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CPG Contact for Changes:
Name: Philip Trapskin, PharmD, BCPS – Manager, Drug Policy Program
Phone Number: 608-263-1328
Email Address: ptrapskin@uwhealth.org

CPG Contact for Content:
Name: Cindy Gaston, PharmD, BCPS – Pharmacy Department
Phone number: 608-265-8161
Email address: cgaston@uwhealth.org

Guideline Update Author:
E. Shannon, PharmD, MS – Pharmacy Department

Coordinating Team Members:
C. Gaston, PharmD, BCPS – Pharmacy Department

Review Individuals/Bodies:
J. Halfpap, PharmD – Pharmacy Department

Committee Approvals/Dates:
Antimicrobial Use Subcommittee (10/13/2015)
Respiratory Care Committee (11/12/2015)
P&T Committee (Last Periodic Review: 12/17/2015)

Release Date: February 2016 | Next Review Date: December 2018
Executive Summary
Guideline Overview
This guideline provides direction on the appropriate dosing, utilization and administration of aerosolized respiratory medications across UW Health.

Key Practice Recommendations
Table 1: Nebulized Medications
Table 2: Metered Dose Inhalers

Companion Documents
Diagnosis and Management of Asthma – Adult/Pediatric – Clinical Practice Guideline
Chronic Obstructive Pulmonary Disease – Adult – Ambulatory/Primary Care/Inpatient – Clinical Practice Guideline
UWHC Hazardous Drug List

Pertinent UWHC Policies & Procedures
UWHC Policy 2.25: Inhaler Medication Treatment
UWHC Policy 1.40: Cleaning & Changing of Patient Care Equipment
UWHC Policy 8.89: Preventing Non-Therapeutic Exposure to Hazardous Drugs

Patient Resources:
HFFY #5060: Cromolyn
HFFY #4668: Adrenergic Bronchodilators
HFFY #6657: Asthma Controller Medicine, Inhaled Corticosteroids
HFFY #6729: Asthma Controller Medicine, Inhaled Corticosteroids (Spanish)
HFFY #6844: Asthma Controller Medicine, Inhaled Corticosteroid & Long Acting Bronchodilator
HFFY #5370: Nebulized Amphotericin B
HFFY #6660: Asthma Rescue Medicine
HFFY #6662: Asthma Controller Medicine – Leukotriene Modifiers
HFFY #7020: Nebulized Cayston
HFFY #4714: Nebulized Tobramycin
HFFY #5851: Nebulized Colistin
HFFY #4932: Nebulized Dornase Alfa or Pulmozyme
HFFY #4311: Ribavirin Treatment of Respiratory Syncytial Virus (RSV)
HFFY #5527: Aerosolized Pentamidine
HFFY #6658: Pulmicort Flexhaler
HFFY #5831: Inhaled Lidocaine Nebulizer Treatment
HFFY #6355: Nebulized Hypertonic Saline
Scope
Disease/Condition(s): This guideline directs the appropriate administration of respiratory medications across UW Health throughout inpatient and ambulatory practice settings.

Clinical Specialty: This guideline is intended for all personnel authorized to administer respiratory medications in all clinical areas of pediatric and adult practice.

Intended Users: Physicians, Pharmacists, Respiratory Therapists, Nurses

Objective(s): To provide guidelines for administration of UW Health formulary respiratory medications.

Target Population: Adult and pediatric patients within UW Health requiring administration of medications through the respiratory route.

Major Outcomes Considered: Effective and safe administration of aerosolized respiratory medications without undue patient harm.

Guideline Metrics: Patient Safety Net reports will be monitored for errors or adverse events associated with aerosolized respiratory medication administration.

Methodology
Methods Used to Collect/Select the Evidence:
Evidence was obtained from the clinical literature, manufacturer prescribing information and tertiary care references.

Methods Used to Assess the Quality and Strength of the Evidence:
A modified Grading of Recommendations Assessment, Development and Evaluation (GRADE) developed by the American Heart Association and American College of Cardiology has been used to assess the Quality and Strength of the Evidence in this Clinical Practice Guideline. (Appendix A).

Methods Used to Formulate the Recommendations:
Evidence available in the literature, manufacturer prescribing information, and tertiary care references were utilized at the time of guideline creation to formulate recommendations.

Introduction
Medications administered via nebulization or inhalation provides an opportunity to administer treatment directly to the lungs for asthma, chronic obstructive pulmonary disease (COPD) and other respiratory diseases. Additionally, the lungs provide a large surface area for medication absorption for the treatment of systemic diseases. Administration of medication via nebulization may be useful in cases where the oral or intravenous route is not an option.

The following tables provide general guidelines, monitoring parameters, equipment information, and patient education pearls for the administration of select UWHC respiratory medications.

Recommendations
All recommendations have a Class I, Level A recommendation, unless otherwise noted.
<table>
<thead>
<tr>
<th>Medication</th>
<th>Nebulized Pediatric Dose</th>
<th>Nebulized Adult Dose</th>
<th>Diluent</th>
<th>Indication</th>
<th>Side Effects</th>
<th>May Be Mixed With</th>
<th>Equipment Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylcysteine&lt;sup&gt;3&lt;/sup&gt; (Acetadote&lt;sup&gt;®&lt;/sup&gt;)</td>
<td>Infants: 1 to 2 mL of 20% solution every 6 to 8 hr. Children: Refer to adult dosing. Consider pretreatment with bronchodilator.</td>
<td>4 mL of the 20% solution every 8 hr. Consider pretreatment with bronchodilator.</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Mucolytic (helps clear secretions)</td>
<td>Bronchospasm, sore throat, nausea</td>
<td>None</td>
<td>Standard nebulizer or IPV; instill via ETT for intubated patients.</td>
</tr>
<tr>
<td>Albuterol&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1.25 to 2.5 mg every 6 to 8 hr</td>
<td>2.5 mg/3 mL or 2.5 mg/0.5 mL every 6 to 8 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Bronchodilator</td>
<td>Tachycardia, anxiety, occasional allergy to preservative</td>
<td>Ipratropium; use non-diluted albuterol when mixing with ipratropium to decrease volume nebulized</td>
<td>Standard nebulizer or IPV</td>
</tr>
<tr>
<td>Albuterol/Ipratropium solution for nebulizer&lt;sup&gt;3&lt;/sup&gt; (DuoNeb&lt;sup&gt;®&lt;/sup&gt;)</td>
<td>Not established</td>
<td>Initial dose: 3 mL every 6 hr. Maximum dose: 3 mL every 4 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Bronchodilator for COPD</td>
<td>Tachycardia, anxiety</td>
<td>Patients with soy and/or peanut allergies SHOULD NOT use Combivent&lt;sup&gt;®&lt;/sup&gt;</td>
<td>None</td>
</tr>
<tr>
<td>Amikacin&lt;sup&gt;3&lt;/sup&gt; (Class IIb, Level B)</td>
<td>Pre-treat with bronchodilator</td>
<td>Pre-treat with bronchodilator</td>
<td>Dilute with normal saline to a volume of 6 mL</td>
<td>Inhaled antibiotic for lung infections</td>
<td>Shortness of breath, nausea, excessive coughing, sore throat, dysphonia</td>
<td>None</td>
<td>Standard nebulizer</td>
</tr>
<tr>
<td>Amphotericin B</td>
<td>Pre-treat with bronchodilator</td>
<td>Pre-treat with bronchodilator</td>
<td>Supplied by pharmacy (10 mg/2mL). Needs to be further diluted in 3 mL sterile water for injection</td>
<td>Inhaled antifungal for lung infections</td>
<td>Shortness of breath, sore throat, nausea</td>
<td>None</td>
<td>Standard nebulizer. No other medications can be put in this nebulizer</td>
</tr>
<tr>
<td>Medication</td>
<td>Nebulized Pediatric Dose</td>
<td>Nebulized Adult Dose</td>
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<tr>
<td>Alteplase (t-PA)&lt;sup&gt;15,16&lt;/sup&gt;</td>
<td>12 mg then 5 mg every 2 hr Taper down based on clinical response (Class IIa, Level C)</td>
<td>Not established</td>
<td>Reconstituted to 2 mg/mL with normal saline</td>
<td>Plastic Bronchitis with Fontan Procedure</td>
<td>No side effects reported in case reports</td>
<td>None</td>
<td>Standard nebulizer. No other medications can be put in this nebulizer.</td>
</tr>
<tr>
<td>Aztreonam&lt;sup&gt;3&lt;/sup&gt; (Cayston®)</td>
<td>Age &lt;7 years: 75 mg three times daily&lt;sup&gt;17&lt;/sup&gt; (Class IIa, Level B) Premedication with bronchodilator recommended</td>
<td>Age 7 yrs and older: 75 mg three times daily</td>
<td>Use diluent provided by manufacturer; 0.17% sodium chloride, 1 mL ampule</td>
<td>Inhaled antibiotic for <em>Pseudomonas aeruginosa</em> Rash, facial swelling, throat tightening</td>
<td>None</td>
<td>Altera Nebulizer</td>
<td></td>
</tr>
<tr>
<td>Budesonide&lt;sup&gt;3&lt;/sup&gt; (Pulmicort Respules®)</td>
<td>0.25 to 1 mg every 12 to 24 hr, depending on previous therapy</td>
<td>0.25 or 0.5 mg every 12 to 24 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Inhaled corticosteroid Sore throat, hoarseness</td>
<td>None</td>
<td>Standard nebulizer</td>
<td></td>
</tr>
<tr>
<td>Colistimethate (Colistin Base)&lt;sup&gt;1,18&lt;/sup&gt;</td>
<td>Pre-treat with bronchodilator 75 to 150 mg every 8 to 12 hr</td>
<td>Pre-treat with bronchodilator 75 to 150 mg every 8 to 12 hr</td>
<td>Comes diluted from the pharmacy. Further dilute to total volume of 3 to 4 mL with normal saline.</td>
<td>Inhaled antibiotic for lung infections Shortness of breath, nausea</td>
<td>None</td>
<td>Standard nebulizer or IPV</td>
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</tr>
<tr>
<td>Cromolyn (Intal)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Age &gt;2 yr: 20 mg every 6 hr</td>
<td>20 mg every 6 hr (20 mg/2 mL)</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Mast cell stabilizer for asthma Cough, sore throat, wheezing Albuterol; use non-diluted</td>
<td>Standard nebulizer or IPV</td>
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<tr>
<td>Dornase&lt;sup&gt;3,19-21&lt;/sup&gt; (Pulmozyme®) Dornase Alfa - Pediatric/Adult - Inpatient</td>
<td>2.5 mg every 12 to 24 hr (Class I, Level B) Age &gt;5 yr: Use Adult dose</td>
<td>2.5 mg every 12 to 24 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Thins secretions in CF patients Sore throat, lost voice, shortness of breath</td>
<td>None</td>
<td>Standard nebulizer. No other medications can be put in this nebulizer.</td>
<td></td>
</tr>
<tr>
<td>Epoprostenol</td>
<td>Please refer to the UW Health Clinical Practice Guideline: Epoprostenol Inhaled – Adult/Pediatric/Neonatal - Inpatient</td>
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<tr>
<td>Medication</td>
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<td>Nebulized Adult Dose</td>
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<tr>
<td>Hypertonic saline³,²²-²⁴</td>
<td>Pre-treat with bronchodilator 4 mL of 7% solution every 12 hr (<em>Class I, Level B</em>)</td>
<td>Pre-treat with bronchodilator 4 mL of 7% solution every 12 hr</td>
<td>No further dilution necessary</td>
<td>Assist with secretion clearance</td>
<td>Sore throat, wheezing, bronchospasm</td>
<td>None</td>
<td>Standard nebulizer or IPV</td>
</tr>
<tr>
<td>Ipratropium³ (Atrovent®)</td>
<td>Age 5-11 yr: 125 to 250 mcg every 8 hr Age &gt; 12 yr: 250 to 500 mcg every 6 to 8 hr</td>
<td>500 mcg every 4 to 8 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Bronchodilator NOTE: Nebulized ipratropium DOES NOT contain soy lecithin, thus it can be safely administered to patients with soy allergies.</td>
<td>Bad taste in mouth, sore throat, sinusitis</td>
<td>Albuterol</td>
<td>Standard nebulizer or IPV</td>
</tr>
<tr>
<td>Levalbuterol³ RESTRICTED TO USE IN NEONATES (unless patient’s own supply)</td>
<td>Age ≤ 4 yr: 0.31 to 1.25 mg every 4 to 6 hr as needed Age 5 to 11 yr: 0.31 to 0.63 mg every 4 to 6 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Bronchodilator</td>
<td>Tachycardia, anxiety, occasional allergy to preservative</td>
<td>Ipratropium</td>
<td>Standard nebulizer</td>
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<tr>
<td>Medication</td>
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<tr>
<td>Lidocaine</td>
<td>Cough: 1-3 mg/kg/dose of either 1% or 2% as needed, as directed. Recommended maximum dose: 100 mg 4 times daily Anesthetic: 4-8 mg/kg of 1% or 2%. Recommended maximum total dose: 20 mg/kg per procedure. <em>(Class IIb, Level B)</em></td>
<td>Cough: 1-5 mL of 1%-4% as needed, as directed. Recommended maximum dose: 160 mg 4 times daily Anesthetic: 3-5 mL of 2% or 4%. Recommended maximum dose: 400 mg per procedure. <em>(Class IIb, Level C)</em></td>
<td>None—no further dilution necessary</td>
<td>Anesthetic; reduces bronchial hyper-reactivity; Chronic cough</td>
<td>Bad taste in mouth, sore throat, numb throat</td>
<td>None</td>
<td>Standard nebulizer UW Health Health Facts for You: Nebulized Lidocaine</td>
</tr>
<tr>
<td>Morphine</td>
<td>2 mg every 4 hr as needed <em>(Class IIb, Level C)</em></td>
<td>5-30 mg every 4 hr as needed <em>(Class IIb, Level B)</em></td>
<td>2 mL normal saline</td>
<td>Relieve shortness of breath for end-stage cardiac or lung disease</td>
<td>Respiratory depression, confusion, hypotension. Caution when giving to patients with history of asthma. Patient may develop respiratory compromise due to the blunting of the sense of dyspnea.</td>
<td>None</td>
<td>Standard nebulizer</td>
</tr>
<tr>
<td>Naloxone**</td>
<td>Not established</td>
<td>2 mg; may repeat every 30 minutes until satisfactory response <em>(Class IIa, Level C)</em></td>
<td>3 mL normal saline</td>
<td>Opioid overdose. Do NOT use in patients with acute respiratory distress <em>(RR&lt;6)</em></td>
<td>Agitation, diaphoresis, vomiting</td>
<td>None</td>
<td>Standard nebulizer with facemask</td>
</tr>
</tbody>
</table>

**Family members and employees on opioid medication should wear a mask during administration of nebulized naloxone and for 10 minutes after therapy is completed to avoid second hand exposure.
<table>
<thead>
<tr>
<th>Medication</th>
<th>Nebulized Pediatric Dose</th>
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<tbody>
<tr>
<td>Pentamidine&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Pre-treat with a bronchodilator 300 mg every 30 days</td>
<td>Pre-treat with a bronchodilator 300 mg every 30 days</td>
<td>Comes pre-diluted with sterile water from the pharmacy (6 mL syringe). DO not mix with sodium chloride, as precipitation will occur.</td>
<td>Treatment or prophylaxis of <em>Pneumocystis jiroveci</em> pneumonia</td>
<td>Bronchospasm, sore throat, nausea, allergy to the antibiotic</td>
<td>None</td>
<td>Medicator® with HEPA filter. Medication must be scavenged or given in a negative airflow room. All people entering room during and 30 minutes after therapy should wear a HEPA mask.</td>
</tr>
<tr>
<td>Racemic epinephrine&lt;sup&gt;3&lt;/sup&gt;</td>
<td>0.5 mg every 15 minutes until satisfactory response</td>
<td>2.5 mg every 15 minutes until satisfactory response</td>
<td>2 mL normal saline</td>
<td>Reduce supraglottic swelling post-extubation and in croup</td>
<td>Tachycardia, anxiety</td>
<td>None</td>
<td>Standard nebulizer</td>
</tr>
<tr>
<td>Ribavirin</td>
<td>Please refer to the UW Health Policy &amp; Procedure: <a href="#">Ribavirin Delivery via Small Particle Aerosol Generator (Spag-2) - Policy Number: 2.29</a> UW Health Ribavirin Health Facts for You: <a href="#">Ribavirin Treatment of RSV</a></td>
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<tr>
<td>Tobramycin&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Pre-treat the patient with a bronchodilator 80 mg every 12 hr</td>
<td>Pre-treat the patient with a bronchodilator 80 mg every 12 hr</td>
<td>Supplied as 80 mg/2 mL by pharmacy. Diluent is normal saline.</td>
<td>Inhaled antibiotic for lung infections</td>
<td>Shortness of breath, nausea</td>
<td>None</td>
<td>Standard nebulizer or IPV</td>
</tr>
<tr>
<td>Tobramycin high-dose&lt;sup&gt;3&lt;/sup&gt; (TOBI®)</td>
<td>Pre-treat with a bronchodilator 300 mg every 12 hr</td>
<td>Pre-treat with a bronchodilator 300 mg every 12 hr</td>
<td>Unit Dose—no further dilution necessary</td>
<td>Inhaled antibiotic for lung infections</td>
<td>Shortness of breath, nausea</td>
<td>None</td>
<td>Standard nebulizer. No other medications can be put in this nebulizer.</td>
</tr>
<tr>
<td>Vancomycin&lt;sup&gt;8,41&lt;/sup&gt;</td>
<td>Pre-treat with a bronchodilator 250 mg every 12 hr</td>
<td>Pre-treat with a bronchodilator 250 mg every 12 hr</td>
<td>5 mL normal saline</td>
<td>Upper &amp; lower respiratory colonization of MRSA</td>
<td>Bronchospasm</td>
<td>None</td>
<td>Standard nebulizer. No other medications can be put in this nebulizer.</td>
</tr>
<tr>
<td>Medication</td>
<td>Inhaled Pediatric Dose</td>
<td>Inhaled Adult Dose</td>
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<td>Special Instructions</td>
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<tr>
<td>Albuterol HFA³ (Ventolin HFA®, ProAir® HFA is restricted to pediatric ventilated patients only)</td>
<td>2 inhalations every 4 to 6 hr (90 mcg/inhalation)</td>
<td>2 inhalations every 4 to 6 hr (90 mcg/inhalation)</td>
<td>Bronchodilator</td>
<td>Tachycardia, anxiety</td>
<td>Aerochamber®</td>
<td>Teach patient how to prime the MDI and how to determine the number of puffs remaining.</td>
<td></td>
</tr>
<tr>
<td>Albuterol/Ipratropium³ (Combivent®)</td>
<td>Not established</td>
<td>2 inhalations four times daily</td>
<td>Bronchodilator for COPD</td>
<td>Tachycardia, anxiety</td>
<td>Aerochamber®</td>
<td>Teach patient how to determine the number of puffs remaining.</td>
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</tr>
<tr>
<td>Budesonide³,4² (Pulmicort Flexhaler®)</td>
<td>Age ≥ 6 yr: 180 to 360 mcg twice daily</td>
<td>180 to 360 mcg twice daily (max 720 mcg twice daily)</td>
<td>Inhaled corticosteroid to decrease inflammation</td>
<td>Sore throat, thrush, headache</td>
<td>Dry powder Turbuhaler®</td>
<td>Make sure patient rinses mouth after use to prevent thrush. Instruct patient not to store medication in warm and/or moist location. Medication block will be damaged if inhaler is dropped.</td>
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</tr>
<tr>
<td>Budesonide/Formoterol Fumarate³ (Symbicort) NON-FORMULARY</td>
<td>Age 5-11 yr: 2 inhalations twice daily (80/4.5)</td>
<td>2 inhalations twice daily (80/4.5 OR 160/4.5)</td>
<td>Long-acting bronchodilator and inhaled steroid</td>
<td>Tachycardia, anxiety, sore throat, thrush</td>
<td>HFA with Aerochamber®</td>
<td>Teach patient how to prime the MDI and determine how many puffs remain. Make sure patient rinses mouth after use to prevent thrush.</td>
<td></td>
</tr>
<tr>
<td>Fluticasone Diskus³ (Flovent Diskus®)</td>
<td>Age 4 to 11 yr: 50 to 100 mcg twice daily</td>
<td>100 to 250 mcg twice daily</td>
<td>Inhaled corticosteroid to decrease inflammation</td>
<td>Sore throat, thrush</td>
<td>Diskus® inhaler</td>
<td>Make sure patient rinses mouth after use to prevent thrush. Instruct patient not to store medication in warm and/or moist location.</td>
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</tr>
<tr>
<td>Medication</td>
<td>Inhaled Pediatric Dose</td>
<td>Inhaled Adult Dose</td>
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<td>Special Instructions</td>
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</table>
| Fluticasone HFA³ (Flovent HFA®)                | Age 4-11 yr: 88 mcg every 12 hr  
Age ≥ 12 yr: Use adult dose                   | 88 to 440 mcg every 12 hr           | Inhaled corticosteroid to decrease inflammation | Sore throat, thrush         | Aerochamber® | Make sure patient rinses mouth after use to prevent thrush. Teach patient how to prime the MDI and how to determine the number of puffs remaining. |
| Fluticasone/Salmeterol Diskus³ (Advair Diskus®) | Ages 4-11 yr: 1 inhalation every 12 hrs (100/50). This is maximum dose  
Ages ≥ 12 yr: Refer to adult dosing             | Asthma: 1 inhalation every 12 hr  
(100/50, 250/50 or 500/50 mcg)  
COPD: 1 inhalation every 12 hr  
(250/50 mg, 500/50 mcg)               | Long-acting bronchodilator and inhaled steroid | Tachycardia, anxiety, sore throat, thrush   | Diskus® inhaler | Make sure patient rinses mouth after use to prevent thrush. Instruct patient not to store medication in warm and/or moist location. |
| Fluticasone/Salmeterol HFA³ (Advair HFA®)       | Age ≥12 yr: Use adult dose                                                             | 2 inhalations every 12 hr  
(45/21, 115/21 or 230/21 mcg)       | Long-acting bronchodilator and inhaled steroid | Tachycardia, anxiety, sore throat, thrush   | Aerochamber® | Teach patient how to prime the MDI and how to determine the number of puffs remaining |
| Ipratropium HFA³,42,43 (Atrovent HFA®)          | Acute moderate to severe asthma exacerbations:  
Age ≤5 yr: 2 inhalations every 20 mins for one hour  
Age 6-12 yr: 4 to 8 inhalations every 20 mins as needed for up to 3 hr  
Age ≥13 yr: Use adult dose   | COPD: 2 inhalations four times daily  
Acute asthma exacerbation: 8 inhalations every 20 mins as needed for up to 3 hr | Bronchodilator                     | Bad taste in mouth, sore throat. Patients with soy and/or peanut allergies MAY use. | Aerochamber® | Teach patient how to prime the MDI and how to determine the number of puffs remaining |
<table>
<thead>
<tr>
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<tr>
<td>Salmeterol Diskus³ (Serevent®)</td>
<td>Age &gt;4 yr: Use adult dose</td>
<td>1 inhalation (50 mcg) every 12 hr</td>
<td>Long-acting bronchodilator</td>
<td>Tachycardia, anxiety</td>
<td>Diskus® inhaler</td>
<td>Instruct patient not to store medication in warm and/or moist location.</td>
</tr>
<tr>
<td>Tiotropium³ (Spiriva® Handihaler)</td>
<td>Dose not established</td>
<td>Inhale 1 (18 mcg) capsule daily</td>
<td>Bronchodilator for COPD</td>
<td>Pharyngitis, dry mouth, urinary retention (rare)</td>
<td>Dry powder Handihaler®</td>
<td>Place one capsule in the inhaler and puncture before use</td>
</tr>
<tr>
<td>Tiotropium³ (Spiriva® Respimat) NON FORMULARY</td>
<td>Ages &lt;12 yr: Dose not established</td>
<td>Asthma: 2 inhalations (5 mcg) once daily COPD: 2 inhalations (5 mcg) once daily (maximum of 2 inhalations per 24 hrs)</td>
<td>Bronchodilator for COPD and bronchodilator for maintenance treatment of asthma</td>
<td>Pharyngitis, dry mouth, urinary retention (rare)</td>
<td>Aerochamber®</td>
<td>Teach patient how to determine the number of puffs remaining</td>
</tr>
</tbody>
</table>

**Abbreviations:** CF=Cystic Fibrosis; COPD=Chronic Obstructive Pulmonary Disease; ETT=Endotracheal Tube; HFA=Hydrofluoroalkane (propellant); IPV=Intrapulmonary Percussive Ventilation; MDI=Metered-Dose Inhaler; NSS=Normal Saline Solution
UW Health Implementation

Potential Benefits:
This clinical practice guideline provides a standardized approach to the administration of respiratory medications to adult and pediatric patients being treated in the inpatient and ambulatory settings. A decreased risk of adverse events secondary to inappropriate administration of respiratory medications is possible through implementation of this guideline.

Potential Harms:
Medications carry potential risk for undesired side effects and/or adverse events due to the pharmacologic action; however, risks of medications included in this guideline are rarely serious.

Qualifying Statements
Recommendations are based on evidence available at the time of guideline creation. Administration of aerosolized respiratory medications should consider patient specific characteristics and goal of therapy.

Implementation Plan
This guideline will be available on UConnect and cross referenced in guidelines and protocols. New medication records will be created for new medication additions. Respiratory Therapist will be educated on updates to the guideline.

Implementation Tools
HealthLink medication records will include a link to this guideline to support accessibility of this reference. LexiComp entries for medications described within this guideline will be updated with appropriate links to this reference.

Disclaimer
CPGs are described to assist clinicians by providing a framework for the evaluation and treatment of patients. This Clinical Practice Guideline outlines the preferred approach for most patients. It is not intended to replace a clinician’s judgment or to establish a protocol for all patients. It is understood that some patients will not fit the clinical condition contemplated by a guideline and that a guideline will rarely establish the only appropriate approach to a problem.

References

12. Amphotericin B (Fungizone) [prescribing information]. Bristol-Myers Squibb; Montreal, Canada 2009.


# Appendix A – Quality of Evidence and Strength of Recommendation Grading Matrix

<table>
<thead>
<tr>
<th>LEVEL A</th>
<th>Multiple populations evaluated*</th>
<th>Data derived from multiple randomized clinical trials or meta-analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS IIa</td>
<td>Recommendation that procedure or treatment is useful/effective</td>
<td>Some conflicting evidence from multiple randomized trials or meta-analyses</td>
</tr>
<tr>
<td>CLASS IIb</td>
<td>Recommendation in favor of treatment or procedure being useful/effective</td>
<td>Greater conflicting evidence from multiple randomized trials or meta-analyses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL B</th>
<th>Limited populations evaluated*</th>
<th>Data derived from a single randomized trial or nonrandomized studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS IIa</td>
<td>Recommendation that procedure or treatment is useful/effective</td>
<td>Some conflicting evidence from single randomized trial or nonrandomized studies</td>
</tr>
<tr>
<td>CLASS IIb</td>
<td>Recommendation in favor of treatment or procedure being useful/effective</td>
<td>Greater conflicting evidence from single randomized trial or nonrandomized studies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL C</th>
<th>Very limited populations evaluated*</th>
<th>Only expert opinion, case studies, or standard of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS IIa</td>
<td>Recommendation that procedure or treatment is useful/effective</td>
<td>Only diverging expert opinion, case studies, or standard of care</td>
</tr>
<tr>
<td>CLASS IIb</td>
<td>Recommendation in favor of treatment or procedure being useful/effective</td>
<td>Only diverging expert opinion, case studies, or standard of care</td>
</tr>
</tbody>
</table>

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**Comparative effectiveness phrases:**
- Treatment/strategy A is recommended/indicated in preference to treatment B.
- Treatment A should be chosen over treatment B.

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**Suggested phrases for writing recommendations:**
- Should be recommended/is indicated/is useful/efficient/beneficial.
- May/might be considered/reasonable.
- Is reasonable/can be useful/efficient/beneficial/is probably recommended/is indicated.
- Is not recommended/is not indicated/should not be performed/other.
- Is not useful/efficient/effective.

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**Corollary (COR) III:**
- No Benefit
- Harm

**Procedure/Test:**
- Not helpful
- No proven benefit
- Excessive cost
- Harmful to patients
- More harmful

**Treatment:**
- More harmful
- Causes harm
- Associated with excess morbidity/mortality
- Not performed or administered/other