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| **Gas Exchange 5.6** | | | | | |
| **Class: Antihistamines (first generation)**  **Prototypes:** Diphenhydramine (Benadryl)  **Mechanism: Blocks histamine at H1 receptor, inhibits smooth muscle constriction in blood vessels and respiratory and GI tracts: decreases capillary permeability, salivation and tear formation** | | | **Therapeutic Effects:**   * Relieves allergic reactions and temporarily relieves symptoms due to hay fever or other upper respiratory allergies: runny nose; sneezing; itchy, watery eyes; itching of the nose or throat. For example: Common cold symptom management | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * PO/IV/IM/Suppository * Common dosages for adult PO 25-50mg q4-6hrs PRN. IV 10-50mg IM or IV * Common dosages for children 4 years and older 1.25mg per kg or body weight injected IM (intramuscularly) up to 4 times per day | * Common Cold * Respiratory Allergies * Mild allergic reactions | * Avoid alcohol and CNS depressants due to risk of sedation | | * Sedation Anticholinergic effects Gastrointestinal: Nausea/Vomiting * Paradoxical effect: excitation in children * **SAFETY:** Note the name is close to Dimenhydramine (gravol) so double check you have the right medication | * Administer as per policies. Sedation is a very serious consideration especially with intravenous administration. * Monitor respirations ensure resps are over 12 resps per minute * Consider second and third generation antihistamines since they have less sedative properties |

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| **Gas Exchange 5.7** | | | | | |
| **Class: Decongestants**  **Prototypes: Pseudoephedrine (Sudafed)**  **Mechanism: Sudafed is an over the counter decongestant. It acts on the adrenergic receptors by releasing norepinephrine from its storage sites. This causes vasoconstriction-shrinking nasal mucosa membranes.** | | | **Therapeutic Effects:**   * Relieves nasal congestion * Relieves sinus congestion * Decreases sinus pressure and decrease pain | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Do not crush, chew, or break an extended release tablet * Oral suspension is available, ensure proper measuring and dose * Adult Doses: Immediate release: 30 to 60 mg orally every 4 to 6 hours as needed. Sustained release: 120 mg orally every 12 hours as needed. Sustained release suspension: 45 to 100 mg orally every 12 hours as needed. Maximum daily dose is 240 mg/day. | * Use of nasal congestion due to common cold and hay fever * Upper respiratory allergies * Temporarily relieves sinus congestions and pressure | * Avoid using prolonged- greater than 7 days * Only use this medication if advised by prescribing practitioner or pharmacist if the person has heart disease since is acts as a sympathomimetic * This drug is banned for professional sports by the World Anti-Doping Agency as it is a stimulant and is claimed to enhance performance * DO not use in children under 4 years of age * DO not take if taking MAO inhibitors within 14 days, this leads to serious side effects. * DO not take if taking caffeine pills, diet pills or other stimulants such as ADHA medications | | * Rebound congestion with nasal route * Cardiovascular stimulation-fast heartbeat or pounding heart beat sensation * Dizziness or anxiety * Dangerously high blood pressure * Loss of appetite * Fever, headache, cough, or skin rash-contact doctor   **SAFETY:** Cautious when administering to cardiac patients due to the stimulation it can cause   * Death can occur in misuse of cough and cold drugs in very young children * Many over the counter drugs have combination of cough and cold drugs mixed together read the label to ensure you are not taking more drugs than indicated * Can cross into breast milk and could harm a nursing baby | * Drink at least 2-3 litres of water per day * Ensure prescribing doctor thinks its ok to take this medication if the person has heart disease, diabetes or a thyroid disorder |

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| **Gas Exchange 5.8** | | | | | |
| **Class: Antitussives**  **Prototypes: Dextromethorphan (Robitussin DM)**  **Mechanism: Suppresses a cough by depressing the cough center in the medulla oblongata or the cough receptors in the throat, trachea, or lungs that effectively elevate the threshold for coughing** | | | **Therapeutic Effects:**   * Prevents coughing or decreases the frequency | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * PO by elixir * Adults (12 years and over) 2 tsps every 6 hrs * Not for use in children under 12 years old | * Antitussives are used for a dry, hacking, non-productive cough that interferes with rest and sleep * Temporary relief of cough and minor throat and bronchial irritations from common cold or cough * Itchy watery eyes | * Not safe for children under 12 years of age * Has been used for recreational drug abuse to induce hallucinations this is a concern due to risk of overdose and impaired breathing * Do not take with alcohol * If taking MAOI’s consult doctor for further instruction * If taking puffers for respiratory diseases such as albuterol review with pharmacist if there are any interactions | | * Nausea * Drowsiness * Rash * Adverse effect difficult breathing   **SAFETY:**  Use cautiously with respiratory disease such as bronchitis, asthma or emphysema and people taking MAOI drugs | * High dosage can cause hallucinations and disassociation * Avoid irritants that stimulate more coughing * Teaching related to possible multiple drugs in one over the counter medication needs to be addressed for example acetaminophen   If symptoms persist more than 3-5 days seek medical assessment again |

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| **Gas Exchange 5.9** | | | | | |
| **Class: Expectorants**  **Prototypes: Guanfenesin (Mucinex)**  **Mechanism:** Expectorants reduce the viscosity of tenacious secretions by irritating the gastric vagal receptors that stimulate respiratory tract fluid, thus increasing the volume but decreasing the viscosity of respiratory tract secretions. | | | **Therapeutic Effects:**   * Helps loosen sputum (mucus) and thin bronchial secretions to make coughs more productive | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Liquid syrup or elixir, PO pill form – 12 hr effect (1 tablet is 600 mg) Max dose is 1200 mg in 24hrs * No eating or drinking for 30 minutes after syrup * Encourage patient to cough and deep breath * Stay hydrated (2-3 liters/day) * For adults 12 years and older * Do not exceed 24 hr limit of two doses * IF taking pill form-take with full glass of water * Do not crush or break pill | * Expectorants are used for a productive cough and for loosening mucus from the respiratory tract | * CNS depressants * Caution with pregnancy and breast feeding * Do not use if: Hyperthyroid, diabetes, closed angle glaucoma, high blood pressure,   Heart disease,  Enlarged prostate | | * skin rash * headache * nausea and vomiting * diarrhea * large doses cause drowsiness   **Safety**  Speak with prescribing doctor for use when pregnant or breast feeding  Risk of drowsiness-assess respirations and wakefulness | * The medication is safe for all ages. Guaifenesin is only recommended for use during pregnancy and breastfeeding when benefit outweighs the risk * Avoid irritants that stimulate their cough. * Can cause drowsiness. Patients should avoid taking them with other CNS depressants or alcohol |

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| **Gas Exchange 5.10** | | | | | |
| **Class: Beta- 2 Agonists**  **Prototype**: Salmeterol (long acting) and Albuterol (short acting)  **Mechanism:** Albuterol and salmeterol stimulate Beta 2-adrenergic receptors in the smooth muscle of bronchi and bronchioles producing bronchodilation. Beta-1 receptors can also be inadvertently stimulated, causing tachycardia. | | | **Therapeutic Effects:**   * Short-acting albuterol is used to prevent or treat bronchospasms in people with asthma, reversible obstructive airway disease, or exercise-induced bronchospasm. Short acting induces rapid bronchodilation and Long-acting salmeterol is used to prevent bronchospasms. Please note the differences | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Take as directed for proper dosing * Short acting onset 1-5 mins with duration of action 4-6hrs * Long acting onset 30.45 mins and duration of action greater than 12hrs | * Short-acting albuterol is used to prevent or treat bronchospasms in people with asthma, reversible obstructive airway disease, or exercise-induced bronchospasm. Long-acting salmeterol is used to prevent bronchospasm | * Hyperthyroidism * Glaucoma * Diabetes * Hypokalemia * Seizures * Cardiovascular disease (e.g., heart failure, hypertension, arrhythmias, coronary artery disease) | | * Muscle Tremor * Excessive cardiac simulation * CNS stimulation tachycardia and dysrhythmias * Unusual taste in the mouth * Hyperglycemia * Anxiety * Hypokalemia * Development on tolerance   **SAFETY: NOTE that using the long acting version during an acute asthma attack could increase the risk of death so do not use long term puffer for this purpose ensure you are using short acting drug Albuterol** | * Wash mouth before and after administration * Patient teaching needed to ensure proper puffers are used * Can develop paradoxical Broncho spasms |

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| **Gas Exchange 5.11** | | | | | |
| **Class: Anticholinergics**  **Prototypes: Ipratropium (short acting anticholinergic)**  **Tiotropium (long acting anticholinergic)**  **Mechanism:** Anticholinergics block the action of acetylcholine in bronchial smooth muscle, which reduces Broncho-constrictive substance release | | | **Therapeutic Effects:**   * Rapid bronchodilation to improve air movement and gas exchange * In long acting anticholinergics the prevention of bronchospasm and reduced exacerbation in COPD symptoms | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Inhaler use should be done with proper technique to get appropriate dosages * This can also be administered via a nebulizer. A nebulizer is a device such as a face mask that nurses place the liquid form of ipratropium in and attaches it to forced air which blows the medication through steam for 5-15 mins during inhalation. Typically doses are given 3-4 times per day. This is normally given in the hospital setting. The mask must be cleaned after use and the mouth should be rinsed. | * Anticholinergics are used for maintenance therapy of bronchoconstriction associated with asthma, chronic bronchitis, and emphysema * Wheezing | * Although we can see wheezing with infants this drug is not really used * Do not use if having Myasthenia gravis, hyperthyroid, glaucoma, enlarge prostate, urinary blockage tachycardia and heart failure | | * Increase cough * Drying of nasal mucosa * Nervousness * Nausea and GI upset * Headaches * Dizziness * Long term use may lead to angioedema   **Safety**  Understanding how to manage breathing concerns early and when a medical emergency and support is needed | * Watch for signs and symptoms of side effects including angioedema such as swelling in face * For quick relief breathing it is best used regularly as Salbutamol also known as albuterol is mostly known for its fast effects |

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| **Gas Exchange 5.12** | | | | | |
| **Class: Corticosteroids**  **Prototypes: Fluticasone (Flovent)**  **Mechanism:** Fluticasone is a locally acting anti-inflammatory and immune modifier. The nasal spray is used for allergies, and the oral inhaler is used for long-term control of asthma. Fluticasone is also used in a combination product with salmeterol. It decreases the frequency and severity of asthma attacks and improves overall asthma symptoms. Note that there are other corticosteroids that are used for more generalized inflammation such as oral prednisone and Methylprednisolone IV. These drugs have more of a systemic effect and are used at times for respiratory needs but mostly as a last resort. Fluticasone and other inhalers are preferred. | | | **Therapeutic Effects:**   * Used for management of the nasal symptoms of perennial non-allergic rhinitis * Difficulty breathing * Chest tightness * Wheezing * coughing | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Fluticasone aerosol oral inhaler is inhaled twice a day * Fluticasone powder is inhaled once a day * Use at the same time each day * Follow directions exactly to get proper dose * Rinse mouth before and after useage to prevent infection in oral cavity also called thrush | * Inhaler: Used to improve the control of asthma by reducing inflammation in the airways * Respiratory conditions * Seasonal or perennial allergic rhinitis * Bronchial asthma * When patients are not responding to fluticasone –Methylprednisolone IV may be used (not often but in special circumstances) for fast action in the hospital setting-the concern is that it also causes a suppression in the immune system so this is left for urgent needs after all other options exhausted. | * If allergic to milk products- pharmacist to advise * Oral infections can be masked or caused by this drug especially fungal infections or use of antifungals or HIV protease inhibitors | | * Hoarseness * Dry mouth * Cough * Sore throat * Oropharyngeal candidiasis   **Safety**  This product is flammable do not use near open flames it may explode | * Fluticasone will help prevent asthma attacks (shortness of breath, wheezing and coughing) but will not stop it once it is started so it is not really helpful during an attack * It can take 24hrs to start feeling benefits of this medication up to two weeks. Do not stop taking it until discussed with prescribing doctor |

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| **Gas Exchange 5.13** | | | | | |
| **Class: Leukotriene Receptor Antagonists**  **Prototypes: Montelukast (Singulair)**  **Mechanism:** Montelukast blocks leukotriene receptors and decreases inflammation | | | **Therapeutic Effects:**   * Decreases effects of asthmas long term control * Puffy and itchiness of eyes * Nasal congestion * Runny nose * Sneezy | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * Granule packs 4 mg, chewable tablets 4 and 5 mg, and regular tablets 10mg | * Montelukast is used for the long-term control of asthma and for decreasing the frequency of asthma attacks.  It is also indicated for exercise-induced bronchospasm and allergic rhinitis * Puffy eyes and itchy * Nasal congestion | * Suicidal Ideation | | * Headache * Cough * Nasal congestion * Nausea * Hepatotoxicity * Adverse effects Neuropsychiatric events aggression, depression, sleep disturbances, and suicidal behavior and thoughts   **Safety**  **This drug has been examined for its potential cause of increasing mental health disorders and suicidal ideation. In Canada there is discussion about removal of it from practice. Please check to see practice requirements.** | * Can be given to children 12 months and older * Take at regular times each day and two hours before exercise * Not a rescue drug which means during an acute breathing attack this drug will not help breathing, it is a longer term medication that slows the onset of attacks |

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| **Gas Exchange 5.14** | | | | | |
| **Class: Xanthine Derivatives**  **Prototypes: Theophylline**  **Mechanism:** Theophylline relaxes bronchial smooth muscle by inhibition of the enzyme phosphodiesterase and suppresses airway responsiveness to stimuli that cause bronchoconstriction | | | **Therapeutic Effects:**   * Prevents wheezing * Shortness of breath * Chest tightness caused by asthma and other lung diseases like chronic bronchitis, emphysema | | |
| **Administration** | **Indications** | **Contraindications** | | **Side Effects** | **Nursing Considerations** |
| * PO and extended release PO once a day dosage | * Theophylline is used for the long-term management of persistent asthma and COPD that is unresponsive to beta agonists or inhaled corticosteroids | * Active peptic ulcer disease * Seizure disorders * Cardiac arrhythmias * Long acting sustained release should not be used in patients with chronic clearance disorders * smoking | | * Nausea and Vomiting * CNS stimulation * Nervousness * Insomnia   **Safety**  **Can be used with diminished kidney and liver activity with specific monitoring to avoid fatal toxicities –prescribing professional to determine risk to benefit ratio. If vomiting occurs- toxicity is a possibility so checking labs and going to ER is important to understand** | * Avoid respiratory irritants * Drink 2-3 L of water per day to help thin secretions * Serum blood levels q6-12 months to follow and track labs and prevent toxicity * Avoid caffeine * Stop smoking interactions occur * This drug is not a rescue medication |