Wolters Kluwer
When you have to be right

Introduction to Clinical Pharmacology

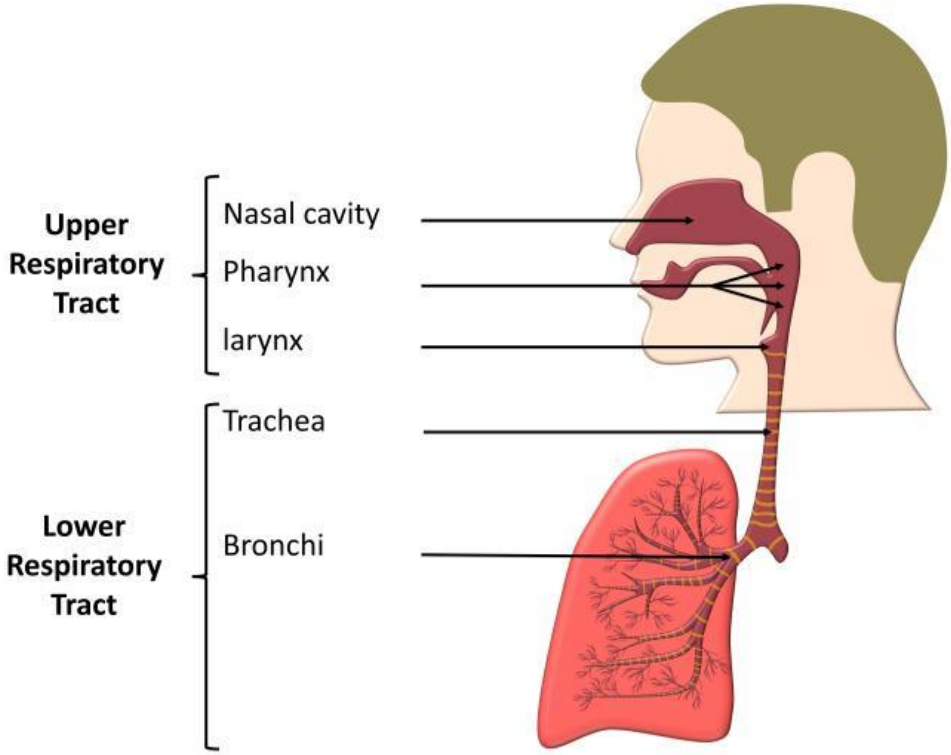
Chapter 30
Upper Respiratory System Drugs

Learning Objectives

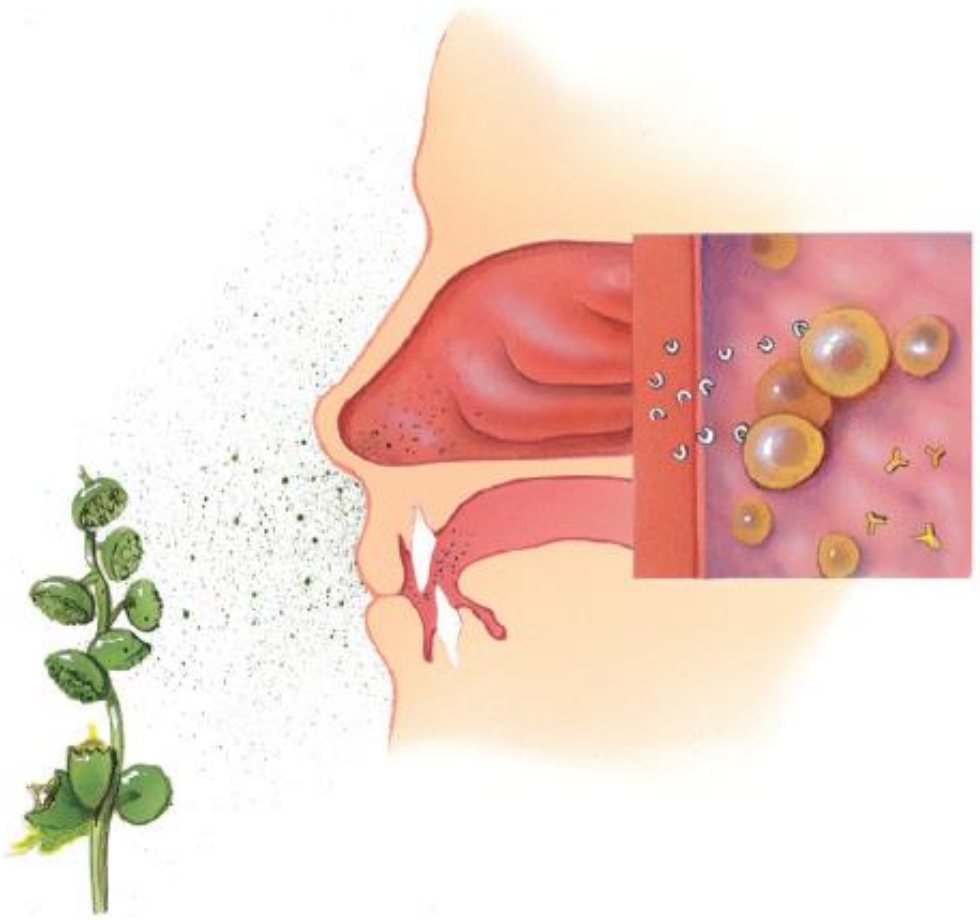
1. Compare and contrast the classes of medications used for upper respiratory system problems.
2. Explain the uses, general drug actions, adverse reactions, contraindications, precautions, and interactions of intranasal steroids, antitussives, mucolytics, expectorants, antihistamines, and decongestants.
3. Distinguish important preadministration and ongoing assessment activities that should be performed on the client receiving intranasal steroids, antitussive, mucolytic, expectorant, antihistamine, or decongestant.
4. List nursing diagnoses particular to a client taking intranasal steroids, antitussive, mucolytic, expectorant, antihistamine, or decongestant.
5. Examine ways to promote an optimal response to therapy, manage common adverse reactions, and educate the client about the use of intranasal steroids, antitussive, mucolytic, expectorant, antihistamine, or decongestant.

Common Conditions of the Upper Respiratory System

- Rhinitis
- Nasal congestion
- Sneezing
- Cough
- Postnasal drip
- Sore throat
- Common colds



Histamine Production



Upper Respiratory System Drug Classes

- Intranasal Steroids
- Antihistamines
- Decongestants
- Antitussives
- Expectorants
- Mucolytics

Intranasal Steroids—Actions and Uses

- **Actions**
  - Also known as glucocorticoids
  - Inhibit the response of cells such as mast cells, neutrophils, eosinophils, and macrophages and reduce mediators such as histamine which have an anti-inflammatory effect

- **Uses**
  - First-line treatment for symptoms of allergic rhinitis
  - Nonallergic rhinitis
  - Nasal polyps
  - Chronic sinusitis

Inhaled Steroids—Adverse Reactions

- Adverse Reactions:
  - Mild and unpleasant smell or taste
  - Dry nasal passages and epistaxis
  - Fungal infections (rarely)

Inhaled Steroids—Contraindications and Precautions

- Contraindicated in clients with:
  - known hypersensitivity to steroids
  - pregnancy (pregnancy category C)

- Use cautiously in clients:
  - taking systemic steroids
  - taking budesonide (increased blood levels of budesonide)
  - in children—slowed growth rate

Inhaled Steroids—Interactions

Interacting Drug	Common Use	Effect of Interaction
Budesonide		
Cimetidine	Reduces stomach acid	Inhaled steroid is less effective

Antihistamines—Actions

- **Actions**
  - Antihistamines block most, but not all, of the effects of histamine
  - First-generation antihistamines bind nonselectively to central and peripheral H_1 receptors and may result in CNS stimulation or depression
  - Other first-generation drugs may have additional effects: antipruritic (anti-itching) or antiemetic (antinausea) effects
  - Second-generation antihistamines are selective for peripheral H_1 receptors and, as a group, are less sedating

Antihistamines—Uses #1

- **Uses**
  - Seasonal and perennial allergies
  - Allergic and vasomotor rhinitis
  - Allergic conjunctivitis
  - Mild and uncomplicated angioneurotic edema and urticaria
  - Allergic reactions to drugs, blood, or plasma
  - Coughs caused by colds or allergy

Antihistamines—Uses #2

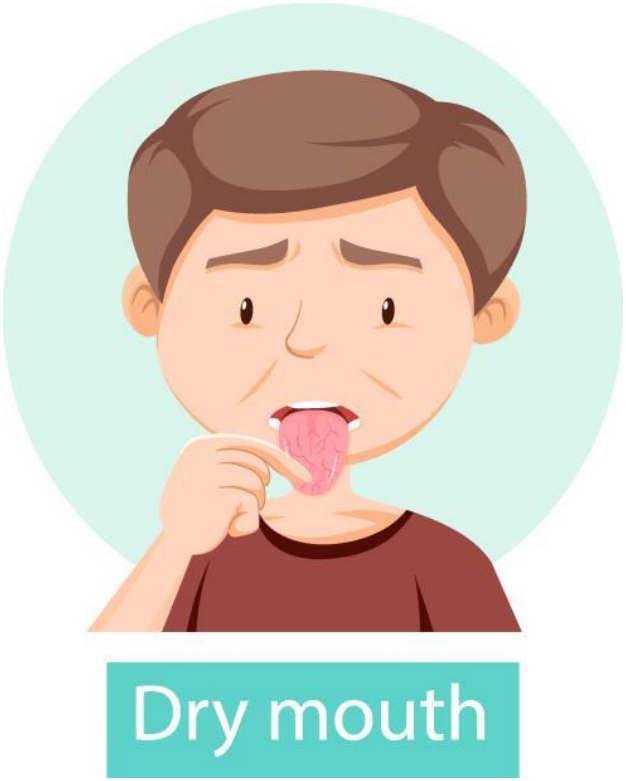
- **Uses**
  - Adjunctive therapy in anaphylactic shock
  - Treatment of parkin-like symptoms
  - Relief of nausea and vomiting
  - Relief of motion sickness
  - Sedation
  - Adjuncts to analgesics

Antihistamines—Adverse Reactions #1

- Central Nervous System Reactions:
  - Drowsiness or sedation
  - Disturbed coordination

Antihistamines—Adverse Reactions #2

- Respiratory System Reactions:
  - Dryness of mouth, nose, throat
  - Thickening of bronchial secretions



Antihistamines—Adverse Reactions #3

- Severe Adverse Reactions:
  - Hypersensitivity
  - Large doses can cause hyperthermia, tachycardia, confusion, sedation, delirium, hallucinations, blurry vision, dizziness, constipation, urinary retention, arrhythmias, seizures, and cardiac arrest

Antihistamines—Contraindications #1

- Contraindicated in clients with:
  - pregnancy (Pregnancy category B and C)
  - First-generation antihistamines: clients with known hypersensitivity to the drugs, newborns, premature infants, nursing mothers, individuals undergoing monoamine oxidase therapy, and in clients with angle-closure glaucoma, peptic ulcer, symptomatic prostatic hypertrophy, and bladder neck obstruction

Antihistamines—Contraindications #2

- Contraindicated in clients with:
  - Second-generation antihistamines: clients with known hypersensitivity
  - Cetirizine is contraindicated in clients who are hypersensitive to hydroxyzine

Antihistamines—Precautions

- **Use cautiously in clients with:**
  - bronchial asthma
  - cardiovascular disease
  - narrow-angle glaucoma
  - hypertension
  - impaired kidney function
  - urinary retention
  - pyloroduodenal obstruction
  - hyperthyroidism

Antihistamines—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Rifampin	Antitubercular agent	May reduce the absorption of the antihistamine (e.g., fexofenadine)
MAOIs	Antidepressant agent	Increased anticholinergic and sedative effects of the antihistamine
CNS depressants (e.g., opioid analgesics or alcohol)	Pain relief	Possible additive CNS depressant effect

Antihistamines—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Beta blockers	Management of cardiovascular disease	Risk of increased cardiovascular effects (e.g., with diphenhydramine)
Aluminum- or magnesium-based antacids	Relief of GI problems or upset	Decreased concentrations of drug in blood (e.g., fexofenadine)

Decongestants—Actions

- **Actions**
  - sympathomimetic drugs, which produce localized vasoconstriction of the small blood vessels of the nasal membranes
  - vasoconstriction reduces swelling

Decongestants—Uses

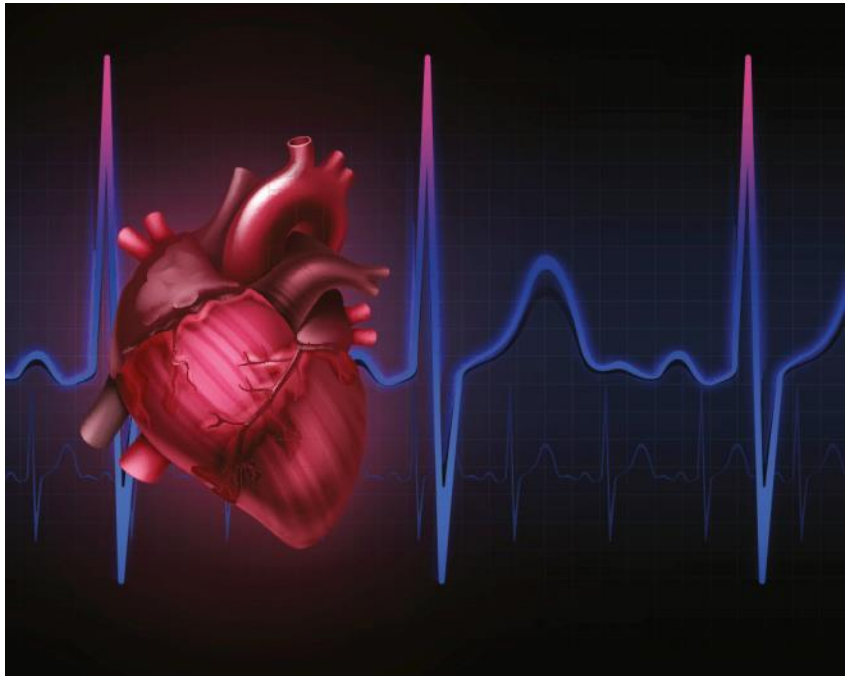
- **Uses**
  - Used to treat congestion associated with:
    - Common cold
    - Hay fever
    - Sinusitis
    - Allergic rhinitis
    - Congestion associated with rhinitis

Decongestants—Adverse Reactions #1

- Topical Reactions:
  - Nasal burning
  - Nasal stinging
  - Nasal dryness

Decongestants—Adverse Reactions #2

- Oral Administration Reactions:
  - Tachycardia and other cardiac arrhythmias
  - Blurred vision
  - Nausea and vomiting



Decongestants—Contraindications and Precautions

- Contraindicated in clients with:
  - known hypersensitivity to the drug or clients taking MAOIs

- Use cautiously in clients with:
  - thyroid disease
  - diabetes mellitus
  - hypertension, cardiovascular disease, coronary artery disease, or peripheral vascular disease
  - prostatic hypertrophy
  - glaucoma

Decongestants—Interactions

Interacting Drug	Common Use	Effect of Interaction
MAOIs	Antidepressant agent	Severe headache, hypertension, and possibly hypertensive crisis
Beta adrenergic blocking drugs	Management of cardiovascular disease	Initial hypertension episode followed by bradycardia

Antitussives, Expectorants, and Mucolytics—Actions

- Antitussives depress the cough center located in the medulla and are called centrally acting drugs (e.g., codeine); another mechanism is to act peripherally by anesthetizing stretch receptors in the respiratory passages (e.g., benzonatate)
- Expectorants increase the production of respiratory secretions, which in turn appears to decrease the viscosity of the mucus. (e.g., guaifenesin)
- Mucolytics reduce the viscosity of secretions by direct action on the mucus (e.g., acetylcysteine)

Antitussives, Expectorants, and Mucolytics—Uses

- Antitussives treat nonproductive cough
- Expectorants help bring up respiratory secretions
- Mucolytic acetylcysteine treats the following:
  - Acute bronchopulmonary disease
  - Tracheostomy care
  - Pulmonary compliance with cystic fibrosis
  - Pulmonary complications associated with surgery/anesthesia
  - Posttraumatic chest conditions
  - Atelectasis due to mucous obstruction
  - Acetaminophen overdosage

Antitussives, Expectorants, and Mucolytics—Adverse Reactions

- Adverse Reactions when combined with an antihistamine:
  - Lightheadedness
  - Dizziness
  - Drowsiness
  - Sedation

Antitussives, Expectorants, and Mucolytics—Contraindications

- Contraindicated in:
  - clients with known hypersensitivity to the drugs
  - premature infants or during labor when delivery of a premature infant is anticipated
  - clients with asthma (mucolytics)
  - pregnancy (pregnancy category D) (iodide)

Antitussives, Expectorants, and Mucolytics—Precautions #1

- Antitussives—use with caution in:
  - Clients with a persistent cough or a cough with excessive secretions, a high fever, persistent headache, and nausea and vomiting
  - Antitussives containing codeine are used with caution in clients during pregnancy (pregnancy category D), acute asthmatic attack, preexisting respiratory disorders, acute abdominal conditions, head injury, increased intracranial pressure, convulsive disorders, hepatic or renal impairment, and prostatic hypertrophy

Antitussives, Expectorants, and Mucolytics—Precautions #2

- Expectorants—use with caution in clients with:
  - Pregnancy (pregnancy category C) and labor (pregnancy category D)
  - persistent cough
  - severe respiratory insufficiency
  - asthma
  - elderly or debilitation

Antitussives, Expectorants and Mucolytics—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Antitussives with codeine		
CNS depressants or alcohol	Pain relief or social enjoyment respectively	Additive depressant effects
Dextromethorphan		
MAOIs	Antidepressant agent	Hypotension, fever, nausea, jerking motions of the leg, and coma

Antitussives, Expectorants and Mucolytics—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Iodine products		
Lithium	Used to treat mania in bipolar disorder	Potentiate hypothyroid effects
Antithyroid drugs	Treat hyperthyroidism	Potentiate hypothyroid effects
Potassium-containing medications	To correct/treat hypokalemia	Increased risk for cardiac arrhythmias or cardiac arrest
Potassium sparing diuretics	To treat heart failure, edema, and certain kidney disorders	Increased risk for cardiac arrhythmias or cardiac arrest

Pharmacology in Practice Exercise #1

- Given below, in random order are the steps of the inflammatory response to injury. Arrange the steps of the inflammatory response in the order they are likely to occur in most situations.

a) Dilation of the arterioles

b) Increased capillary permeability

c) Release of histamine

d) Escape fluid from blood vessels

e) Localized redness

f) Localize swelling

Nursing Process—Client Receiving an Upper Respiratory System Drug #1

- **Preadministration Assessment**
- **Objective** Data
  - Vital signs
  - Weight (for pediatric clients)
  - Auscultate breath sounds

Nursing Process—Client Receiving an Upper Respiratory System Drug #2

- **Preadministration Assessment (continued)**
- **Subjective** Data
  - Type and duration of symptoms
  - Description of activity disruption by symptoms
  - Health history (especially regarding seasonal allergies or allergens in household)
  - Remedies attempted before seeking care

Pharmacology in Practice Exercise #2

- What information should be obtained from the client by the nurse and documented prior to the recommendation of an antitussive? Select all that apply.

a) Type of cough

b) Presence of sputum

c) Home remedies used to treat the cough

d) Vital signs of the last PHCP visit

Nursing Process—Client Receiving an Upper Respiratory System Drug #3

- **Ongoing Assessment**
  - Ask client about diminishing or worsening symptoms
  - If client returns to ambulatory setting or is in an inpatient setting, assess the client's lung sounds and monitor vital signs

Nursing Process—Client Receiving an Upper Respiratory System Drug #4

- **Nursing Diagnosis**
  - Injury Risk related to drowsiness, dizziness, or sedation
  - Ineffective Airway Clearance related to pooling of or thick secretions
  - Impaired Oral Mucous Membranes related to dry mouth, nose, and throat

Nursing Process—Client Receiving an Upper Respiratory System Drug #5

Planning

- Expected client outcomes depend on the reason for administration of the drug but include:
  - Optimal response to therapy
  - Management of adverse drug reactions
  - Confidence in an understanding of the prescribed medication regimen

Nursing Process—Client Receiving an Upper Respiratory System Drug #6

- **Implementation**
  - Promoting Optimal Response to Therapy
    - Clients should be advised that if a cough lasts for more than 10 days or is accompanied by a fever, chest pain, severe headache, or skin rash that the client should consult the primary health care provider
    - Take height and weight annually of children taking long term inhaled steroids and compare to previous growth chart documentation
    - Reinforce teaching points specific to each medication

Nursing Process—Client Receiving an Upper Respiratory System Drug #7

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Injury Risk**
      - Assist the client with ambulation
      - Clear path to bathroom of hazards
      - Place the call light within easy reach and instruct to call before attempting to get out of bed and ambulating
      - In outpatient settings advise client not to engage in activities that require a clear mind or operation of equipment

Nursing Process—Client Receiving an Upper Respiratory System Drug #8

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Ineffective Airway Clearance**
      - In an inpatient setting have suction equipment readily available
      - In clients with thick sputum encourage fluids (up to 2000 mL per day if not contraindicated)
      - Instruct client to deep breathe and cough
      - Document color, amount, and consistency of sputum

Nursing Process—Client Receiving an Upper Respiratory System Drug #9

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Ineffective Airway Clearance (continued)**
      - Teach the client to take INS exactly as prescribed to avoid rebound nasal congestion
      - Suggest that the client use nasal saline irrigation using a “neti pot”

Nursing Process—Client Receiving an Upper Respiratory System Drug #10

- **Implementation**
  - Monitoring and Managing Client Needs
    - **Impaired Oral Mucous Membranes**
      - Offer the client sips of water or ice chips to relieve symptoms of dry mouth, nose, and throat with the administration of antihistamines

Nursing Process—Client Receiving an Upper Respiratory System Drug #11

- **Implementation—Educating the** Client and Family
  - Review the dosage regimen and possible adverse drug reactions with the client
  - Advise the client to read OTC drug labels carefully, follow the dosage recommendations and consult a PHCP if the cough persists for more than 10 days, the color of sputum changes, or the client develops fever or chest pain
  - For clients receiving acetylcysteine, the respiratory therapist typically gives the client and family instruction on how to maintain the equipment and administer the drug; the nursing role is to evaluate the client or family's level of understanding of the drug regimen and has the opportunity to get all questions and answers addressed

Pharmacology in Practice Exercise #3

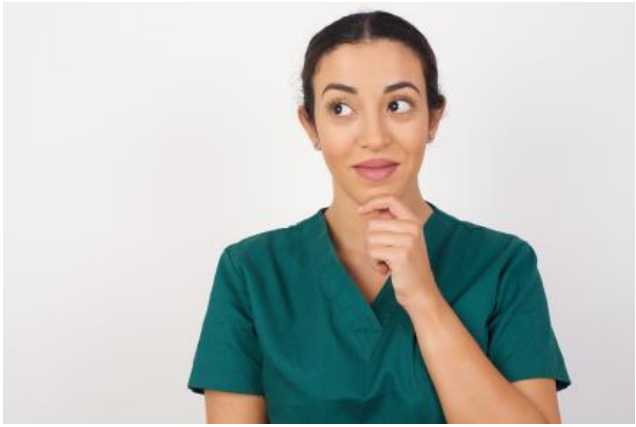
- A nurse in a rehab facility is caring for a client with a tracheostomy who has a severe cough. The PHCP has prescribed acetylcysteine for the client. What is typically the nurse's role when the drug is to be inserted into the tracheostomy?

a) Ensure that the client is not receiving any other drug therapy

b) Ensure that suction equipment is at the client's bedside

c) Ensure that the client gets continuous oxygen supply

d) Ensure that the client keeps drinking warm water



Nursing Process—Client Receiving an Upper Respiratory System Drug #12

- **Implementation—Educating the** Client and Family
- **Teach the Client and Family:**
  - Take the medication exactly as directed; do not exceed recommended dose
  - Avoid respiratory/allergy irritants
  - Drink fluids (1500 mL to 2000 mL per day)
  - Do not break open or chew capsules
  - Do not drink for 30 minutes after using a lozenge

Nursing Process—Client Receiving an Upper Respiratory System Drug #13

- **Implementation—Educating the** Client and Family
- **Teach the Client and Family (continued):**
  - To treat dry mouth, take frequent sips of water or suck on sugarless hard candy or chew sugarless gum
  - Initial use may result in drowsiness; caution when driving or performing hazardous activities; effect will subside over time
  - To avoid alcohol or drugs

Nursing Process—Client Receiving an Upper Respiratory System Drug #14

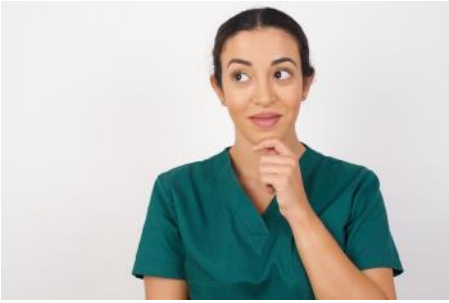
- **Implementation—Educating the** Client and Family
- **Teach the Client and Family: (continued)**
  - Teach methods to prevent and/or treat rebound congestion
  - Teach the client the proper use of a nasal spray devise; do not allow tip of container to touch nasal mucosa. Do not share with other people.
  - Teach signs of nasal fungal infection for clients using INS; discontinue use and report to primary health care provider

Nursing Process—Client Receiving an Upper Respiratory System Drug

- **Evaluation**
  - Was the therapeutic effect achieved and cough relieved?
  - Were adverse reactions: identified, reported, and managed?
    - No evidence of injury
    - Client has a clear airway
    - Mucous membranes are moist and intact
  - Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study #1

- A client with the medical conditions of hypertension and dyslipidemia, is currently taking the medications metoprolol (Toprol XL) 50 mg every day, hydrochlorothiazide 25 mg every morning, and simvastatin 2 mg every day. The client sends an email to the physician's office to inquire about what can be taken for nasal congestion. The triage nurse returns the email and asks if any self remedies have been tried and when the last vital sign recordings have been? The client tells the triage nurse nothing has been taken yet for the nasal congestion, and the client's Apple Watch records a blood pressure of 125/80 mm Hg and pulse of 70 beats/minute. The client denied any other symptoms.



Turn and Talk—Case Study #2

1. Was the client's call warranted?
2. What additional information does the triage nurse need to elicit from the client?
3. The physician recommends an over-the-counter nasal spray for the nasal congestion. Why is this the most appropriate treatment for this client?
4. What counseling should the triage nurse offer the client?