ATI Remediation

HIV/AIDS client education:

- Practice good hygiene and frequent hand hygiene to reduce the risk of infection
- Avoid crowded areas or traveling to countries with poor sanitation
- Avoid raw foods (fruits, vegetables) and undercooked foods (meat, fish, eggs)
- Avoid cleaning pet litter boxes to reduce the risk of toxoplasmosis
- Keep the home environment clean and avoid being exposed to family and friends who have colds or flu viruses
- Wash dishes in hot water using a dishwasher if available
- Bathe daily using antimicrobial soap
- Understand the following teachings:
    - Transmission, infection control measures, and safe sex practices
    - Importance of maintaining a well-balanced diet
    - Self-administering of prescribed medications and potential adverse effects
    - Findings that need to be reported immediately (infection)
- Adhere to the antiretroviral dosing schedules
- Conduct frequent follow-up monitoring of CD4+ and viral load counts
- Perform constructive coping mechanisms
- Identify primary support systems
- Report manifestations of infection immediately to the provider

HIV/AIDS Nursing actions:

- Monitor laboratory results (CBC, WBC, liver function tests). Antiretroviral medications can increase alanine aminotransferase, aspartate aminotransferase, bilirubin, mean corpuscular volume, high-density lipoproteins, total cholesterol, and triglycerides
- Monitor total CD4+ T lymphocyte counts as well as CD4 percentage and ratio of CD4 to CD8 cells
    - Normal CD4-to-CD8 ratio is 2:1. A ratio of less than 1 indicates more severe disease manifestations
    - Low CD4 T lymphocyte counts and steadily decreasing counts indicate poor prognosis or medication resistance

Client education:

- Be aware of the adverse effects of the medications and ways to decrease the severity of adverse effects
- Take medications on a regular schedule and do not miss doses. Missed medication doses can cause drug resistance

HIV/AIDS Interprofessional care:

- Infectious disease services may be consulted to manage HIV
- Respiratory services may be consulted to improve respiratory status and provide portable oxygen
- Nutritional services may be consulted for dietary supplementation. Food services can be indicated for clients who are homebound and need meals prepared
- Rehabilitation services may be consulted for strengthening and improving the client's level of energy
- Refer the client to local AIDS support groups as appropriate
- Home health services can be indicated for clients who need help with strengthening and assistance regarding ADLs. Home health services may also provide assistance with IVs, dressing changes, and total parenteral nutrition (TPN)
- Long-term care facilities can be indicated for clients who have chronic HIV
- Hospice services can be indicated for clients who have a late stage of HIV

Lupus Erythematosus (Lupus), Gout, and Fibromyalgia:

Lupus Erythematosus expected findings:

- Fatigue
- Alopecia
- Blurred vision
- Pleuritic pain
- Anorexia/weight loss
- Depression
- Joint pain, swelling, tenderness
- Weakness

Lupus physical assessment findings:

- Fever (also a major indication of exacerbation)
- Anemia
- Lymphadenopathy
- Pericarditis (presence of a cardiac friction rub or pleural friction rub)
- Raynaud's phenomenon (arterial vasospasms in response to cold/stress)
- Erythematosus "butterfly" rash on the nose and cheeks (raised, dry, scaly)
- Few to no manifestations if lupus is in remission

- With exacerbation of lupus, multiple body systems are often affected (kidney, heart, lungs, gastrointestinal tract, vasculature)

Lupus nursing care:

- Assess/monitor the following:
    - Pain, mobility, and fatigue
    - Vital signs (especially blood pressure)
    - Systemic manifestations
        - Hypertension and edema (renal compromise)
        - Urine output (renal compromise)
        - Diminished breath sounds (pleural effusion)
        - Tachycardia and sharp inspiratory chest pain (pericarditis)
        - Rubor, pallor, and cyanosis of hands/feet (vasculitis/vasospasm, Raynaud's phenomenon)
        - Arthralgias, myalgias, and polyarthritis (joint and connective tissue involvement)
        - Changes in mental status that indicate neurologic involvement (psychoses, paresis, seizures)
        - BUN, blood creatinine level, and urinary output for renal involvement
        - Nutritional status
    - Provide small, frequent meals if anorexia is a concern. Offer between-meal supplements
    - Encourage the client to limit salt intake for fluid retention secondary to steroid therapy
    - Provide emotional support to the client and family

Gout risk factors:

- Obesity
- Heredity
- Postmenopausal
- Cardiovascular disease
- Trauma
- Alcohol ingestion
- Starvation dieting
- Diuretic use
- Some chemotherapy agents
- Chronic kidney failure

Gout nursing care:

- Assess/monitor the following:
  - Pain
  - Redness/swelling of affected joint
  - Serum uric acid levels

Gout client education:

- Stay on a low-purine diet, which includes no organ meats or shellfish
- Limit alcohol intake
- Avoid starvation diets, aspirin, and diuretics
- Limit physical or emotional stress
- Increase fluid intake
- Practice medication adherence
- Use stress-management techniques

Fibromyalgia expected findings:

- Cardiovascular manifestations: chest pain, dysrhythmia, dyspnea
- Dysrhythmias
- Mild to severe fatigue
- Sleep disturbances
- Numbness/tingling of extremities
- Sensitivity to noxious smells, loud noises, and bright lights
- Headaches
- Jaw pain
- Depression
- Concentration and memory difficulties
- GI manifestations: abdominal pain, heartburn, constipation, diarrhea
- Genitourinary manifestations: frequency, urgency, dysuria, pelvic pain
- Visual changes

Fibromyalgia nursing care:

- Assess/monitor pain, mobility, and fatigue
- Provide emotional support to the client and family

Fibromyalgia client education:

- Limit intake of caffeine, alcohol, and other substances that interfere with sleep
- Develop a routing for sleep
- Engage in regular, low-impact exercise
- Complementary and alternative therapies can be helpful (acupuncture, stress management, tai chi, hypnosis)

Rheumatoid Arthritis (RA) expected findings depend on the area affected by the disease process, and can include the following:

- Pain at rest and with movement
- Morning stiffness
- Pleuritic pain (pain upon inspiration)
- Xerostomia (dry mouth)
- Anorexia/weight loss
- Fatigue
- Paresthesias
- Recent illness/stressor
- Joint pain
- Lack of function
- Joint swelling and deformity
    - Joint deformities are late manifestations of RA
    - Joint swelling, warmth, and erythema are common
    - Finger, hands, wrists, knees, and foot joints are generally affected
    - Finger joints affected are the proximal interphalangeal and metacarpophalangeal joints
    - Joints can become deformed merely by completing ADLs
    - Ulnar deviation, swan neck, and boutonniere deformities are common in the fingers
- Subcutaneous nodules
- Fever (generally low-grade)
- Muscle weakness/atrophy
- Reddened sclera and/or abnormal shape of pupils
- Lymph node enlargement
- Early manifestations of RA (fatigue, join discomfort) are vague and can be attributed to other disorders in older adult clients

RA nursing care:

- Assist with and encourage physical activity to maintain joint mobility (within the capabilities of the client)
- Monitor for indications of fatigue
- Teach the client measures to do the following:
    - Maximize functional activity
    - Minimize pain
    - Monitor skin closely
- Provide a safe environment
    - Provide referrals for physical therapy and occupational therapy

    - Provide information for support organizations
    - Facilitate the use of assistive devices
    - Remove unnecessary equipment and supplies
- Monitor for medication effectiveness (reduced pain, increased motility)

RA interprofessional care:

- Refer the client to support groups as appropriate
- Refer the client to occupational therapy for adaptive devices that can facilitate carrying out ADLs and prevent deformities
- A home health aide can be necessary for assistance with ADLs

Cancer body tissues:

- Epithelial tissue: carcinomas
- Glandular organs: adenocarcinomas
- Mesenchymal tissue: sarcomas
- Blood-forming cells: leukemias
- Lymph tissue: lymphomas
- Plasma cells: myelomas

Health promotion and disease prevention:

- Consume a healthy diet (low-fate with increased consumption of fruits, vegetables, and lean protein)
- Limit intake of sugar, salt, nitrates, nitrites, and processed meat/red meats
- Maintain a healthy body weight/body mass index
- Avoid use of tobacco products
- Limit alcohol consumption to one drink per day for females and two drinks per day for males
- Avoid risky lifestyle choices (recreational drug use, needle sharing, unprotected sexual intercourse)
- Avoid exposure to environmental hazards (radiation, chemicals). Use PPE when available
- Breastfeed infants exclusively for the first 6 months of life
- Engage in physical activity or exercise routinely
- Protect skin and eyes from UVA and UVB rays
- Remove at-risk tissue such as moles to prevent conversion to skin cancer
- Chemoprevention is the use of medications or other substances to disrupt cancer development
    - Aspirin and celecoxib to reduce the risk of breast cancer
    - Vitamin D and tamoxifen to reduce the risk of breast cancer

- Immunization to prevent human papilloma virus (HPV), which is associated with cervical, head, and neck cancers
- Immunization for Hepatitis B to prevent liver disease which can progress to liver cancer

Cancer expected findings:

- Benign tumors are often slower growing, have cells that closely resemble the surrounding area, and primarily have localized effects unless they compress blood vessels or nerves
- Malignant tumors have cells that are different from the cells around them, and can grow very rapidly if they are more abnormal. These cells continually proliferate toward the outer edges of the tumor, so that they can take over other tissue and access vasculature and lymphatics
- The findings associated with the presence of a tumor are dependent on the tissue in which they are located; clients will report pain and possible physiological changes if organ or tissue function has been disrupted

Cancer prognosis:

- Early diagnosis of cancer usually results in a better prognosis. Many cancers spread or metastasize before any manifestations are noted
- Minority populations tend to have a worse prognosis for cancer related to several factors (low socioeconomic status, lack of access to health care, or reluctance to seek treatment)
- For the client who has successful cancer treatment, the nurse should help create a survivorship plan. The client will need to continue prevention and screening for new cancer or recurrence of the original cancer, as well as watch for manifestations of metastasis. The client might require ongoing therapy for the effects of cancer and cancer treatment, such as pain management or fertility treatments. The nurse should assist with management and help the client coordinate care among various providers

Anesthesia and Moderate Sedation:

Anesthesia risk factors:

- General anesthesia:
    - Family history of malignant hyperthermia
    - Respiratory disease (hypoventilation)
    - Cardiac disease (dysrhythmias, altered cardiac output)
    - Gastric contents (aspiration)

    - Alcohol or substance use disorder
- Local anesthesia:
    - Allergy to ester-type anesthetics
    - Alterations in peripheral circulation
- Older adult clients are more susceptible than any other population to anesthetic agents
    - Careful titration of medications helps control the incidence of unwanted effects
    - Airway patency is the main priority in all situations, but cardiac problems can arise much more quickly in older adult clients
    - Pay special attention when an older adult is undergoing a procedure, because the client's condition can deteriorate quickly

Phases of General Anesthesia:

- Induction: Initiation of IV access, administration of preoperative medications given, securing of airway patency
- Maintenance: Performance of surgery, removal of assistive airway devices
- Emergence: completion of surgery, removal of assistive airway devices

The Four Stages of General Anesthesia:

- Stage I: Beginning analgesia and relaxation. The client feels dizzy and detached with reduced sensation to pain. Clients are sometimes sensitive to noise and stimuli
- Stage II: The client might feel delirious, act excited, and can be loud or crying. This stage can be bypassed if medications are given quickly enough. Pupils dilate but still respond to light
- Stage III: Operative or surgical anesthesia. The client has relaxed muscles and eventually loses reflexes. Vital functions begin to reduce, sensation is lost, and the client cannot hear. Pupils are small but reactive
- Stage IV: Dangerous level of anesthesia. Vital organ function is depressed to the point of respiratory failure and cardiac arrest. Pupils are fixed and death can occur. Anesthesia must be stopped immediately. The client might receive stimulant medications and narcotic agonists (to reverse opioids)

Preoperative Nursing Care:

Risk factors for surgical complications:

- Obstructive sleep apnea: Airway obstruction, oxygen desaturation

- Pregnancy: Fetal risk with anesthesia
- Respiratory disease: COPD, pneumonia, asthma
- Cardiovascular disease: Heart failure, myocardial infarction, hypertension, dysrhythmias
- Diabetes mellitus: Decreased intestinal motility, altered blood glucose levels, delayed healing, infection
- Liver disease: Altered medication metabolism and increased risk for bleeding
- Kidney disease: Altered elimination and medication excretion
- Endocrine disorder: Hypo/hyperthyroidism, Addison's disease, Cushing's syndrome
- Immune system disorders: Immunocompromised
- Coagulation defect: Increased risk of bleeding
- Malnutrition: Delayed healing
- Obesity: Pulmonary complications due to hypoventilation, effect on anesthesia, elimination, and wound healing
- Some medications: Antihypertensives, anticoagulants, NSAIDs, tricyclic antidepressants, herbal medications, over-the-counter medications
- Substance use: Tobacco, alcohol
- Family history: Malignant hyperthermia
- Allergies: Latex, anesthetic agents
- Inability to cope, lack of support system
- Disease processes involving multiple body systems
- Older adult clients: Possible age-related changes include the following:
    - Decrease hepatic and renal function that alters clearance of anesthetic agents and opioids
    - Co-morbidities (chronic disease processes, use of multiple medications)
    - Greater risk of adverse reactions to preoperative medications
    - Less physiologic reserve than younger clients, which can cause decreased immune system response and decreased wound healing
    - Reduction of muscle mass and amount of body water, which places older adult clients at risk for dehydration
    - Sensory decline (decreased eyesight, hearing loss)
    - Oral alterations (dentures, bridges, loose teeth) that pose problems during intubation
    - Perspire less, which leads to dry, itchy skin that becomes fragile and easily abraded
    - Decreased subcutaneous fat, which makes them more susceptible to temperature changes

Nursing care:

- Verify that the informed consent is accurately completed, signed, and witnessed
- Administer enemas and/or laxatives the night before and/or the morning of the surgery for clients undergoing bowel surgery
- Regularly check scheduled medication prescriptions. Some medications (antihypertensives, anticoagulants, antidepressants) can be withheld until after the procedure
- Determine whether autologous blood or direct blood donation from family is available if needed
- Ensure that the client remains NPO for at least 6 hr for solid foods and 2 hr for clear liquids before surgery with general anesthesia to avoid aspiration. Note on the chart the last time the client ate or drank
- Perform skin preparation, which can include cleansing with antimicrobial soap. If absolutely necessary, use electric clippers or chemical depilatories to remove hair in areas that will be involved in the surgery
- Ensure that jewelry, dentures, prosthetics, makeup, nail polish, and glasses are removed. These items can be given to the family or stored safely
- Cover the client with a lightweight cotton blanket heated in a warmer to prevent hypothermia. Hypothermia increase the chance for surgical wound infections, alters metabolism of medication, and causes coagulation problems and cardiac dysrhythmias
- Establish IV access using a large-bore (18-gauge) catheter for easier infusing of IV fluids or blood products
- Administer preoperative medications (prophylactic antimicrobials, antiemetics, sedatives) as prescribed
    - Prophylactic antibiotics are administer within 1 hr of surgical incision
    - If the client previously took a beta-blocker, administer a beta-blocker prior to surgery to prevent a cardiac even and mortatiliy
    - Have the client void prior to administration
    - Monitor response to medications
    - Raise side rails following administration to prevent injury
- Ensure that the preoperative checklist is complete
- Confirm and verify the correct surgical site with the client and all health care team members before clearly marking the surgical site
- Minimize client anxiety while waiting to go to surgery by using distraction techniques (watching TV, reading, listening to music)
- For clients encountering severe anxiety and panic, reassurance will be necessary and sedation medications can be given. Nonpharmacological interventions (distraction, imagery, and music therapy) can be initiated

- Ensure that measures are taken to prevent postoperative deep-vein thromboembolism by continuing anticoagulant therapy and/or anti-embolism stockings, pneumatic compression devices, and range-of-motion exercises

Client education:

- Understand the purpose and effects of preoperative medications that will be administered
- Be aware of postoperative pain control techniques (medications, immobilization, patient-controlled analgesia pumps, splinting)
- Perform splinting, coughing, and deep breathing
- Perform range-of-motion exercises and early ambulation for prevention of thrombi and respiratory complications
- Use antiembolism stockings and pneumatic compression devices to prevent deep-vein thrombosis
- Perform bowel and skin preparations as prescribed (cleansing enema, preoperative shower with medicated soap)
- Understand the purpose of invasive lines used in surgery and after (drains, catheters, IV lines)
- Adhere to the postoperative diet
- Perform incentive spirometry to promote oxygenation
- Adhere to preoperative instructions regarding medications
    - If taking acetylsalicylic acid, stop taking it for 1 week before an elective surgery to decrease the risk of bleeding
    - As the provider before taking any herbal or over-the-counter medications. Some medications can increase the risk of bleeding or adverse effects from anesthesia
    - Medications for cardiovascular disease, pulmonary disease, seizures, diabetes mellitus, some antihypertensive medications, and eye drops for glaucoma are usually allowed prior to surgery or a procedure
- Use a pain scale to rate pain level
- Understand the care and restrictions relative to the surgical procedure performed
- Avoid smoking, alcohol, or illicit drug use, which can interfere with surgical medications and increase the risk for surgical complications

Postoperative Nursing Care:

Risk factors for complications:

- Immobility: Respiratory compromise, thrombophlebitis, pressure injury

- Anemia: Blood loss, inadequate/decreased oxygenation, impaired healing factors
- Hypovolemia: Tissue perfusion
- Hypothermia: Risk for surgical wound infection, altered absorption of medication, coagulopathy, and cardiac dysrhythmia
- Cardiovascular diseases: Fluid overload, deep-vein thrombosis, arrhythmia
- Respiratory disease: Respiratory compromise
- Immune disorder: Risk for infection, delayed healing
- Diabetes mellitus: Gastroparesis, delayed wound healing
- Coagulation defect: Increased risk of bleeding
- Malnutrition: Delayed healing
- Obesity: Respiratory compromise, postoperative nausea and vomiting, wound healing, dehiscence, evisceration
- Age-related: Respiratory, cardiovascular, and renal changes necessitate specific attention to the postoperative recovery of older adults
    - Older adults perspire less, which leads to dry, itchy skin that becomes fragile and easily abraded. The use of paper tape for wound dressing can be appropriate, as well as lifting precautions
    - Older adults can be at risk for delayed wound healing because of possible compromised nutrition

Diagnostic procedures:

- CBC: WBC (infection/immune status), Hgb and Hct (fluid status, anemia)
- Metabolic profile: Blood electrolytes (electrolyte imbalances), BUN, and creatinine (renal function)
- ABGs: Oxygenation status
- Additional laboratory tests: Blood glucose, prothrombin time, INR based on procedure and associated health problems

Wound healing:

- Encourage the client to consume a diet high in calories, protein, and vitamin C
- If the client has diabetes mellitus, maintain appropriate glycemic control

Discharge teaching:

- Teach the client the purpose, administration guidelines, and adverse effects of medications

- Reinforce activity restriction (driving, stairs, limits on weight lifting, sexual activity) with the client
- Provide dietary guidelines, if applicable
- Inform the client about treatment instructions (wound care, catheter care, use of assistive devices)
- Inform the client of emergency contact information
- Advise the client to inform the surgeon if pain is unrelieved by current medication
- Teach the client to monitor and report any indications of infection at the surgical site to the surgeon

Diabetes Mellitus health promotion and disease prevention:

- Diabetes mellitus type 1 cannot be prevented. Lifestyle modifications can be reduce the risk of diabetes mellitus type 2, and minimize the risk of complications for clients who develop diabetes mellitus
- Try to maintain weight appropriate for body build and height

Client education:

- Exercise and good nutrition are necessary for preventing or controlling diabetes
    - Carbohydrates: 45% of total daily intake
    - Protein: 15% to 20% of total daily intake, depending upon kidney function
    - Unsaturated and polyunsaturated fats: 20% to 35% of total daily intake
- Consistency in the amount of food consumed and regularity in meal times promotes blood glucose control
- Consume a diet low in saturated fats to decrease low-density lipoprotein (LDL), assist with weight loss for secondary prevention of diabetes, and reduce risk of heart disease
- Modify the diet to include sources of omega-3 fatty acids and fiber to lower cholesterol, improve blood glucose for clients who have diabetes, for secondary prevention of diabetes, and to reduce the risk of heart disease
- Perform physical activity at least three times per week (150 min/week)

Expected findings:

- Polyuria: Excess urine production and frequency from osmotic diuretics
- Polydipsia: Excessive thirst due to dehydration
    - Loss of skin turgor, skin warm and dry
    - Dry mucous membranes

    - Weakness and malaise
    - Rapid weak pulse and hypotension
- Polyphagia: Excessive hunger and eating caused from inability of cells to receive glucose (because of a lack of insulin or cellular resistance to available insulin) and body's use of protein and fat for energy (which causes ketosis)
    - The client can display weight loss
- Kussmaul respirations: Increased respiratory rate and depth in attempt to excrete carbon dioxide and acid due to metabolic acidosis
- Recurrent infections: Ask clients about the occurrence of vaginal yeast infections
- Other manifestations: Acetone/fruity breath odor (due to accumulation of ketones), headache, N/V, abdominal pain, inability to concentrate, fatigue, weakness, vision changes, slow healing of wounds, decreased level of consciousness, seizures leading to coma

Immune and Infectious Disorders Diagnostic Procedures:

Interpretations of Findings: The expected range of WBCs is 5,000 to 10,000/ mm3

- Leukopenia is the total WBC count less than 4,000/mm3. It can indicate drug toxicity, autoimmune disease, bone marrow failure, and some overwhelming infections
- Leukocytosis is a total WBC count greater than 10,000/mm3. It can indicate inflammation, infection, some malignancies, trauma, dehydration, stress, steroid use, and thyroid storm. The WBCs involved in inflammation are neutrophils, macrophages, eosinophils, monocytes, and basophils
    - A client who has had a splenectomy can have a persistently increased WBC count
    - Older adult clients can have a severe bacterial infection without leukocytosis. Manifestations of infection, such as fever, can be absent in an older adult who has an infection. The nurse should monitor older adult clients carefully for infection risks
- Neutropenia is a neutrophil count less than 2,000/mm3. Neutropenia occurs in clients who have viral infections, overwhelming bacterial infections, or are undergoing radiation or chemotherapy. A client who has neutrophils is at an increased risk for infection
    - The absolute neutrophil count (ANC) of a client who has neutropenia can help determine severity of the client's risk for

infection. Multiplying the total WBC count by the percentage of neutrophils plus the percentage of bands determines the ANC
    - An ANC less than 1,000 means that neutropenic precautions are essential
    - Neutropenic precautions (a protective environment) include the following:
        - Restricting visitors
        - Prohibiting visits by people who have an infection
        - Restricting exposure to live (cut or potted) plants
        - Avoiding contamination from the client's own bacterial flora by avoiding the measurement of rectal temperature and administering IM injections
- Left shift is an increase in immature neutrophils (bands or stabs) that occurs with an acute infection. Neutrophil production increases, allowing the release of immature neutrophils that are not capable of phagocytosis (ingesting and destroying bacteria)

Blood Allergy Test (IGE Antibody Test): Blood allergy testing can determine sensitivity to various allergens. The technician mixes specific allergens with the blood and incubates it with radiolabeled anti-IgE antibodies. Blood allergy testing can complement skin testing or be an alternative when the risk of a hypersensitivity reaction to an allergen exists. The radioallergosorbent test (RAST) is one form of blood allergy testing

Advantages:

- Will not precipitate a dangerous allergic reaction
- Quicker than skin testing

Disadvantages:

- Usually only tests for a small amount of allergens at a time, such as a panel for meat allergens, or panel for fruit allergens
- Can be less sensitive than skin testing

Immunizations:

Active:

- Active-natural immunity develops when the body produces antibodies in response to exposure to a live pathogen that enters the body naturally
- Active-artificial immunity develops when a vaccine is given and the body produces antibodies in response to exposure to a killed or attenuated virus

Passive:

Passive-natural immunity occurs when antibodies are passed from the mother to the fetus/newborn through the placenta and breast milk

Passive-artificial immunity occurs after antibodies in the form of immune globulins are administered to an individual who requires immediate protection against a disease where exposure has already occurred, such as following a bite from a poisonous snake or an animal who has rabies. After several weeks or months, the individual is no longer protected

Administration: The CDC immunization recommendations for adults (19 years and older):

- Tetanus, diphtheria (Td) booster: Give booster every 10 years. For adults who did not receive a dose of tetanus, diphtheria, pertussis (Tdap) previously, substitute one dose with Tdap
    - Pregnant clients should receive the vaccine between 27 and 36 weeks gestation. Pregnant clients should get Tdap vaccine with each pregnancy to protect the fetus from pertussis
- Measles, mumps, and rubella (MMR) vaccine: Follow recommendations for administering one or two doses to clients between the ages of 19 and 49 who lack documentation of immunization or prior infection, or laboratory proof of immunity. People born before 1957 are considered immune to measles and mumps
    - A client who is pregnant should not receive the MMR vaccine
    - Anaphylactic-like reaction to gelatin or neomycin is also a contraindication for not administering the MMR vaccine
    - Use caution when administering to a client who has a history of thrombocytopenia or thrombocytopenic purpura
- Varicella vaccine: Give two doses to adults who do not have evidence of a previous infection (or one dose, depending on the type of zoster vaccine). Give a second dose to adults who have had only one previous dose
    - Varicella vaccine is contraindicated for clients who are pregnant, have some cancers, or have hypersensitivity to neomycin and gelatin
    - The vaccine is not recommended for clients who have HIV, congenial immune deficiencies, or those taking immunosuppressive medication
- Pneumococcal vaccine: Two types are available: 13-valent pneumococcal conjugate vaccine (PCV13) and the 23-valent pneumococcal polysaccharide vaccine (PPSV23)

    - Follow recommendations for administration to adults who are immune compromised, have specific chronic diseases, smoke cigarettes, or live in long-term care facilities
    - PPSV23 does not work in children younger than 2 years old
    - For adults 65 years and older who have not been immunized with PCV13 or PPSV23, administer first and then give PPSV23 at age 65 or older, and additional dose is not indicated
- Hepatitis A: Two doses for high-risk individuals
    - One month after the first dose of hepatitis A vaccine, 94% to 100% for adults and children develop a protective level of antibodies. Adults who receive the second dose have 100% protective levels of antibodies after 1 month
- Hepatitis B: Administered three doses to high-risk individuals who lack completion of the series. There must be at least 1 month between doses one and two, and at least 2 months between doses two and three. A minimum of 4 months are required between doses one and three
    - Clients have greater than 85% protection after the second dose of hepatitis B vaccine and more than 90% after the third dose
    - The antibody duration of protection is 5 to 7 years
- Influenza vaccine:
    - Recommended for all adults annually
    - Inactivated influenza vaccine (IIV) is approved for clients who are pregnant
    - Recombinant influenza vaccine (RIV) is approved for adults 18 years and older
    - The live attenuated vaccine (LAIV), given as a nasal spray, is indicated only for adults under the age of 50 who are not pregnant or immunocompromised
    - Client who have an allergy to chicken eggs, previous severe reaction to the influenza vaccine, or previous Guillain-Barre Syndrome should not receive the influenza vaccine
    - Administration recommendations can change yearly, because the vaccine is created with different influenza strains each year. The vaccine is typically available beginning in early fall
- Meningococcal conjugate polysaccharide vaccines (MPSV4) and meningococcal conjugate polysaccharide vaccines (MCV4)
    - MPSV4 is not effective in children. It should be administered only to adults older than 55 years of age
    - MCV4 is recommended for infants to adults under 56 years of age, and all children between the age of 11 through 12 should receive an initial dose with a booster at age 16 years

    - Administer a dose of MCV4 to students up to age 21 years entering college and living in dormitories if a dose was not received on or after the 16th birthday. Two doses of MCV4 at least 2 months apart are recommended for individuals who have anatomical or functional asplenia, and one dose is recommended for military recruits and those traveling to or living in areas of hyper-endemic or epidemic rates of meningococcal disease
    - MPSV4 is preferred for adults who are 56 years of age or older, require a single dose, and have not had MCV4 previously
    - Re-immunization with MCV4 is recommended every 5 years for adults who remain at high risk for infection and were previously immunized with MCV4 or MPSV4
- Human papilloma virus vaccine:
    - There are three types of vaccines; only the 9-valent vaccine is available for use in the U.S.
    - 9-valent human papillomavirus (9vHPV) prevents HPV 6, 11, 16, 18, plus HPV 31, 33, 45, 52, and 58 noninfectious virus-like particles (VLP). Administered to adolescents as young as age 9 years but usually at ages 11 to 12 years
    - If initial dose is administered before age 15, only 2 doses are required, and the second should be given 6 to 12 months after the first
    - If the initial dose is administered after the 15th birthday, 3 doses are required. The second dose is recommended 1 to 2 months after the first, and the third dose 6 months from the first
- Zoster vaccine: Recommended as a one-time dose for all adults older than 60 years

Disorders of the Eye:

Macular Degeneration, often called age-related macular degeneration (AMD), is the central loss of vision that affects the macula of the eye

- There is no cure for macular degeneration
- AMD is a common cause of vision loss in older adults
- Two types of macular degeneration:
    - Dry macular degeneration is the most common and is caused by a gradual blockage in retinal capillary arteries, which results in the macula becoming ischemic and necrotic due to the lack of retinal cells

    - Wet macular degeneration is a less common form and is caused by the new growth of blood vessels that have thin walls that leak blood and fluid

Risk factors:

- Smoking
- Hypertension
- Female sex
- Short body stature
- Family history
- Diet lacking carotene and vitamin E
- Wet macular degeneration can occur at any age

Expected findings:

- Lack of depth perception
- Objects appear distorted
- Blurred vision
- Loss of central vision
- Blindness

Client education:

- Encourage clients to consume foods high in antioxidants, carotene, and vitamins E and B12. The provider may prescribe a daily supplement high in carotene and vitamin E
- As loss of vision progresses, clients can be challenged with the inability to eat, drive, write, and read, as well as other activities of daily living
- Refer clients to community organizations that can assist with transportation, reading devices, and large-print books

Cataracts: A cataract is an opacity in the lens of an eye that impairs vision

Common causes of cataracts:

- Age-related: Drying of lens due to water loss; increase in lens density due to lens fiber compaction
- Traumatic: Blunt or penetrating injury or foreign body in the eye, exposure to radiation or ultra violet light
- Toxic: Long-term use of corticosteroids, phenothiazine derivatives, beta-blockers, or miotic medications
- Associated: Diabetes mellitus, hypoparathyroidism, Down syndrome, chronic sunlight exposure

- Complicated: Intraocular disease (retinitis pigmentosa, glaucoma, retinal detachment)

Health promotion and Disease Prevention:

- Teach clients to wear sunglasses while outside
- Educate clients to wear protective eyewear while playing sports and performing hazardous activities, such as welding and yard work
- Encourage annual eye examinations and good eye health, especially in adults over the age of 40

Nursing Care:

- Check visual acuity using the Snellen chart
- Examine external and internal eye structures using an ophthalmoscope
- Determine the client's functional capacity due to decreased vision
- Increase the amount of light in a room
- Provide adaptive devices that accommodate for reduced vision
    - Magnifying lens and large print books/newspapers
    - Talking devices, such as clocks

Middle and Inner Ear Disorders:

Risk factors:

Middle ear disorders:

- Recurrent colds and otitis media
- Enlarged adenoids
- Trauma
- Changes in air pressure (scuba diving, flying)

Inner ear disorders:

- Viral or bacterial infection
- Damage due to ototoxic medications

Expected Findings:

Middle ear disorders:

- Hearing loss
- Feelings of fullness and/or pain in the ear
- Red, inflamed ear canal an tympanic membrane (TM)
- Bulging TM
- Fluid and/or bubbles behind TM
- Diffuse appearance of or inability to visualize normal light reflex

- Fever

Inner ear disorders:

- Hearing loss
- Tinnitus
- Dizziness or vertigo
- Vomiting
- Nystagmus
- Alterations in balance

Nursing care:

- Monitor functional ability and balance. Take fall risk precautions as necessary
- Evaluate the client's home situation. Collaborate with home health to assess home safety and fall risks, as needed
- Encourage a client who has balance or functional limitations to rise slowly and use assistance and assistive devices as needed
- Monitor blood levels of ototoxic medication, and teach clients about adverse effects. Routine audiometry is indicated with use of ototoxic IV antibiotics. Ototoxic medications include the following:
    - Antibiotics: gentamicin, erythromycin
    - Diuretics: furosemide, ethacrynic acid
    - NSAIDs: aspirin, ibuprofen
    - Chemotherapeutic agents: cisplatin
- Assist with ENG and caloric testing as needed
- Administer antivertigo and antiemetic medications as needed

Head Injury:

- Types of Brain Injury: Types of brain injury include concussion, contusion, diffuse axonal injury, and intracranial hemorrhage:
    - A concussion, or mild traumatic brain injury, occurs after head trauma that results in a change in the clients neurologic function but no identified brain damage and usually resolves within 72 hr. Post-concussion syndrome includes persistence of cognitive and physical manifestations for an unknown period of time
    - A contusion occurs when the brain is bruised and the client has a period of unconsciousness associated with stupor and or confusion
    - Diffuse axonal injury is a widespread injury to the brain that results in coma and is seen in severe head trauma

    - Intracranial hemorrhage can occur in the epidural, subdural, or intracerebral space. It is a collection of blood following head trauma. There can be a delay of weeks to months in presenting manifestations for a subacute or chronic subdural hematoma
- Open-head injuries pose a high risk for infection. Scalp injuries often result in profuse bleeding due to the poor vasoconstriction of the blood vessels of the scalp
- Skull fractures can occur following forceful head injury. The brain might be damaged as a result. The client can have localized pain at the site of the fracture, and swelling can occur. The nurse should be alert for drainage from the ears or eyes (cerebral spinal fluid [CSF])
- A cervical spine injury should always be suspected when a head injury occurs. A cervical spine injury must be ruled out prior to removing any devices used to stabilize the cervical spine

Risk factors:

- Motor vehicle or motorcycle crashes
- Illicit drug and alcohol use
- Sports injuries
- Assalt
- Gunshot wounds
- Falls

Diagnostic procedures:

- Cervical spine films to diagnose a cervical spine injury
- Computerized tomography (CT) and/or a magnetic resonance imaging (MRI) of the head and/or neck (with and without contrast if indicated)
- Calculation of cerebral perfusion using the ICP monitor, if it in place

Stroke:

Health Promotion and Disease Prevention:

- Hypertension, diabetes mellitus, smoking, and other related disorders can increase a client’s risk for a stroke
- Early treatment of hypertension, maintenance of blood glucose within expected range, and refraining from smoking will decrease these risk factors
- Maintaining a healthy weight and getting regular exercise can also decrease the risk of a stroke

Risk factors:

- Cerebral aneurysm
- Arteriovenous (AV) malformation
- Diabetes mellitus
- Obesity
- Hypertension
- Hyperlipidemia
- Atherosclerosis
- Hyperlipidemia
- Hypercoagulability
- Atrial fibrillation
- Use of oral contraceptives
- Smoking
- Cocaine use

Expected Findings: Some clients report transient manifestations (visual disturbances, dizziness, slurred speech, a weak extremity)

- These manifestations can indicate a transient ischemic attack (TIA), which can be a warning of an impending stroke.
- Antithrombic medication and/or surgical removal of atherosclerotic plaques in the carotid artery can prevent the subsequent occurrence of a stroke

Spinal Cord Injury (SCI):

Health Promotion and Disease Prevention:

- Causes of most SCIs are trauma (such as motor vehicle accidents), diving accidents, and gunshot wounds
- Hyperflexion injuries are caused by acceleration injuries that cause sharp forward flexion of the spine (head-on collision, fall, or diving). Hyperflexion injuries are caused by a backward snap of the spine (rear-end collision or a downward fall onto the chin

Risk factors:

- High-risk activities (extreme sports or high-speed driving)
- Participation in impact sports (football or diving)
- Acts of violence (gunshot and knife wounds)
- Substance use
- Disease (metastatic cancer or arthritis of the spine)
- Falls, especially in older adults

Client education:

- Clients who have experienced SCI with subsequent loss of function will need varying levels of support upon discharge, and multiple referrals can be required
- Clients who have quadriplegia require a lengthy and extensive rehabilitative experience, which can occur on an outpatient or in-home basis. Less extensive therapy is required for paraplegia, but many accommodations need to be made
- A family member or support person should understand how to assist with care (ADLs, transfers, medications)
- Many adaptations might also need to be made to the home to make it wheelchair accessible

Respiratory Diagnostic Procedures:

Pulmonary Function Tests (PFTs): PFTs determine lung function and breathing difficulties

- PFTs measure lung volumes and capacities, diffusion capacity, gas exchange, flow rates, and airway resistance, along with distribution of ventilation
- Helpful in identifying clients who have lung disease
- Commonly performed for clients who have dyspnea
- Can be performed before surgical procedures to identify clients who have respiratory risks
- If client is a smoker, instruct client not to smoke 6 to 8 hr prior to testing
- If a client uses inhalers, withhold 4 to 6 hr prior to testing (varies according to facility protocol)

Arterial Blood Gases: An arterial blood gas (ABG) sample reports the status of oxygenation and acid-base balance of the blood

- An ABG measures the following:
    - pH: Amount of free hydrogen ions in the arterial blood (H+)
    - PaO2: Partial pressure of oxygen
    - PaCO2: Partial pressure of carbon dioxide
    - HCO3-: Concentration of bicarbonate in the arterial blood
    - SaO2: Percentage of oxygen bound to Hgb as compared with the total amount that can be possible carried
- ABGs can be obtained by an arterial puncture or through an arterial line

Bronchoscopy: Bronchoscopy permits visualization of the larynx, trachea, and bronchi through either a flexible fiber-optic or rigid bronchoscope

- Bronchoscopy can be performed as an outpatient procedure, in a surgical suite under general anesthesia, or at the bedside under local anesthesia and moderate (conscious) sedation
- Bronchoscopy can also be performed on clients who are receiving mechanical ventilation by inserting the scope through the client's endotracheal tube

Chest Tube Insertion and Monitoring:

- Chest Tube Systems: A disposable three-chamber drainage system is most often used
    - First chamber: drainage collection
    - Second chamber: water seal
    - Third chamber: suction control (can be wet or dry)
- Chest Tube Insertion Potential Diagnoses:
    - Pneumothorax: partial to complete collapse of the lung due to accumulation of air in the pleural space
    - Hemothorax: partial to complete collapse of the lung due to accumulation of blood in the pleural space
    - Postoperative chest drainage: thoracotomy or open-heart surgery
    - Pleural effusion: abnormal accumulation of fluid in the pleural space
    - Pulmonary empyema: accumulation of pus in the pleural space due to pulmonary infection, lung abscesses, or infected pleural effusion
- Client presentation:
    - Dyspnea
    - Distended neck veins
    - Hemodynamic instability
    - Pleuritic chest pain
    - Cough
    - Absent or reduced breath sounds on the affected side
    - Hyper-resonance on percussion of affected side (pneumothorax)
    - Dullness or flatness on percussion of the affected side (hemothorax, pleural effusion)
    - Asymmetrical chest wall motion

Respiratory Management and Mechanical Ventilation:

Nasal cannula:

- A length of tubing with two small prongs for insertion into the nares
- FiO2 24% to 44% at flow rates of 1 to 6 L/min
- Advantages:
    - Safe, easy to apply, comfortable, and well tolerated
    - The client is able to eat, talk, and ambulate
- Disadvantages:
    - FiO2 varies with the flow rate, and the client's rate and depth of breathing
    - Extended use can lead to skin breakdown and drying of the mucous membranes
    - Tubing is easily dislodged

Simple facemask:

- Covers the client's nose and mouth
- FiO2 40% to 60% at flow rates of 5 to 8 L/min
- Advantages:
    - A face mask is easy to apply and can be more comfortable than a nasal cannula
- Disadvantages:
    - Flow rates of less than 5 L/min can result in rebreathing of CO2
    - Device is poorly tolerated by clients who have anxiety or claustrophobia
    - Eating, drinking, and talking are impaired
    - Use caution with clients who have a high risk of aspiration or airway obstruction
    - Moisture and pressure can collect under the mask and cause skin breakdown

Partial rebreather mask:

- Covers the client's nose and mouth
- FiO2 40% to 75% at flow rates of 6 to 11 L/min
- Advantages:
    - The mask has a reservoir bag attached with no valve, which allows the client to rebreathe up to one third of exhaled air together with room air
- Disadvantages:
    - Complete deflation of the reservoir bag during inspiration causes CO2 buildup
    - FiO2 varies with the client's breathing pattern
    - Mask is poorly tolerated by clients who have anxiety or claustrophobia
    - Eating, drinking, and talking are impaired

    - Use with caution for clients who have a high risk of aspiration or airway obstruction

Asthma:

Risk factors:

- Older adult clients have decreased pulmonary reserves due to physiologic lung changes that occur with the aging process
    - Older adult clients are more susceptible to infections
    - The sensitivity of beta-adrenergic receptors decreases with age. As the beta receptors age and lose sensitivity, they are less able to respond to agonists, which relax smooth muscle and can result in bronchospasms
- Family history of asthma
- Smoking
- Secondhand smoke exposure
- Environmental allergies
- Exposure to chemical irritants or dust
- Gastroesophageal reflux disease (GERD)

Expected findings:

- Dyspnea
- Chest tightness
- Anxiety or stress

Physical assessment findings:

- Coughing
- Wheezing
- Mucus production
- Use of accessory muscles
- Prolonged exhalation
- Poor oxygen saturation (low SaO2)
- Barrel chest or increased chest diameter

Nursing care:

- Position the client to maximize ventilation (high-Fowler’s)
- Administer oxygen therapy as prescribed
- Monitor cardiac rate and rhythm for changes during an acute attack (can be irregular, tachycardic, or with PVCs)
- Monitor respiratory rate and rhythm for changes in effort, symmetry, SaO2; auscultate lung sounds

- Initiate and maintain IV access
- Remain calm and reassuring
- Provide rest periods for older adult clients who have dyspnea. Design room and walkways with opportunities for rest. Incorporate rest into ADLs
- Encourage prompt medical attention for infections and appropriate immunizations
- Administer medications as prescribed

Chronic Obstructive Pulmonary Disease (COPD):

Health Promotion and Disease Prevention:

- Promote smoking cessation
- Avoid exposure to secondhand smoke
- Use protective equipment, such as mask, and ensure proper ventilation while working in environments that contain carcinogens or particles in the air
- Influenza and pneumonia immunizations are important for all clients who have COPD, but especially for older adults

Risk factors:

- Advanced age: Older adult clients have a decreased pulmonary reserve due to age-related lung changes
- Cigarette smoking is the primary risk factor for the development of COPD
- Alpha1-antitrypsin (AAT) deficiency
- Exposure to environment factors (air pollution)

Physical assessment findings:

- Dyspnea upon exertion
- Productive cough that is most severe upon rising in the morning
- Hypoxemia
- Crackles and wheezes
- Rapid and shallow respirations
- Use of accessory muscles
- Barrel chest or increased chest diameter (with emphysema)
- Hyper-resonance on percussion due to “trapped air” (with emphysema)
- Irregular breathing pattern
- Thin extremities and enlarged neck muscles
- Dependent edema secondary to right-sided heart failure

- Clubbing of fingers and toes (late stages of the disease)
- Pallor and cyanosis of nail beds and mucous membranes (late stages of the disease)
- Decreased oxygen saturation levels (expected reference range is 95% to 100%
- In older adults or clients who have dark-colored skin, oxygen saturation levels can be slight lower

Tuberculosis (TB):

Health Promotion and Disease Prevention:

- Clients who live in high-risk areas for tuberculosis should be screened on a yearly basis
- Family members of clients who have TB should be screened
- Screening is particularly important for people born outside the U.S. and migrant workers
- Early detection and treatment are vital. TB has a slow onset, and the client might not be aware until the disease is advanced. TB diagnosis should be considered for any client who has a persistent cough, chest pain, weakness, weight loss, anorexia, hemoptysis, dyspnea, fever, night sweats, or chills
- National and global health goals for TB include increasing the percentage of clients who complete treatment for TB
- Individuals who have been exposed to TB but have not developed the disease can have latent TB. This means that *Mycobacterium tuberculosis* is in the body, but the body has been able to fight off the infection. If not treated, it can lie dormant for several years and then become active as the individual becomes older or immunocompromised

Risk factors:

- Frequent and close contact with an untreated individual
- Lower socioeconomic status and homelessness
- Immunocompromised status (HIV, chemotherapy, kidney disease, diabetes mellitus, Crohn’s disease)
- Poorly ventilated, crowded environments (correctional or long-term care facilities)
- Advanced age
- Recent travel outside of the United States to areas where TB is endemic

- Immigration (especially from Mexico, Philippines, Vietnam, China, Japan, and Eastern Mediterranean countries)
- Substance use
- Health care occupation that involves performance of high-risk activities (respiratory treatments, suctioning, coughing procedures)

Expected findings:

- Persistent cough lasting longer than 3 weeks
- Purulent sputum, possibly blood-streaked
- Fatigue and lethargy
- Weight loss and anorexia
- Night sweats and low-grade fever in the afternoon

Physical assessment findings: Older adult clients often present with atypical finds of the disease (altered mentation or unusual behavior, fever, anorexia, weight loss)

Pulmonary embolism (PE):
Health Promotion and Disease Prevention:

- Promote smoking cessation
- Encourage maintenance of appropriate weight for height and body frame
- Encourage a healthy diet and physical activity
- Prevent DVT by encouraging clients to do leg exercises, wear compression stockings, and avoid sitting for long periods of time

Laboratory tests:

- ABG analysis
    - $PaCO_2$ levels are low (expected reference range is 35 to 45 mmHg) due to initial hyperventilation (respiratory alkalosis)
    - As hypoxemia progresses, respiratory acidosis occurs
    - Further progression leads to metabolic acidosis due to buildup of lactic acid from tissue hypoxia
- D-dimer:
    - Elevated above expected reference range in response to clot formation and release of fibrin degradation products (expected reference range is less than 0.4 mcg/mL)

Nursing care:

- Administer oxygen therapy to relieve hypoxemia and dyspnea. Position the client to maximize ventilation (high-Fowler’s = 90 degrees)

- Initiate and maintain IV access
- Administer medications as prescribed
- Assess respiratory status at least every 30 min
    - Auscultate lung sounds
    - Measure rate, rhythm, and ease of respirations
    - Inspect skin color and capillary refill
    - Examine for position of trachea
- Assess cardiac status
    - Compare blood pressure in both arms
    - Palpate pulse quality
    - Check for dysrhythmias on cardiac monitor
    - Examine the neck for distended neck veins
    - Inspect the thorax for petechiae
- Provide emotional support and comfort to control client anxiety
- Monitor changes in level of consciousness and mental status

Pneumothorax and Hemothorax:

Risk factors:

- Blunt chest trauma
- Penetrating chest wounds
- Closed/occluded chest tube
- Older adult clients have decreased pulmonary reserves due to normal lung changes, including decreased lung elasticity and thickening alveoli
- Chronic obstructive pulmonary disease (COPD)

Expected findings:

- Anxiety
- Pleuritic pain

Physical assessment findings:

- Manifestations of respiratory distress (tachypnea, tachycardia, hypoxia, cyanosis, dyspnea, and use of accessory muscles)
- Tracheal deviation to the unaffected side (tension pneumothorax)
- Reduced or absent breath sounds on the affected side
- Asymmetrical chest wall movement
- Hyper-resonance on percussion due to trapped air (pneumothorax)
- Dull percussion (hemothorax)
- Subcutaneous emphysema (air accumulating in subcutaneous tissue)

Nursing care:

- Administer oxygen therapy
- Auscultate heart and lung sounds and monitor vital signs every 4 hr
- Document ventilator settings hourly if the client is receiving mechanical ventilation
- Check ABGs, SaO2, CBC, and chest x-ray results
- Position the client to maximize ventilation (high-Fowler's = 90 degrees)
- Provide emotional support to the client and family
- Monitor chest tube drainage
- Administer medications as prescribed
- Encourage prompt medical attention when evidence of infection occurs
- Set up referral services (home health, respiratory services) to provide portable oxygen if needed

Respiratory Failure:

Expected findings:

- SOB
- Dyspnea with or without exertion
- Orthopnea (difficulty breathing lying flat)
- Rapid, shallow breathing
- Cyanotic, mottled, dusky skin or mucous membranes
- Tachycardia
- Hypotension
- Substernal or suprasternal retractions
- Decreased SaO2 (less than 90%)
- Adventitious breath sounds (wheezing, rales)
- Cardiac arrhythmias
- Confusion
- Lethargy

Laboratory tests: ABGs to confirm and monitor ARF, ARDS, and SARS

- PaO2 less than 60 mmHg and oxygen saturation less than 90% on room air (hypoxemia)
- PaCO2 greater than 45 mmHg and pH less than 7.35 (hypoxemia, hypercarbia)

Interprofessional care:

- Respiratory therapy

    - The respiratory therapist typically manages the ventilator, adjusts the settings, and provides chest physiotherapy to improve ventilation and chest expansion
    - The respiratory therapist also can suction the endotracheal tube and administer inhalation medications, such as bronchodilators
- Physical therapy for extended ventilator support and rehabilitation
- Nutritional therapy:
    - Enteral or parenteral feeding
    - Nutritional support following extubation