

Bullet Point Nursing

Pulmonology pharmacology

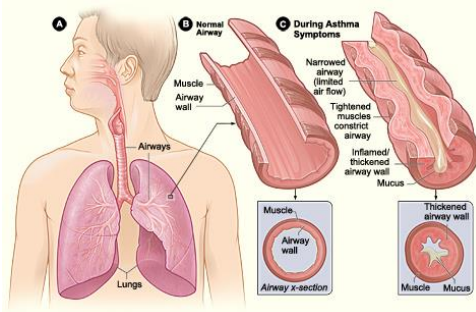
Disclaimer: These notes are designed to provide the key points of each topic and may not contain all necessary information. Every effort is made to ensure this content is up to date and accurate at the time of writing. No liability is assumed for the content or its relation to current standards and practices. This should not replace comprehensive nursing educational resources.

Drug name: Oxygen

- Prescription medication
- Routes include NC, simple face mask, NRB, BVM, ventilator and more
- Room air oxygen has a fraction of inspired oxygen (FiO₂) of 21%
 - Goal of oxygen administration is to improve efficiency of ventilation effort
- Nasal cannula increases the FiO₂ by approx. 4% per LPM
- BVM and NRB achieve an FiO₂ of 90% -100%
- NC flow rates are 1-6 LPM
- NRB flow rates are 10-15 LPM
- BVM flow rates are 10-15 LPM
- Hyperoxia is too much oxygen and can be harmful if given in excess
 - Can cause oxygen toxicity
 - Can cause apnea in patients with hypoxic drive
- Not indicated for pulse ox levels above 94%

Pathophysiology review:

- Asthma pathophysiology is bronchoconstriction, inflammation, and increased secretions



Emergency treatment:

- Oxygen
- Short acting beta agonist (SABA)
- Anticholinergic agent
- Systemic glucocorticoids
- Magnesium sulfate

Long-term management:

- Inhaled corticosteroid (ICS)
- Long-acting beta agonist (LABA)
- Long-acting muscarinic antagonist (LAMA)
- Leukotriene receptor antagonist (LTRA)
- Mast cell stabilizer
- Methylxanthines
- Monoclonal antibodies

Drug class: Beta two adrenergic agonist

- Drugs:

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- Albuterol (Ventolin, Proair)
- Levalbuterol
- MOA: Beta two adrenergic agonist resulting in bronchodilation
- Indications: Asthma, COPD
- SE/AE: Tachycardia, hypokalemia, hyperglycemia, palpitations
- Levalbuterol may have less cardiac side effects
- Patient education:
 - How to use a spacer, when to take it, and proper technique
 - Can be taken prior to exercise for exercise induced asthma
- Do not discontinue for tachycardia as long as the patient needs the bronchodilation
- Terbutaline is another beta two agonist that can be used for asthma
- When taking a SABA and another inhaled medication, the SABA comes first

Drug class: Beta agonist – long acting (LABA)

- Drug:
 - Salmeterol (Serevent)
 - Formoterol
- MOA: Beta two agonist – causes bronchodilation
- Indications: Long term management of asthma and COPD
- Black Box warning: Not to be used as monotherapy for disease management
- Taken via the inhalation route twice daily

Drug class: Anticholinergic

- Drug:
 - Ipratropium (Atrovent)
- MOA: Anticholinergic effects – bronchodilation and reduction in secretions
- Indications: Acute symptoms of asthma and COPD and long-term management of COPD
- Not a first line agent for long-term management
- SE/AE: Anticholinergic effects – Urinary retention, constipation, dry eyes, dry mouth, and more
- Another drug here is tiotropium. Also referred to as a LAMA (long-acting muscarinic antagonist)
 - Tiotropium is not used for acute symptoms

Drug class: Systemic glucocorticoids

- Drugs:
 - Prednisone
 - Methylprednisolone
 - Dexamethasone
- MOA: Suppressing inflammation. Results are more open airways and reduction of secretions
- Indications: Acute exacerbation of asthma and COPD
- Last resort medication due to side effects of systemic steroids
 - May be given early in acute exacerbation due to onset of roughly one hour
- May be given in dose-packs with standard taper schedule
- Discussed further in analgesics/anti-inflammatory lecture

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Drug class: Inhaled glucocorticoids (ICS)

- Drugs:
 - Fluticasone (Flovent)
 - Budesonide (Pulmicort)
- MOA: Suppressing inflammation. Results are more open airways and reduction of secretions
- Indications: Long-term management of asthma and off-label for COPD
- First line treatment for long-term management of asthma
- Onset is several weeks for peak effect
- Not to be used for acute exacerbations
- Patient education: Rinse mouth after using ICS inhaler to avoid oral candidiasis

Drug name: Magnesium

- MOA: Smooth muscle relaxant
- Indications: Hypomagnesemia (PO or IV)
 - Off-label use: Acute asthma exacerbation (IV)
- Monitor for signs of magnesium toxicity
 - Requires frequent assessment for DTRs and monitoring of respirations

Drug class: Methylxanthines

- Drug:
 - Theophylline
- MOA: Relaxes the smooth muscle of the bronchi causing bronchodilation
- Indication: Alternative agent for long-term management of asthma and COPD
- This drug has a narrow therapeutic index, caution for toxicity
 - Toxicity can cause dysrhythmias
- SE/AE: Insomnia, headache, palpitations, tachycardia, seizures
- Patient education: Avoid caffeine while taking this medication
- Oral medication

Drug class: Leukotriene receptor antagonists (LTRA)

- Drug:
 - Montelukast (Singular)
 - Zafirlukast
- MOA: Reduces inflammation in the airways
- Indications: Alternative agent for long-term management of asthma, COPD, allergic rhinitis
- Black Box warning: Neuropsychiatric events such as depression and suicide
- Oral medication

Drug class: Mast cell stabilizer

- Drug:
 - Cromolyn
- MOA: Reduces inflammation in the airways

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- Indication: Alternative agent for long-term management of asthma and COPD
- Dosed four times daily

Drug class: Monoclonal antibodies

- Drug:
 - Omalizumab (Xolair)
- MOA: Antagonizes IgE thereby limiting the body release of mediators that trigger inflammation and bronchospasm
- Indication: Alternative agent for trigger related asthma patients
- Black Box warning: Can cause anaphylaxis
- Given via subcutaneous route only

Combination drug examples:

- ICS/LABA
 - Advair – Fluticasone and Salmeterol
 - Breo Ellipta – Fluticasone and Vilanterol
 - Symbicort – Budesonide and Formoterol

Management with long-term medications does not negate the need for rescue inhaler (SABA)

STEPWISE APPROACH FOR MANAGING ASTHMA LONG TERM
 The stepwise approach tailors the selection of medication to the level of asthma severity (see page 5) or asthma control (see page 6). The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.

ASSESS CONTROL: → **STEP UP IF NEEDED** (first, check medication adherence, inhaler technique, environmental control, and comorbidities) → **STEP DOWN IF POSSIBLE** (and asthma is well controlled for at least 3 months)

| | STEP 1 | STEP 2 | STEP 3 | STEP 4 | STEP 5 | STEP 6 |
|--|----------------------------|---|-----------------------------------|---|--|---|
| At each step: Patient education, environmental control, and management of comorbidities | | | | | | |
| 0-4 years of age | Intermittent Asthma | Persistent Asthma: Daily Medication Consult with asthma specialist if step 3 care or higher is required. Consider consultation at step 2. | | | | |
| | Preferred Treatment* | SABA* as needed | low-dose ICS* | medium-dose ICS* + either LABA* or montelukast | high-dose ICS* + either LABA* or montelukast | high-dose ICS* + either LABA* or montelukast + oral corticosteroids |
| | Alternative Treatment*†‡ | | cromolyn or montelukast | | | |
| | Quick-Relief Medication | * SABA* as needed for symptoms; intensity of treatment depends on severity of symptoms. * With viral respiratory symptoms: SABA every 4-6 hours up to 24 hours (longer with physician consult). Consider short course of oral systemic corticosteroids if asthma exacerbation is severe or patient has history of severe exacerbations. * Caution: Frequent use of SABA may indicate the need to step up treatment. | | | | |
| 5-11 years of age | Intermittent Asthma | Persistent Asthma: Daily Medication Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3. | | | | |
| | Preferred Treatment* | SABA* as needed | low-dose ICS* | low-dose ICS* + either LABA* LTRA* or theophylline** | medium-dose ICS* + LABA* | high-dose ICS* + LABA* + oral corticosteroids |
| | Alternative Treatment*†‡ | | cromolyn, LTRA,* or theophylline* | OR medium-dose ICS + either LTRA* or theophylline* | high-dose ICS* + either LTRA* or theophylline* | high-dose ICS* + either LTRA* or theophylline* + oral corticosteroids |
| | Quick-Relief Medication | * SABA* as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral systemic corticosteroids may be needed. * Caution: Increasing use of SABA or use > 2 days/week for symptom relief (not to prevent EIB*) generally indicates inadequate control and the need to step up treatment. | | | | |
| ≥12 years of age | Intermittent Asthma | Persistent Asthma: Daily Medication Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3. | | | | |
| | Preferred Treatment* | SABA* as needed | low-dose ICS* | low-dose ICS* + LABA* OR medium-dose ICS* | medium-dose ICS* + LABA* | high-dose ICS* + LABA* + oral corticosteroids** |
| | Alternative Treatment*†‡ | | cromolyn, LTRA,* or theophylline* | low-dose ICS* + either LTRA,* theophylline,* or zileuton† | medium-dose ICS* + either LTRA,* theophylline,* or zileuton† | consider omalizumab for patients who have allergies** AND consider omalizumab for patients who have allergies** |
| | Quick-Relief Medication | * SABA* as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral systemic corticosteroids may be needed. | | | | |

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References

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