causes)
7. Participate in enucleation for corneal harvesting under supervision.
8. Participate in management of orbital injuries.
9. Manage the treatment of common and uncommon eye problems with appropriate consultation.

Plastic and Reconstructive Surgery

Unit Objectives:

- Demonstrate an understanding of the nature and principles of correction and reconstruction of congenital and acquired defects of the head, neck, trunk, and extremities.
- Demonstrate the ability to manage the treatment of acute, chronic, and neoplastic defects not requiring complex reconstruction.

Competency-Based Knowledge Objectives:

1. Outline the components of a comprehensive focused history and physical examination pertinent to the evaluation and correction of congenital or acquired defects under the realm of plastic and reconstructive surgery.
2. Discuss and compare skin and connective tissue according to:
   a. Anatomy
   b. Normal physiology and biochemistry
   c. Pathophysiology of benign and malignant skin disorders
   d. Unique pathophysiology of connective tissue disorders
3. Explain the basic techniques for surgical repair of superficial incisions and lacerations of the head, neck, trunk, and extremities to include the following considerations:
   a. Skin
   b. Subcutaneous tissue
   c. Superficial muscle and fascia
   d. Dressings
   e. Splints
   f. Suturing and knot tying
4. Describe the physiology of various techniques of skin and composite tissue
transplantation with particular regard to component tissue circulation:

a. Skin grafts (split- vs. full-thickness)
b. Bone (cartilage grafts)
c. Composite grafts
d. Skin flaps
e. Muscle flaps
f. Myocutaneous flaps
g. Bone flaps
h. Osteocutaneous flaps
i. Myo-osseous flaps
j. Vascularized versus nonvascularized flaps
k. Neurocutaneous flaps

5. Categorize the pathophysiology of thermal, chemical, and electrical burns, including consideration of:

a. Systemic pathophysiology
b. Local pathophysiology
c. Cardiac depression
d. Pulmonary compromise

6. Describe the "classical" chemical agents causing burns; list their antidotes.

7. Outline the components of a comprehensive examination of the naso-, oro-, and hyopharynx to include:

a. Normal anatomy
b. Common congenital anomalies
c. Evolution of neoplastic disease

8. Explain the assessment of facial skeletal trauma according to the following systems:

a. LeFort I, II, and III classification of maxillary fractures
b. Nasoethmoidal disruption classification
c. Zygomatic, orbit, and mandibular fractures
d. Disruption classification

9. Define the tumor, node, and metastases (TNM) classification system as used for neoplasms of skin, soft tissue, and head and neck.

10. Discuss epidemiology, risk factors, treatment, and prevention of cutaneous malignancies in the geriatric patient, including:

a. Skin cancer rates (basal cell carcinoma [BCC], squamous cell carcinoma [SCC])
b. Average age of onset for BCC/SCC
c. Etiology of BCC/SCC
d. Usual modes of treatment for BCC/SCC (Mohs Technique, radiation, chemotherapy)
e. Prevention using medications (isotretinoin, beta-carotene)

11. Explain the methods for performing incisional and excisional biopsies of skin and oral cavity.

12. Demonstrate the systematic examination of the hand to assess motor and sensory function, including:

a. Intrinsic tendon and muscle function
b. Extensive tendon and muscle function
c. Median nerve
d. Ulnar nerve
e. Radial nerve
f. Circulation
g. Bones

13. Describe the physiology of local and general anesthetics in these categories:

a. Narcotics
b. Sedatives
c. Analgesics
   i. Local anesthesia
   ii. General anesthetics
14. Outline appropriate diagnostic studies needed to supplement the physical examination when developing a treatment plan for:
   a. Surgery of the hand
   b. Facial fractures
   c. Congenital structural anomalies of the head/neck and hand/trunk.
15. Summarize the evaluation of patients with head and neck cancer, and develop a treatment plan according to the following criteria:
   a. Location of lesion
   b. Size of primary lesion
   c. Presence of metastatic disease
16. Demonstrate a working knowledge of the safe use of nasopharyngoscopy, laryngoscopy, esophagoscopy, and other endoscopic procedures utilized in the evaluation of patients with head and neck cancer.
17. Discuss the use of the reconstructive ladder (including skin grafts, local flaps, and regional and free microvascular flaps) in the definitive management of traumatic or excised wounds.
18. Explain considerations in a geriatric patient undergoing major reconstructive operation, to include the implications of:
   a. Decreased functional physiologic reserve
   b. Multiple medical problems
   c. Slower wound healing (consider significance of: age, concomitant illnesses, medications)
   d. Preoperative evaluation procedures
   e. Invasive operative monitoring
   f. Intensive postoperative monitoring
19. Discuss the surgical treatment of:
   a. Common hand injuries and tumors
   b. Surgical repair of facial trauma, soft tissue, and bony defects
   c. Resection and reconstruction of the simple, soft tissue defects following resection of neoplasms of the head and neck
   d. Resection of skin and soft tissue neoplasms requiring complex reconstruction
   e. Reconstruction of the breast for congenital and acquired defects
   f. Management of the burned hand and face
   g. Reconstruction of congenital craniofacial defects
20. Analyze treatment options for the comprehensive care of the burn patient, including:
   a. Excision of burn
   b. Homografting
   c. Xenografting
   d. Autografting
   e. Tissue engineering and prefabrication
21. Assess basic lines of research in plastic and reconstructive surgery to include:
   a. Current hypotheses dealing with:
      i. Craniofacial growth and development
      ii. Perfusion of the skin and muscle
      iii. Wound healing
      iv. Skin, bone, and cartilage grafts
      v. Tumor biology
      vi. Reconstructive hand surgery
      vii. Bone reconstruction
      viii. Bone distraction
      ix. Tissue transplantation
   b. Avenues for new investigation
22. Summarize currently accepted surgical techniques for treating the following:
   a. Correction of congenital lesions of the head/neck and hand/trunk
   b. Craniofacial anomalies, including cleft lip and palate
   c. Breast reconstruction after mastectomy
d. Reconstruction and ablative head and neck surgery
e. Aesthetic rejuvenation of the face and body

Competency-Based Performance Objectives:

1. Complete a comprehensive physical examination and clinical data history, including pertinent diagnostic laboratory and radiographic findings.
2. Evaluate and treat simple and intermediate abrasions and burns of the face, trunk, and extremities.
3. Perform simple incisional biopsies and excise small lesions on the skin and subcutaneous tissue of the trunk or extremities.
4. Provide definitive treatment plans for superficial incised and lacerated wounds of the neck, trunk, and extremities.
5. Participate in the perioperative evaluation and management of congenital or acquired defects (traumatic and surgical).
6. Apply and remove dressings of the head, neck, hand, trunk, and extremities, including:
   a. Occlusive
   b. Non-occlusive
   c. Wet to dry
   d. Casts
   e. Alginate
   f. Colloidal
7. Debride and suture major non-facial wounds and burns.
8. Participate in the acute resuscitation, evaluation, and initial treatment of a burned patient.
9. Harvest and apply split-thickness skin grafts.
10. Perform simple, localized skin flaps for wound coverage.
11. Participate in the evaluation and formulation of treatment plans for:
   a. Hand injuries
   b. Facial fractures
   c. Head and neck cancer
   d. Congenital anomalies
   e. Breast deformities
   f. Burn patients
12. Under the direction of a plastic surgeon, assist in the planning and performance of complex reconstructive operations.
13. Harvest and apply full-thickness skin grafts and local flaps.
14. Reconstruct defects with random flaps, composite flaps, and grafts.
15. Act as first assistant and attending-supervised surgeon for major resectional and reconstructive surgery of the head, neck, breast, trunk and extremities.
16. Raise muscle and skin-muscle flaps under direct supervision.
17. Perform major excision of burns, escharotomy, and skin grafting.
18. Assess and act as first assistant and attending-supervised surgeon for the following:
   a. Complex soft tissue injury
   b. Fractures requiring operative and non-operative reduction
   c. Nerve, tendon, and bone surgery of the hand
   d. Vascular injuries
19. Act as first assistant or attending supervised surgeon for:
   a. Reconstruction and reparative surgery of the hand
   b. Surgical repair of facial trauma
   c. Resection of neoplasms of the head and neck
   d. Resection of major skin and soft tissue neoplasms requiring complex reconstruction
   e. Surgical repair of craniomaxillofacial congenital defects
   f. Reconstruction of the breast
   g. Complex wound reconstruction using flap both local, regional, and free
microvascular

Urology

Unit Objectives:

- Demonstrate an understanding of the anatomy, physiology, and pathophysiology of the genitourinary system.
- Demonstrate the ability to manage routine and emergency genitourinary problems in a variety of settings.

Competency-Based Knowledge Objectives:

1. Describe the normal anatomy and physiology of the genitourinary system to include the following structures:
   a. Kidneys
   b. Ureters
   c. Bladder
   d. Prostate seminal vesicles and vas deferens
   e. Urethra (male and female)

2. Summarize the basic science of genitourinary disease to include the following:
   a. Anatomy, physiology, biology, biochemistry, microbiology, immunology, and embryology of the genitourinary system
   b. Pathophysiology of urinary tract disease
   c. Endocrine function of kidney

3. Discuss the components of a focused genitourinary history and physical examination to include:
   a. History
      i. Pain (location)
      ii. Hematuria
         1. Painful, painless
         2. Initial, terminal, total
         3. Presence of clots
      iii. Lower urinary
         1. Irritative
         2. Obstructive
      iv. Incontinence (stress, urge)
      v. Sexual dysfunction
   b. Physical Examination
      i. Kidneys
         1. Flank masses
         2. Peritoneal signs
         3. Signs of nerve root irritability
      ii. Bladder
      iii. Penis
      iv. Scrotum and contents
      v. Rectal examination (to include prostate)
      vi. Pelvic examination in female

4. Explain the following clinical science study factors/variables as they relate to genitourinary disease:
   a. Anatomy
   b. Embryology of genitourinary tract
5. Describe the pathologic anatomy and pathophysiology of non-complex genitourinary diseases such as:
   a. Tumors (renal, ureteral, bladder, testicular, prostate)
   b. Calculi (renal, ureteral, bladder)
   c. Trauma (testis, upper and lower urinary tract)
   d. Renal infections
   e. Benign prostatic hyperplasia and bladder outlet obstruction
   f. Vesicoureteral reflux and pyelonephritis
   g. Varicocele
   h. Incontinence (stress, overflow, neurogenic, urgency)
   i. Impotence and Peyronie’s disease
   j. Urethral stricture disease
   k. Priapism

6. Explain the tumor, nodes, and metastases (TNM) classification of tumors of the kidney, bladder, prostate, and testis.

7. Summarize the indications for routine diagnostic procedures in urology such as:
   a. Cystoscopy (ureteral catheterization)
   b. Bladder catheterization
   c. Intravenous pyelogram
   d. Cystogram (retrograde ureteropyelogram)
   e. Computed tomography and ultrasound of the GU tract
   f. Urography in trauma
   g. Indications for using MRI
   h. Retrograde urethrogram
   i. Transrectal ultrasound
   j. Renal arteriography
   k. Renography and renal perfusion scanning (I 131)
   l. Urinalysis, biochemical and radioimmunoassay

8. Discuss the nature and indication for routine therapeutic procedures in genitourinary disease such as:
   a. Bladder catheterization
   b. Passage of Coudé tips and filiform catheters c. Meatotomy if necessary for catheterization
   c. Suprapubic punch cystostomy
   d. Dorsal slit for phimosis

9. Analyze the etiology of urinary incontinence in elderly patients. Consider the following:
   a. Factors that may be associated with aging
      i. Bladder capacity
      ii. Amount of residual urine
      iii. Frequency of involuntary bladder contractions
      iv. Incidence of impaired mobility
      v. CNS disorder
      vi. Congestive heart failure
      vii. Medications
   b. Female elderly patients
      i. Decline in bladder outlet
      ii. Decline in urethral resistance pressure
         1. Influence of estrogen
         2. Pelvic structures associated with childbirth
         3. Surgeries
c. Male elderly patients
  Prostatic enlargement
    i. Obstructed urethra (overflow incontinence)
    ii. Detrusor motor instability (urge incontinence)
10. Describe the rationale for transurethral prostate resection and other endoscopic urologic procedures.
11. Describe cancer of the prostate, citing disease rates that make it the:
   a. Most commonly diagnosed malignancy in men
   b. Second leading cause of cancer death in men
12. Describe the embryology of the GU tract to include a discussion of the following:
   Congenital abnormalities
     a. Ureteropelvic junction (UPJ) with hydronephrosis
     b. Reflux
     c. Polycystic kidney
     d. Urethral valves with hydronephrosis
13. Describe the types of incisions and exposure required for genitourinary surgery, including those for:
   a. Nephrectomy
   b. Radical nephrectomy
   c. Ureterolithotomy
   d. Radical cystectomy
   e. Radical retropubic prostatectomy
   f. Perineal prostatectomy
   g. Orchiectomy
   h. Radical orchiectomy
   i. Laparoscopic urologic surgery (nephrectomy, partial nephrectomy, prostatectomy)
14. Discuss treatment options in the management of ureteral injuries to include:
   a. Primary repair
   b. Ureteroureterostomy
   c. Neoureterocystostomy
   d. Psoas hitch
   e. Percutaneous drainage
   f. Emergent nephrectomy
   g. Ureteral stenting
15. Outline recommended screening guidelines for prostate cancer.
16. Summarize considerations for appropriate treatment of incidentally detected carcinoma of the prostate, found on simple prostatectomy, when these conditions exist:
   a. Low-grade lesion with combined Gleason score <5
   b. Transurethral resection (TUR) shows lesion occupies 5% or less of tissue resected
   c. Lesion is considered clinical stage A-1

Competency-Based Performance Objectives:

1. Complete and record a focused urological history and physical examination.
2. Work up a prostatic mass on a routine rectal examination, including processing necessary radiologic and laboratory studies.
3. Plan and initiate appropriate therapy for urological disorders such as:
   a. Hematuria work up
   b. Obstructive uropathy work-up
   c. Simple infections
   d. Resistant infections
   e. Initiate therapy for: calculus disease, renal neoplasm, transitional cell neoplasm
   f. Maintain a working knowledge of carcinoma of the prostate
4. Perform a bladder catheterization (including passage of Coudé tips).
5. Perform a urologic evaluation (history and physical exam), diagnostic studies (retrograde urethrogram, cystogram, CT, angiography), and treatment (cystostomy, cystorrhaphy, ureteral repair, ureteral reconstruction, renal artery and vein repair, nephrectomy) in a trauma setting.
6. Interpret Computed Tomography scans and ultrasound results in genitourinary diseases.
7. Perform cystoscopy and urethral catheterization.
8. Request intravenous pyelography (IVP), CT, and ultrasound genitourinary procedures in appropriate cases.
11. Manage urologic emergencies such as torsion of testicle, scrotal masses, and urinary retention.
12. Manage complex intra-abdominal and pelvic general surgery that involves the genitourinary system.

Gynecology and Obstetrics

Part A: Gynecology

Unit Objectives:

- Demonstrate the ability to identify basic gynecologic pathologic conditions, and differentiate between gynecological and abdominal pathology requiring surgical intervention.
- Demonstrate the ability to manage gynecologic problems, including emergency procedures and pathology/trauma involving pelvic and abdominal organs.

Competency-Based Knowledge Objectives:

1. Describe the components of a complete gynecological assessment, including an accurate history and physical examination. Note how the examination and findings would likely differ for a postmenopausal woman without estrogen replacement therapy.
2. Outline the anatomical relationships of the pelvic organs and the lower intra-abdominal organs.
3. Explain the physiology and endocrinology relating to endometrial function (e.g., hypothalamic pituitary ovarian axis and menstrual function).
4. Discuss the physiology and pathophysiology of gynecologic conditions and disease, including:
   a. Intrauterine pregnancy
   b. Benign diseases of the ovaries (e.g., cysts and the risks of torsion, hemorrhagic corpus luteum)
   c. Ectopic pregnancy
   d. Carcinoma of the ovary, uterus, cervix uteri, vagina, and vulva
   e. Advanced uterine prolapse in a postmenopausal woman
   f. Uterine leiomyoma in a postmenopausal woman
   g. Urinary and rectal incontinence
5. Outline the differential diagnoses for pelvic pathology such as:
   a. Salpingitis versus appendicitis
   b. Mittelschmerz versus bleeding ovarian cyst
   c. Fibroid uterus versus other intra-abdominal masses
6. Discuss the differential diagnosis of a pelvic mass to include considering:
   a. Cysts
      i. Benign ovarian cysts (functional, neoplastic)
ii. Malignant ovarian cysts

b. Tumors
   i. Benign solid tumors (uterus, tubes, ovaries)
   ii. Malignant solid tumors (primary or metastatic)

c. Infectious processes (tubo-ovarian abscess)

d. Gastrointestinal processes (diverticular disease)

7. Summarize the categories of information provided by the following types of studies:
   a. Imaging (ultrasound—including Doppler flow, computed axial tomography, magnetic resonance imaging)
   b. Cytology of ascitic fluid
   c. Intravenous pyelography and cystoscopy
   d. Gastrointestinal contrast studies and sigmoidoscopy

8. Explain the basis of preferred treatment for the following conditions:
   a. Uterine bleeding
   b. Ectopic pregnancy (ruptured versus unruptured)
   c. Ovarian cysts with bleeding, enlargement
   d. Adnexal torsion (role of detorsion, color flow Doppler)
   e. Endometriosis
   f. Carcinoma of the ovary, uterus, vagina, and vulva
   g. Fibroids; fibroids in a 70-year-old woman
   h. Normal pregnancy and its complications requiring Caesarean section

9. Discuss the significance of postmenopausal vaginal bleeding, including:
   a. Etiology
   b. Evaluation
   c. Diagnostic studies (including endometrial stripe assessment, saline-infusion sonohysterography)
   d. Alleviation of symptoms
   e. Treatment alternatives

10. Identify and discuss pelvic support defects in the elderly woman, including:
    a. Restoration of normal genital tract anatomy
       i. Bladder neck
       ii. Anterior vaginal wall
       iii. Apex of vagina
       iv. Vaginal length
       v. Posterior vaginal wall
       vi. Perineal body
    b. Options to surgery
    c. Associated risks and benefits
       i. Quality of life decisions
       ii. Healthy life-style

11. Describe the indications for hysterectomy.

12. Explain the appropriate surgical approach to radical groin dissection and vulvectomy for carcinoma.

13. Describe the surgical and pathological staging of ovarian and uterine neoplasia.

14. Summarize the principles of the following surgical procedures:
    a. Hysterectomy
    b. Salpingectomy
    c. Oophorectomy
    d. Laparoscopy
    e. Vulvectomy
    f. Radical groin dissection

15. Explain the principle of uterine artery embolization procedures.

16. Describe the relation of the ureters to the pelvic anatomy and the most common locations for ureteral compromise.

17. Explain the principles of chemotherapy and radiotherapy in the management of gynecologic malignancies.
18. Discuss the management of an ovarian mass unsuspected at laparotomy by considering:
   a. Biopsy versus oophorectomy
   b. Surgical staging (peritoneal washings, contralateral ovarian biopsy, omentectomy)
   c. Consultation (family, gynecologist)
   d. Morphology (size, septations, surface texture)

19. Adenocarcinoma of the endometrium is the most common invasive gynecologic malignancy in the U.S. Describe:
   a. Mean age at diagnosis
   b. Most common presenting complaint (90% of cases)
   c. High-risk factors (including Tamoxifen use and familial predisposition)

Competency-Based Performance Objectives:

1. Perform pelvic examinations, only initially under direct supervision:
   a. Part of every woman’s general physical examination (including rectovaginal exam)
   b. Significant for patient to be evaluated for abdominal or pelvic symptoms
   c. Critical for patients who must undergo abdominal or pelvic surgery
   d. Evaluation of traumatically injured female

2. Participate as part of the surgical team in performing multiple gynecological surgery procedures:
   a. Perform as surgical assistant during earliest training stages
   b. Perform surgical procedures when experienced and under supervision:
      i. Pelvic laparoscopy
      ii. Oophorectomy
      iii. Salpingectomy
      iv. Hysterectomy

3. Formulate differential diagnoses of pelvic infection and masses to consider:
   a. Common infections (endometritis, salpingitis, tubo-ovarian abscess, bacterial vaginosis)
   b. Common organisms (gonococcus, chlamydia, anaerobic bacteria)
   c. Differentiating findings on pelvic and abdominal examination (mass, tenderness, signs of peritoneal irritation, ultrasound imaging, fever, leucocytosis)

4. Identify all normal pelvic structures visually and through palpation during laparotomy.

5. Manage general surgical problems of the pregnant patient (appendicitis, cholecystitis, breast mass, intestinal obstruction, ovarian torsion).

6. Diagnose ectopic pregnancy (role of quantitative B-HCG and transvaginal ultrasound, discriminatory zone)

7. Perform a salpingostomy under direct supervision. (evaluate contralateral Fallopian tube and consider salpingectomy)

8. Perform an emergency hysterectomy (beware the ureters).

9. Perform a radical groin dissection and assist in the performance of related gynecological surgery for carcinoma such as:
   a. Pelvic and inguinal lymph node dissection
   b. Bowel resection
   c. Cystectomy
   d. Pelvic exenteration with urinary and/or bowel diversion

Part B: Obstetrics

Unit Objectives:

- Demonstrate an understanding of the process of pregnancy.
- Demonstrate the ability to manage common surgical problems that occur during
pregnancy.

**Competency-Based Knowledge Objectives:**

1. Describe the physiologic changes in pregnancy, including:
   a. Cardiovascular
   b. Respiratory
   c. Gastrointestinal
   d. Genital
   e. Breasts
2. Describe normal intrauterine growth and development with consideration for the following:
   a. Basic science principles of placental and fetal development
   b. Fetal developmental physiology
3. Explain the stages of fetal development, including
   a. Characteristics of each trimester of pregnancy
   b. Assessment of the fetus
   c. Risk of surgery in each trimester.
4. Outline major issues involved in managing surgical conditions in the pregnant patient, including:
   a. Appendicitis (difficult to diagnose; necessity for different surgical approach)
   b. Cholecystitis (medical management before resorting to surgery)
   c. Intestinal obstruction (confusing symptoms; operative approach; postoperative nutritional support)
   d. Breast mass (confusion with physiologic changes in breast; special considerations at surgery; postoperative complications with lactation)
   e. Trauma (management of mother and fetus; special diagnostic measures)
   f. Ovarian torsion (diagnosis and treatment options, risk of oophorectomy in the first trimester)
5. Specify possible physiologic effects to the pregnant woman and/or the developing child exposed to the following agents:
   a. Anesthesia
      i. Effects of common anesthetic agents, inhalation, and conduction
      ii. Catastrophic events: failed endotracheal intubation, pulmonary aspiration, total spinal block
      iii. Anesthetic management in obstetric complications: amniotic fluid embolism, hemorrhage, hypertension
      iv. Position on operating room table and relevance to hemodynamics
   b. Medication
      i. Understanding risk factors and categories assigned to all drugs
      ii. Fetal effects of drugs which cross the placenta
   c. Radiation
      i. Effect on fertility
      ii. Effect on fetus (trimester specific, Rad/Gray levels considered safe)
6. Discuss the differential diagnosis of ectopic pregnancy, including:
   a. Signs and symptoms
   b. Qualitative human chorionic gonadotrophin (hCG)
   c. Quantitative hCG
   d. Abdominal and vaginal ultrasonography: correlation with hCG for presence of intrauterine fetal sac or adnexal mass (discriminatory zone)
7. Outline the indications and contraindications for laparoscopy in the pregnant patient, discussing:
   a. Diagnosis and treatment of ectopic pregnancy
   b. Contraindications: including multiple previous laparotomies, Class IV cardiac disease, peritonitis or obstruction with bowel distension
Competency-Based Performance Objectives:

1. Diagnose pregnancy, utilizing:
   a. History: include menstrual history and symptoms of early pregnancy
   b. Physical examination: expected changes in the uterine cervix and corpus
   c. Laboratory tests for pregnancy
2. Diagnose common gynecological problems that affect pregnant women, including:
   a. Sexually transmitted diseases
   b. Acquired Immunodeficiency Syndrome
   c. Human papillomavirus infections (especially condylomata)
   d. Leiomyomata uteri
3. Deliver a baby during an uncomplicated delivery.
4. Perform a Cesarian section in an emergency situation.
5. Manage a pregnant surgical patient during acute trauma (mother comes first!).
6. Perform laparoscopy under direct supervision for a pregnant patient (usually ectopic pregnancy).
7. 

Thoracic Surgery

Unit Objectives:

- Demonstrate an understanding of the anatomy, physiology, and pathophysiology of thoracic conditions pertinent to general surgery, exhibiting knowledge of how these change with age and how those changes alter one’s considerations.
- Effectively apply this understanding to the diagnosis, evaluation, and treatment of patients with thoracic problems who are to be managed by general surgery.

Competency-Based Knowledge Objectives:

Junior Level:

1. Describe thoracic anatomy and physiology, including anatomic and functional relationships:
   a. Chest wall (including spine)
   b. Accessory muscles of respiration
   c. Diaphragm (including subjacent abdominal organs)
   d. Mediastinum
   e. Trachea, segmental and subsegmental bronchi
   f. Lungs
   g. Esophagus
   h. Heart and pericardium
   i. Great vessels and their immediate branches
   j. Peripheral nerves (vagus, sympathetic, intercostals, phrenic, recurrent laryngeal)
   k. Thoracic duct
   l. Azygous and Hemiazygous veins
2. Summarize and discuss the embryological development of:
   a. Upper airway
   b. Lower airway
   c. Lungs
   d. Esophagus
e. Heart and great vessels
f. Mediastinal contents
g. Lymphatic drainage of esophagus and lungs

3. Review and analyze the basic principles and critical factors involved in:
   a. Ventilation
   b. Perfusion
   c. Control of respiration
   d. Lung function tests
   e. Respiratory failure
   f. Oxygen therapy
   g. Function of the diseased lung (obstructive, restrictive, and vascular)

4. Summarize the modalities listed below, stating their indications and limitations in thoracic surgical procedures:
   a. Endoscopy/thoracoscopy
   b. Standard and positional roentgenograms
   c. Arteriography
   d. Ultrasonography
   e. Computed axial tomography (CAT), magnetic resonance imaging (MRI), and positron emission tomograph (PET)
   f. Nuclear medicine
   g. Ventilatory methods
   h. Tracheostomy
   i. Intubation and vent support
   j. Central venous catheters
   k. Pacemakers/defibrillators
   l. Thoracostomy tubes
   m. Stents (coronary, esophageal, tracheal, and bronchial)

5. Discuss the following conditions, then choose and justify the appropriate diagnostic and therapeutic modalities:
   a. Pneumothorax
   b. Hydrothorax and hemothorax
   c. Combinations of a and b
   d. Chylothorax
   e. Pulmonary infiltrates or masses
   f. Abnormal cardiac silhouettes
   g. Congenital anomalies
   h. Pleural effusions
   i. Fractures (clavicles, sternum, ribs, scapulae, and spine)
   j. Mediastinal masses
   k. Infectious processes (parenchymal and pleural)
   l. Neoplastic processes (esophageal, pulmonary, extrapulmonary)
   m. Reactive processes (esophageal)

6. Explain the various types of anesthetic agents and equipment used in thoracic surgery.

7. Discuss and justify the indications for the following procedures:
   a. Needle aspiration
   b. Chest tube placement
   c. Mediastinoscopy
   d. Thoracoscopy
   e. Median sternotomy
   f. Mediastinotomy
   g. Thoracotomy
   h. Bilateral thoracotomy
   i. Heller myotomy
   j. Thal patch
   k. Stent use
   l. Bronchoscopy
8. Evaluate a patient as a candidate for thoracic surgery and discuss:
   a. Operative risks
   b. Diagnostic tests important in assessing probable outcome
   c. Potential complications
   d. Operation choices
   e. Informed consent
   f. Advanced directives
   g. Living wills
   h. Power of attorney

9. Explain the mechanics and applications of pulmonary function studies in evaluating patients for thoracic surgery.

10. Recommend when to use such diagnostic and therapeutic procedures as:
    a. Bronchoscopy and esophagoscopy (flexible and rigid)
    b. Thoracoscopy/Video Assisted Thoracoscopic Surgery (VATS)
    c. Emergency room thoracotomy
    d. Aortic cross clamping
    e. Standard thoracotomy and median sternotomy (Chamberlain and book procedures)
    f. Pericardial window/pericardiocentesis
    g. Lung biopsy/fine-needle aspiration (FNA)
    h. Pulmonary resection
    i. Lung volume reduction operations
    j. Mediastinoscopy
    k. Dilatation
    l. Manometry (esophageal)
    m. 24-hour pH monitoring

11. Demonstrate an understanding of the mechanics of ventilatory support and the clinical application of mechanical ventilation by completing the following activities:
    a. Contrast types of ventilators
    b. Specify indications for ventilators
    c. Demonstrate management of ventilators
    d. Differentiate modes of ventilation
    e. Explain weaning
    f. Evaluate weaning parameters
    g. Analyze complex ventilation problems
    h. Discuss indications for tracheostomy

12. Identify indications for the following therapeutic modalities; and then justify/critique their use:
    a. Extra corporeal membrane oxygenation
    b. Ventricular assist devices (LVAD, RVAD, BVAD)
    c. Intra-aortic balloon pump (IABP)
    d. High frequency jet ventilation
    e. Laser (used endoscopically)
    f. Endoscopic thoracic procedures
    g. Alveolar (pulmonary) lavage
    h. Autotransfusion
    i. Cell saver
    j. Pulmonary artery catheterization

13. Analyze changes in thoracic anatomy and physiology resulting from the following:
    a. Abdominal operations
    b. Mediastinoscopy
    c. Thoracotomies
    d. Sternotomies
    e. Thoracoscopy
    f. Thoracoplasties
    g. Spine operations
h. Neck operations
i. General anesthesia
j. Epidural anesthesia

14. Illustrate the various types of incisions used in thoracic surgery for:
   a. Apical resections
   b. Pneumonectomy
   c. Esophagectomy
   d. Mediastinal procedures
   e. Tracheal/bronchial procedures
   f. Esophageal stenosis and diverticula
   g. Thoracoplasty
   h. Diaphragmatic operations

**Senior Level:**

1. Discuss the general diagnostic and operative approaches to treating blunt and penetrating trauma to the thorax and its contents.
2. Describe specific surgical management of trauma to the thorax and its contents:
   a. Neck
   b. Esophagus
   c. Nerves
   d. Mediastinum
   e. Bony thorax
   f. Diaphragm
   g. Vessels
   h. Trachea/lungs
   i. Heart

3. Integrate the pathophysiology and surgical management of the following:
   a. Aortic aneurysms
   b. Aortic dissections
   c. Trauma to heart and great vessels
   d. Occlusive disease

4. Evaluate infiltrates, infectious processes, and neoplastic processes in the thorax, and recommend appropriate management.
5. Discuss and list thoracic tumor types, staging for each, including descriptions of nodal drainage sites and levels.
6. Summarize the causes and appropriate management of cardiac arrhythmias, including:
   a. Pharmacotherapeutics
   b. Cardioversion
   c. Pacemakers
   d. Defibrillators

7. Describe the diagnosis and discuss therapy of such surgical complications as:
   a. Fistulas: bronchopleural, pleurocutaneous, tracheoesophageal (TE), arteriovenous (AV) and thoracic duct
   b. Esophageal leak/stenosis/obstruction
   c. Loculated hemothorax
   d. Postoperative bleeding
   e. Empyema
   f. Air leaks
   g. Bronchial obstructions
   h. Endstage COPD/pulmonary fibrosis

8. Identify indications for and be prepared to interpret results of the following diagnostic modalities:
   a. Plain and positional chest x-rays
   b. Gastrointestinal contrast studies
c. CAT, MRI, and PET scans
d. Bronchograms
e. Pulmonary function studies
f. Ventilation-perfusion studies
g. Nuclear medicine studies
h. Ultrasound
i. Split pulmonary functions

9. Specify and justify the diagnostic or therapeutic indications for the use of the following modalities:
   a. Rigid and flexible bronchoscopy
   b. Esophagoscopy (rigid and flexible)
c. Mediastinoscopy (cervical and parasternal)
d. Thoracoscopy/VATS
e. Laser
f. Stents
g. Lung transplant

10. Assess and recommend the surgical procedures involved in:
    a. Tracheal, bronchial, and esophageal obstructing lesions
    b. Thoracoplasty
c. Esophageal resection/reconstruction
d. Anti-reflux procedures
e. Sleeve resection of the trachea/bronchus for tumor
    f. Chest wall reconstruction using myocutaneous flaps and/or synthetic materials

11. Select and specify diagnostic and therapeutic maneuvers to manage problem areas following thoracic surgery:
    a. Cardiovascular and pulmonary medical complications
    b. Renal failure
c. Liver failure
d. Diabetes mellitus
e. Malnutrition
    f. Metabolic dysfunction
g. Immune system suppression

12. Discuss quality assurance, cost-cutting measures, and patient-care pathways as they relate to thoracic surgery.

Competency-Based Performance Objectives:

Junior Level:

1. Evaluate thoracic pathophysiology; order and interpret appropriate tests.
2. Diagnose and provide initial management of fractures of ribs, clavicle, sternum, scapulae, and spine.
3. Evaluate patients for thoracic surgery with regard to risk factors, candidacy for surgical resection, pulmonary function studies, and possible postoperative disability.
4. Manage general thoracic perioperative procedures.
5. Use, set, and regulate mechanical ventilators.
6. Observe and then:
   a. Insert chest tubes
   b. Perform thoracentesis
c. Insert central venous access lines
d. Execute simple endoscopic procedures
e. Perform tracheostomies
   f. Institute naso- oropharyngeal/tracheal anesthesia for endoscopic procedures
7. Use data obtained from diagnostic and therapeutic procedures to assess and plan treatment for thoracic pathology.
8. Perform bronchoscopy, esophagoscopy, nasotracheal, and orotracheal intubation, including double lumen tubes.
9. Manage empyemas surgically.
10. Insert Swan-Ganz catheter and perform cardiovascular monitoring calculations for:
   a. Pressures
   b. Cardiac output
   c. Systemic vascular resistance
11. Supervise ventilator regulation.

**Senior Level:**

1. Perform and/or supervise all thoracic diagnostic and therapeutic endoscopic procedures.
2. Resect ribs, treat empyema cavities, perform pleural and lung biopsies.
3. Manage thoracic trauma.
4. Manage thoracic aortic aneurysms and dissections.
5. Direct complex ventilator-dependent patient management.
6. Perform lung resections, rib resections, mediastinoscopies, and mediastinotomies.
7. Provide surgical management of neoplasms of the thorax and its contents.
8. Provide medical and surgical management of infectious processes in the thorax.
9. Manage cardiac arrhythmias.
10. Perform and/or supervise pacemaker/defibrillator selection and placement.
11. Manage all pharmacotherapeutics associated with thoracic surgery.
12. Treat medical conditions associated with thoracic surgical procedures.
13. Place esophageal and bronchial stents.

**Cardiac and Great Vessels Surgery**

**Unit Objectives:**

- Demonstrate knowledge of the anatomy, physiology, and pathophysiologic conditions of the heart and great vessels which are amenable to surgical correction.
- Demonstrate the ability to clinically manage patients with pathologic conditions of the heart and great vessels.

**Competency-Based Knowledge Objectives:**

**Junior Level:**

1. Describe and demonstrate a working knowledge of the heart and great vessels, including:
   a. Cardiac chambers (atria and ventricles)
   b. Cardiac valves (mitral, aortic, tricuspid, pulmonic)
   c. Coronary arteries
   d. Intrinsic neural conduction system
   e. Extrinsic neural innervation (sympathetic and parasympathetic)
   f. Great vessels (cavae, aorta, innominate artery, carotid arteries, and subclavian arteries)
2. Describe and demonstrate working knowledge of cardiac physiology, including:
   a. Electrophysiology (action potential, depolarization, repolarization, mechanisms of rhythm control)
   b. Determinants of cardiac output (heart rate and stroke volume)
   c. Interactions and control mechanisms (preload, afterload, contractility, Frank-
3. Identify the control mechanisms and normal physiology of peripheral vessels. Relate each of these to a clinical example:
   a. Arterial autoregulation
   b. Venous flow regulation
   c. Interrelationship of cardiac output, peripheral blood flow, and autoregulation

4. Discuss the information obtained from the history and physical examination pertinent to cardiac and peripheral vascular pathophysiology. Determine the interactions of those details and their implications on planned surgical procedures and outcomes. Consider the following for risk assessment and perioperative management:
   a. Patient age
   b. Risk factors for cardiovascular disease (family history, smoking, hypertension, diabetes mellitus, hyperlipidemia, and obesity)
   c. Symptoms/signs associated with coronary artery disease, ventricular dysfunction, and valvular dysfunction
   d. Pulmonary dysfunction (pulmonary hypertension, chronic obstructive pulmonary disease [COPD], previous pulmonary resection)
   e. Neurologic abnormalities
   f. Renal dysfunction
   g. Hematologic abnormalities
   h. Hepatic dysfunction
   i. Cerebrovascular, peripheral vascular, or aneurysmal disease
   j. Gastrointestinal considerations
   k. Metabolic, nutritional, genetic, immune, and oncologic abnormalities
   l. Psychiatric conditions, psychological and social interactions
   m. Re-operative chest surgery
   n. Miscellaneous considerations (prior operations including vascular or valvular prostheses, substance abuse, dental status, interactions of medications)

5. Discuss the use and interpretation of cardiovascular diagnostic tests in identification of cardiovascular pathology, including:
   a. Electrocardiography
   b. Echocardiography (transthoracic and transesophageal)
   c. Traditional roentgenography
   d. Cardiac catheterization and arteriography
   e. Peripheral vascular arteriography
   f. Vascular ultrasonography
   g. Computer and magnetic resonance imaging
   h. Radionuclide scintigraphy (multi-gated acquisition [MUGA], stress, and Persantine thallium)

6. Demonstrate the use and principles associated with various cardiac monitoring methods, including:
   a. Intra-arterial and central venous pressure transducers
   b. Pulmonary artery catheters
   c. Left atrial catheters
   d. Temporary percutaneous and intracardiac pacing wires

7. Discuss techniques, mechanisms of action, and potential complications for mechanical and pharmacologic support of the circulation, including:
   a. Inotropic agents (dopamine, dobutamine, epinephrine, norepinephrine, amrinone, isoproterenol)
   b. Pre-/after-load agents (Nipride, nitroglycerine, Neo-synephrine)
   c. Intra-aortic balloon pump
   d. Ventricular assist devices
   e. Cardiac pacing

8. Describe and assess the operative indications, risk, and expected outcomes associated
with several cardiac surgical procedures, including:
   a. Coronary artery bypass and minimally invasive direct coronary artery bypass surgery
   b. Valvular replacement/repair (aortic, mitral, tricuspid)
   c. Operations of the ascending aorta, aortic arch and descending thoracic aorta
   d. Permanent pacemaker/automatic defibrillator insertion
   e. Pericardial drainage procedure

9. Discuss the complications of cardiac surgery and methods used to reduce their incidence. Complications: death, myocardial infarction, stroke, bleeding, arrhythmias, low cardiac output syndrome, cardiac tamponade, pneumothorax, sternal and extremity wound infections, respiratory and renal failure

10. Review the management of postoperative cardiac surgery patients in the intensive care unit.

**Senior Level:**

1. Discuss the pathophysiology of congenital cardiac disease, including:
   a. Coarctation of the aorta
   b. Patent ductus arteriosus
   c. Atrial septal defects
   d. Ventricular septal defects
   e. Complex cyanotic cardiac disease
      i. Transportation of great vessels
      ii. Tetralogy of Fallot
      iii. Pulmonary atresia
      iv. Total anomalous venous return

2. Discuss the pathophysiology of acquired cardiac disease including:
   a. Myocardial ischemia
   b. Valvular heart disease (stenotic and regurgitant)
   c. Endocarditis
   d. Ventricular aneurysms
   e. Thoracic aneurysms
   f. Trauma to the heart and great vessels

3. Summarize the management of the following post-cardiac surgery variances, including the monitoring, prevention, and the therapeutic intervention of:
   a. Arrhythmias (ventricular and atrial)
   b. Bleeding (correction of coagulopathy, indications for re-exploration)
   c. Infection (methods of prophylaxis, empiric and culture-specific therapy)
   d. Low cardiac output and hypotension
   e. Postoperative hypertension

4. Demonstrate working knowledge and use of the following postoperative support systems:
   a. Cardiac drugs (inotropic, chronotropic, afterload-reducing, anti-platelet, beta-blockade, ACE inhibition, diuretics)
   b. Mediastinal and pleural drainage
   c. Mechanical ventilation, airway management systems
   d. Temporary and permanent pacemakers
   e. Intra-aortic balloon pumps and other ventricular assist devices
   f. Dialysis and ultrafiltration
   g. Cardiopulmonary bypass and extracorporeal membrane oxygenation

5. Summarize the diagnostic evaluation and indications for each of the following surgical procedures:
   a. Coronary artery bypass grafting
   b. Adult valvular repair and replacement procedures (mechanical vs. bioprosthetic)
   c. Resection of ventricular aneurysms
   d. Resection and grafting of thoracic aneurysms
e. Combination operations of valve replacement and coronary artery bypass grafting
f. Surgical treatment of idiopathic hypertrophic subaortic stenosis

6. Discuss the evaluation and therapeutic options available for surgical management of cardiac trauma such as:
   a. Traumatic transection of the aorta and other great vessels
   b. Blunt and penetrating cardiac and great vessel injury

7. Outline the post-hospitalization follow-up and management of cardiac surgery patients to include:
   a. Instructions to the patient
   b. Follow-up clinic visit (including physical examination, electrocardiogram [ECG], Chest x-ray)
   c. Long-term follow-up for coronary and valve patients (including anticoagulation adjustment where indicated)

**Competency-Based Performance Objectives:**

**Junior Level:**

1. Perform preoperative evaluation, history, and physical examination of cardiac surgery patients.
2. Obtain and interpret indicated diagnostic studies.
3. Discuss diagnostic and therapeutic approaches to specific acquired and congenital cardiac diseases with the attending physicians.
4. Assist with selected cardiac and general surgery cases, such as:
   a. Pacemaker and defibrillator insertions
   b. Saphenous vein harvest and wound closure for coronary bypass operations
   c. Valve and coronary operations
   d. Pericardial drainage operations
   e. Tracheostomy
   f. Minor vascular repairs
5. Provide postoperative cardiac surgery follow-up care for the following cases:
   a. Coronary surgery
   b. Valve surgery
   c. Thoracic aortic surgery
   d. Pacemaker and defibrillator placement
6. Perform percutaneous insertion of chest tubes and intravenous, intra-arterial, and pulmonary artery catheters with supervision.

**Senior Level:**

1. Serve as first assistant on selected major cardiothoracic cases, including:
   a. Coronary artery bypass surgery, minimally invasive direct coronary artery bypass
   b. Valvular replacements and repairs, including minimally invasive procedures
   c. Thoracic aortic surgery
   d. Congenital cardiac surgery
   e. Complex defibrillators
   f. Emergency thoracotomies
2. Perform cardiac procedures, under supervision, including the following:
   a. Insert intra-aortic balloon pump
   b. Pacemaker implantation
   c. Median sternotomy incision
   d. Aortic cannulation for cardiopulmonary bypass
   e. Saphenous vein and internal thoracic artery harvest
   f. Perform proximal coronary anastomoses
3. Coordinate the work-up of emergency cardiac surgery cases with:
   a. Emergency room or trauma team
   b. Cardiac catheterization laboratory
   c. Diagnostic imaging services
   d. Laboratory (including blood bank)
   e. Anesthesia
   f. Operating room
   g. Perfusion services
4. Assist with emergency cardiac surgery, including trauma cases.
5. Recognize and prescribe treatment for complications of cardiac surgery such as:
   a. Gastrointestinal bleeding
   b. Cerebrovascular accident
   c. Endocrine abnormalities
   d. Pulmonary complications
   e. Renal dysfunction
   f. Coagulopathy
   g. Dysrhythmias
   h. Low cardiac output status

**Cardiothoracic Surgery in Elderly Patients**

**Competency-Based Knowledge Objectives:**

1. Discuss the epidemiological impact of cardiovascular disease in the elderly.
2. Identify the cardiovascular risk factors associated with surgical morbidity and mortality.
3. Discuss the cardiac surgical procedures performed most often in the elderly.
4. Discuss the indications for valvular heart surgery in the elderly.
5. Discuss the pathophysiologic changes in the cardiovascular system that accompany aging.
6. Discuss the case management of elderly patients with coronary artery disease with respect to surgical risk.

**Diagnostic and Therapeutic Radiology**

**Unit Objectives:**

- Demonstrate the appropriate, efficient, and economic use of radiologic resources for the clinical management of surgical procedures.
- Demonstrate basic knowledge regarding the indications, contraindications, and possible adverse effects of diagnostic radiologic techniques.
- Demonstrate knowledge and application of the use of radioisotopes and ionizing radiation in the management of vascular and non-vascular disease.
- Utilize radiologic consultation to enhance the diagnostic evaluation and therapeutic options of complex surgical patients.

**Competency-Based Knowledge Objectives:**

**Section One: Background**
1. Discuss the four basic densities and their radiologic/pathologic correlations.
2. Demonstrate an understanding of the fundamental physics and potential hazards of the following imaging techniques:
   a. X-irradiation, including plain radiographic films, mammography, fluoroscopy, angiography, and computed axial tomography (CAT)
   b. Ultrasound
   c. Nuclear medicine
   d. Magnetic resonance imaging (MRI)
   e. Positron emission tomography (PET)
3. Discuss the specific patient preparations for the aforementioned radiological studies, including oral intake restrictions and bowel preparative regimens.

Section Two: Diagnostic Studies

1. Discuss the following typical plain radiographs utilized to evaluate blunt and penetrating trauma, and identify cardinal features of commonly injured organs:
   a. Spine radiographs
   b. Chest radiographs
   c. Kidney-ureter-bladder radiographs
   d. Pelvis radiographs
2. Develop a strong foundation in the interpretation of chest radiographs, particularly involving a consistent, systematic, and reproducible approach to their interpretation.
3. Recognize radiologic findings that may be associated with age-related normal variations and degenerative processes.
4. Identify practical adjustments that may be necessary for the radiographic examination of the geriatric patient, considering:
   a. Physical and/or behavioral patient conditions that may limit or modify the procedure
   b. Stressful rigors of some radiographic examinations
   c. Influence of patient anxiety
   d. Patient positioning issues which may lead to suboptimal imaging, such as immobilization devices
5. Summarize the components of an acute abdominal series in the evaluation of a potentially acute surgical abdomen. Be prepared to identify typical radiographic abnormalities and their implications, including pneumoperitoneum and calcification.
6. Select the appropriate preoperative studies utilized to diagnose surgical pathology occurring in the following organ systems:
   a. Central nervous system
   b. Thorax
   c. Cardiovascular system
   d. Peripheral vascular system
   e. Gastrointestinal system
   f. Genitourinary system
   g. Retroperitoneum
   h. Musculoskeletal system
   i. Vascular
   j. Breast
7. Recognize the potential applications and limitations of the following common imaging modalities utilized to diagnose surgical lesions:
   a. Computed axial tomography
   b. Ultrasound
   c. Magnetic resonance imaging
   d. Nuclear Medicine
8. Given a specific clinical condition, identify the most efficacious imaging stratagem to confirm or dismiss the working diagnosis.
9. Formulate a therapeutic plan based on variable imaging outcomes, being cognizant of:
   a. Atypical manifestation of common disease
   b. Realistic limitations of the radiologic study
   c. Discrepancies in clinical and radiographic findings
10. Analyze the applications and limitations of commonly utilized radioisotopic studies, including:
    a. Bleeding scans
    b. Thyroid and parathyroid imaging
    c. Ventilation/perfusion scans
11. Utilize the radiologist as a consultant to:
    a. Review studies
    b. Recommend the most appropriate or additional studies
    c. Provide diagnostic intervention
    d. Provide therapeutic intervention

Section Three: Therapeutic Radiology

1. Discuss the use of radioisotopes in the treatment of appropriate conditions, including:
   a. Endocrine disorders
   b. Oncologic disorders
2. Assess the potential utility, limitations, and complications of interventional radiological procedures in various clinical settings.
3. Discuss the technical approaches and limitations of fine-needle and needle-core biopsies of masses performed using radiologic guidance.
4. Summarize the indications, limitations, and risks of interventional procedures for peripheral vascular disease, including angioplasty, stents, and thrombolytic therapy.

Competency-Based Performance Objectives:

Junior Level:

1. Demonstrate a practical knowledge of basic radiographic interpretation
2. Identify appropriate imaging modalities given various clinical situations.
3. Recognize and communicate potential patient-specific conditions, including allergic, which may impact on the safety and efficacy of radiographic evaluation.
4. Obtain appropriate preparatory studies for selected radiographic procedures.

Senior Level:

1. Supervise and/or request pertinent radiographic investigations in diagnostic evaluation.
2. Teach junior-level residents radiologic principles and pitfalls.
3. Identify the utility of adjunct imaging modalities to better define surgical conditions.
4. Recognize interventional radiological procedures that may provide definitive or complementary treatment of surgical conditions.
5. Initiate radiologic consultation on complex cases to avoid potential delay in diagnosis.

Pharmacotherapeutics

Unit Objectives:

- Demonstrate an understanding of general pharmacologic principles and knowledge of specific pharmacotherapeutic classes of drugs.
- Apply this knowledge to effectively prescribe and monitor medications in the surgical
Patient.

**Competency-Based Knowledge Objectives:**

**Junior Level:**

1. Describe general pharmacokinetic principles, including:
   a. Absorption
   b. Distribution
   c. Metabolism
   d. Elimination

2. Describe how aging affects the following pharmacokinetic parameters:
   a. Absorption
   b. Distribution
   c. Metabolism
   d. Elimination

3. Define pharmacodynamics, and explain its place in therapeutics.

4. Identify clinically significant drug interactions, including:
   a. Drug-drug interactions
   b. Drug-nutrient interactions

5. Identify which medications are pharmacodynamically altered in elderly people.

6. Identify adverse reactions to medications from clinical and laboratory observations.

7. Describe the various pharmacological effects of giving medications via different routes of administration, including:
   a. Oral
   b. Parenteral
   c. Topical
   d. Intrathecal
   e. Rectal
   f. Inhalation
   g. Sublingual

8. Discuss the association between increasing age and the occurrence of adverse medication reactions.

9. Identify five medication classes which are common causes of adverse medication reactions in elderly people.

10. Describe the essential components of an inpatient drug order and an outpatient prescription, including:
    a. Date/time
    b. Drug name
    c. Strength
    d. Schedule
    e. Route of administration
    f. Refills or duration of therapy

11. List three reasons for reduced medication compliance in elderly people.

12. Identify the following medications for which an antidote exists, and describe how the antidote should be administered:
    a. Narcotic analgesics
    b. Benzodiazepines
    c. Heparin
    d. Digoxin
    e. Warfarin

13. Relate the key components of a drug and allergy patient history.

14. Explain the pharmacologic profile and clinical use of the following core groups of medications:
    a. Analgesics and anesthetics
b. Antibiotics  
c. Cancer chemotherapeutic agents  
d. Cardiovascular drugs  
e. Modulators of the immune response  
f. Hormones  
g. Modulators of coagulation  
h. Modulators of wound healing  
i. Neuropsychiatric medications  
j. Gastrointestinal drugs  
k. Anti-inflammatory medications  
l. Respiratory agents  
m. Skeletal muscle relaxants  
n. Blood derivatives  

15. Analyze the methods for effective medication monitoring.  
16. Become familiar with and utilize a variety of terms with older patients that may be used synonymously with pain, such as:  
   a. Burning  
   b. Discomfort  
   c. Aching  
   d. Soreness  
   e. Heaviness  
   f. Tightness  

17. Discuss the potential side effects associated with the medication groups listed in #14 above, and identify treatment choices for these complications.  
18. Identify indications for use of the following classes of medications in emergency or critical care:  
   a. Inotropes  
   b. Pressors  
   c. Diuretics  
   d. Antiarrhythmics  
   e. Antihypertensives  
   f. Volume expanders  
   g. Neuromuscular blocking agents  
   h. Analgesics  

19. Explain the principles of perioperative drug use, including antimicrobial agents.  
20. Summarize the management of pain through the use of appropriate pharmacologic analgesia.  
21. Summarize the prophylactic and therapeutic use of anticoagulants in the surgical patient.  

Senior Level:  

1. Formulate pharmacotherapeutic-dosing strategies in patients with altered pharmacokinetics such as:  
   a. Hepatic dysfunction  
   b. Kidney dysfunction  
   c. Cardiovascular dysfunction  
   d. Ascites  
   e. Short bowel  
   f. Advanced age  

2. Utilize serum concentration monitoring to modify dosage regimens of medications with narrow therapeutic indices such as:  
   a. Aminoglycosides  
   b. Theophylline  
   c. Vancomycin  
   d. Phenytoin
3. Design, evaluate, and modify pharmacotherapeutic strategies to treat patients in complex clinical situations, including:
   a. Multiple diseases
   b. Multiple medications
   c. Intensive care setting
   d. Polypharmacy in the elderly

Competency-Based Performance Objectives:

Junior Level:

1. Take and record an appropriate drug and allergy history.
2. Write appropriate inpatient medication orders and outpatient prescriptions, under supervision.
4. Monitor the pharmacotherapeutic effects of medications.
5. Prescribe medications for patients without altered pharmacokinetic parameters.
6. Prescribe medications such as inotropes, pressors, diuretics, antiarrhythmics, and antihypertensives in emergency and critical care situations.
7. Prescribe medications pre- and post-operatively to prevent surgical complications, including infection, thromboembolic events, and stress related occurrences.
8. Prescribe and monitor appropriate analgesic therapy based on an assessment of a patient's pain.
9. Prescribe appropriate antimicrobial therapy for given surgical infections, and monitor the effectiveness of such therapy.
10. Appropriately prescribe and monitor the effects of anticoagulant therapy in surgical patients with thromboembolic disease.
11. Apply microbiology and antimicrobial knowledge in selecting appropriate therapeutic or empiric antibiotic coverage for a suspected infection.

Senior Level:

1. Manage patients in complex clinical pharmacotherapeutic situations.
2. Monitor and adjust the dose of medications (described as groupings in #14 of the first section) for patients with altered pharmacokinetics.
3. Monitor and alter the dose of selected medications based on serum concentrations.
4. Appropriately prescribe the following medications in the geriatric patient:
   a. Antihypertensives
   b. Digoxin
   c. Benzodiazepines
   d. Anticoagulants
   e. Analgesics
   f. Antimicrobials
5. Monitor and alter the dose of medications listed above in the elderly patient.

Anesthesiology

Unit Objectives:

- Demonstrate an understanding of the pathophysiology of pain and its management.
- Demonstrate an understanding of the pharmacology and principles of regional and
general anesthesia in analgesia.
- Demonstrate the ability to use these principles in the management of surgical patients.
- Recognize the condition of malignant hyperthermia and its treatment.

Competency-Based Knowledge Objectives:

1. Discuss the rationale governing the use of local, regional, and general anesthesia, including the following concepts:
   a. Careful cardiovascular, respiratory, and neurologic monitoring is the mainstay of safe anesthesia
   b. No specific anesthetic is inherently safer than any other; and as such, risk assessment must be considered in each case
   c. Regional anesthesia may provide some advantages, including:
      i. Decreased blood loss
      ii. Improved perioperative graft patency in vascular reconstruction
      iii. Reduced incidence of venous thrombosis
   d. Combined regional and general techniques may improve outcomes in selected patient populations:
      i. Significant cardiovascular disease and major abdominal or thoracic surgery
      ii. Severe pulmonary disease and major abdominal or thoracic surgery
   e. Preemptive analgesia, such as the use of epidural anesthesia, enhances perioperative comfort

2. Summarize the essential elements of the pre-anesthesia assessment, including:
   a. Targeted history and physical examination (review of systems, emphasizing cardiovascular and pulmonary disease)
      i. Effects of chronic medications (anticoagulants, insulin, and antiarrhythmics)
      ii. Effects of preoperative medications (narcotics, anxiolytics, and atropine)
      iii. Effects of postoperative medications (including antihypertensives and antiemetics)
   b. Anatomic and physiologic variables germane to anesthetic success:
      i. Airway anatomy, including the Mallampati classification.
         1. Class 1: Visualization of all oro- and hypo-pharyngeal structures
         2. Class 2: Anterior and posterior tonsillar pillars are obscured by tongue
         3. Class 3: Soft palate and base of uvula are visible
         4. Class 4: Only the soft palate is visualized
         5. Increasing Mallampati score is associated with the reduced likelihood of successful direct laryngoscopic intubation.
      ii. Skeletal deformities
      iii. Neuromuscular diseases
      iv. Aspiration risk (pregnancy, scleroderma, hiatal hernia)
   c. Assigned Anesthesia Society of America class and physical status:
      i. Class 1: No organic disease
      ii. Class 2: Mild to moderate systemic disease
      iii. Class 3: Severe systemic disorders
      iv. Class 4: Severe systemic disturbance; life threatening
      v. Class 5: Patient is moribund with little chance of survival
      vi. Class E: Patient requires an emergency procedure

3. Outline the major characteristics of the pharmacokinetics and pharmacodynamics of anesthetic agents (local, volatile, opioid), considering:
   a. Lipid solubility
   b. Protein binding
   c. Partition coefficients
4. Summarize the use and monitoring of drugs for sedation and analgesia to include:
   a. Minimum anesthetic monitoring (pulse oximetry, electrocardiogram, blood pressure)
   b. Advantages of scheduled postoperative analgesia versus intermittent dosing
   c. Indications for patient-controlled anesthesia (PCA)
   d. Importance of periodic assessment to determine:
      i. Level of consciousness
      ii. Pulmonary status in sedated patients

5. Summarize the principles of administration for and compare the effectiveness of the following methods of anesthesia:
   a. General
   b. Spinal
   c. Regional
   d. Local

6. Describe the potential benefits of regional and local anesthesia, including:
   a. Decreased respiratory depression
   b. Diminished systemic effects (liver and renal toxicity)
   c. Decreased direct cardiac depression

7. Outline the potential complications associated with the use of regional anesthesia, including:
   a. Spinal anesthetics (headache, cerebrospinal fluid leak, meningitis)
   b. Regional nerve blocks (perineural hematomas)

8. Discuss the indications for the use of muscle relaxants.

9. Analyze anesthetic monitoring techniques, to include:
   a. Swan-Ganz catheters
   b. Arterial lines
   c. Transvenous pacemakers
   d. End-tidal carbon dioxide monitoring
   e. Temperature monitoring
   f. Transesophageal echocardiography

10. Describe the techniques and potential complications of managing an airway, including endotracheal and nasotracheal intubation.

11. Describe and explain the most common immediate postoperative anesthetic issues:
    a. Airway stability
    b. Ventilation and oxygenation
    c. Pain control
    d. Nausea and vomiting
    e. Temperature regulation
    f. Hemodynamic stability

12. Analyze therapeutic options for patients with chronic pain.

13. Recognize the condition of malignant hypothermia and its management:
    a. Incidence in general population (1:10,000)
    b. Autosomal inheritance with variable penetrance
    c. Pathophysiology of defective sarcoplasmic reticulum and secondary diminished reuptake of myoplasmic calcium leading to increased aerobic metabolism of skeletal muscle
    d. Inducing medications, including inhaled anesthetics and succinylcholine
    e. Hallmarks of hypermetabolism, skeletal muscle rigidity, and increased temperature
    f. Therapy includes the discontinuance of anesthetic agents, dantrolene administration, and fluid resuscitation with proper physiologic monitoring.

**Competency-Based Performance Objectives:**

**Junior Level:**
1. Manage the airway in adults and children, employing appropriate:
   a. Physical maneuvers
   b. Oral/nasal support devices
   c. Suctioning techniques to maintain clear airway
2. Perform nasal and oral intubation.
3. Recognize the stages of general anesthesia and their implications, particularly in regard to airway management.
4. Recognize and treat the signs and symptoms of complications due to anesthetic agents such as:
   a. Cardiovascular collapse
   b. Acute metabolic disturbances
   c. Malignant hyperthermia
5. Perform preoperative assessment of patients.
6. Recognize risks and possible side effects of drugs used for pain control.

Senior Level:

1. Monitor patients under anesthesia, including the use of peripheral and pulmonary artery catheters.
2. Administer pre- and post- anesthesia care.
3. Apply appropriate monitoring devices.
4. Establish vascular access in a child and in an adult.
5. Manage the difficult airway, including the performance of both rigid and fiberoptic bronchoscopy.
6. Establish an emergent airway, utilizing percutaneous or surgical techniques.

Anesthesia for the Elderly Patient

- Demonstrate an understanding of the physiological alterations of the aging process and the potential impact on anesthetic administration.
- Recognize and manage postoperative altered mental status in the elderly.

Competency-Based Knowledge Objectives:

1. Summarize how the physiology of aging interacts with the effects of anesthesia, with particular attention to:
   a. How high sympathetic tone, loss of beta-receptor responsiveness, and volume sensitivity to both hypovolemia and hypervolemia make blood pressure inherently unstable.
   b. How increased chest wall stiffness, increased lung compliance, and increased brain sensitivity to sedative/analgesics increase the likelihood of hypoxia, atelectasis, and pneumonia.
2. Summarize the pharmacokinetic and pharmacodynamic principles underlying the effective use of anesthetic agents, particularly how aging often leads to increased sensitivity and prolonged duration of drug effects.
3. Understand how the anesthesiologist approaches patient evaluation and the optimization of patient condition in preparation for surgery.
4. Recognize those issues important to an elderly patient when faced with the decision to have surgery, and be able to determine when mental impairment does or does not preclude the patient from providing informed consent.
5. Understand how the elderly patients are predisposed to hypothermia and how hypothermia adversely affects the risk of infection and cardiac morbidity.
6. Be familiar with the causes, diagnosis, and management of postoperative delirium.
7. Explain the principles and techniques of preemptive analgesia, including non-steroidal analgesics and peripheral nerve and field blocks.

8. Analyze and compare the hemodynamic effects, benefits, risks, and contraindications for the following advanced techniques of postoperative pain control:
   a. Epidural infusions of local anesthetics and/or opioids.
   b. Continuous nerve blocks
   c. Intrapleural and extrapleural catheters

Competency-Based Performance Objectives:

Junior and Senior Levels:

1. Assess the risk surrounding the stress of the proposed surgery relative to the benefit of the surgery, with the perspective of the physiological reserve of the patient, and be able to adjust the scope of the proposed surgery accordingly.

2. Appropriately select medications and adjust dosages for the elderly patient.

3. Recognize postoperative delirium and be able to diagnose and treat reversible causes.

4. Perform common field and nerve blocks for postoperative analgesia.

5. Establish effective dialogue with anesthesia and internal medicine colleagues for the comprehensive care of complicated patients.

6. Internal Medicine

Unit Objectives:

- Describe approaches to maximize communication when medical consultations are requested on surgical patients.
- Summarize the principles of effective surgical consultation on medical patients.
- Describe methods for preoperative assessment of perioperative cardiac risk in noncardiac surgery.
- Describe the methods for preoperative assessment of pulmonary risk factors.
- Discuss the perioperative management of common medical disorders.
- Explain the risks of surgery in geriatric patients with respect to age and age-related changes in cardiovascular and pulmonary physiology, response to pharmacologic therapy, and response to surgical stress.

Competency-Based Knowledge Objectives:

1. Discuss principles for effective communication when requesting a medical consultation, to include:
   a. Indications for requesting a pre- or post-operative medical evaluation on a surgical patient
   b. Clear articulation of reason(s) for requesting consultation
   c. Direct communication with the consultant whenever possible
   d. Medical records that provide meaningful clinical information from the history, physical examination, and laboratory
   e. Clarification of the role you wish the consultant to assume.

2. Describe effective communication with the patient’s primary care provider when the patient is diagnosed with a surgical problem, to include:
   a. Maintaining a collaborative approach to management
   b. Enlisting the primary care provider in preoperative and postoperative care
   c. Obtaining medical and psychosocial information about the patient, including other illnesses, social stressors and supports, patient preferences regarding end-of-life
3. Discuss key components of a general surgical consultation performed on a medical patient with emphasis on:
   a. Clarifying reasons for the consultation request and urgency
   b. Assessing need for further laboratory or radiologic studies
   c. Direct communication to responsible caregivers
   d. Need for timely follow-up when definitive action is delayed
   e. Importance of prompt communication with the primary care provider after performing a surgical procedure

4. Explain preoperative assessment of cardiovascular risk in noncardiac surgery:
   a. Review rationale for preoperative risk stratification and commonly used clinical risk assessment scales (Goldman criteria, Detsky criteria)
   b. Clinical risk factors for perioperative cardiovascular events
   c. Indications for preoperative stress ECG, exercise or pharmacologic stress test with nuclear perfusion imaging, stress echocardiography, ambulatory ECG monitoring, or coronary angiography
   d. Methods to reduce risk of perioperative cardiovascular events such as beta-blockers in elderly patients
   e. Common presentations of perioperative cardiovascular events such as angina, myocardial infarction (MI), arrhythmias, and congestive heart failure (CHF)

5. Explain preoperative assessment of pulmonary risk factors for perioperative morbidity and mortality:
   a. History of cigarette smoking, exercise capacity, COPD, asthma
   b. Clinical evaluation using physical examination and observation of the patient walking
   c. Indications for preoperative pulmonary function tests and their interpretation
   d. Predictors of difficulty weaning after general anesthesia
   e. Pre- and post-operative measures that can reduce risk of pulmonary complications
   f. Perioperative management of bronchospasm

6. Discuss measures to reduce risk for perioperative deep venous thrombosis and pulmonary emboli:
   a. Stratification of risk for perioperative venous thrombosis based on patient characteristics and type of surgery (high, medium, low)
   b. Choice of deep venous thrombosis (DVT) prophylaxis based on risk stratification
   c. Indications for coumadin, subcutaneous low dose heparin, subcutaneous low molecular weight heparin, pneumatic compression devices, early mobilization
   d. Clinical and laboratory methods for diagnosing DVT and pulmonary embolus (PE) based on pretest likelihood

7. Describe assessment and management of hypertension in the perioperative period:
   a. Definitions of hypertensive urgency, emergency, and malignant hypertension.
   b. Impact of hypertension on operative risk, including assessment of end-organ damage
   c. Perioperative management of hypertension, including pharmacologic management in patients who have restricted oral intake
   d. Management of hypertension in geriatric patients
   e. Indications for seeking medical consultation in the hypertensive patient

8. Describe the perioperative assessment and management of the diabetic patient:
   a. Determination of glycemic control by glycosylated hemoglobin level
   b. Assessment for ketoacidosis and/or hyperosmolar state
   c. Appreciate presentation of diabetes in the elderly
   d. Describe methods for intraoperative and perioperative management in Type I and II diabetes
   e. Describe formulas for determining insulin dosage during and after surgery in insulin-requiring patients
   f. Discuss indications for sliding scale insulin treatment
g. Appreciate common side effects of oral hypoglycemic agents
h. Describe emergent management of hypoglycemia
i. Discuss indications for medical consultation in the diabetic patient

9. Discuss the perioperative assessment and management of other common endocrinologic problems, including:
   a. Hypothyroidism and hyperthyroidism
   b. Hypoparathyroidism and hyperparathyroidism

10. Describe assessment and management of common electrolyte disturbances:
    a. Hypo- and hyper- natremia
    b. Hypo- and hyper- kalemia
    c. Divalent homeostasis

11. Discuss approach to the patient with jaundice:
    a. Interpretation of liver function tests and imaging studies to distinguish hepatocellular disease from biliary obstruction (intrahepatic and extrahepatic)
    b. Causes of postoperative jaundice
    c. Presentation of viral hepatitis (acute and chronic)
    d. Impact of liver disease on drug metabolism

12. Discuss approach to the surgical patient with renal failure:
    a. Describe clinical and laboratory assessment of renal function
    b. Distinguish acute renal failure from chronic renal failure
    c. Segregate causes of acute renal failure into prerenal, intrarenal, and postrenal (obstructive)
    d. Describe clinical signs and symptoms of uremia
    e. Discuss differential diagnosis of postoperative acute renal failure
    f. List indications for acute hemodialysis and hemofiltration
    g. Describe medical management of acute renal failure
    h. Appreciate impact of renal failure on drug excretion
    i. List medications that can cause acute renal failure

13. Describe indications for subacute bacterial endocarditis (SBE) prophylaxis based on type of valvular problem and type of procedure.


15. Describe how to assess and manage postoperative fever.


17. Recognize unique features of the geriatric surgical patient:
    a. Impact of age on operative morbidity and mortality
    b. Age-related changes in cardiovascular and pulmonary physiology
    c. Pharmacologic alterations with aging and polypharmacy
    d. Risk factors for postoperative delirium and its management
    e. Cardiovascular risk assessment and use of beta-blockers to reduce risk of perioperative ischemic events
    f. Skin care
    g. Nutritional assessment and correction of nutritional deficiencies
    h. Diminished special senses such as hearing and eyesight
    i. Ethical issues such as informed consent in the demented patient, advanced directives, do-not-resuscitate (DNR), end-of-life care, communicating with families
    j. Assessment for post-surgical care, including home nursing and nursing home placement
    k. Importance of the care team in managing elderly patients

Competency-Based Performance Objectives:

1. Diagnose and manage surgical patients with concomitant acute and/or chronic medical illnesses.
2. Properly perform perioperative evaluation of the surgical patient with:
a. Moderate to high cardiovascular and respiratory risk
b. Immunosuppressed state
c. Significant psychiatric problem

3. Perform a general surgery consultation to a medical service patient.

Psychiatry

Unit Objectives:

- Demonstrate an understanding of psychiatric principles in the management of surgical patients.
- Demonstrate the ability to apply appropriate psychiatric principles in the management of surgical patients.

Competency-Based Knowledge Objectives:
Review diagnosis of psychiatric illness pertinent to surgical patients:

1. Describe the signs and symptoms of psychiatric disorders of significance to the general medical management of surgical patients, including:
   a. Disorders diagnosed in childhood
   b. Schizophrenia and psychotic disorders
   c. Cognitive disorders
   d. Mood disorders
   e. Anxiety-related disorders
   f. Eating disorders
   g. Substance-related disorders
   h. Personality disorders

2. Outline the medical treatment of psychiatric disorders, and describe their pharmacologic side effects:
   a. Antilytics
      i. Central nervous system (CNS)
      ii. Depression
      iii. Addiction/tolerance
   b. Antipsychotic medications, including: (side effects, including
      i. Sedation (4) Extrapyramidal symptoms
      ii. Hypotension (5) Lower seizure threshold
      iii. Anticholinergic effects
   c. Antidepressants, including: (side effects, including sedation
      i. Sedation
      ii. Anticholinergic effects
      iii. Monoamine oxidase inhibitors (MAOI)
      iv. Food and drug interactions, including anesthesia conduction
   d. Mood stabilizers
      i. Lithium (side effects, including tremor, gastrointestinal
         1. Tremor
         2. Gastrointestinal disturbances
         3. Renal effects
      ii. Carbamazepine (side effects, including leukopenia)
         1. Leukopenia
         2. Agranulocytosis
         3. Aplastic anemia
   e. Hypnotics

3. Understand the etiology and treatment options for acute mental status changes that can follow surgery, including:
a. Somnolence
b. Confusion
c. Disorientation
d. Agitation
e. Convulsions
f. Hallucinations

4. Summarize common psychiatric reactions to surgical treatments and procedures, including:
   a. "ICU psychosis"
   b. Delirium
c. Depression
d. Anxiety reaction
e. Acute drug withdrawal
f. "Sundowning"

5. Identify and assess characteristics of the suicidal patient:
   a. Identifying signs
      i. Drug overdose
      ii. Self-inflicted injuries
   b. Predisposing conditions
      i. Depression
      ii. Alcoholism
      iii. Personality disorders
      iv. Addiction
      v. Schizophrenia
      vi. Manic-depressive psychosis
   c. Risk Factors
      i. History of suicide attempts
      ii. Advanced age
      iii. Recent loss
      iv. Chronic illness

6. Recognize the need for the prescription of suicide precautions.
7. Recognize the management of patients with altered mental status.
8. Understand general principles of drug and/or alcohol withdrawal and their impact on surgical patients.
9. Discuss the epidemiology of mental health problems in elderly patients, including:
   a. Normal changes of aging
      i. Reaction time
      ii. Precision-requiring activities
      iii. Risk taking
   b. Medications
   c. Psychiatric problems as primary or secondary diagnosis for nursing home residents
   d. Organic disorders (Alzheimer’s disease)
e. Primary and secondary depressions, including pseudodementia and sleep disorders
f. Interactions between mental and physical health
g. Alcohol abuse

10. Identify factors unique to elderly persons that predispose to delirium.
11. Describe approaches to supporting the dying patient:
   a. Pain management/comfort measures
   b. Communication skills with patient and family
   c. Coping skills, patient support systems, and family dynamics
   d. Limiting/withdrawing support
      i. “Do not resuscitate” orders
      ii. Living will
      iii. Health care proxy
iv. Persistent vegetative state  
v. Irreversible coma  
vi. Role of ethics consultation  
vii. Competency determination  
viii. Documentation  
ix. Potential organ donation  
e. Review the definitions of death  

12. Understand the role of the psychiatric consult team.  
13. Review the effect of psychiatric illness on surgical care and the effect of surgery on psychiatric illness:  
   a. Identify common psychiatric reactions to surgical treatments/procedures (see objective #4 and #5 above).  
   b. Outline procedures utilized to assess competency in the hospitalized patient.  
   c. Describe the signs and symptomatology of child, partner, or elder abuse and the institutional and legal procedures for reporting suspected abuse cases.  
   d. Formulate appropriate responses for managing disruptive patients, including agitated patients, malingers, and sociopaths.  

14. Implement initial psychiatric treatment and access referral systems for ongoing psychiatric evaluation and care:  
   a. Specify the considerations for management of surgical patients with complex psychiatric illness.  
   b. Outline plans for follow-up care and referrals for surgical patients with psychiatric problems.  
   c. Determine the special psychiatric issues associated with the management of:  
      i. Burn patients (burn delirium, pain management, deformity)  
      ii. Transplant patients  
      iii. Cancer patients  
      iv. Head and spinal cord injury patients  

Competency-Based Performance Objectives:

1. Apply knowledge of the impact of psychiatric illness to the management of surgical patients:  
   a. Incorporate the review of psychiatric symptomatology in the evaluation of surgical patients.  
   b. Obtain a psychiatric drug profile.  
   c. Monitor use of psychiatric medications  
   d. Assess pain and prescribe appropriate medication.  
   e. Manage minor psychiatric problems in postoperative patients.  

2. Apply knowledge of the initial management of psychiatric problems to surgical patients:  
   a. Manage disorientation and anxiety in intensive care patients.  
   b. Assess suicidal potential, request psychiatric consultation, and institute suicide precautions.  
   c. Inform families of patient deaths, request autopsies, and organ donation.  
   d. Consider recommendations from psychiatric consultations.  
   e. Record signs and symptoms of abuse and initiate required reports.  
   f. Evaluate the effect of disruptive behavior and deliberate non-compliance on surgical outcomes.  

3. Facilitate a team approach to surgical patients with psychiatric problems and assure follow-up as needed:  
   a. Manage the surgical care of patients with complex psychiatric illness.  
   b. Monitor the psychiatric treatment of general surgical patients.  
   c. Arrange for appropriate follow-up care and/or referral of patients with complex psychiatric illness.  
   d. Assist with competency determinations in appropriate cases.
e. Manage patients with special psychiatric concerns such as:
   i. Trauma
   ii. Burns
   iii. Transplant
   iv. Malignancy
   v. Head and spinal cord injury

Otolaryngology and Head and Neck Surgery

Part A: Otolaryngology

Unit Objectives:

- Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the ear, nose, and throat pertinent to the practice of general surgery.
- Demonstrate the ability to manage ear, nose, and throat problems associated with the practice of general surgery.

Competency-Based Knowledge Objectives:

1. Identify the anatomy and explain the physiology of the ear, nose, oral cavity, and throat.
2. Summarize the essential components of a focused history and physical examination for common otolaryngologic problems.
3. Discuss the significance of the cornerstones of the physical examination, including:
   a. Visual inspection
   b. Auscultation
   c. Palpation
   d. Percussion
4. Analyze the clinical management of ear, nose, and throat (ENT) patients in the intensive care unit (ICU), including:
   a. Respiratory infection management
   b. Airway management
   c. Wound care
5. Describe and compare the pathophysiology of the following common ENT diseases:
   a. Sinusitis
   b. Sialadenitis
   c. Neck abscess
   d. Epiglottitis
6. Describe and explain the pathophysiology of presbycusis as it can be:
   a. Conductive
   b. Metabolic and toxic
   c. Neural
   d. Cochlear
   e. Tumor-related
   f. Age-dependent
7. Explain how physical examination differs for delineation of conductive versus neurosensory hearing loss.
8. Explain the principal causes of simple epistaxis and describe its management.
9. Evaluate patients with facial trauma and develop a treatment plan for the management of:
   a. Fractures
   b. Lacerations
   c. Hemotympanum
   d. Epistaxis
10. Describe the indications for tracheostomy in adults and children.
11. Discuss the indications for biopsy of lesions of the skin of the face, neck, and oral cavity.
12. Compare the use of the following procedures in evaluating ENT problems:
   a. Radiography
   b. Contrast studies
   c. Ultrasound
13. Describe the indications for simple endoscopy and its diagnostic contributions such as:
   a. Nasopharyngoscopy
   b. Direct laryngoscopy
   c. Esophagoscopy
14. Summarize the characteristics of the common neoplasms of the ear, nose, and throat, and describe appropriate surgical intervention.
15. Outline the diagnostic approaches to otolaryngologic neoplasia, including:
   a. Direct visualization
   b. Indirect visualization
   c. Use of radiography
   d. Fine-needle biopsy
16. Describe diagnostic and therapeutic procedures utilized in treating the following:
   a. Abscess
   b. Neck mass
   c. Oral ulcer
   d. Salivary gland mass
17. Describe and demonstrate methods for removing foreign bodies from the trachea, bronchus, and esophagus.
20. Summarize diagnostic and therapeutic considerations in the management of caustic injury to the mouth, nasopharynx, trachea, and esophagus.
21. Discuss the management of airway in patients with terminal carcinoma of the thyroid and trachea.
22. Describe the signs and symptoms and discuss the health care significance to elderly patients from the pathophysiology of:
   a. Tinnitus
   b. Vertigo
   c. Cerumen impaction
   d. Basilar artery stenosis

Competency-Based Performance Objectives:

1. Perform and record a focused ENT history and physical examination.
2. Manage the emergent/elective airway; using visual inspection, radiographic evaluation, indirect invasive and non-invasive visualization techniques (direct speculum and indirect mirror evaluations, direct fiberoptic and rigid evaluations); with consideration for:
   a. Nose, nasal passages
   b. Nasopharynx
   c. Oropharynx
   d. Larynx
   e. Trachea
3. Be prepared to manage airway obstruction as the result of:
   a. Edema
   b. Secretion
   c. Benign and malignant tumors (including, vascular malformations and infectious processes)
   d. Anaphylaxis
e. Foreign body
4. Evaluate patients with facial trauma, including fractures, lacerations, hemotympanum, and epistaxis.
5. Perform tracheostomy on adults under direct supervision.
6. Perform biopsies of lesions of skin of face, neck, and oral cavity.
7. Perform evaluation of a neck mass, and provide appropriate treatment.
8. Correctly differentiate between the indications for and management of cricothyroidotomy and tracheostomy, demonstrating varying techniques and choice of instrumentation for emergent airway management and ventilation in each.
9. Interpret radiologic examinations of sinuses.
10. Perform simple endoscopy including:
   a. Nasopharyngoscopy
   b. Direct laryngoscopy
   c. Esophagoscopy
11. Evaluate head and neck tumor patients, and be prepared to perform a tumor biopsy.
13. Evaluate radiologic studies of the head and neck, including computed axial tomography (CAT) scanning.
14. Evaluate and treat head and neck abscesses and other masses.
15. Remove esophageal foreign bodies endoscopically.
17. Reconstruct facial and neck defects with transposition and myocutaneous flaps.
18. Manage facial fractures with appropriate consultation.
19. Evaluate and treat caustic injury.
20. Manage airway in patients with terminal thyroid or tracheal carcinoma.

Part B: Head and Neck Surgery

Unit Objectives:

- Demonstrate understanding of the anatomy, physiology, and pathophysiology of the head and neck amenable to surgical intervention.
- Demonstrate the ability to manage surgical problems of the head and neck in a variety of settings.

Competency-Based Knowledge Objectives:

1. Define and discuss the three-dimensional anatomy of the head and neck region with regard to:
   a. Intervertebral relationships of anatomy
   b. Fascial planes
   c. Path and course of cranial nerves
   d. Major arterioles and venous structures
   e. Musculature of face and neck
   f. Anatomy of larynx and cervical trachea
   g. Location of cricothyroid membrane
   h. Cervical anatomy of nasopharynx, pharynx, esophagus (special emphasis on sinuses, eustachian tubes, middle and external ear structures)
2. Describe laryngeal function as it relates to voice production.
3. Describe the interrelationship of pharyngeal and laryngeal function.
4. Identify the bones of the skull, face, and cervical spine. Explain their relationship to major neurologic and neurovascular structures of the head and neck.
5. Analyze predisposing factors for head and neck cancer.
6. Differentiate between neoplastic and non-neoplastic neck masses.
7. Explain the tumor, nodes, and metastases (TNM) classification system for tumors of the head and neck.
8. Prepare a protocol for evaluating intraoral cancer.
9. Outline the principles associated with the repair of avulsion of ear and nose.
10. Indicate how to examine a patient with severe facial laceration to rule out damage to the following:
   a. Lacrimal drainage systems
   b. Parotid gland and duct
   c. Facial nerve
11. Identify and delineate
   a. Pathophysiology of cranial nerve dysfunctions and injuries
   b. Brachial plexus injuries
   c. Anatomy/location of parotid and submandibular ductal drainage systems
12. Define and describe the Le Fort maxillary fracture classification system.
15. Describe the roles of the following diagnostic modalities in the evaluation of head and neck lesions and facial fracture:
   a. Plain x-rays
   b. CT scanning
   c. Sialography
   d. Magnetic resonance imaging (MRI)
   e. Isotope scans
   f. Ultrasound
16. Describe the anatomy of the fascial spaces of the neck and their importance in neck abscesses and infections.
17. Discuss indications for radical and modified radical neck dissection.
18. Distinguish between the following kinds of grafts in the management of head and neck problems:
   a. Split-thickness grafts
   b. Full-thickness skin grafts
   c. Rotational flaps
   d. Free flaps
19. Describe the anatomy and the advantages and disadvantages of regional flaps available for head and neck reconstruction.
20. Compare and contrast the use of the following local flaps:
   a. Advancement
   b. Rotational
   c. Pedicle
   d. Rhomboid (Limberg)
   e. Z-plasty
   f. W-plasty
   g. V-Y advancement
21. Outline the advantages and disadvantages of irradiation, chemotherapy, and resection of neoplastic lesions of the:
   a. Tongue
   b. Floor of mouth
   c. Buccal mucosa
   d. Retromolar trigone
   e. Alveolar ridge
   f. Palate
22. Discuss the frequency of benign and malignant head and neck tumors in the pediatric population.
23. Outline the microbiology and treatment of deep neck abscesses.
24. Explain the techniques of scar revision, including:
a. Primary excision  
b. Z-plasty  
c. Serial excision  
d. Geometric broken line closure  
e. Use of cosmetics

**Competency-Based Performance Objectives:**

1. Perform head and neck examinations, including nasopharyngoscopy and fiberoptic direct laryngoscopy.
2. Administer postoperative care (ICU, wards, discharge planning, follow-up appointments, patient/family counseling, home health care) for head and neck patients.
3. Provide emergency airway management, including performance of:
   a. Intubation  
   b. Emergency cricothyrotomy  
   c. Emergency tracheostomy
4. Administer treatment for sialadenitis.
5. Diagnose and evaluate infectious illness (viral, bacterial, fungal), acute and chronic, affecting:
   a. CNS  
   b. Sinuses  
   c. Bones  
   d. Soft tissues of face
6. Demonstrate a clear understanding of the pathophysiology of:
   a. Ludwig’s angina  
   b. Necrotizing fasciitis of the neck  
   c. Mucormycosis of sinus  
   d. Epiglottitis  
   e. Gustatory sweating (Frye’s syndrome)
7. Perform biopsy of all intraoral lesions.
8. Care for contaminated wounds, including animal bites of face and neck.
9. Assist with incisions for head and neck surgery, including:
   a. Radical neck dissection  
   b. Salivary gland surgery  
   c. Tracheostomy  
   d. Laryngeal/tracheal trauma  
   e. Considerations for incisions of previously irradiated tissues
10. Formulate a plan for the management of an unknown primary tumor of the head and neck.
11. Perform fine-needle biopsies.
12. Perform simple operative incisions with supervision (tracheostomy, intubation, simple lesions of head and neck).
14. Perform simple operative incisions without direct supervision.
15. Perform radical neck dissection under direct supervision.
16. Manage postoperative complications, including nerve paralysis and cutaneous fistulas from the aerodigestive tract.
17. Manage trauma to the upper airway.

**Management of Ambulatory Surgery and Outpatient Care**

**Part A: Management of Ambulatory Surgery**

**Unit Objectives:**
• Demonstrate knowledge of the principles and rationale for performing ambulatory surgical procedures where ambulatory surgery is defined as any procedure for which the patient is admitted and discharged on the same day, regardless of type of anesthesia.
• Demonstrate the ability to manage surgical conditions in an ambulatory setting.

Competency-Based Knowledge Objectives:

1. Discuss the principles and rationale for performing ambulatory surgery on selected patients, including:
   a. Assessment of patient risk
   b. Patient selection
   c. Level of preparation for patients with co-morbid diseases
2. List those general surgical procedures commonly performed in an ambulatory setting in your community.
3. Discuss the social and economic issues associated with selecting an ambulatory surgery option.
4. Describe the anesthesia options available for ambulatory surgery and their possible complications to include:
   a. Discussion of types of anesthetic
   b. Delineation of duration of typical local anesthetic action and limitations
   c. Calculation of dosages, including maximum dosage of typical local anesthetics
   d. Discussion of techniques of local anesthetics, both field and nerve block
   e. Consideration of possible adverse reactions
   f. Outlining of benefits and risks of pharmacologic sedation
5. Analyze the importance of postoperative pain management in the ambulatory setting.
6. Differentiate between intraoperative issues in awake versus anesthetized patients in terms of:
   a. Patient's physical and emotional comfort
      i. Positioning of patient
      ii. Patient's physical exposure
      iii. Tissue handling
   b. Intraoperative communication with the patient
      i. Aspects of procedure
      ii. Provide distraction from awareness of procedure via “small talk” or some other means
   c. The need to maintain a sensitive and professional level of communication with other health care workers
7. Discuss postoperative follow-up procedures, including methods for monitoring and managing complications.
8. Outline community resources available to assist ambulatory surgery patients, and describe the methods for accessing these resources.
9. Describe appropriate methods for handling pathology specimens for typical outpatient procedures.

Competency-Based Performance Objectives:

1. Complete a preoperative evaluation of a patient as a potential candidate for ambulatory surgery, including consideration of patient risks and treatment options.
2. Counsel patients and their families appropriately about ambulatory surgery and follow-up care, including obtaining informed consent after discussing the risks, benefits, and alternatives to the procedure.
3. Preoperatively prepare a patient with co-morbid diseases for ambulatory surgery.
4. Perform procedures while assuring patient comfort:
   a. Provide adequate local anesthesia and/or adequate sedation
   b. Prevent potentially negative visual and auditory stimuli
c. Communicate with the patient intraoperatively in a calm and reassuring manner:
   i. Alert patient to new aspects of the procedure
   ii. Communicate results of the procedure to the patient
   iii. Respond sensitively to patient’s concerns regarding level of pain, embarrassment, and procedure’s results

5. Maintain a positive, calm, reassuring, and professional atmosphere in the operating room.

6. Perform selected ambulatory surgical procedures such as:
   a. Excision of skin and soft tissue lesions
   b. Breast biopsy
   c. Lymph node biopsy
   d. Vascular access procedures
   e. Incising and draining (I & D) abscesses
   f. Endoscopic procedures
   g. Hernia repairs
   h. Anorectal surgery
   i. Laparoscopic cholecystectomy

7. Arrange for appropriate handling of pathological specimens.

8. Manage unexpected emergencies during the course of ambulatory surgery, such as:
   a. Hemorrhage
   b. Anaphylactic shock
   c. Drug reaction
   d. Chest pain
   e. Pneumothorax

9. Perform appropriate postoperative examination prior to discharge.

10. Manage postoperative surgery and anesthesia complications.

11. Prescribe necessary follow-up care, including:
   a. Prescribing appropriate postoperative analgesia
   b. Communicating instructions and expectations for follow-up, such as:
      i. Pain level and location
      ii. Possible side effects of medications
      iii. Level of activity and return to work
      iv. Wound care and potential problems
      v. Timing of follow-up appointment
   c. Arrange for home health and other outpatient services using institutional and community resources

Attitudes:

1. Recognize the concerns of patients and family regarding ambulatory surgery and outpatient follow-up care.

2. Become attuned to patient’s concerns and needs:
   a. Preoperatively
   b. Intraoperatively
   c. Postoperatively

Part B: Outpatient Care - Includes Office Experience/Pre- and Post- Hospital Care of the Surgical Patient

Unit Objectives:

- Maintain continuity in terms of care of the patient with surgical diseases from pre-hospital evaluation through post-surgical management and follow-up.
- Develop and hone skills in history taking, physical examination, interpersonal communication, critical appraisal, and self-directed learning.
Competency-Based Knowledge Objectives:

1. Delineate the components of and discuss the importance of a focused history and physical examination performed in an outpatient setting on a patient with a surgical disease.
2. Identify indications for, technical aspects of, and typical results from the following screening tests:
   a. Stool guaiac
   b. Sigmoidoscopy
   c. Prostate screening
   d. Mammography
3. Demonstrate a working knowledge of the natural history of surgical diseases:
   a. If untreated
   b. If treated surgically
   c. If treated non-surgically
4. Distinguish between different types of biopsy techniques in an outpatient setting.
5. Specify indications for such common office procedures as:
   a. Core-needle biopsy/fine-needle aspiration
   b. Incision and drainage of abscesses (recognize those requiring in-hospital operating room drainage)
   c. Sigmoidoscopy/anoscopy
   d. Excision of cutaneous lesions
6. Delineate hospital mechanisms for admitting patients.
7. Estimate costs of hospitalization and various surgeries.
8. Describe the expected appearance of wound sites at various postoperative intervals.
9. Delineate appropriate pain medications and dosages.
10. Specify the need for drains and tubes, stating the types and special requirements for replacement or removal.

Competency-Based Performance Objectives:

1. Demonstrate the ability to obtain the essential elements of a focused preoperative history, including assessment of medications.
2. Perform a complete physical examination, paying special attention to assessment of cardiopulmonary risk of surgery.
3. Order appropriate and cost-effective laboratory tests for screening and pre- and postoperative evaluation.
4. Accurately interpret clinical laboratory results, pathology reports, and radiographic studies.
5. Synthesize historical findings, physical examination, and laboratory data for diagnosis.
6. Develop appropriate plans for management.
7. Order appropriate consultations.
8. Appropriately and sensitively counsel the patient and patient's family regarding:
   a. Disease entity (prognosis, treatment options, additional treatment)
   b. Surgical issues
      i. Operative risks (possible complications, including mortality)
      ii. Operative procedures (preparation, testing, duration of surgery and hospitalization)
      iii. Anesthesia
      iv. Prognosis (curative vs. palliative)
   c. Other treatment options (no treatment [explain natural history of disease] and non-surgical therapy)
   d. Informed consent
   e. Community resources
9. Perform appropriate office procedures.
10. Arrange patient admission to hospital facility.
11. Explain the prospective surgical approach to the patient.
12. Postoperatively, obtain appropriate follow-up history, including:
   a. General well-being
   b. Pain control
   c. Presence of fever
   d. Nutritional state (ability to eat, nausea)
   e. Bowel function
   f. Level of activity
   g. Compliance with instructions (medications, complications of medication, physical therapy)
13. Perform appropriate postoperative examination of the surgical site.
14. Provide appropriate wound care. Identify and manage wound problems, including:
   a. Superficial wound separation; abdominal dehiscence
   b. Vascular surgery incisions and wounds (diabetic foot problems and their impact)
   c. Seromas
   d. Infections (cellulitis or abscess, determining the need for antibiotics, drainage, office vs. operating room care)
   e. Lymphoceles
   f. Incisional hernia
   g. Foreign body reaction (to sutures, staples)
15. Ascertain the need for further consultative support, and arrange for patient referral when indicated.
16. Assess the need for further follow-up, including:
   a. Arrangement for home nursing evaluation and care
   b. Assessment/arrangement for other support (e.g., the homemaker)
   c. Prescribing appropriate dietary supplements
   d. Hospice care
17. Prescribe appropriate pain medication.
18. Assess patient's ability to maintain level of activity (drive motor vehicle, work, exercise, sexual activity)
19. Appropriately and sensitively communicate with patient and family.
20. Appropriately communicate with referring physicians in a timely fashion regarding patient outcome.
21. Develop the ability to teach in office settings (for nurses, patients, medical students, and junior house officers).

Competency-Based Attitudinal Objectives:

1. Have a working understanding of the role of the surgeon as primary care giver in office and clinical settings.
2. Demonstrate professionalism, empathy, and compassion by showing respect for a patient's privacy and self-esteem during aspects of the physical examination which may be uncomfortable, frightening, or embarrassing for the patient.
3. Demonstrate an awareness of, and respect for, patient autonomy, especially regarding:
   a. Decisions about therapy
   b. Decisions not to treat
   c. Issues of patient compliance
4. Show an awareness of, and respect for, the contributions of other office staff members (nurses, technicians, secretaries).
5. Demonstrate a respect for medical students in office and/or clinic settings.
6. Recognize patient or patient family responsibilities that may affect the timing of surgery.
7. Demonstrate an understanding of, and sensitivity to, patient socioeconomic concerns regarding such issues as:
a. Insurance and the ability to pay for physician services, hospitalization, and prescribed medications
b. Possible loss of work time and wages

8. Demonstrate sensitivity and appropriate flexibility regarding patient fears and concerns, including:
   a. Preoperatively
      i. Anxiety about pain and procedure's findings
      ii. Embarrassment
   b. Intraoperatively
      i. Pain and individual response to pain
      ii. Modesty
      iii. Comfort
   c. Postoperatively
      i. Ability to care for self
      ii. Drugs
      iii. Level of function
      iv. Prognosis

9. Display a working knowledge of the management of the office and the outpatient surgical setting.

Research and Biostatistical Methods

Unit Objectives:

- Demonstrate an understanding of research principles and their application to the practice of general surgery.
- Demonstrate knowledge about the use and application of study designs and statistical methods.
- Demonstrate knowledge of the role of clinical databases in clinical research and patient care.
- Demonstrate knowledge of the principles underlying evidence-based surgery.
- Demonstrate the ability to critically evaluate the information provided by drug companies and medical instrument and equipment manufacturers.

Competency-Based Knowledge Objectives

1. Differentiate between the following study designs:
   a. Descriptive or case series
   b. Case control (retrospective)
   c. Cross sectional (prevalence)
   d. Cohort (prospective/incidence)
   e. Clinical trial
   f. Sequential (repeated measures)
   g. Crossover

2. Discuss the following concepts related to study design:
   a. Internal versus external validity (generalizability)
   b. Major threats to internal and external validity
   c. Randomization, random selection, random assignment
   d. Inclusion versus exclusion criteria
   e. Blinding, blocking, stratification
   f. Number needed to treat
   g. "Intention to Treat" principle

3. Explain the differences between the following scales of measurement:
   a. Nominal
   b. Ordinal
c. Interval
d. Ratio

4. Distinguish between the following techniques/methods for exploring and presenting data:
   a. Frequency distribution
   b. Bar chart
   c. Contingency table
   d. Histogram
   e. Frequency polygon
   f. Scatterplot

5. Distinguish between the following statistics used to summarize or describe data:
   a. Mean, mode, median
   b. Range, standard deviation
   c. Percentile, interquartile range
   d. Proportion, ratio, rate

6. Interpret the following vital statistics rates:
   a. Mortality, morbidity, cause specific mortality rates
   b. Prevalence, incidence
   c. Adjusted rates

7. Distinguish between the following measures of relationship between two variables:
   a. Pearson correlation coefficient
   b. Coefficient of determination
   c. Spearman rank correlation
   d. Relative risk, odds ratio

8. Interpret the following terms and concepts related to drawing inferences from research data:
   a. Population versus sample
   b. Population distribution, sampling distribution, standard normal distribution
   c. Standard error versus standard deviation
   d. Hypothesis testing, null and alternative (research) hypothesis
   e. Parametric versus nonparametric tests
   f. Confidence intervals, confidence limits
   g. One tailed versus two tailed tests
   h. Level of significance, alpha level, P value
   i. Type I error, type II error, power

9. Identify the following tests of significance and concepts related to the comparison of means:
   a. Independent and paired t-test (parametric tests)
   b. Wilcoxon rank sum test (also called the Mann Whitney U or the Mann Whitney Wilcoxon rank sum test) (nonparametric test)
   c. Wilcoxon signed ranks test (nonparametric test)
   d. One way analysis of variance (ANOVA)
   e. Two way ANOVA
   f. Repeated measures ANOVA
   g. Statistical interaction
   h. Planned comparisons
   i. Posterior or post hoc comparisons such as the Tukey, Scheffe, Newman Keuls, Bonferroni, and Dunnett procedures

10. Identify the following tests of significance and concepts related to the comparison of proportions:
    a. Z approximation test
    b. Chi square test
    c. McNemar test for comparing proportions in paired groups
    d. Sample size and strength of association in the interpretation of the chi square statistic
    e. Fisher's Exact Test
11. Identify the following tests of significance and concepts related to investigating the relationship between two or more variables:
   a. t-test for testing the significance of the correlation
   b. Fisher's Z transformation
   c. Confidence intervals for the relative risk and odds ratio
   d. Simple and multiple linear regression
   e. Standard error of estimate
   f. Confidence bands for a regression line
   g. Comparing two regression lines
   h. Testing the significance of the regression line and the regression coefficients
   i. Stepwise multiple regression
   j. Logistic regression

12. Identify the following concepts related to the analysis of survival data:
   a. Actuarial or life table analysis versus Kaplan Meier
   b. Comparing two survival curves using the Gehan or generalized Wilcoxon test, the logrank test, and the Mantel Haenszel chi square test
   c. Censored observations
   d. Cox regression

13. Interpret the following concepts related to evaluating diagnostic tests and procedures:
   a. Sensitivity and specificity
   b. Gold standard
   c. Predictive value of a positive or negative test
   d. Index of suspicion or prior probability
   e. Likelihood ratio method

14. Discuss the following procedures, principles, and concepts related to the ethics of medical research:
   a. The Declaration of Helsinki (see Troidl reference)
   b. Informed consent
   c. Institutional review boards and animal use review committees
   d. Ethical use of animals in research
   e. Confidentially and anonymity concerns
   f. Truth and accuracy in the publication of research results

15. Explain the following procedures and concepts related to clinical databases:
   a. Role of clinical databases in clinical research and outcomes research
   b. Database terminology such as field, record, query, report generation, ASCII file, computer file, and merging
   c. Data coding, data entry, and data verification
   d. Use of standardized databases such as hospital tumor registries or state trauma registries
   e. Database development

16. Discuss the following principles, methods, and concepts related to evidence-based surgery:
   a. Basic skills needed to critically evaluate the published evidence:
      i. Defining the clinical question
      ii. Translating the question into searchable keywords
      iii. Conducting the search
      iv. Selecting the best articles
   b. Users’ guides for selecting and evaluating articles about therapy, diagnosis, harm, and prognosis
   c. Selection and evaluation of integrative articles such as review articles, meta-analyses, practice guidelines, and decision analyses
   d. Use of administrative databases to link patient outcomes to costs related to producing these outcomes
   e. Use of patient-reported outcome measures as another method for evaluating the success of surgical treatments
Competency-Based Performance Objectives

1. Critically evaluate the published evidence for a surgical therapy using a computer search engine such as MEDLINE, using the users’ guide for evaluating therapy articles, and summarizing your findings in writing, to include your recommendation for surgical practice.
2. Write a summary of the literature review, including a synthesis of the major findings and a recommendation for surgical practice.
3. Develop and implement a computer-based clinical database using a software package such as EXCEL, ACCESS, SPSS, SAS, FileMaker, or other commercially available software.
4. Identify and prepare a case study suitable for presentation or publication.
5. Design and conduct a surgical research study, utilizing the following activities:
   a. Select/search for a researchable project, involving an attending or other clinician-mentor
   b. Search and review the literature
   c. Formulate hypotheses
   d. Identify key variables (both predictor and outcome), decide on the optimal level of measurement, create operational definitions, and assess reliability
   e. Develop a research design
   f. Identify population and study sample
   g. Develop sample selection procedures
   h. Select or develop measures
   i. Develop study protocol and prepare institutional review board (IRB) proposal
   j. Collect and analyze data
   k. Interpret results
   l. Identify various journal formats and related instructions to authors
   m. Write paper
   n. Review techniques for optimal presentation of papers and posters, including related media
   o. Convert paper into an appropriate presentation
   p. Deliver the presentation

Clinical Epidemiology and Outcomes Research

Part A: Clinical Epidemiology

Unit Objective:
Demonstrate understanding of the principles of clinical epidemiology and their application to the practice of general surgery.

Competency-Based Knowledge Objectives:

1. Explain the discipline of clinical epidemiology to include the study of groups of people and the background evidence needed for clinical decisions in patient care.
2. List the clinical events of primary interest in clinical epidemiology, including: death, disease, disability, discomfort, and dissatisfaction.
3. Distinguish mass screening from case finding.
4. Discuss the following criteria used to determine for which diseases people should be screened:
   a. Sensitivity
   b. Specificity
   c. Positive predictive value; negative predictive value
   d. Number of false positives
   e. Test factors (e.g., simplicity, cost, safety, patient acceptability)
5. For a given disease/condition, compare the advantages and disadvantages of applying multiple diagnostic tests all at once versus consecutively.

6. Discuss clinical decision analysis, including:
   a. Defining the problem, alternative actions, and possible outcomes
   b. Developing a decision tree to assign probabilities for each outcome
   c. Assigning a value or utility for each outcome

7. Differentiate risk factors from prognostic factors for a given disease/condition (e.g., for acute myocardial infarction, older age and male gender are both risk factors and prognostic factors, whereas hypertension is a risk factor but hypotension is a prognostic factor).

8. Discuss the following five rates commonly used to predict prognosis:
   a. Five-year survival
   b. Case-fatality
   c. Response
   d. Remission
   e. Recurrence

9. Identify locations of potential bias in randomized, controlled clinical trials, including:
   a. Patient selection
   b. Patient allocation to study groups
   c. Patient compliance
   d. Definition of outcomes
   e. Generalizability of results

10. Distinguish between clinical significance and statistical significance.

11. Analyze the following situations in which a physician's personal experience is insufficient to establish a relationship between a disease and its cause. Personal experience is insufficient when:
   a. The disease is common
   b. The disease has multiple causes
   c. The disease has a low incidence
   d. The disease has a long latency period

12. For non-experimental studies, define the following criteria for determining cause and effect:
   a. Temporality
   b. Strength of the measure of association
   c. Presence of a dose/response relationship
   d. Consistency of results
   e. Biological plausibility
   f. Specificity of effect

Competency-Based Performance Objectives:

1. Recognize when to apply a specific screening test in a case finding situation.
2. Apply clinical decision analysis to the treatment of a given patient with a given disease.
3. Estimate risk of disease development for a given patient given a history of exposure to specific risk factors.
4. Decide whether a given association is one of cause and effect.

Part B: Outcomes Research

Competency-Based Knowledge Objectives:

1. Explain the traditional negative clinical outcomes for a given surgical procedure, including death, disease, disability, and complications.
2. Discuss the modern clinical outcomes for a given surgical procedure, including discomfort, dissatisfaction, quality of life, and cost-effectiveness.
3. Identify the most frequently occurring negative outcome(s) of a given surgical procedure, (e.g., thrombosis following arterial venous prosthetic shunt formation).

4. Compare the following different ways of measuring outcomes for a given surgical procedure:
   a. Chart reviews
   b. Clinical evaluations
   c. Questionnaires

5. Discuss each of the following steps in conducting prospective outcomes research:
   a. Hypothesis formation
   b. Computerized literature search
   c. Selection of a study design
   d. Estimation of sample size
   e. Specification of inclusion and exclusion criteria
   f. Allocation of patients to groups
   g. Evaluating outcome(s)
   h. Analyzing data

6. Provide examples of potentially confounding patient variables, including age, sex, race, income, education, occupation, religion, marital status, residence, nationality, disease stage, comorbidities, and complications.

7. Provide examples of potentially confounding treatment variables, including extent of surgery, timing of surgery, anesthetic technique, postsurgical nursing care, drug therapy, chemotherapy, radiotherapy, physical therapy, and nutritional therapy.

8. Describe the following common problems in collecting useful outcomes data:
   a. Inadequate sample size
   b. Inaccurate characterization of patient population
   c. Inappropriate comparison group
   d. Uncontrolled patient variables
   e. Uncontrolled treatment variables
   f. Patient noncompliance

Competency-Based Performance Objectives:

1. Demonstrate the ability to review the surgical literature critically.
2. Design a clinical outcomes research study.

Ethical and Legal Issues in Surgical Practice

Unit Objectives:

- Demonstrate knowledge of basic ethical and legal principles applicable to the practice of medicine.
- Demonstrate the ability to recognize ethical and legal issues that arise in the practice of surgery.
- Demonstrate the ability to employ strategies for effectively managing ethical and legal issues associated with the practice of surgery.

Competency-Based Knowledge Objectives:

Section One: Ethical, and legal issues associated with the practice of medicine

1. Define the following terms, and analyze their application to the practice of surgery:
   - Abortion
   - Advance Directives
     - Patient Self-Determination Act
ii. Living Will (your state requirements)  
iii. Durable Power of Attorney for Health Care  
iv. Right to Die concept  

- Authoritarianism (importance of patient choices)  
- Autonomy  
  i. As ‘capacity for self-determination’  
  ii. As 'right to self-determination'  
- Beneficence  
- Bioethics  
- Casuistry (based on the study of case histories)  
- Causation  
- Civil law  
- Codes of ethics  
- Competence  
- Confidentiality  
- Continuity of care  
- Cost of care  
  i. Cost-benefit analysis  
  ii. Cost-containment, including use of clinical pathways  
  iii. Access to health care  
  iv. Rights to health care  
- Covenant  
- Criminal law  
- Death (including various legal definitions)  
- Deontological ethics  
- 'Do Not Resuscitate' decisions  
- Duty  
- Ethics  
  i. As the analysis of human behavior according to given principles, values, virtues, and/or according to specific methods of reasoning  
  ii. As the rules or patterns of behavior expected within certain groups (e.g., professions, religious communities) or by virtue of holding a specific role  
- Eugenics  
- Euthanasia  
- "Futile" treatment  
- Hospital Ethics Committee  
- Impaired physician  
- Informed consent  

Institutional Review Board  

- Justice  
  i. As 'distributive'  
  ii. As 'retributive'  
  iii. As 'commutative' (justice in transactions)  
- Liability (including forms and limits of coverage)  
- Malpractice  
- Managed care  
- Medical ethics  
- Morality  
- Natural law  
- Natural rights  
- Negligence  
- Omission (morally not performing an act or not performing a moral act)  
- Palliative care
- Paternalism (relation with patients)
- Peer review
- Physician-assisted suicide
- Pragmatism
- Prima facie duty
- Principles
- Privacy
- Quality assurance (and associated concepts such as Continuous Quality Improvement)
- Quality of life
- Research on human and animal subjects
- Right
  i. As a 'negative right'
  ii. As a 'positive right'
- Rule
- Situation ethics
- Social contract
- Standard of care
- Surrogate decision-maker (proxy)
- Telological ethics
- Tort
- Truthfulness
- Utilitarianism
- Utilization review (and related concepts)
- Values (patient defines benefit and quality)
- Virtue ethics
- Withdrawal or withholding treatment

2. Identify and evaluate similarities and differences between the ethical and the technical aspects of clinical decision making.
3. Specify the ethical and legal values and principles associated with the profession of surgery and clinical surgical decision-making.
4. Discuss ethical and legal considerations for the development and use of new technologies in human subjects, including stem cell research, cloning, and gene therapy.
5. Assess the professional and institutional resources and methods for managing ethical and legal issues including the management of conflict.

Section Two: The physician-patient relationship

1. Analyze and explain the ethical and legal characteristics of the physician-patient relationship, including:
   a. Establishing the relationship
   b. Maintaining the relationship, including continuity of care
   c. Observing a patient's right to privacy and the confidentiality of clinical information
   d. Severing the relationship; patient abandonment
2. Predict possible implications of 'managed care' on the traditional physician-patient relationship.

Section Three: The medical record
Analyze the ethical and legal considerations of the medical record by performing these tasks:

1. Describe the essential components of a medical record that meet both clinical and legal requirements.
2. Describe the role of the inpatient/outpatient medical record and its use as:
   a. An accurate and complete account of the surgical management of a patient
   b. A legal document
3. Specify the legal implications of altering or destroying medical records.
4. Identify the proper method of making corrections or additions to the medical record.

Section Four: Informed consent

1. Analyze the concept of informed consent by performing these tasks:
   a. Define competence, and discuss its application in obtaining informed consent.
   b. Determine how to ensure that patient consent to treatment is given voluntarily.
   c. Describe your institutional requirements for informed consent.
   d. Review the concept that physicians disclose all risks that would be considered material to the competent person (Canterbury v. Spence).
   e. Discuss the role of second opinion in surgical decision-making.
   g. Discuss the ethical and legal issues associated with the performance of prophylactic surgery.
   h. Define the physician's responsibilities in the performance of experimental procedures.
   i. Define the ethical and legal obligations to inform patients of a physician's HIV status.

2. Analyze patient advance directives, including:
   a. Identify federal, state, institutional, and individual responsibilities under the Patient Self-Determination Act.
   b. Review statutory requirements for legally valid advance directives.
   c. Compare and contrast living wills versus durable powers of attorney

3. Summarize ethical and legal issues associated with death and dying, considering:
   a. "Do Not Resuscitate" orders
   b. Discontinuing or foregoing treatment
   c. Withholding or withdrawing life-prolonging medical treatment
   d. Nutrition and hydration
   e. Euthanasia
   f. Physician-assisted suicide
   g. Determination of death

Section Five: Professional responsibility

1. Formulate an appropriate approach to the management of:
   a. The impaired physician
   b. Physician error
      i. Own error
      ii. Another's error

2. Explain the ethical and legal implications of refusing requested medical treatment under the following circumstances:
   a. Where treatment would be futile
   b. Where medical treatment poses risks to the physicians or others
   c. Where the physician opposes the treatment for moral reasons
   d. Where the physician opposes treatment for economic reasons

3. Identify the physician's ethical obligation to participate in:
   a. Medical review of individual physician/surgeon activities
   b. General evaluation of surgical therapies

4. Discuss the following aspects of medical staff appointment and disciplinary decisions:
   a. Role of economic credentialing
   b. Utilization review
   c. Implications of the American's with Disabilities Act

5. Review the confidentiality of medical peer review records and proceedings.
6. Discuss the responsibilities of the profession to provide access to health care.
7. Discuss political and social activism in the profession regarding:
   a. Membership and participation in professional associations
   b. Communication with legislators
   c. Community activism and education
   d. Participation in physician “union” activities

Section Six: Professional licensure and certification

1. Describe the processes and identify the agencies associated with:
   a. Residency program accreditation
   b. Physician/surgeon certification
   c. Licensure
   d. Credentialing
2. Assess the value of recertification.

Section Seven: Professional liability

1. Analyze the characteristics and issues involved in the current malpractice climate by performing the following tasks:
   a. Characterize the relationships between the legal and medical professions and the insurance industry in resolution of malpractice claims.
   b. Discuss the function and process of litigation in resolving malpractice claims.
   c. Summarize the issues and goals involved in legislative reform of the civil justice system in the area of professional liability.
2. Compare various types of professional liability insurance with regard to forms of coverage, limits of coverage, availability, and cost.
3. Outline the process of a medical liability action and the role of each of the following in the process:
   a. Subpoena
   b. Discovery
   c. Deposition
   d. Settlement
   e. Directed verdict
   f. Appeal
4. Outline the process of a medical malpractice trial.
5. Describe criteria for the entry of legal actions into the National Practitioner Data Bank.
6. Estimate the significance of the following variables:
   a. Potential litigious situations
   b. Malpractice avoidance/practice management techniques
   c. Corporate negligence or negligent credentialing
   d. Spoliation of evidence
7. Review the general rules for:
   a. Professional liability insurance carrier involvement
   b. Attorney selection
   c. Preparation of defense
   d. Role and selection of expert witnesses
8. Discuss the role, practices, and procedures of the following in reducing professional liability:
   a. Risk management
   b. Quality assurance
9. Review the legal aspects of ex parte contacts with attorneys representing physicians in malpractice actions.

Competency-Based Performance Objectives
1. Illustrate various moral concepts using examples from health care, especially those cases that have set a legal precedent or significantly influenced medical ethics (e.g., Roe v. Wade, Quinlan, Bouvia, Cruzan, Sakiewicz, and Tuskegee Syphilis Study).
2. Describe the pluralistic nature of the United States and the role of health care as a 'public arena.'
3. Determine the course of action to be followed in the event of a malpractice claim, including interaction with plaintiffs, lawyers, and insurance companies.
4. Outline the appropriate steps to take when one suspects that a colleague is impaired.
5. Identify the professional liability concerns of other members of the healthcare team, including nurses, pharmacists, dieticians, and other medical specialists.
6. Obtain proxy consent in appropriate cases, including those involving minors.
7. Demonstrate proper methods of correcting medical records.
8. Participate in discussions and decisions regarding the discontinuation or foregoing of treatment.
10. Write orders for treatment limitation in appropriate cases.
11. Participate in the identification and resolution of cases involving surgical error.
12. Determine the degree of personal involvement in professional liability issues.
13. Formulate a plan for involvement in the political and legislative arenas regarding civil justice reform of professional liability litigation.
14. Determine a personal plan for achieving recognition and certification in surgery or its subspecialties.
15. Participate in surgical case review activities.
16. Participate in utilization review activities.
17. Review options for reform of the U.S. healthcare system, and identify possible consequences of reform proposals for surgical practice, patient access to care, and the cost of health care.

Practice Management

Note: Knowledge and performance activities are designed to assist the resident in preparing for post-residency career decisions. The unit is presented to assist the resident in his/her transition to a form of surgical practice, with an emphasis on private practice.

Unit Objectives:

- Demonstrate knowledge of the principles of management associated with a surgical career.
- Demonstrate the ability to apply sound management principles in establishing and managing a surgical practice that is clinically efficient, financially sound, and ethically correct.

Competency-Based Knowledge Objectives:

Junior Level:

1. Analyze the surgeon's responsibilities to society as they are associated with the management of a surgical practice.
2. Summarize the responsibilities and obligations of a surgeon regarding his/her social leadership in the community and health care facilities.
3. Analyze how the health care delivery system affects the socioeconomic well being of the local community and nation.
4. Discuss the characteristics and relationships of the multiple components of the health care delivery system, including:
   a. Treatment facilities such as hospitals, long-term care facilities, community clinics
   b. Health care legislation currently in effect
c. Management/provision of health care, including third party payment systems:
   i. Medicare and Medicaid requirements
   ii. Employer-provided health insurance
   iii. Private health insurance
   iv. Responding to insurance denials
   v. Dealing with gatekeepers
   vi. Case management (Large Case Management) procedures
   vii. Closed panel managed care plans

d. Diagnosis and processing codes; use of Fee Allowance Schedule

e. Physician practice organizations

f. Medical equipment and pharmaceutical manufacturing, sales, and distribution

5. Assess the cost-containment responsibilities of a physician in the ordering of diagnostic and therapeutic measures, to include consideration of effectiveness and efficiency.

6. Demonstrate familiarity with the political, economic, and social changes and trends likely to affect future surgical practice.

7. Discuss the characteristics and importance of effective interpersonal communication with colleagues, consultants, clinical and administrative support personnel, and patients.

8. Describe approaches about how to involve the patient's family and spiritual counselor in clinical decisions and discussions.

9. List the institutional and social service agencies in your community, and describe their role in the surgical management of patients and in assisting families.

10. Summarize the career options available at the conclusion of the residency, including:
    a. General surgery practice (private practice or academic)
    b. Fellowship in subspecialty
    c. Other choices (e.g., research, entrepreneurial business, administration)

11. Discuss the types and characteristics, potential and shortcomings of organizational structures that affect the practice and fiscal aspects of surgical practice, including:
    a. Solo practice
    b. Group practice
      i. Partnership
      ii. Professional Association
      iii. Corporation
      iv. Group practice without walls (GPWW)
    c. Academic practice
    d. Health Maintenance Organization (HMO)
      i. Preferred Provider Organization (PPO)
      ii. Independent Practice Association (IPA)
      iii. Staff model (to employ providers directly)
    e. Exclusive Provider Organization (EPO)
    f. Federal
      i. Medicare
      ii. Medicaid
      iii. Title XX of the Social Security Act
      iv. Older Americans Act
      v. Veterans Administration

12. Summarize significant aspects of the following critical issues as they relate to surgical practice management:
    a. Legislative/regulatory requirements
      i. Americans with Disabilities Act (ADA)
      ii. Clinical Laboratory Improvement Amendments (CLIA)
    b. Federal/professional regulatory institutions
      i. Health Care Financing Administration (HCFA)
      ii. Joint Commission for the Accreditation of Healthcare Organizations (JCAHO)
      iii. Occupational Safety and Health Administration (OSHA)
    c. Societal expectations
i. Affirmative action
ii. Equal opportunity
iii. Sexual harassment

13. Describe patient eligibility variability through the Medicare program, financed through HCFA, for coverage of:
   a. Elderly
   b. Disabled persons receiving Social Security
   c. Persons with end-stage renal disease
   d. Certain federal employees

14. Define the range of current coverage and aspects of implementation for the following:
   a. Medicare Part A and Part B
   b. Diagnosis-related groups (DRG's)
   c. Medigap

15. Describe the range of support available for home and community-based care for the elderly.

16. Demonstrate a working knowledge of the organization, content, and analysis of the outpatient record.


18. Outline a plan for evaluating personal and professional considerations in making a career choice.

19. Recognize the importance of spouse and family involvement in making career choices, including choice of geographic location.

Senior Level:

1. Select a specific planning methodology to be used in career decisions.
2. Review the availability, requirements, and application procedures for post-residency fellowships under consideration.
3. Review and critique the following issues as they relate to a planned surgical practice:
   a. Health care delivery systems, including managed care
   b. Health care economics
   c. Political and legislative processes in health care
4. Obtain demographic studies of potential practice locations to include population and medical demographics.
5. Outline the essential characteristics of the business side of medical practice, including:
   a. Content and interpretation of financial reports
   b. Management of human resources
   c. Facilities design and management, including site selection and equipment requirements
   d. Accounting procedures such as billing and collections
6. Analyze the financial issues associated with the selection of the career options under consideration.
7. Describe and evaluate the essential components of the following topics associated with the management of a planned surgical practice:
   a. Financial management and accounting
   b. Coding, billing, and collections
   c. Selection and management of facilities, including real property and equipment
   d. Human resources management
   e. Marketing and planning
   f. Data management using computer technology
   g. Contractual and legal issues
   h. Quality assurance
   i. Risk management (professional and employer)
   j. Cost-containment
8. Describe the content, managed care relationships, interpretation, and utilization of the following financial documents:
   a. Balance sheet
   b. Income and expense statement
   c. Accounts payable and receivable
   d. Collection analysis

9. Determine the insurance requirements related to the planned surgical practice, including:
   a. Casualty, fire, and theft
   b. Liability/malpractice
   c. Personal health and disability
   d. Personal life

10. Outline quality assurance activities required in surgical practice, including:
    a. Clinical record adequacy and accuracy
    b. Risk management
    c. Documentation of morbidity and mortality
    d. Periodic review of morbidity and mortality
    e. Appropriate provision of second opinion

11. Formulate plans to acquire and maintain managerial skills appropriate for the practice.

Competency-Based Performance Objectives:

Junior Level:

1. Discuss post-residency career options with:
   a. Faculty
   b. Other residents
   c. Family

2. Locate sources for review of:
   a. Social, legal, and ethical issues associated with post-residency career decisions
   b. Health care economics and structure

3. Begin to accumulate information about surgical practice opportunities, including type of practice and location.

4. Accumulate information about pertinent fellowship opportunities.

5. Explore other post-residency career choices.

6. Assess own interpersonal skills and their impact on career choice.

7. Develop and implement strategies for improving interpersonal communications skills.

8. Select and implement a logical plan for making decisions about a post-residency career. Include a timetable and milestones.

9. Involve appropriate family members in career planning.

10. Accumulate a notebook with basic laws covering office management (e.g., CLIA)

11. Maintain accurate and current documentation of patient care experiences while in training, utilizing the appropriate software package for ACGME-RRC documentation and American Board of Surgery application completion. Determine and follow a plan of action for meeting required case number minimums.

12. Develop a personal resume/curriculum vitae and collection file for updating scholarly accomplishments and other credentials appropriate for preparing professional announcements.

13. Locate sources for review of the physician’s role in cost-containment.

Senior Level:

1. Obtain specific information about post-residency fellowships including availability, requirements, and application procedures.

2. Gather information about specific types of surgical practice of personal interest.
3. Analyze current medical and population demographics associated with the types and locations of surgical practice being considered.
4. Prepare a detailed financial plan for each selected career option. Include repayment of educational loans in the plan.
5. Select type of surgical practice to pursue.
6. Review practice facility requirements, including:
   a. Location, including proximity to hospital, consultants, diagnostic services
   b. Space, including floor plan, patient flow, waiting room capacity
   c. Patient access, including parking
   d. Equipment
7. Develop a business plan for surgical practice.
9. Determine requirements and select systems to manage:
   a. Clinical records
   b. Finance, accounting, billing, and collection
   c. Schedules and appointments
10. Complete a financial plan for the proposed surgical practice to include:
    a. Start up costs
    b. Revenue generation including fee schedules
    c. Practice expenses
    d. Insurance requirements and costs
    e. Human resources compensation and costs
    f. Income projections
    g. Equipment costs, including maintenance
11. Determine human resource requirements, including recruiting and training.
12. Prepare professional job descriptions for all personnel requirements.
13. Construct a basic plan for fair and appropriate personnel mentoring and evaluation.
14. Complete licensure and registration requirements for your chosen location.
15. Complete applications for hospital staff membership and clinical privileges.
16. Develop a marketing strategy for the chosen community.
17. Formulate a plan for personal and practice promotion to include:
    a. Active participation in medical staff affairs
    b. Attendance at appropriate hospital and medical staff committee meetings and meetings of local medical societies
    c. Participation in medical education programs for:
       i. Medical staff
       ii. Residents and medical students
       iii. Nursing and hospital ancillary staff
       iv. Public
    d. Participation in emergency call as appropriate
    e. Involvement in clinical and/or basic science research
    f. Participation in community social, cultural, and service activities
    g. Being available, dependable and visible
18. Formulate plans to maintain clinical skills appropriate for practice through continuing medical education (CME) activities:
    a. Preparation for recertification
    b. CEM documentation for relicensure
19. Prepare materials for Website formulation appropriate for dispensing information for patients and colleagues in surgery and other disciplines.

**Palliative Care**

**Unit Objectives:**

- Outline resources available to patients at end of life, both locally and nationally.
• Demonstrate an understanding of the differences between curative and palliative patient care models.
• Integrate patient care, considering life-prolongation and palliation.
• Utilize effective principles of communication, bioethical concepts, and practical bedside care in working with patients, families, and other health care providers.
• Evaluate differential goals of treatment options/palliative care options available for geriatric patients.
• Learn and apply the principles of palliative care for patients with advanced illness and those at the end of life.

Competency-Based Knowledge Objectives:

1. Discuss the evolution of palliative care. Utilize the following terms in your discussion of the evolution: to alleviate, to mitigate, to lessen pain, and to give temporary relief.
2. Discuss the principles and rationale for the goal of palliative care as achieving the best quality of life for patients and their families, utilizing the following core principles:
   a. Respect the dignity of patient and caregivers.
   b. Be sensitive to and respectful of the wishes of patient and family.
   c. Use the most appropriate measures that are consistent with patient choices.
   d. Ensure alleviation of pain and management of other physical symptoms.
   e. Recognize, assess, and address psychological, social, and spiritual and religious problems.
   f. Ensure appropriate continuity of care by the patient’s primary and specialist physicians.
   g. Provide access to any therapy that may realistically be expected to improve the patient’s quality of life.
   h. Provide access to appropriate palliative care and hospice care.
   i. Respect the patient’s right to refuse treatment.
   j. Recognize the physician’s responsibility to forgo treatments that are futile.
3. Summarize and give examples of how to comply with patient and family expectations in the five domains of quality end of life care from the patient’s perspective:
   a. Receiving adequate pain and symptom management
   b. Avoiding inappropriate prolongation of dying
   c. Achieving a sense of control
   d. Relieving burden
   e. Strengthening relationships with loved ones
4. Outline considerations for determining measures of quality of life.
5. Illustrate how one would go about assessing quality of life for:
   a. Patient
   b. Caregivers
6. Explain the significance and interrelationship between these two basic clinical tasks as they relate to palliative care:
   a. Communication skills
   b. Symptom control/management
7. Analyze the significance of and mechanisms for implementing a team approach for caring for the patient with advanced illness, include consideration of:
   a. Other physicians
   b. Nursing staff
   c. Other health care team members
8. Analyze and discuss the significance of the “active, optimistic, interventionist” tradition of surgery for cure as compared with the needs of the patient who is “beyond cure” regarding these issues:
   a. Time to pursue various treatments
   b. Realistic vs. unrealistic goal accomplishment
   c. Use of these verbs: cut, sew, resect vs. bypass, stabilize, decompress
9. The literature indicates that the most prominent concern voiced by patients facing life-limiting disease is of pain and poorly controlled symptoms. Evaluate the surgeon’s professional and ethical obligation in dealing with this patient concern. Discuss this issue, considering:
   a. The surgeon has the patient’s comfort as priority
   b. Every resource is accessed to attain patient comfort

**Competency-Based Performance Objectives:**

1. Complete an evaluation and treatment plan for a patient who is at the end of life and for whom integration of life-prolongation and palliation are important considerations. Consider the following:
   a. Patient risks
   b. Treatment options
   c. Patient goals and values

2. Utilize the principles of appropriate palliative care to counsel patients and their families about surgical and medical procedures to be employed, including obtaining informed consent after discussing the risks, benefits, and alternatives to the procedure.

3. Demonstrate communication skills in end of life care through establishing interpersonal relationships with patients while discussing problems with them.

4. Establish collegiality with non-surgical partners in patient care, especially regarding the spiritual care of the patient.

5. Utilize professional resources such as Websites to assist and improve patients’ palliative care.

6. Perform selected palliative general surgical procedures such as:
   a. Drainage of effusions (ascites, pleural, pericardial)
   b. Intervention for obstructions (respiratory, gastrointestinal, urologic, vascular)
   c. Control of pain
   d. Palliative tumor resection
   e. Supportive intervention (tissue sampling, vascular access, enteral feeding tubes)

**Attitudes:**

1. Recognize the concerns of patients and their families regarding their fear of uncontrolled pain.

2. Respond positively and actively to the efforts of other members of the healthcare team for the total care of the patient, including consideration of:
   a. Non-medical consequences of treatment
   b. Quality of life issues
   c. Spiritual needs of patient and caregivers
   d. Interpersonal relationships