Asthma & COPD Medication Review

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Disclosures

• Neither I, nor my spouse, have relationships with pharmaceutical companies, biomedical device manufacturers, or other commercial companies whose products or services are related to the subject matter of this presentation.

Objectives

• Discuss updated guideline recommendations for treatment of chronic obstructive pulmonary disease (COPD).
• Compare and contrast between asthma and COPD presentation and therapy management.
• Examine new and established treatment options for stable COPD and asthma.
• Recommend appropriate medication therapy adjustments as needed for long-term COPD management to accommodate age-related physical changes.
Extra References


COPD Definition

- Previous Guidelines:
  - Preventable and treatable
  - Characterized by persistent airflow limitation that is usually progressive
  - Associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases
  - Exacerbations and comorbidities contribute to the overall severity in individual patients

- 2017 Update:
  - Common, preventable and treatable
  - Characterized by persistent respiratory symptoms and airflow limitation
  - Due to airway and/or alveolar abnormalities
  - Caused by significant exposure to noxious particles or gases


COPD Prevalence

- The direct costs of COPD for the US has been estimated at $29.5 billion
- Worldwide COPD is estimated to become the third leading cause of death in 2020 and fourth leading cause of death in 2030
- In the United States:
  - In 2011, 6.5% of the US population had COPD
  - In 2010, there were 133,575 deaths caused by COPD
  - Overall, death rates for COPD have not declined


Age Adjusted Prevalence of COPD in adults ≥25 years of age in 2011

Age Adjusted Death-rates (per 100,000) of COPD in adults ≥25 years of age between 1999-2000

Age Adjusted Death-rates (per 100,000) of COPD in adults ≥25 years of age between 2009-2010
Risk Factors for COPD Development & Progression

- Genetic factors
  - Alpha-1 antitrypsin deficiency
- Age and gender
- Lung growth and development
- Exposure to particles
  - Cigarette smoking
- Socioeconomic status—questionable
- Asthma/bronchial hyper-reactivity
- Chronic bronchitis
- Infections

GOLD Guidelines 2017. [www.goldcopd.org](http://www.goldcopd.org)

COPD Symptoms and Diagnosis

- Symptoms
  - Dyspnea
  - Cough
  - Sputum production
  - Wheezing and chest tightness
- Diagnosis
  - Spirometry demonstrating post-bronchodilator FEV1/FVC <0.70

GOLD Guidelines 2017. [www.goldcopd.org](http://www.goldcopd.org)

Normal Spirometry

![Normal Spirometry graph]

FEV1 = 4L  
FVC = 5L

FEV1 /FVC = 0.8
Spirometry in Obstructive Disease

- FEV1 = 1.5L
- FVC = 2.9L
- FEV1/FVC = 0.57

COPD Assessment

- Goals of assessment
  - Determine severity of the disease
  - Impact on health status
  - Determine risk of future events
  - Used to guide therapy

- Disease characteristics considered
  - Spirometry
  - Patient symptoms
  - Exacerbation risk
  - Comorbidities

OLD COPD Assessment

<table>
<thead>
<tr>
<th>Cat</th>
<th>Symptom Score</th>
<th>Exacerbation History</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt;10</td>
<td>0-1 exacerbation/year</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10</td>
<td>≥2/year OR ≥1 leading to admission</td>
</tr>
</tbody>
</table>

Symptoms
- mMRC <2
- mMRC ≥2

Breathlessness

Step 1: Airflow Limitation
• Spirometry
  – Based on post-bronchodilator FEV₁

- GOLD Classification
  - GOLD 1: Mild, FEV₁ >80% predicted
  - GOLD 2: Moderate, 50% < FEV₁ <80% predicted
  - GOLD 3: Severe, 30% < FEV₁ <50% predicted
  - GOLD 4: Very severe, FEV₁ <30% predicted

Step 2: Assess Symptoms & Exacerbation Risk
• Exacerbation
  - Acute event
  - Characterized by worsening of patient’s respiratory symptoms
  - Leads to change in medications
  - Frequent exacerbations are more than 2 per year
• Exacerbation risk assessment
  - High risk:
    - ≥2 exacerbations per year
    - ≥1 exacerbation leading to hospital admission
  - Lower risk: 1 exacerbation per year (not leading to hospital admission)
COPD Assessment

Exacerbation History

- >2/year OR
- ≥1 leading to admit
- 0-1 exacerbation/year

<table>
<thead>
<tr>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

CAT<10  CAT≥10
Symptoms
mMRC <2  mMRC ≥ 2
Breathlessness

Step 2: Assess Symptoms & Exacerbation Risk

- Patient symptoms
  - COPD Assessment Test (CAT)
    - 8 items
    - Score ranges 0-40
    - <10 means less symptoms, ≥10 means more symptoms
  - COPD Control Questionnaire (CCQ)
    - 10 items—self administered
    - <1 more symptoms, ≥2 less symptoms
  - Modified British Medical Research Council Questionnaire (mMRC)
    - 5 grades—score of 0-4
    - <2 less symptoms, ≥2 more symptoms

GOLD Guidelines 2017. [www.goldcopd.org](http://www.goldcopd.org)

COPD Assessment

- Patient symptoms
  - COPD Assessment Test (CAT)
    - Patient ranks their symptoms on a scale of 0-5
    - Example questions:
      - 0: I am not limited doing any activities at home
      - 5: I am very limited in doing activities at home
      - 0: I have no phlegm in my chest to 5: my chest is full of phlegm

GOLD Guidelines 2017. [www.goldcopd.org](http://www.goldcopd.org)
COPD Assessment

- Patient symptoms
  - Modified British Medical Research Council Questionnaire (mMRC)
    - 0=I only get breathless with strenuous exercise
    - 2=I walk slower than people of the same age on the level because of breathlessness or I have to stop for breath when walking at my own pace on the level.
    - 4=I am too breathless to leave the house or I am breathless when dressing or undressing.


Patient Case

- MS is a 67 year old female who has had COPD for 9 years. During an MTM visit, you ask several questions to assess her COPD. Her CAT score is 16. FEV₁ at last measurement was 35%. She had one COPD exacerbation 8 months ago and was admitted to the local hospital for 5 days.

Patient Case

- SN is a 72 year old male with COPD. As a part of his outpatient visit, you need to assess his COPD. His mMRC score is 2. He had one COPD exacerbation 3 months ago which was treated outpatient. His FEV₁ at last measurement was 52%.
COPD Treatment Update: Brief Overview

COPD Treatment

• Pharmacologic treatment
  – No agent has been shown to decrease mortality for COPD patients
  – Reduces COPD symptoms, frequency of exacerbations, and improve health status
• Smoking cessation
  – Slows disease progression
• Oxygen therapy
  – Increases survival in patients with severe resting hypoxemia
• Pulmonary rehabilitation


COPD Treatment Common Agents

• Inhalers
  – Beta agonists
    • Short vs. long acting
  – Anticholinergics/ Antimuscarinics
    • Short vs. long acting
  – Corticosteroids
  – Combination inhalers
• Oral agents
  – Methylxanthines
    • Theophylline
    • Aminophylline
  – Phosphodiesterase-4 inhibitor (PDE4 inhibitor)
    • Roflumilast (Daliresp®)
  – Systemic corticosteroids

2016 COPD Treatment Selection

**Group**  | **First Line** | **Alternative** | **Other** |
---|---|---|---|
A | SABA p.r.n or SAAC p.m | LABA or SABA+SAAC | Theophylline |
B | ICS or LAMA | LABA+LAMA | SABA and/or SAAC or Theophylline |
C | ICS+LAMA or LAMA | LABA+LAMA or LABA+PDE4 inhibitor or LABA-steroid inhibitor | Theophylline |
D | ICS+LAMA and/or LAAC | ICS+LAMA or ICS+LAMA+PDE4 inhibitor or LAMA+PDE4 inhibitor | Carbocysteine, N-acetylcysteine, SABA and/or SAAC, Theophylline |

SABA: short-acting beta-agonist  
SAAC: short-acting anticholinergic  
LAMA: long-acting antimuscarinic  
LABA: long-acting beta agonist  
ICS: inhaled corticosteroid  

GOLD Guidelines 2016: [www.goldcopd.org](http://www.goldcopd.org)

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**Asthma vs. COPD**

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Asthma vs. COPD definition

**Asthma**
- Usually characterized by chronic airway inflammation.
- It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

**COPD**
- Characterized by persistent respiratory symptoms and airflow limitation that is due to airways and/or alveolar abnormalities usually caused by significant exposure to noxious particle or gases.

Asthma vs COPD features

**Asthma**
- Onset before age 20
- Symptoms vary over minutes, hours or days
  - Mainly early morning or night
  - Triggered by emotions, exercise or allergens
- Family history of allergic condition
- No worsening over time
- Immediate response to BD
- Variable airflow limitation

**COPD**
- Onset after age 40
- Persistent symptoms despite treatment
  - Good and bad days
  - Symptoms present and unrelated to triggers
- Increased exposure to smoke or biomass fuels
- Slowly worsening over time
- Limited relief from rapid BD
- Persistent airflow limitation

Asthma vs COPD treatment

**Asthma**
- Maintenance therapy based on Inhaled Corticosteroids (ICS)
- Add on treatment if needed
  - Long-acting β2-agonists (LABA)
  - Long-acting anticholinergics (LAMA)
- Never long acting bronchodilator alone

**COPD**
- Starts with bronchodilators or combination therapy
  - LABA and/or LAMA
  - LABA and ICS
  - LAMA and ICS
- Never ICS alone
TREATMENT FOR ASTHMA

Pharmacologic Therapy

- **Controller Medications**
  - Low & medium dose Inhaled Corticosteroids (ICS)
  - Long-acting β2-agonists (LABA) added to ICS
- **Reliever (rescue) medication**
  - Short-acting β2-agonists (SABA)
- **Add on**
  - Leukotriene Receptor Antagonist (LTRA)
  - Methylxanthines (theophylline)
  - Long-acting anticholinergic (LAMA)
  - Omalizumab (anti-IgE)
  - Mepolizumab (anti-IL5)
  - Oral Corticosteroids (OCS)

* Not for children <12 years.
** For children 6-11 years, the preferred Step 3 treatment is medium dose ICS.
# Tiotropium by mist inhaler is an add-on treatment for patients with a history of exacerbations.

Stepwise Approach for Asthma
Pharmacologic Therapy

- Bronchodilators
  - Long-acting & short-acting β2-agonists (LABA and SABA)
  - Long-acting & short-acting anticholinergics (LAMA and SAMA)
  - Methylxanthines (theophylline)

- Anti-inflammatory
  - Inhaled Corticosteroids (ICS)
  - Phosphodiesterase-4 Inhibitors (PDE4i)
  - Antibiotics

TREATMENT FOR STABLE COPD

GOLD Guidelines (updated 2017)
Preferred treatment

(C) (D) Roflumilast Macrolide
LAMA + LABA LAMA + ICS
LAMA + ICS LABA + LAMA
LAMA LABA + LAMA
LAJA + LABA ICS
Continue, stop, or try alternative class of bronchodilator

LAMA
Bronchodilator
LAJA or LAMA

(D) Roflumilast Macrolide
LAMA + LABA LAMA + ICS
LAMA + ICS LABA + LAMA
LAMA LABA + LAMA
LAJA + LABA ICS
Continue, stop, or try alternative class of bronchodilator

LAMA
Bronchodilator
LAJA or LAMA
### Pharmacologic Therapy (cont.)

<table>
<thead>
<tr>
<th>Category</th>
<th>Initial Therapy</th>
<th>If Further Exacerbations (alternative option)</th>
<th>Additional Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bronchodilator (short or long acting)</td>
<td>Continue, stop or try alternative class of bronchodilator</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>LAMA or LAβA</td>
<td>LAMA + LAβA</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>LAMA</td>
<td>LAMA + LAβA (LAβA + ICS)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>LAβA + LAMA</td>
<td>ICS + LAβA + LAMA (LAβA + ICS) (LAMA)</td>
<td>PDE4i (chronic bronchitis) Macrolide (former smokers)</td>
</tr>
</tbody>
</table>

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### INHALER TREATMENT OPTIONS

- SAβA & SAMA inhalers

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### Bronchodilators: SABA

#### Albuterol Sulfate
- **MDI:**
  - ProAir HFA®
  - Proventil HFA®
  - Ventolin HFA®
  - Dose: 2 puffs Q 4-6 hours
- **Nebulized solution**
  - Dose: 1 vial Q 4-8 hours
  - Onset: 5 - 15 minutes
  - Duration: 2 - 6 hours

#### Levalbuterol
- **MDI:**
  - Xopenex HFA®
  - Dose: 2 puffs Q 4-6 hours
  - Onset: 5 - 10 minutes
  - Duration: 3 - 6 hours
- **Nebulized solution**
  - Dose: 1 vial Q 6-8 hours
  - Onset: 10 - 17 minutes
  - Duration: 5 - 8 hours

### Bronchodilators: SAMA

#### Ipratropium bromide
- **Atrovent® HFA**
  - Dose: 2 puffs QID
    - Max 12 puffs/day
  - Nebulized solution
    - Dose: 1 vial 3-4 times a day
    - 6-8 hours between doses
  - Onset: 15 - 30 minutes
  - Duration: 6 - 8 hours

#### Side Effects:
- Dry mouth, bitter or metallic taste

#### Cautions:
- Glaucoma, prostatic hyperplasia, myasthenia gravis

### Bronchodilators: SABA + SAMA

#### Albuterol sulfate / ipratropium bromide
- **Combivent® Respimat®**
  - 1 puffs QID
  - Max: 6 puffs/24 hours
  - Does not contain soy lecithin
  - Discard 3 months after inserting cartridge.
- **DuoNeb®**
  - 1 vial every 6 hours
  - Max: 1 vial every 4 hours

**Note:**
- Does not contain soy lecithin
- Discard 3 months after inserting cartridge.
Types of Inhalers

MDIs
- Chemical propellant
- Long, slow breath
- Can use spacers

DPIs
- Powder is propelled by force of patient’s inhalation
- Short, fast and forceful
- Can NOT use spacer

LAβA: Arcapta Neohaler, Foradil Aerolizer, Serevent Diskus, Striverdi Respimat

LAβA

<table>
<thead>
<tr>
<th>Generic (Brand)</th>
<th>Dose</th>
<th>Side Effects</th>
<th>Warnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arformoterol (Brovana)</td>
<td>BID</td>
<td>Chest pain, diarrhea, sinusitis</td>
<td>Black box warning in Asthma-related deaths</td>
</tr>
<tr>
<td>Formoterol (Foradil Aerolizer, Perforomist)</td>
<td>BID</td>
<td>Tremor, palpitations, infection, diarrhea</td>
<td>Similar cautions as short acting</td>
</tr>
<tr>
<td>Indacaterol (Arcapta Neohaler)</td>
<td>Qday</td>
<td>Headache, cough, nasopharyngitis</td>
<td>Milk protein allergy (except olodaterol and nebulized solution)</td>
</tr>
<tr>
<td>Olodaterol (Striverdi Respimat)</td>
<td>2 puffs Qday</td>
<td>Nasopharyngitis, UTI, bronchitis, back pain</td>
<td></td>
</tr>
<tr>
<td>Salmeterol (Serevent Diskus)</td>
<td>BID</td>
<td>Headache, pain, respiratory infections</td>
<td></td>
</tr>
<tr>
<td>Vilanterol</td>
<td>Qday</td>
<td>See combination</td>
<td></td>
</tr>
</tbody>
</table>
**LAMAs:** Incruse Ellipta, Spiriva HandiHaler/Respimat, Seebri Neohaler, Tudorza Pressair

<table>
<thead>
<tr>
<th>LAMA</th>
<th>Generic (Brand)</th>
<th>Dose</th>
<th>Side Effects</th>
<th>Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aclidinium Bromide (Tudorza Pressair)</td>
<td>1 puff BID</td>
<td>Headache, diarrhea, nasopharyngitis, cough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycopyrronium Bromide (Seebri Neohaler)</td>
<td>1 puff BID</td>
<td>Approved, but not available in US...yet</td>
<td>Narrow-angle glaucoma</td>
<td></td>
</tr>
<tr>
<td>Tiotropium Bromide (<em>Spiriva Respimat 1.25 mg, 2.5 mcg</em>* EQ)</td>
<td><em>1 puff QDay</em> 2 puffs Qday</td>
<td>Xerostomia, URTI, headache, chest pain</td>
<td>Prostatic hyperplasia, Milk protein allergy</td>
<td></td>
</tr>
<tr>
<td>Umeclidinium Bromide (Incruse Ellipta)</td>
<td>1 puff QDay</td>
<td>Nasopharyngitis, URTI, cough</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LABA & LAMA:** Anoro Ellipta, Duaklir Genuair, Stiolto Respimat, Bevespi Aerosphere, Utibron Neohaler
LAMA & LABA

<table>
<thead>
<tr>
<th>Generic (Brand)</th>
<th>Dose</th>
<th>Side Effects</th>
<th>Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vilanterol/Umecridinium (Anoro Ellipta)*</td>
<td>1 puff Qday</td>
<td>2%: Pharyngitis, limb pain, diarrhea</td>
<td>Black box warning in Asthma-related deaths</td>
</tr>
<tr>
<td>Olodaterol/Tiotropium (Stolto Respimat)*</td>
<td>2 puffs Qday</td>
<td>12%: Nasopharyngitis 4%: back pain and cough</td>
<td>CVD Diabetes Glaucoma Hypokalemia</td>
</tr>
<tr>
<td>Indacaterol/Glycopyrrolate (Utibron Neohaler)*</td>
<td>1 puff BID</td>
<td>4-10%: Nasopharyngitis 6%: cough 2-4%:pneumonia, UTI, ≤ 3%: xerostomia</td>
<td>Prostatic hyperplasia Urinary retention Seizures *Milk protein allergy</td>
</tr>
<tr>
<td>Formoterol/Glycopyrrole (Bevespi Aerosphere)</td>
<td>2 puffs BID</td>
<td>3%: UTI 4%: Cough</td>
<td>Approved in EU, not US (probably 2018)</td>
</tr>
<tr>
<td>Aclidinium/Formoterol (Duaklir Genuair)*</td>
<td>1 puff BID</td>
<td>Approved in EU, not US (probably 2018)</td>
<td></td>
</tr>
</tbody>
</table>

Inhaled Corticosteroids (ICS)

- Dosing
  - Approved for Asthma only

- Side effect
  - Oral thrush
  - Reflex cough
  - Systemic side effects seen at higher doses

- Formulations:
  - Beclomethasone (Qvar)
  - Budesonide (Pulmicort)
  - Ciclesonide (Alvesco)
  - Flunisolide (Aerospan)
  - Fluticasone furoate (Arnuity)
  - Fluticasone propionate (Flovent)
  - Mometasone (Asmanex)

Adults and adolescents (≥12 years)
ICS doses by potency

<table>
<thead>
<tr>
<th>Generic name</th>
<th>Total daily dose (mcg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Beclomethasone dipropionate</td>
<td>80 – 160</td>
</tr>
<tr>
<td>Budesonide</td>
<td>180 – 360</td>
</tr>
<tr>
<td>Ciclesonide</td>
<td>80 – 160</td>
</tr>
<tr>
<td>Flunisolide</td>
<td>320</td>
</tr>
<tr>
<td>Fluticasone furoate</td>
<td>100</td>
</tr>
<tr>
<td>Fluticasone propionate</td>
<td>88 - 250</td>
</tr>
<tr>
<td>Mometasone furoate</td>
<td>110 – 220</td>
</tr>
</tbody>
</table>

- This is not a table of equivalence, but of estimated clinical comparability.
- Most of the clinical benefit from ICS is seen at low doses.
- High doses are arbitrary, but for most ICS are those that, with prolonged use, are associated with increased risk of systemic side effects.
### ICS: Aerospan, Alvesco, Asmanex

- Beclomethasone HFA: Qvar 40 & 80 BID
- Budesonide DPI: Pulmicort Flexhaler 90 & 180 BID
- Ciclesonide HFA: Alvesco 80 & 160 BID
- Flunisolide MDI: Aerospan 80 BID
- Fluticasone furoate: Ellipta 100 & 200 Qday
- Fluticasone propionate HFA: Flovent HFA 44, 110 & 220 BID
- Fluticasone propionate DPI: Flovent Diskus 50, 100 & 250 BID
- Mometasone DPI: Asmanex DPI 110 & 220 Q day or BID
- Mometasone HFA: Asmanex HFA 100 & 200 BID

### ICS: Arnuity, Flovent, Pulmicort, Qvar,

- Beclomethasone HFA: Qvar 40 & 80 BID
- Budesonide DPI: Pulmicort Flexhaler 90 & 180 BID
- Ciclesonide HFA: Alvesco 80 & 160 BID
- Flunisolide MDI: Aerospan 80 BID
- Fluticasone furoate: Ellipta 100 & 200 Qday
- Fluticasone propionate HFA: Flovent HFA 44, 110 & 220 BID
- Fluticasone propionate DPI: Flovent Diskus 50, 100 & 250 BID
- Mometasone DPI: Asmanex DPI 110 & 220 Q day or BID
- Mometasone HFA: Asmanex HFA 100 & 200 BID

### ICS: Generic Brand Strengths

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Strengths (mcg)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone HFA</td>
<td>Qvar</td>
<td>40 &amp; 80</td>
<td>BID</td>
</tr>
<tr>
<td>Budesonide DPI</td>
<td>Pulmicort Flexhaler</td>
<td>90 &amp; 180</td>
<td>BID</td>
</tr>
<tr>
<td>Ciclesonide HFA</td>
<td>Alvesco</td>
<td>80 &amp; 160</td>
<td>BID</td>
</tr>
<tr>
<td>Flunisolide MDI</td>
<td>Aerospan</td>
<td>80</td>
<td>BID</td>
</tr>
<tr>
<td>Fluticasone furoate</td>
<td>Ellipta</td>
<td>100 &amp; 200</td>
<td>Q day</td>
</tr>
<tr>
<td>Fluticasone propionate HFA</td>
<td>Flovent HFA</td>
<td>44, 110 &amp; 220</td>
<td>BID</td>
</tr>
<tr>
<td>Fluticasone propionate DPI</td>
<td>Flovent Diskus</td>
<td>50, 100 &amp; 250</td>
<td>BID</td>
</tr>
<tr>
<td>Mometasone DPI</td>
<td>Asmanex DPI</td>
<td>110 &amp; 220</td>
<td>Q day or BID</td>
</tr>
<tr>
<td>Mometasone HFA</td>
<td>Asmanex HFA</td>
<td>100 &amp; 200</td>
<td>BID</td>
</tr>
</tbody>
</table>
ICS + LAβA: Advair Diskus, Breo Ellipta, Dulera, and Symbicort

ICS + LAβA

<table>
<thead>
<tr>
<th>Generic (brand)</th>
<th>Preparations (mcg)</th>
<th>COPD dose (mcg)</th>
<th>Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluticasone/salmeterol (Advair Diskus)*</td>
<td>100/50, 250/50 &amp; 500/50</td>
<td>250/50</td>
<td>1 puff BID</td>
</tr>
<tr>
<td>Fluticasone/salmeterol (Advair HFA)</td>
<td>45/21, 115/21 &amp; 230/21</td>
<td>Not approved</td>
<td>2 puffs BID</td>
</tr>
<tr>
<td>Budesonide/formoterol (Symbicort)</td>
<td>80/4.5 &amp; 160/4.5</td>
<td>160/4.5</td>
<td>2 puffs BID</td>
</tr>
<tr>
<td>Mometasone/formoterol (Dulera)</td>
<td>200/10 &amp; 400/10</td>
<td>Not approved</td>
<td>2 puffs BID</td>
</tr>
<tr>
<td>Fluticasone/vilanterol (Breo Ellipta)*</td>
<td>100/25 &amp; 200/25</td>
<td>100/25</td>
<td>1 puff Qday</td>
</tr>
</tbody>
</table>

*CI if milk protein allergy

Future Treatments in Development

- AZ & Me (est. file 2018)
  - Symbicort DPI
  - Glycopyrrolat/ formoterol/ budesonide
  - AZD8871
    - Muscarinic acetylcholine antagonist, beta2 agonist (MABA)
  - AZD7594
    - Non-steroidal Selective Glucocorticoid- Receptor Modulators (SGRM)
    - AZD7594/ abediterol
- Teva
  - Albuterol
  - DPI formulation
- GlaxoSmithKline
  - Fluticasone/ umecillinium/ vilanterol
  - Vilanterol
  - 961081
    - MABA
  - 961081/ fluticasone
- Novartis (for Asthma)
  - Indacaterol/ mometasone
  - Indacaterol/ mometasone/ glycopyronium
Approved in Asthma, now being studied in COPD

- Interleukin 5 receptor monoclonal antibody
  - Anti-IL5
  - Reduce exacerbations
- GlaxoSmithKline
  - Mepolizumab
- AZ & Me (est. file 2018)
  - Benralizumab

Non-pharmacologic Management

<table>
<thead>
<tr>
<th>PATIENT CATEGORY Dependent On LOCAL GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD &amp; Asthma (&gt; 19 yo) Flu vaccination Pneumococcal vaccination</td>
</tr>
<tr>
<td>Asthma (&lt; 19 yo) Flu vaccination</td>
</tr>
<tr>
<td>Asthma (&lt;19 yo) on high dose ICS Flu vaccination Pneumococcal vaccination</td>
</tr>
</tbody>
</table>

Vaccinations: Influenza

- All adults should receive a dose annually.
  - Strains change yearly
  - Must get a vaccination for each flu season to be protected
- Flu season is from October to May
Vaccinations: Influenza (cont.)

- Inactivated influenza vaccine (IIV)
  - Persons aged 6 months and older, including pregnant women and persons with hives-only allergy to eggs, can receive the inactivated influenza vaccine

- Quadrivalent (IIV4) vs trivalent (IIV3)
  - IIV3: 2 influenza A strains and 1 influenza B strain
  - IIV4: 2 influenza A strains and 2 influenza B strains

### Alternate Flu Preparations

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Type of Vaccine</th>
<th>Ages (years)</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluzone High-dose</td>
<td>IIV3</td>
<td>≥65</td>
<td>Egg protein allergy</td>
</tr>
<tr>
<td>Fluzone Intradermal</td>
<td>IIV4</td>
<td>18-64</td>
<td>Egg protein allergy</td>
</tr>
<tr>
<td>FluBlok</td>
<td>Recombinant influenza vaccine (RIV3)</td>
<td>18-49</td>
<td></td>
</tr>
<tr>
<td>Flucelvax</td>
<td>Cell culture-based influenza vaccine (ccIIV4)</td>
<td>≥18</td>
<td>Egg protein allergy</td>
</tr>
</tbody>
</table>

### Recommendations regarding Influenza vaccination and egg protein allergy

<table>
<thead>
<tr>
<th>Can the person eat lightly cooked egg without reaction?</th>
<th>After eating eggs or egg-containing foods, does the person experience only hives?</th>
<th>After eating eggs does the person experience: CV changes, GI, respiratory distress, Epinephrine needed, ED needed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Per usual protocol</td>
<td>IIV or RIV</td>
<td>RIV or IIV by MD with experience with management of severe allergic conditions</td>
</tr>
</tbody>
</table>
Vaccinations: Pneumococcal

- Four categories for treatment
  - Adults aged ≥ 65 years (immunocompetent)
  - Adults aged ≥ 19 years with immunocompromising conditions or anatomical or functional asplenia
  - Adults aged ≥ 19 years with cerebrospinal fluid leaks or cochlear implants
  - Adults aged 19 - 64 years with chronic heart disease, chronic lung disease (chronic obstructive lung disease, emphysema, and asthma), chronic liver disease, alcoholism, diabetes or who smoke cigarettes.

Vaccinations: Pneumococcal (cont.)

- Two types of Pneumococcal Vaccine
  - 23-valent pneumococcal polysaccharide vaccine (PPSV23)
  - 13-valent pneumococcal polysaccharide vaccine (PCV13)

Vaccinations: Pneumococcal (cont.)

- Adults aged ≥ 65 years (immunocompetent)
  - There should be at least 1 year between PCV 13 and PPSV23 doses
  - There should be at least 5 years between PPSV23 doses
- Adults aged 19 – 64 years
  - Give PPSV23
  - At age ≥ 65 years
    - At least 1 year after PPSV23 dose administer PCV13
    - At least 5 years after last dose of PPSV23 administer PPSV23
Vaccinations: Pneumococcal (cont.)

If no previous pneumococcal at 65 years
PCV13 → ≥ 1 year → PPSV23

If previous PPSV23 ≥ 65 years old
≥ 2 years → PCV13

If previous PPSV23 < 65 years old
≥ 1 yr → PCV13 at 65 yr → ≥ 1 yr → PPSV23
*As long as there is ≥ 5 years between PPSV23

NON-PHARMACOLOGIC THERAPY

Smoking Cessation

- Has the greatest impact on the progression of COPD
- In 2011, 39% of the 15 million adults with COPD continued to smoke
- Recommended for all GOLD categories
- Most trials have been done in middle-aged populations
Smoking Cessation

Lung function vs. age and the relationship between smoking and lung function decline


Loss of lung function over 11 years based on smoking status


Smoking Cessation

• Counseling delivered by healthcare professionals increases quit rates
• Brief strategies to help the patient willing to quit (the 5 A’s):
  – Ask—identify all tobacco users
  – Advise—strongly urge all tobacco users to quit
  – Assess—determine willingness to make a quit attempt
  – Assist—aid the patient in quitting
  – Arrange—schedule follow-up contact

Smoking Cessation

- Products available for smoking cessation
  - Nicotine Replacement:
    - OTC: patches, gum, or lozenges
    - Prescription: inhaler or nasal spray
  - E-cigarettes
  - Other pharmacologic options
    - Varenicline (Chantix®)
    - Buproprion (Zyban®)

Nicotine. In: Lexi-Comp Online [AUHSP Intranet].

Self-Check

- Which of the following is FALSE regarding smoking cessation?
  A. It is recommended for all stages of COPD
  B. Counseling by healthcare professionals increases likelihood of quitting
  C. Smoking cessation stops the progression of COPD

Application to Older Adults
COPD in Older Adults

- The number of people >60 years of age is expected to rise from 810 million in 2012 to 2 billion in 2050
  - People >80 years of age is expected to increase 4-fold
- COPD is one of the most common chronic diseases affecting older adults

Treatment of COPD in Older Adults

- Considerations for pharmacists
  - Age-related changes
  - Peak inspiratory flow
  - Patient education
  - Smoking cessation
  - Immunizations

Age Related Changes

- Physical changes
  - Manual dexterity
  - Visual changes
  - Age is inversely related to extremity muscle strength, respiratory muscle strength, and pulmonary function
- Cognitive changes
  - Patients with a Mini Mental Status Exam score of less than 23 out of 30 are unlikely to learn and retain correct MDI technique
Peak Inspiratory Flow

- Inhalers require a minimum peak inspiratory flow
- Optimal peak inspiratory flows
  - MDI—minimum 25 L/min
  - DPI
    - Turbuhaler—minimum 60 L/min
    - HandiHaler—minimum 20 L/min
    - Diskus—minimum 30 L/min
  - Nebulizer—no peak inspiratory flow needed

Patient Education

- Progression of disease
  - Not curable and progressive
  - Medical therapy will not be stepped down
- Medication counseling
  - Role of medications
    - Rescue medication vs maintenance medication
  - Inhaler devices
    - Ensure correct use at each visit
    - Demonstrate technique for patient
    - Use teach-back approach

Potential Solutions for Older Patients

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires hand-breath coordination</td>
<td>Use a spacer or nebulizer</td>
</tr>
<tr>
<td>Lacking hand strength or dexterity</td>
<td>Use a spacer or nebulizer</td>
</tr>
<tr>
<td>Difficulty generating adequate peak inspiratory flow</td>
<td>Change DPI to MDI Consider nebulizer</td>
</tr>
<tr>
<td>Possible cognitive impairment</td>
<td>Have patient demonstrate proper technique at each visit</td>
</tr>
<tr>
<td>Patient on multiple inhalers</td>
<td>Change inhalers to same administration type (for example, all DPI) Combine active ingredients if possible into single inhalers Ensure proper use at each visit</td>
</tr>
</tbody>
</table>

2/16/2017
Asthma & COPD Medication Review

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