

Name(s)

- **Generic:** albuterol (al BYOO ter ole)
- **Brand:** ProAir (Digihaler, Hydrofluoroalkane [HFA], Respiclick); Ventolin HFA; Proventil; Accuneb

Therapeutic & Pharmacologic Category

- **Therapeutic Class:** Bronchodilator | **Pharmacologic Class:** Beta-2 Adrenergic Agonist

Indication(s)

- 1 **Bronchospasm:** Treatment and/or prevention of bronchospasms in patients with obstructive airway disease that irreversible such as asthma, COPD, etc.
 - 2 **Exercise-induced bronchospasm (EIB):** To prevent bronchospasms caused from exercise and/or physical activity
- OFF LABEL: Hyperkalemia (inh) – Not covered so please refer to the most current literature

Dosage Form / Strength / Dosing

- **Dosage Form(s) & Strength(s):**
 - **Inhalation:**
 - Breath Activated Aerosol Powder, Inhalation:
 - ProAir Digihaler: 90 mcg/actuation (contains lactose)
 - ProAir RespiClick: 90 mcg/actuation (contains milk protein)
 - Aerosol Solution, Inhalation:
 - ProAir HFA: 90 mcg/actuation (8.5 g)
 - Profentil HFA: 90 mcg/actuation (6.7 g)
 - Ventolin HFA: 90 mcg/actuation (8 g, 18 g)
 - Nebulized Solution (Sln), Inhalation:
 - 0.63 mg/3 mL (3 mL)
 - 0.083%, 2.5 mg/3 mL (3 mL)
 - 0.5%, 2.5 mg/0.5 mL (20mL)
 - **Oral:**
 - Syrup, Oral: 2 mg/5 mL
 - Tablet, Oral:
 - Immediate Release (IR): 2 mg, 4 mg
 - Extended Release (ER), 12-Hour: 4 mg, 8 mg
- **Adult dosing for Asthma**
 - *Acute symptom relief:*
 - MDI or DPI: Inhale 2 puffs po q 4-6 h prn. Some experts suggest 4 inh if moderate-severe symptoms
 - Nebulized Sln: Inhale 2.5 mg via nebulizer q 4-6 h prn
 - *Acute exacerbation:*
 - Mild-Moderate (Home management)
 - MDI or DPI: Inhale 2-4 puffs q 20 min for 3 doses; if responding may inc freq to q 3-4 h prn
 - Nebulized sln: Inhale 2.5 mg via neb q 20 min for 3 doses; if responding may inc to q 3-4 h prn
 - Moderate-Severe (Primary or acute care setting)
 - MDI or DPI: Inhale 4-8 puffs q 20 min for 3 doses; if tolerated taper freq to 2-4 puffs q 1-4 h prn Some experts suggest up to 10 inh for initial dosing in extremely severe exacerbations
 - Nebulized sln: Inhale 2.5-5 mg via neb q 20 min for 3 doses; if tolerated taper freq to q 1-4 h prn. If patient is critical 10-15 mg administered continuously via nebulizer over 1 hour
- **Adult dosing for Exercise-induced Bronchoconstriction (EIB)**
 - EIB prevention: MDI or DPI – Inhale 2 puffs po 5-20 min prior to exercise



- **Adult dosing for anaphylaxis-related Bronchospasm due to anaphylaxis**
 - *NOTE:* Admin epinephrine first!
 - MDI or DPI – Inhale 2-3 puffs po prn for relief of symptoms
 - Nebulized sln – Inhale 2.5-5 mg po via nebulizer repeating prn
- **Adult dosing for Chronic Obstructive Pulmonary Disease (COPD)**
 - *Acute symptom relief:* (Used PRN and can be in combination w/ short-acting muscarinic antagonists)
 - MDI or DPI: Inhale 2 puffs po q 4-6 h prn
 - Nebulized sln: Inhale 2.5 mg q 4-6 h prn
 - *Acute exacerbation:*
 - MDI or DPI: Inhale 1-2 puffs po q 1-2 h prn. If severe use 4-8 puffs
 - Nebulized sln: Inhale 2.5 mg q 1-4 h prn
- **Pediatric dosing for Asthma**
 - *Outpatient; mild-moderate exacerbation*
 - Infants – Children ≤5 years
 - MDI: Inhale 2-6 puffs q 20 min for 2-3 doses. If rapid response after 2 doses then admin 2-6 puffs q 3-4 h for 24-48 hours. Experts suggest if rapid response w/o recurring symptoms after 1-2 hours then change freq to q 3-4 h prn
 - Nebulized sln: Inhale 2.5 mg q 20 min for first hour prn. If rapid response after 1-2 hours change freq to q 3-4 h prn
 - Children ≥6 – Adolescents
 - MDI: Inhale 2-10 puffs q 20 min for 2-3 doses in first hour. If rapid response after 2 doses then admin 2-6 puffs q 3-4 h for 24-48 hours. Experts suggest if rapid response w/o recurring symptoms after 1-2 hours then change freq to q 3-4 h prn. If poor response admin 4-10 inh q 3-4 h or up 6-10 puffs q 1-2 h
 - *Emergency / Hospital*
 - Infants – Children (Consult most current literature, limited data)
 - <4 years, MDI: Administer 4-8 puffs po q 20 min for 3 doses then q 1-4 h
 - <2 years, Nebulized sln: 0.15 mg/kg/dose (min dose 2.5 mg/dose) q 20 min for 3 doses then 0.15-0.3 mg/kg/dose q 1-4 h. DNE 10 mg/dose
 - Weight based dosing: NIH, NAEPP (0.5 mg/kg/hour); Alternate (0.3 mg/kg/hour, in 20.7 months ±38 months resulted in no cardiotoxicity); Fixed dosing (<20 kg: 10 mg/hour | ≥20 kg: 20 mg/hour)
 - Adolescents:
 - MDI: Inhale 4-8 puffs po q 20 min for up to 4 hours then q 1-4 h
 - Nebulized Sln:
 - Intermittent: Use 2.5-5 mg via nebulizer q 20 min for 3 doses then 2.5-10 mg q 1-4 h prn
 - Continuous: 10-15 mg/hour
 - Alternate: <20 kg: 10 mg/hour | ≥20 kg: 20 mg/hour
 - *Maintenance therapy (non-acute)*
 - MDI: (4 years and older) 2 puffs q 4-6 h prn. Not long-term therapy
 - Nebulized sln:
 - Infants to Children <5 years: inhale 0.63-2.5 mg po via neb q 4-6 prn
 - Children ≥5 years to Adolescents: inhale 1.25-5 mg po via neb q 4-8 h prn
- **Pediatric dosing for Bronchospasm**
 - MDI:
 - Children ≥5 years to Adolescents: 1-2 puffs q 4-6 h
 - Children 6-11 years:
 - Acute: 1 puff q 4-6 h prn
 - Maintenance (w/ corticosteroid therapy): 1 puff q 4-6 h prn; Max daily dose 4/day



- DPI:
 - Children ≥4 years to Adolescents: 1-2 puffs q 4-6 h
 - Acute: 1 puff q 4-6 h prn; Max daily dose 4/day
 - Maintenance (w/ corticosteroid therapy): 1 puff q 4-6 h prn; Max daily dose 4/day
- Syrups, tablets: Not covered, Refer to most current literature
- **Pediatric dosing for EIB**
 - MDI:
 - Infants and Children <5 years: 1-2 puffs 5-20 min before exercise/activity
 - Children ≥5 years and Adolescents: 2 puffs 5-20 min before exercise/activity

Mechanism of Action & Pharmacology

- Albuterol works by relaxing the bronchial smooth muscle through the agonism of beta2-receptors. There should be little effect on heart rate.
- **Metabolism:** Hepatically resulting in an inactive sulfate | **Excretion:** Urine 80-100% when inh; 76% over 3 days when po, Fecal (<20% inh, 4% po) | **Onset of Action:** Inh is rapid occurring in ≤5 min; PO IR is ≤30 min | **Time to Peak:** Serum – Neb sln 30 min; Inh DPI 30 min, MDI 25 min; PO IR ≤2 hours, ER 6 hours; FEV1 (Forced Expiratory Volume over 1 second) – Neb sln ~1-2 hrs; Inh DPI w/in 30 min; Inh MDI 47 min; PO IR 2-3 hrs | **Duration of Action:** Neb soln 3-6 hrs; Inh DPI ~2 hrs; Inh MDI ~4-6 hr; PO IR 6-8 hrs; PO ER up to 12 hrs | **Half-Life Elimination:** 3.8-5 hrs; PO IR 5-6 hrs; PO ER 9.3 hrs | **Protein Binding:** 10%

Special Populations / Considerations

- **Renal Impairment:** 67% decline in albuterol clearance in patients w/ CrCl 7-53 mL/min
- Use with caution in patients w/ cardiovascular disease, diabetes, glaucoma, hyperthyroidism, lactose intolerant (DPI-specific)
- Albuterol crosses placenta but not associated w/ increased risk of fetal malformations

Side Effects

- Most commonly tremor. Less commonly fast heartbeat/pulse. Rarely cough and hives/welts, chest tightness

Drug Interactions

- Monitor therapy w/ drugs that could enhance tachycardic effects of Beta2-Agonists such as atomoxetine, and even cannabinoid-containing products
- Caution with beta-blockers which may diminish bronchodilatory effects fo beta2-agonists.
- Beta2-agonists will enhance hypokalemic effects of loop diuretics such as furosemide and thiazides such as hydrochlorothiazide
- QT-prolongation risk when used with QT-prolonging drugs such as haloperidol

Monitoring Parameters

- FEV1, peak flow, other pulmonary function test, BP, HR, serum glucose

Patient Counseling Information

- Used to open airways in lung diseases where spasm-related breathing problems are occurring
- If muscle pain/weakness/cramps occur may be a sign of low potassium

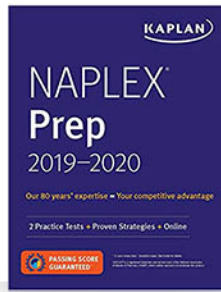
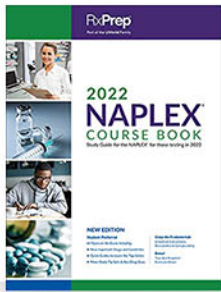
Reference(s)

- <https://www.drugs.com/cons/albuterol-inhalation.html>
- <https://www.drugs.com/ppa/albuterol.html>
- https://ginasthma.org/wp-content/uploads/2020/04/Main-pocket-guide_2020_04_03-final-wms.pdf
- https://www.nhlbi.nih.gov/files/docs/guidelines/asthma_qrg.pdf

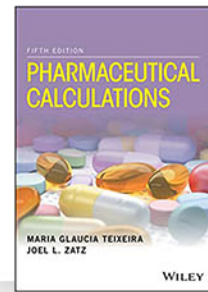
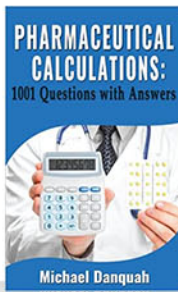
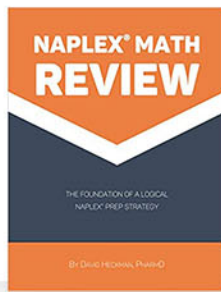
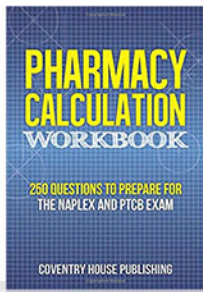


PREPARE FOR SUCCESS!

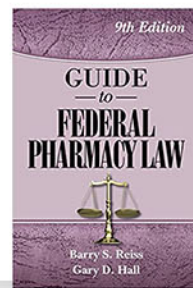
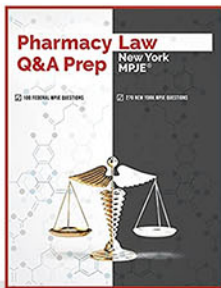
Comprehensive (NAPLEX)



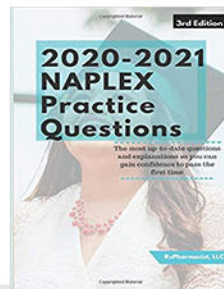
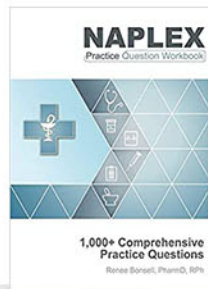
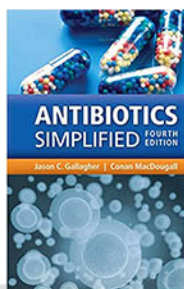
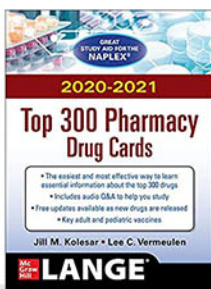
Calculations (NAPLEX)



Pharmacy Law (MPJE)



Supplemental



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Here are some NAPLEX & MPJE prep recommendations to help you do everything you can to **pass the first time!**

HEY STUDENT!

When I was P1 one of the best pieces of advice I got from those before me was to use a NAPLEX Prep book while learning each topic.

This helps focus your learning and the repetition helps to retain info and indirectly prepare you for the NAPLEX



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