Asthma in later life: challenges and opportunities

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October 21, 2017
Conflicts of Interest

• I currently hold grant funding from Pfizer International

• I have previously worked for Ortho-McNeil Inc, and The Upjohn Company of Canada

• The slides from GINA and GOLD are used with permission.
Why I am here
Outline

• Demographics
• Presentation
• Epidemiology
• Multimorbidity
• Inhaler technique
• Product design
• Interventions
Demographics - Canada

Median age by province, territory – July 2012
Old vs Young

Number of children aged 14 and under and of people aged 65 and over, Canada, 1921 to 2011
Demographics – 85+

Chart 1
Population aged 85 and older, Canada, 1966 to 2051

Sources: Statistics Canada, Census of Population, 1966 to 2016. Data for 2021 to 2051 are population projections from the M1 medium-growth scenario of national projections. The projection data have as a basis population estimates based on the 2011 Census, adjusted for net undercoverage. For more information, see the report Population Projections for Canada (2013 to 2063), Provinces and Territories (2013 to 2038) (Statistics Canada Catalogue no. 91-520-X).
Presentation in Older Adults

• New terminology
  – ACO
    • No “S” because it is not a unique syndrome
  – ACOS = Asthma and Chronic Obstructive Pulmonary Disease (COPD) Overlap Syndrome

• Recognition that older adults often have both diseases, COPD and asthma
## Terminology and Presentation

### Asthma

Asthma is a heterogeneous disease, 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. [GINA 2017]

### COPD

Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. [GOLD 2017]

### Asthma-COPD overlap [not a definition, but a description for clinical use]

Asthma-COPD overlap (ACO) is characterized by persistent airflow limitation with several features usually associated with asthma and several features usually associated with COPD. Asthma-COPD overlap is therefore identified in clinical practice by the features that it shares with both asthma and COPD. This is not a definition, but a description for clinical use, as asthma-COPD overlap includes several different clinical phenotypes and there are likely to be several different underlying mechanisms.
Presentation

• For patients with respiratory symptoms, infectious diseases and non-pulmonary conditions need to be distinguished from chronic airways disease

• In patients with chronic airways disease, the differential diagnosis differs by age
  – Children and young adults: most likely to be asthma
  – Adults >40 years: COPD becomes more common, and distinguishing asthma from COPD becomes more difficult

• It is likely that a range of different underlying mechanisms and origins will be identified
Physiological Changes

- Body composition - ↑fat
- CV - ↓ cardiac output, ↓ beta sensitivity
- Renal - ↓ GFR, ↓ nephrons
- GI - ↓ H⁺, ↑ gastric emptying time
- Hepatic - ↓ size, ↓ blood flow
- Nervous - ↓ blood flow to CNS
- Pulmonary - ↓ cilia
- Endocrine - ↓ hormonal secretions
Challenges in Presentation

- ACO worse than asthma or COPD alone
  - Examples: Frequent exacerbations, mortality
- Reported prevalence of overlap varies
  - Concurrent MD-diagnosed asthma and COPD: 15–20% of patients with chronic airways disease
  - Reported rates of overlap are between 15–55% of patients with chronic airways disease, depending on the definitions used, and the population studied
- Most clinical trials and guidelines are focused on asthma or COPD alone
Management of Asthma and ACO
Stepwise approach to diagnosis and initial treatment

For an adult who presents with respiratory symptoms:

1. Does the patient have chronic airways disease?
2. Syndromic diagnosis of asthma, COPD and overlap
3. Spirometry
4. Commence initial therapy
5. Referral for specialized investigations (if necessary)

**Step 1: Diagnose Chronic Airways Disease**

| Do symptoms suggest chronic airways disease? |
|-----------------|-----------------|
| Yes             | No              |

**Step 2: Syndromic Diagnosis in Adults**

- (i) Assemble the features for asthma and for COPD that best describe the patient.
- (ii) Compare number of features in favour of each diagnosis and select a diagnosis.

<table>
<thead>
<tr>
<th>Features: if present suggest</th>
<th>Asthma</th>
<th>COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of onset</td>
<td>Before age 20 years</td>
<td>After age 40 years</td>
</tr>
<tr>
<td>Pattern of symptoms</td>
<td>Variation over minutes, hours or days</td>
<td>Persistent despite treatment</td>
</tr>
<tr>
<td></td>
<td>Worse during the night or early morning</td>
<td>Good and bad days but always daily</td>
</tr>
<tr>
<td></td>
<td>Triggered by exercise, emotions including laughter, dust or exposure to allergens</td>
<td>Symptoms and exacerbations</td>
</tr>
<tr>
<td>Lung function</td>
<td>Record of variable airflow limitation (spirometry or peak flow)</td>
<td>Record of persistent airflow limitation (FEV&lt;sub&gt;1&lt;/sub&gt;/FVC &lt; 0.7 post-BD)</td>
</tr>
<tr>
<td>Lung function between symptoms</td>
<td>Normal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>Past history or family history</td>
<td>Previous doctor diagnosis of asthma, Family history of asthma, and other allergic conditions (allergic rhinitis or eczema)</td>
<td>Previous doctor diagnosis of COPD, chronic bronchitis or emphysema</td>
</tr>
<tr>
<td></td>
<td>Heavy exposure to risk factor: tobacco smoke, biomass fuels</td>
<td></td>
</tr>
<tr>
<td>Time course</td>
<td>No worsening of symptoms over time. Variation in symptoms either seasonally, or from year to year</td>
<td>Symptoms slowly worsening over time (progressive course over years)</td>
</tr>
<tr>
<td></td>
<td>May improve spontaneously or have an immediate response to bronchodilators or to ICS over weeks</td>
<td>Rapid-acting bronchodilator treatment provides only limited relief</td>
</tr>
<tr>
<td>Chest X-ray</td>
<td>Normal</td>
<td>Severe hyperinflation</td>
</tr>
</tbody>
</table>

**Diagnosis and Confidence in Diagnosis**

- **Asthma**
- **Some features of asthma**
- **Features that could be COPD**
- **Some features of COPD**
- **Some features of both**
- **Possible COPD**
- **COPD**

**Step 3: Perform Spirometry**

- Marked reversible airflow limitation (pre-post bronchodilator) or other proof of variable airflow limitation
- FEV<sub>1</sub>/FVC < 0.7 post-BD

**Step 4: Initial Treatment**

- Asthma drugs
  - No LABA monotherapy
  - Asthma drugs + LABA monotherapy
- COPD drugs
  - ICS, and usually LABA +/or LAMA
  - COPD drugs

**Step 5: Specialised Investigations or Refer If:**

- Persistent symptoms and/or exacerbations despite treatment.
- Diagnostic uncertainty (e.g. suspected pulmonary hypertension, cardiovascular diseases and other causes of respiratory symptoms).
- Suspected asthma or COPD with atypical or additional symptoms or signs (e.g. haemoptysis, weight loss, night sweats, fever, signs of bronchiectasis or other structural lung disease).
- Few features of either asthma or COPD.
- Comorbidities present.
- Reasons for referral for either diagnosis as outlined in the GINA and GOLD strategy reports.

*Consult GINA and GOLD documents for recommended treatments.
<table>
<thead>
<tr>
<th>STEP 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL TREATMENT*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asthma drugs</th>
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<th>ICS and consider LABA +/or LAMA</th>
<th>COPD drugs</th>
<th>COPD drugs</th>
</tr>
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<tr>
<td>No LABA monotherapy</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Consult GINA and GOLD documents for recommended treatments.
Step 4 – Commence initial therapy

- Initial pharmacotherapy choices are based on both efficacy and safety
- If syndromic assessment suggests asthma as single diagnosis
  - Start with low-dose ICS
  - Add LABA and/or LAMA if needed for poor control despite good adherence and correct technique
  - Do not give LABA alone without ICS
- If syndromic assessment suggests COPD as single diagnosis
  - Start with bronchodilators or combination therapy
  - Do not give ICS alone without LABA and/or LAMA
- If differential diagnosis is equally balanced between asthma and COPD, i.e. asthma-COPD overlap
  - Start treatment as for asthma, pending further investigations
  - Start with ICS at low or moderate dose
  - Usually also add LABA and/or LAMA, or continue if already prescribed

GINA 2017
Step 4 – Commence initial therapy

- For all patients with chronic airflow limitation:
  - Treat modifiable risk factors including advice about smoking cessation
  - Treat comorbidities
  - Advise about non-pharmacological strategies including physical activity, and, for COPD or asthma-COPD overlap, pulmonary rehabilitation and vaccinations
  - Provide appropriate self-management strategies
  - Arrange regular follow-up
STEP 5
SPECIALISED INVESTIGATIONS or REFER IF:

- Persistent symptoms and/or exacerbations despite treatment.
- Diagnostic uncertainty (e.g. suspected pulmonary hypertension, cardiovascular diseases and other causes of respiratory symptoms).
- Suspected asthma or COPD with atypical or additional symptoms or signs (e.g. haemoptysis, weight loss, night sweats, fever, signs of bronchiectasis or other structural lung disease).
- Few features of either asthma or COPD.
- Comorbidities present.
- Reasons for referral for either diagnosis as outlined in the GINA and GOLD strategy reports.
The Complexity of Caring for Older Adults
Pharmacoepidemiology

**FIGURE 2.**
Percentage of claims for different drug classes among seniors on public drug programs, by age groups, 2010–2011*

* The seven provinces submitting data to the National Prescription Drug Utilization Information System Database as of March 2011: Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia and Prince Edward Island.
Health System Use

Seniors account for approximately

– 16% of the population
– 25% MD visits
– 40% of hospital stays
– 45% of healthcare spending in Canada

– Disproportionate use of public funding for medications
A Example of Polypharmacy
Multimorbidity
Multimorbidity

Comorbidity of 10 common conditions among UK primary care patients

Percentages who only have the row condition

* Percentage who do not have one of 39 other conditions in the full count

Guthrie BMJ 2012
Assessment of asthma

1. Asthma control - two domains
   – Assess symptom control over the last 4 weeks
   – Assess risk factors for poor outcomes, including low lung function

2. Treatment issues
   – Check inhaler technique and adherence
   – Ask about side-effects
   – Does the patient have a written asthma action plan?
   – What are the patient’s attitudes and goals for their asthma?

3. Comorbidities
   – Think of rhinosinusitis, GERD, obesity, obstructive sleep apnea, depression, anxiety
   – These may contribute to symptoms and poor quality of life
Managing exacerbations in acute care settings

**INITIAL ASSESSMENT**
A: airway  B: breathing  C: circulation

Are any of the following present?
- Drowsiness
- Confusion
- Silent chest

Further TRIAGE BY CLINICAL STATUS according to worst feature

**MILD** or **MODERATE**
- Talks in phrases
- Prefers sitting to lying
- Not agitated
- Respiratory rate increased
- Accessory muscles not used
- Pulse rate 100–120 bpm
- $O_2$ saturation (on air) 90–95%
- PEF >50% predicted or best

**SEVERE**
- Talks in words
- Sits hunched forwards
- Agitated
- Respiratory rate >30/min
- Accessory muscles being used
- Pulse rate >120 bpm
- $O_2$ saturation (on air) < 90%
- PEF ≤50% predicted or best

Short-acting beta$_2$-agonists
Consider ipratropium bromide
Controlled $O_2$ to maintain saturation 93–95% (children 94–98%)
Oral corticosteroids

Consult ICU, start SABA and $O_2$, and prepare patient for intubation

If continuing deterioration, treat as SEVERE and re-assess for ICU

ASSESS CLINICAL PROGRESS FREQUENTLY
MEASURE LUNG FUNCTION in all patients one hour after initial treatment

FEV1 or PEF 60-80% of predicted or personal best and symptoms improved
- MODERATE
  - Consider for discharge planning

FEV1 or PEF <60% of predicted or personal best or lack of clinical response
- SEVERE
  - Continue treatment as above and reassess frequently
Multimorbidity


- Criticisms of Guidelines (CPG)
  - Applicability to older adults
  - Short vs long-term goals
  - Quality of scientific evidence
  - Incorporation of scientific evidence
  - Lack of patient-centred domains (e.g. cost, burden, convenience)
Multimorbidity - Case

• Applying individual disease guidelines to a patient with five chronic conditions, what would her regimen be?

• 79-year-old woman with osteoporosis, osteoarthritis, type 2 diabetes mellitus, hypertension, and chronic obstructive pulmonary disease, all of moderate severity
## Multimorbidity - Case

<table>
<thead>
<tr>
<th>Time</th>
<th>Medications</th>
<th>Non-pharmacologic Therapy</th>
<th>All Day</th>
<th>Periodically</th>
</tr>
</thead>
<tbody>
<tr>
<td>07</td>
<td>Ipratropium MDI</td>
<td>Check feet</td>
<td>Joint protection</td>
<td>Pneumonia vaccine</td>
</tr>
<tr>
<td></td>
<td>Alendronate 70 mg Qweek</td>
<td>Sit upright 30 min</td>
<td>Energy conservation</td>
<td>Yearly influenza vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check blood sugar</td>
<td>Exercise (non-weight bearing if severe foot disease, weight bearing for osteoporosis); muscle strengthening exercises, aerobic exercise, ROM</td>
<td>All provider visits: evaluate self-monitoring of glucose, foot exam, BP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Avoid environmental exposures that might exacerbate COPD</td>
<td>Quarterly: A1C, biannual LFTs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wear appropriate footwear</td>
<td>Yearly Cr, lytes, microalbuminuria, cholesterol</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Salbutamol MDI PRN</td>
<td>Referrals: Pulmonary Rehab, PT, DEXA q2y, eye exam q yearly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Limit alcohol</td>
<td>Medical nutrition therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintain normal body weight</td>
<td>Patient education – high-risk foot conditions, foot care, foot wear, OA, COPD</td>
</tr>
<tr>
<td>08</td>
<td>Eat breakfast</td>
<td>2.4 g Na, 90mmol K,</td>
<td></td>
<td>Medication and delivery system training, DM</td>
</tr>
<tr>
<td></td>
<td>HCTZ</td>
<td>adequate Mg, low cholesterol and saturated fat, medical nutrition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lisinopril</td>
<td>therapy for DM, DASH</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Glyburide</td>
<td></td>
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<td></td>
<td>ECASA</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Metformin</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Naproxen</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Omeprazole</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Calcium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitamin D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Eat lunch</td>
<td>Diet as above</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ipratropium MDI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Calcium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitamin D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Eat dinner</td>
<td>Diet as above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ipratropium MDI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metformin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naproxen</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Calcium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lovastatin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Ipratropium MDI</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Multimorbidity Case Example

- The patient would take:
  - 12 separate medications with a medication complexity score of 14.51
  - This regimen requires 19 doses per day, taken at 5 times during a typical day, assuming that salbutamol “as needed” is taken twice daily, plus weekly alendronate.
  - Non-pharm: 14 non-pharmacological activities are recommended for this patient if all nutritional recommendations are pooled into one.
Multimorbidity Case Example

• Additional Interventions
  – The CPG also recommend one-time educational and rehabilitative interventions, and monitoring of the patient’s chronic diseases from daily to biennial intervals depending on the type of monitoring.
  – It theoretically would be possible to compress all monitoring into 2 to 4 primary care visits and 1 ophthalmologic visit per year.

• Interactions
  – Medications and a disease, and between food and medications.
  – Recommendations may also contradict one another.
Multimorbidity

AGS 2012

1. Patient preferences
2. Interpreting the evidence
3. Prognosis
4. Clinical feasibility
5. Optimizing therapies and care plans
• Side-effects of oral corticosteroids
  – When prescribing short-term OCS, remember to advise patients about common side-effects (sleep disturbance, increased appetite, reflux, mood changes)
GINA Guidelines and Multimorbidity

• All patients should have a written asthma action plan
  – The aim is to show the patient how to recognize and respond to worsening asthma
  – It should be individualized for the patient’s medications, level of asthma control and health literacy
  – Based on symptoms and/or PEF (children: only symptoms)
• The action plan should include:
  – The patient’s usual asthma medications
  – When/how to increase reliever and controller or start OCS
  – How to access medical care if symptoms fail to respond
• Why?
  – When combined with self-monitoring and regular medical review, action plans are highly effective in reducing asthma mortality and morbidity

GINA 2017
GINA Guidelines and Multimobidity

• Monitoring
  – Consider the benefit versus the burden
  – Frequency of measurement of lung function
    • “Lung function should be assessed at diagnosis or start of treatment; after 3–6 months of controller treatment to assess the patient’s personal best FEV$_1$; and periodically thereafter”
  – ‘Periodically’ has been clarified
    • Most adults: lung function should be recorded at least every 1-2 yrs
    • More frequently in higher risk patients
GOLD Guidelines and Multimorbidity

Non-Pharmacologic Recommendations:

- Education and self-management
- Physical activity
- Pulmonary rehabilitation programs
- Exercise training
- Self-management education
- End of life and palliative care
- Nutritional support
- Vaccination
- Oxygen therapy
Assessment of asthma

1. Asthma control - two domains
   - Assess symptom control over the last 4 weeks
   - Assess risk factors for poor outcomes, including low lung function

2. Treatment issues
   - Check inhaler technique and adherence
   - Ask about side-effects
   - Does the patient have a written asthma action plan?
   - What are the patient’s attitudes and goals for their asthma?

3. Comorbidities
   - Think of rhinosinusitis, GERD, obesity, obstructive sleep apnea, depression, anxiety
   - These may contribute to symptoms and poor quality of life

GINA 2017
How to distinguish between uncontrolled and severe asthma

<table>
<thead>
<tr>
<th>Watch patient using their inhaler. Discuss adherence and barriers to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compare inhaler technique with a device-specific checklist, and correct errors; recheck frequently. Have an empathic discussion about barriers to adherence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Confirm the diagnosis of asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>If lung function normal during symptoms, consider halving ICS dose and repeating lung function after 2–3 weeks.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remove potential risk factors. Assess and manage comorbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for risk factors or inducers such as smoking, beta-blockers, NSAIDs, allergen exposure. Check for comorbidities such as rhinitis, obesity, GERD, depression/anxiety.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consider treatment step-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider step up to next treatment level. Use shared decision-making, and balance potential benefits and risks.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refer to a specialist or severe asthma clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>If asthma still uncontrolled after 3–6 months on Step 4 treatment, refer for expert advice. Refer earlier if asthma symptoms severe, or doubts about diagnosis.</td>
</tr>
</tbody>
</table>
Provide hands-on inhaler skills training

<table>
<thead>
<tr>
<th>Choose</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Choose an appropriate device before prescribing. Consider medication options, arthritis, <strong>patient skills</strong> and cost. For ICS by pMDI, prescribe a spacer</td>
</tr>
<tr>
<td>• Avoid multiple different inhaler types if possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Check technique at every opportunity – “Can you show me how you use your inhaler at present?”</td>
</tr>
<tr>
<td>• Identify errors with a device-specific checklist</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Give a physical demonstration to show how to use the inhaler correctly</td>
</tr>
<tr>
<td>• Check again (up to 2-3 times)</td>
</tr>
<tr>
<td>• Re-check inhaler technique frequently, as errors often recur within 4-6 weeks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Confirm</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Can you demonstrate correct technique for the inhalers you prescribe?</td>
</tr>
<tr>
<td>• Brief inhaler technique training improves asthma control</td>
</tr>
</tbody>
</table>
Poor adherence:
- Is very common: it is estimated that 50% of adults and children do not take controller medications as prescribed
- Contributes to uncontrolled asthma symptoms and risk of exacerbations and asthma-related death

Contributory factors
- Unintentional (e.g. forgetfulness, cost, confusion) and/or
- Intentional (e.g. no perceived need, fear of side-effects, cultural issues, cost)

How to identify patients with low adherence:
- Ask an empathic question, e.g. “Do you find it easier to remember your medication in the morning or the evening?”, or “Would you say you are taking it 3 days a week, or less, or more?”
- Check prescription date, label date and dose counter
- Ask patient about their beliefs and concerns about the medication

GINA 2017
Choosing between controller options – individual patient decisions

Decisions for individual patients

Use shared decision-making with the patient/parent/carer to discuss the following:

1. Preferred treatment for symptom control and for risk reduction
2. Patient characteristics (phenotype)
   • Does the patient have any known predictors of risk or response? (e.g. smoker, history of exacerbations, blood eosinophilia)
3. Patient preference
   • What are the patient’s goals and concerns for their asthma?
4. Practical issues
   • Inhaler technique - can the patient use the device correctly after training?
   • Adherence: how often is the patient likely to take the medication?
   • Cost: can the patient afford the medication?
Strategies to improve adherence in asthma

- Only a few interventions have been studied closely in asthma and found to be effective for improving adherence
  - Shared decision-making
  - Comprehensive asthma education with nurse home visits
  - Inhaler reminders for missed doses
  - Reviewing patients’ detailed dispensing records
Adherence

• How adherent are we?
Adherence

• Unintentional
  – Forgetting medications

• Functional:
  – Trouble opening containers
  – Trouble swallowing medications

• Intentional:
  – Hoarding
  – Altering doses based on symptoms
  – Reducing dosage to save money
Factors Improving Compliance

• Belief medication was important
• Belief medication was effective
• Regularly attending same clinic, pharmacy
# Function - Dependence

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Mild</th>
<th>Mod</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-64</td>
<td>4%</td>
<td></td>
<td></td>
<td>4%</td>
</tr>
<tr>
<td>65-74</td>
<td>10%</td>
<td>2%</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>75-84</td>
<td>19%</td>
<td>6%</td>
<td>2%</td>
<td>27%</td>
</tr>
<tr>
<td>85+</td>
<td>32%</td>
<td>15%</td>
<td>5%</td>
<td>52%</td>
</tr>
</tbody>
</table>
3.8 million Canadians with disabilities

- 15-24 years: 4.4%
- 25-44 years: 6.5%
- 45-64 years: 16.1%
- 65-74 years: 26.3%
- 75+ years: 42.5%
- All ages: 13.7%

3.8 million adult Canadians limited in their daily activities due to a disability.

13.7% of adult population

Source: Statistics Canada. [Canadian Survey on Disability 2012](http://www.statscan.gc.ca) (Cat. No. 89-654-XWE)
Medication Management

• Complexity of the management process:
  – Ordering
  – Picking up
  – Sorting
  – Packaging
  – Reminding/cueing
  – Administration
  – Monitoring
Management in the Home

- Storage
- Hoarding
- Sharing
Administration Ability

• How often are you asked?
• How often do you demonstrate?

• Abilities required:
  – Cognition
  – Manual dexterity
  – Vision
Medication Regimen Complexity Index

• Part A - type of dosage form
• Part B – dosing frequency
• Part C – additional directions

• Examples:
  – Spiriva Handihaler/Respimat inhale once daily
  – Tylenol No.3 1-2 tabs q4-6h PRN
  – Ramipril 10 mg daily
  – Insulin sliding scale, with monitoring QID
Management Interventions

• Suggest use of intuitive products
  – Participate in the design of products
• Use of calendar packaging
  – Evidence is variable
  – Not applicable for devices
• Simplification of the regimen
• Education
• Home care assessment/support
Inhalers

• “Metered dose inhalers are effective if they are used correctly.”

  – Anna Murphy, 2002
Studies of Inhaler Use

• 1990’s - 2000’s
  – Focus on CFC-propellant MDI’s
Pharma Ingenuity and Creativity
Inhaler Technique

• N=56 medical interns

• Correct use of MDI:
  – Pre-test = 5%
  – Lecture + demonstration = 13%
  – Intensive 1:1 session = 73%

• Greatest difficulty: coordinating actuation with inhalation
Inhaler Technique

• N = 3955 asthma patients
  – 71% misusers of the device
    • 47% of the misusers had poor coordination
    • 15% rated their technique as poor or very poor

• reflected by:
  – increased beta-agonist use
  – worsening of asthma
  – serious exacerbations
Inhaler Technique

• Zanamivir Diskhaler

• N=73 elderly patients unfamiliar with the Diskhaler

• Results:
  – 50% had difficulty with inhaler after training
  – 65% had difficulty using the device 1 day later
Inhaler Technique

• N=71 elderly subjects

• Results:
  – 62% demonstrated correct technique immediately following instruction
  – 56% demonstrated correct technique at 1 week
Recent Studies

• New devices
• Same problems
Inhaler Technique

- N=47 inpatients
- 70% made at least one critical error while demonstrating their inhaler technique
- Number of critical errors/patient = 1.6

AlAmmari 2016
Inhaler Technique

• Children vs older adults
• Methods: 10-step protocol
  – Assessed inhaler technique in 135 pediatric asthma patients and 128 adult asthma patients.
• Results:
  – The most common error among the pediatric patients was failing to execute a 10-s breath-hold after inhalation
  – The most common error among the adult patients was failing to exhale fully before using the inhaler.

Manriquez, 2015
Inhaler Technique

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Correct technique</th>
<th>Incorrect technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric patients</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>5-6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>7-8</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>9-10</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>11-12</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>13-18</td>
<td>49</td>
<td>14</td>
</tr>
<tr>
<td>%</td>
<td>73.4</td>
<td>26.6 *</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Correct technique</th>
<th>Incorrect technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult patients</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>19-30</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>31-45</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>46-60</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>61-75</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>76-90</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>%</td>
<td>9.4</td>
<td>90.6 *</td>
</tr>
</tbody>
</table>

*Frequency of correct/incorrect inhaler technique, by age group.  
*p < 0.05 (equivalence test for two proportions).
Inhaler Technique

• Some research tells us that patients may prefer or perform better with one device over another

Chrystyn, 2016
Inhaler Technique

• Overall:

• Estimates of appropriate use of a device:
  – 30% of elderly patients cannot use an inhaler
  – 40% have some difficulty using an inhaler
  – TOTAL = 70% of patients do not fully benefit from their inhalers
Inhaler Technique

Poor technique associated with many factors, including:

- low cognitive (MMSE) score
- low planning/executive function (EXIT) score
- arthritis
- weakness
- poor dexterity
- poor vision
- cerebrovascular disease
- lack of instruction
Design and Function

• Universal Design
  1. Equitable use
  2. Flexibility
  3. Simple and intuitive
  4. Perceptible information
  5. Tolerance for error
  6. Low physical effort
  7. Size and space for approach and use
Design and Function

• An example of Universal Design
  – Bobby McFerrin

• https://www.youtube.com/watch?v=Hodp2esSV9E
Regulatory Requirements

• “The term Medical Devices, as defined in the *Food and Drugs Act*, covers a wide range of health or medical instruments used in the treatment, mitigation, diagnosis or prevention of a disease or abnormal physical condition.”

• Examples:
  – bed rails
  – pacemakers
  – artificial heart valves
  – hip implants
  – synthetic skin
  – medical laboratory diagnostic instruments
  – test kits for diagnosis
  – contraceptive devices
Additional Challenges for Older Adults
### Income

<table>
<thead>
<tr>
<th>Population</th>
<th>Percent in low income after tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Canadians</td>
<td>8.8</td>
</tr>
<tr>
<td>65 and older</td>
<td>5.2</td>
</tr>
<tr>
<td>Males 65 and older</td>
<td>3.8</td>
</tr>
<tr>
<td>Females 65 and older</td>
<td>6.4</td>
</tr>
<tr>
<td>Unattached males 65 and older</td>
<td>12.2</td>
</tr>
<tr>
<td>Unattached females 65 and older</td>
<td>16.1</td>
</tr>
</tbody>
</table>
Living Alone

Percentage of the population aged 15 and over (2011)
Examples of barriers to implementation

- **Health care providers**
  - Insufficient knowledge of recommendations
  - Lack of agreement with or confidence in recommendations
  - Resistance to change
  - External barriers (organizational, policies, cost)
  - Lack of time and resources
  - Medico-legal issues

- **Patients**
  - Low health literacy
  - Insufficient understanding of asthma and its management
  - Lack of agreement with recommendations
  - Cultural and economic barriers
  - Peer influence
  - Attitudes, beliefs, preferences, fears and misconceptions
Addressing Health Care Challenges

• Demand a Plan
• Resources
• Living settings
• Mandating supports
• Engaging community (health/non-health)
Policy and Seniors’ Health

- Health issues that need to be addressed:
  - Social connectedness
  - Physical activity
  - Healthy eating
  - Falls prevention
  - Tobacco control

- Health System issues
  - Access to care
  - Knowledge of seniors’ health
  - Data
Challenges with Information Delivery
Reducing the impact of impaired health literacy

• Health literacy affects health outcomes, including in asthma
  – ‘The degree to which individuals have the capacity to obtain, process and understand basic health information and services to make appropriate health decisions’ (Rosas-Salazar, JACI 2012)

• Strategies for reducing the impact of impaired health literacy
  – Prioritize information (most important to least important)
  – Speak slowly, avoid medical language, simplify numeric concepts
  – Use anecdotes, drawings, pictures, tables and graphs
  – Use the ‘teach-back’ method – ask patients to repeat instructions
  – Ask a second person to repeat the main messages
  – Pay attention to non-verbal communication
Health Literacy

• Specific for inhalers
• Mean baseline scores for inhaler technique:
  – 12.2 +/- 2.2 steps correct for the control group
  – 13.4 +/- 1.3 for the low health-literacy group of the 18 maximum points
• Change in inhaler technique score:
  – control group was 1.0 +/- 1.8
  – low health-literacy group was 2.1 +/- 2.7
  • (P = .03).

Beatty, 2017
Medication Information

- What is most prominent on a label?
- Colour/size of information

Easy-to-read label with larger type and simple instructions

Attached info card with important personal and drug information

Custom-color ID ring for each member of the family
For many of us, it is not just the loss of our hair that we are concerned with ... it is also the loss of our self-confidence, well-being, and the bond jokes we’ve had to endure. This trend, a to continuously look for the most advanced hair loss solutions available.

We understand your concerns and as such, we provide the most successful treatment for hair loss in men and women today.

Hair Grow Technology Inc. is the exclusive import of BIO-FEN products into North America. This revolutionary hair product is recognized throughout Europe in the prevention of hair loss and undertaking new hair growth. We only distribute our products through the highest levels of research and research to prove their effectiveness.

DEALER INQUIRIES WELCOME! VISIT US AT www.biofen.com/dealers

These photos are the Real McCoys! They haven’t been touched up in any way!

27/03/2007

NOVO-HYDRAZIDE 25MG TAB
HYDROCHLOROTHIAZIDE (hydo-clor-oh-THYE-a-zide)

COMMON USES: This medicine is a thiazide diuretic used to treat high blood pressure and swelling due to excess blood water. It may also be used to treat other conditions as determined by your doctor.

HOW TO USE THIS MEDICINE: The dosage of this medicine may vary for different patients. Follow your doctor’s instructions when taking this medicine. To ensure you get the best results from this medicine, take it at regular intervals. Take this medicine at the same time each day or at bedtime. This medicine may be taken with food or on an empty stomach. Avoid using alcohol or other medicines that may increase your heart rate or blood pressure. Avoid using this medicine if you are pregnant or breastfeeding. This medicine contains hydrochlorothiazide (HCTZ), which is a diuretic that can cause dehydration and electrolyte imbalance. It is important to keep track of your fluid intake and electrolyte levels. If you experience symptoms of dehydration, such as dry mouth, thirst, dizziness, or weakness, contact your healthcare provider immediately. Avoid driving or operating heavy machinery until you know how this medicine affects you. If you take this medicine with other medications, interactions may occur. Consult your healthcare provider for more information.

CAUTIONS: This medicine may cause dizziness or lightheadedness. Do not drive, use machinery, or do other activities that require alertness until you are sure you can perform such activities safely. If you are elderly, this medication may increase your risk of falling. Do not use this medicine if you have certain medical conditions, such as liver disease, kidney disease, or glaucoma. This medication may cause dizziness or lightheadedness. Avoid driving or operating heavy machinery until you know how this medicine affects you. This medicine may cause dizziness or lightheadedness. Do not drive, use machinery, or do other activities that require alertness until you are sure you can perform such activities safely. Avoid alcohol and other medications that may increase your heart rate or blood pressure. If you take this medication with other medications, interactions may occur. Consult your healthcare provider for more information.

If you miss a dose, take it as soon as possible. If it is almost time for your next dose, skip the missed dose and go back to your regular dosing schedule. Do not take a double dose at once.

WAL-MART PHARMACY
800 BURNABY ST.
VANCOUVER, BC
(604) 685-2000

NEW CANADA

TEA. 604-685-2000

811

WESTCOAST NATURALS
From Nature’s Medicine Cabinet

Vision Care™
Cataracts and Age-related Macular Degeneration (AMD) are the leading causes of vision impairment and legal blindness in developed countries, and the leading causes of blindness in developing countries.

Recent studies have found that consumption of Lutein rich foods and supplements may play an important role in reducing the risk of serious eye conditions, such as age-related macular degeneration and cataracts.

These are all risk include: the elderly, women more than men, Caucasians more than any other race, smokers, diabetics, people with inflammatory diseases, and those with high exposure to the sunlight. Individuals with light (blue and green) coloured eyes are more prone to Cataracts. The only treatment for Cataracts is surgically replacing the natural lens. AMD is an incurable condition, but Lutein can help.

Lutein belongs to the family of Carotenoids found in fruits, vegetables, and leafy greens, and is known for its antioxidant properties. It is naturally occurring in the body, but its levels can be supplemented to help maintain good eye health.

There are over 600 different Carotenoids found in nature, but only about 20 in the human body. Of these, only Lutein and Zeaxanthin are found in the eye - specifically in the macula and the lens.

Although they share similar chemical structure, Lutein and Zeaxanthin differ from one another. The amount of lutein in the eye is referred to as "Macular Pigment Density" (MPD). It is possible to increase MPD through diet or supplements rich in lutein. A study from Harvard University confirms that people with higher MPD have a significantly lower risk of Age-related Macular Degeneration. The Nurses Health Study, Health Professionals Follow-Up Study and Eye Disease Case-Control Study all reported direct link between dietary intake of Lutein, around 6 mg per day, and decreased risk of AMD and Cataracts.

Each Vision Care™ capsule contains 2 mg of elemental Lutein. Take 3 per day to meet the therapeutic dosage. Vision Care™ also contains the added benefits of Ester-C®, European Bilberry, Eye Bright, L-Glutamine, Grape Seed Extract and Citrus Bioflavonoids, which are well-known antioxidants or circulatory agents.

Caution: Lutein inhibits absorption of Beta-carotene (vitamin A).

Take Vision Care™ supplements at least 2 hours apart from Lutein.

NOTE: This product is intended for research and educational purposes only, and is not intended to diagnose or treat any disease. For medical advice, see your health professional.

Westcoast Naturals® From Nature's Medicine Cabinet™

©09/03

BIO-FEN

My hair is very thin and I was terriﬁed when I noticed mine was starting to thin. I’ve only been taking BIO-FEN for three weeks and already I can see the difference, not only as much hair in the days, but also...
Lori A., Toronto

"Thanks to BIO-FEN, I’ve been taking BIO-FEN for three months now, I’m not losing any more hair and I can see new hair growing! I’m not going to end up bald like my dad!"
Brenda S., Edmonton

I’ve seen more results with BIO-FEN in the last six weeks than all of the last seven years that I’ve been using another well known product.”

terry R., Alberta

I have been using BIO-FEN for 4 weeks now and I have already noticed a significant reduction in my hair loss. My wife is convinced that there is more hair growth already. Overall, I’m delighted with the results and I encourage others to give BIO-FEN a try.

Vince L., 39 years old, Calgary, Alberta

I’ve been progressively losing my hair for the last 15 years. I’ve tried lots of different products, shampoos, lotions, creams and medications, all to no avail. Then I came across BIO-FEN. It was totally herbal, so it was safe, it was easy, one pill a day and the fact that it had been sold in Europe for the last ten years and had 1 million customers, I had to give it a shot. I’ve been so thrilled with the results, after just 3 months... I’ve got hair! I encourage anyone, male or female, who is having trouble with hair loss to give BIO-FEN a try.

Gerry Freund, Brooks, AB, Sept. 2001

These photos are the Real McCoys! They haven’t been touched up in any way!

Check out the new hair growth - above and below the line!
Tips for Caregivers

Many of us are unfamiliar with blindness and may feel uncomfortable when we are caring for a person who is blind, visually impaired or deafblind. The following tips will help you feel more at ease.

1. The individual is a person first and visually impaired second. As in any care-giving relationship, common courtesy and good communication skills are key.

2. Not all people considered “blind” are totally without sight. About 90 percent of blind people see something. Vision impairment may range from a loss of central vision because of an eye condition like macular degeneration, to a loss of peripheral vision because of glaucoma, or spotty, fluctuating vision because of diabetes complications. Some degree of visual impairment is common among seniors.

3. Each person is unique. How a person with vision loss sees depends upon the eye condition and how well the remaining vision is used. Lighting and contrast are also important factors. If you aren’t sure how much a person can see, ask!

4. When approaching a person with vision loss, make verbal contact. Address the person by name if possible, and always identify yourself. Speak directly to the person with vision loss in a normal tone of voice. Remember to let the person know when you are leaving.

5. Use common phrases like ‘see’, ‘look’ and ‘read’ freely. People with vision loss are used to these terms and likely use them as much as you do.

6. In a situation where you need to guide a person with vision loss, let the person take your arm. Never push or pull a blind, visually impaired or deafblind person from place to place.

7. Help the person with vision loss become familiar with the surroundings by describing the contents of each room. Then, do not move anything without telling the person. Avoid leaving ‘obstacles’ in the usual travel path of a person with vision loss.

8. In a care centre, gradually acquaint the person with vision loss with as many areas of the facility as possible, such as nurse’s stations, recreational facilities, washrooms, elevators, the cafeteria and telephones. If there is a bedside table, it should be placed on the person’s better visual side.

9. Tell the person with vision loss what foods are being served at mealtime. You can also
Summary

- Asthma commonly occurs with COPD in older adults
- Their aging bodies, comorbid diseases, and medical burden can affect how the disease is managed
- Tailoring our care for older adults is necessary