

## Asthma Medication Update

Wendy Brown Pharm.D., AE-C

NDSU College of Pharmacy  
Family HealthCare Center  
Fargo, North Dakota

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- Determine how a drug class is able to affect the lungs and ultimately improve asthma control.
- Explain the various methods of asthma drug delivery.
- Distinguish between patient oriented evidence that matters (POEMs) and disease oriented evidence (DOE) in asthma pharmacotherapy.
- Identify pipeline drugs for asthma management.

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## How a person with Asthma Responds to a Trigger

- Immediate
  - Occurs within minutes
  - Immediate bronchoconstriction (Bronchial Hyper-responsiveness)
  - Resolves spontaneously or resolves easily by reliever medication (Short Acting  $\beta_2$ -agonist use)

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## Short Acting $\beta_2$ -Agonists

AKA: Reliever Medications

- **Albuterol (Proventil<sup>®</sup>, Ventolin<sup>®</sup>, ProAir<sup>®</sup>)**
  - Tablets, Meter Dose Inhaler (HFA and CFC), Solution for Nebulization
- **Levalbuterol (Xopenex<sup>®</sup>)**
  - Meter Dose Inhaler (HFA), Solution for Nebulization
- **Pirbuterol (Maxair<sup>®</sup>)**
  - Autohaler (Meter Dose Inhaler)

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- **By December 2008 all CFC inhaler must be removed from the market. Increase in HFA inhalers (Ex. Provental<sup>®</sup> HFA, Flovent<sup>®</sup> HFA, QVAR<sup>®</sup>)**
- **Any new inhalation devices have a dose counting system**

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## How a person with Asthma Responds to a Trigger

- **Late Response-**
  - Asthma Exacerbation (patients may refer to as “Asthma Attack”)
  - May occur between 4 and 12 hours after Immediate Asthmatic Response
  - Influx of inflammatory cells and mediators (Airway Inflammation)
  - This response is often more severe and prolonged

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## Controller Medications

- Corticosteroids
- Leukotriene modifiers
- Cromones (Mast Cell Stabilizers)
- Immune System Modulator

Used to **CONTROL** inflammation in the airways.

- Methylxanthine
- Long-acting beta<sub>2</sub>-agonists

Used to **CONTROL** hyperresponse of muscles in the airways

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## Inhaled Corticosteroids

- **Beclomethasone HFA (QVAR®)**
  - Metered Dose Inhaler
- **Budesonide (Pulmicort®)**
  - Dry Powder Inhaler, **Suspension** for Nebulization
- **Flunisolide (AeroBid®)**
  - Metered Dose Inhaler, AeroBid-M® (Menthol)
- **Fluticasone (Flovent®)**
  - Metered Dose Inhaler (HFA and CFC), Dry Powder Inhaler
- **Mometasone (Asmanex®)**
  - Dry Powder Inhaler
- **Triamcinolone (Azmacort®)**
  - Metered Dose Inhaler with attached spacer

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## The Differences Among Inhaled Corticosteroids

- **Efficacy**
- **Duration of Activity**
- **Bioavailability**

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## Leukotriene Modifiers

- **Montelukast (Singulair®)**
  - Granules, Chewable Tablets, Tablet
- **Zafirlukast (Accolate®)**
  - Tablet
- **Zileuton (Zyflo®)**
  - Tablet

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## Cromones (Mast Cell Stabilizers)

- **Cromolyn (Intal®)**
  - Metered Dose Inhaler, Solution for Nebulization
- **Nedocromil (Tilade®)**
  - Metered Dose Inhaler

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## Long-acting beta<sub>2</sub>-agonists

- **Salmeterol (Serevent®)**
  - Dry Powder Inhaler
- **Formoterol (Foradil®)**
  - Dry Powder Inhalation (capsule)

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## Long-Acting Beta<sub>2</sub>-Agonists

- **Result of Salmeterol Multi-center Asthma Research Trial (SMART)**

- **Black Box Warning**

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## Combination Therapy

- **Fluticasone / Salmeterol (Advair<sup>®</sup>)**
  - Meter Dose Inhaler (HFA), Dry Powder Inhaler
- **According to NAEPP guidelines the combination of an inhaled corticosteroid and long acting beta<sub>2</sub> agonist are indicated for patients who exhibit moderate persistent asthma.**

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## Immune System Modulator

- **Omalizumab (Xolair<sup>®</sup>)**
  - **Black Box Warning**

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• **Reliever Medications**

- **Short Acting  $\beta_2$ -Agonists, Anticholinergics, and Oral Steroid “burst” therapy**

• **Controller Medications**

- **Inhaled Steroids, Long Acting  $\beta_2$ -Agonists, Leukotriene Modifiers, Mast Cell Stabilizers, Theophylline, Omalizumab, and Oral Steroids- daily dose for some severe persistent asthmatics**

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### Particle Size

- **> 5  $\mu\text{m}$  deposits mouth/esophageal region with no clinical effect and allows absorption from G.I. track**
- **2-5 $\mu\text{m}$  deposits bronchi and bronchioles providing clinical effect and allows absorption from Lungs**
- **< 1 $\mu\text{m}$  questionable deposition in the peripheral airways and most often exhaled without providing clinical effect**

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Def: POEM's

- Patient
- Oriented
- Evidence that
- Matters



What **goals** are most important to my patients?

- Minimal or no chronic symptoms day/night
- No limitations on activities
- Minimal or no exacerbations
- No adverse effects from medications

Flaherty, R. A Simple Method for Evaluating the Clinical Literature. *Fam Pract Manag* 2004; 11(5): 47-52.

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**How can I assist my patient to meet their goals? (D.O.E.- Disease Oriented Evidence)**

- Proper classification of severity
- Minimal use of inhaled short-acting  $\beta_2$ -agonists
- PEF > 80% of personal best

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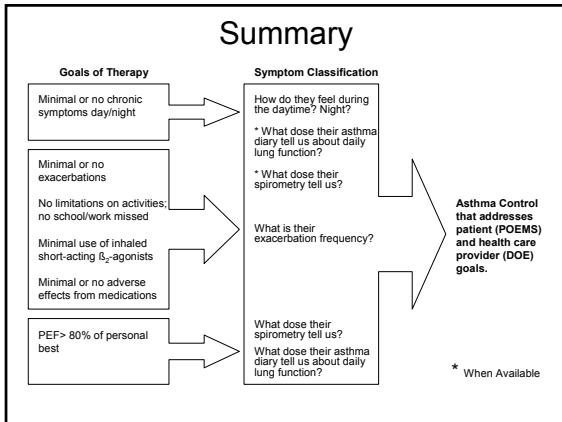
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**Summary**



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**Pipeline**

- Arformoterol® (Brovana)
- Symbicort® (Budesonide/Formoterol)
- Alvesco® (Ciclesonide)

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