A. Enhancement Objectives

When a pharmacist first joins a practice site, the practice site physicians may not be clear on how or why to refer a patient to a pharmacist. Presenting case studies to the physicians helps educate them about a pharmacist’s role in the health care team and informs them about the various reasons why patients can be referred.

The physicians’ objective can differ from the pharmacist’s, depending on the physician. The physicians may want more general continuing education (i.e., Continuing Medical Education) that is more patient specific. These case study presentations may be submitted for credit. Also, the practice may use these presentations as an opportunity for physicians to discuss cases.

B. Tool or Enhancement Description

PowerPoint presentations (or similar software) and handouts are used. For example, an IMPACT pharmacist provided handouts that detailed a patient’s list of medications before and after meeting with the pharmacist. Handouts can also include guidelines related to a specific disease; for example, chronic obstructive pulmonary disease (COPD).

Please see the end of this chapter for examples of case study presentations and handouts.

C. Medication Management Improvements

For a pharmacist, each case study is an example of improved medication management and the presentation can show the practice site physicians how the pharmacist managed the patient’s medication.

For example, presenting the case study of a very complicated patient can demonstrate to the practice site physicians how patients manage their own medication without the physicians’ knowledge. It may lead the physicians to consider how they manage their own patients and may help them realize that more can be done during a consult than has been done in the past. It could lead the physicians to ask the patients more questions or to spend a few extra minutes going over their medications with them.

Because case study presentations have the potential to teach the physicians what other questions could be asked of their patients about their medications, theoretically the physicians may be able to more thoroughly manage their patients’ medications by improving communication between the patient and the physician (if the physicians have more time for extended consultations). This could then assist patients in providing better information to their physicians as to how they are taking their medications (e.g., taking more or less than the amount prescribed) and then lead to appropriate changes in drug therapy (by identifying drug-related problems) and improved medication management. Because case presentations have the potential to change the approach physicians take with their patients, patient engagement in medication use could improve their candidness with their physicians.

In addition, the presentations may lead to an increase in the referrals to the pharmacist and other health care professionals by the physicians. An increase in referrals may improve the flow of the referral process and the efficiency of the physicians and the practice by having the pharmacist (and/or other health care professionals) assist in managing the health of their patients.

An increase in the number of referrals would also have the potential to improve the patients’ engagement in the use of their medications. A pharmacist has the time to explain what each medication is and its purpose. A pharmacist can also determine whether patients are taking their medication correctly and if dosing changes are needed. More drug-related problems can be identified and resolved, which, in turn, leads to better health outcomes.

D. Development Process

Physicians ask or the pharmacist suggests presenting case studies to the team. All patients in the practice could benefit from this enhancement, depending on the number of physicians who attend the case study presentations.

Discuss possible cases with peers and physicians. Create a first draft of the presentation that can be sent to peers for review. Incorporate the feedback into a final draft for the presentation.

After giving one presentation, the pharmacist may be asked to continue presenting case studies if the first is well received.
References and resources

The case study presentations should incorporate information from clinical practice guidelines and related articles to help a pharmacist provide documented information for a case study, information the physicians would also find helpful. The following articles were used for the example case studies shown:


E. Implementation Process

The pharmacist may not be directly involved in organizing meetings for the presentations. Often, the lead physician organizes the meetings, tracks the physicians attending the meetings and books the projector. The lead physician informs participants about the meeting date, time and location; however, be prepared to organize meetings if that is the lead physician’s preference. This may entail:
- Coordinating a date that is acceptable to all (or the majority) of the physicians at the practice site
- Booking a room and projector for the designated day
- Informing all practice site physicians of the day, room and time of the presentation

Present the case study and supply handouts to the physicians. One-page handouts are more likely to be read than longer ones.

Ask for informal or formal feedback after the first case study presentation.

F. Overcoming Challenges

Researching and writing the presentation in the time allotted may be a challenge. Budgeting time and asking physicians for direction and suggestions for relevant resources can focus a pharmacist’s work, saving both time and effort.

Gathering all physicians together at one time may not be possible because of varying schedules. Hold presentations when a majority of physicians are available, and offer to hold them again to ensure all physicians attend at least once.

G. Facilitating Factors

Starting and continuing case study presentations are helped by many factors at the practice site: the team members’ openness to new ideas, willingness to use them, and ability to make changes when they recognize ideas that do not work.

H. Evaluation Results

No strategy to evaluate this enhancement was undertaken.
Case Study 1 Presentation Example

Meet the patient

- JM, 70 y.o. female
- Dx: Type 2 Diabetes, High cholesterol, Hypertension, OA, Polymyalgia
  Rheumatica, Constipation, Coronary Artery Disease, Hypothyroidism, Depression,
  GERD, Migraines, Asthma/COPD
- Smoker, (5 eigs 2x week), 5'6", 87.3kg
- No exercise, no alcohol, sleeps – 3 pillows

Current medication list from the PATIENT
- She self-increased the following
  - Arthrotec 75mg – 2 bid
  - Morphine SR 30mg – 2 bid
- Was the doctor aware?
  - NO

Patient Demographics

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JM, 70 y.o. female</td>
<td></td>
</tr>
<tr>
<td>Dx: Type 2 Diabetes. High cholesterol, Hypertension, OA, Polymyalgia Rheumatica, Constipation, Coronary Artery Disease, Hypothyroidism, Depression, GERD, Migraines, Asthma/COPD</td>
<td></td>
</tr>
<tr>
<td>Smoker, (5 eigs 2x week), 5'6&quot;, 87.3kg</td>
<td></td>
</tr>
<tr>
<td>No exercise, no alcohol, sleeps – 3 pillows</td>
<td></td>
</tr>
</tbody>
</table>

Current medication list from the PATIENT

- She self-increased the following
  - Arthrotec 75mg – 2 bid
  - Morphine SR 30mg – 2 bid
- Was the doctor aware?
  - NO

Current medication list from the PATIENT

<table>
<thead>
<tr>
<th>Current medication list from the PATIENT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>She self-increased the following</td>
<td></td>
</tr>
<tr>
<td>Arthrotec 75mg – 2 bid</td>
<td></td>
</tr>
<tr>
<td>Morphine SR 30mg – 2 bid</td>
<td></td>
</tr>
<tr>
<td>Was the doctor aware?</td>
<td>NO</td>
</tr>
</tbody>
</table>

DATA

Creatinine

<table>
<thead>
<tr>
<th>Date</th>
<th>Creatinine (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 8</td>
<td>76</td>
</tr>
<tr>
<td>February 10</td>
<td>108</td>
</tr>
<tr>
<td>June 10</td>
<td>165</td>
</tr>
</tbody>
</table>

Creatinine Clearance

<table>
<thead>
<tr>
<th>Creatinine Clearance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Cockcroft-Gault Formula (CPG):</td>
<td></td>
</tr>
<tr>
<td>Male:</td>
<td></td>
</tr>
<tr>
<td>Cl(c) = (140 - age [y]) x (weight [kg]) / serum creatinine (umol/L)</td>
<td></td>
</tr>
<tr>
<td>Female: multiply above equation by 0.85</td>
<td></td>
</tr>
<tr>
<td>Usually use IBW if BMI &gt; 30 or THW</td>
<td></td>
</tr>
<tr>
<td>IBW (Male) = 51.56 + (1.85 * [ht-60])</td>
<td></td>
</tr>
<tr>
<td>IBW (Female) = 48.67 + (1.65 * [ht-60])</td>
<td></td>
</tr>
<tr>
<td>ht in inches</td>
<td></td>
</tr>
</tbody>
</table>

DATA

Creatinine & Creatinine Clearance

<table>
<thead>
<tr>
<th>Date</th>
<th>Creatinine (mg/dL)</th>
<th>Cl(c) (mL/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 8</td>
<td>76</td>
<td>56 mL/min</td>
</tr>
<tr>
<td>February 10</td>
<td>108</td>
<td>39 mL/min</td>
</tr>
<tr>
<td>June 10</td>
<td>165</td>
<td>26 mL/min</td>
</tr>
</tbody>
</table>

- Normal Cl(c) > 90 mL/min

36 IMPACT • Practice Enhancement Guide — Copyright 2006. All rights reserved
PRACTICE ENHANCEMENT EXAMPLES

Case Presentation to Physicians

**ASSESSMENT**
- Potential medication which may influence Cr
  1. Arthrotec 75 mg 2 bid
  2. Losartan 50 mg od
- Medications that may be affected by Cr
  1. Metformin 500 mg bid
  2. HCTZ 25 mg od

**ARTHROTEC 75MG 2 BID**
- Maximum dose = 75 mg bid
- NSAIDs may cause a dose dependent reduction in prostaglandin formation and may precipitate overt renal decompensation (> risk in impaired renal function, heart failure, liver dysfunction, diabetics and elderly)
- D/C NSAID is usually followed by recovery to the pretreatment state

**LOSARTAN 50MG OD**
- Pt has been on losartan since at least 5 years
- Minor increases in serum creatinine were observed in < 0.1 of patients with essential hypertension treated with losartan alone. No patient discontinued taking losartan alone due to increased serum creatinine. [CPS 2004]

**METFORMIN 500MG BID**
- **Canadian Diabetes 2003 Clinical practice guidelines:**
  - Metformin is contraindicated in pts with Cr(creatinine) < 60 mL/min because of risk of lactic acidosis
  - 0.03 cases/1000 patient-years with approximately 0.015 fatal cases/1000 patient-years

**HCTZ 25MG OD**
- Thiazides may decrease GFR and precipitate or increase azotemia
- Treatment should be d/c or withheld in the presence of increasing azotemia, oliguria and in severe progressive renal disease
- Suggest further renal investigation for JM

**Speak to physician (to discuss plan)**
**Case Presentation to Physicians**

**PLAN**
1. Suggest titrate Arthrotec 75 mg 2 bid to a lower dose or discontinue
2. Suggest d/c metformin 500 mg bid
3. Suggest continue hotz 25 mg od until further investigation regarding renal fx
4. Suggest monitor Cr, BUN, FBS, HbA1C, albumin to creatinine ratio

**PLAN cont’d**
5. Patient education
   1. Monitor blood sugars bid
   2. BP weekly
6. Pharmacist follow-up in 1-2 months
   1. Pain – OA and migraine
   2. Diabetes – blood sugars

**Call Patient: July 21, 2004**
- Discontinue metformin
- Check blood sugars at least twice daily
- Reduce Arthrotec 75 mg bid
- Pt also complained of constipation
- Make a f/u appointment to review blood sugars, pain and constipation

**Follow-Up Assessment Report**
- Constipation (Rome Criteria Questionnaire)
- Suggest D/C docusate sodium because evidence shows that it does not help constipation
- Suggest Lactulose 15-30 mL od

**Follow-up**
- Review the following
  1. Pain
  2. Diabetes
  3. Constipation
PRACTICE ENHANCEMENT EXAMPLES
Case Presentation to Physicians

PAIN
- Low back, leg & knee pain (pain=9)
- Morphine SR 45 mg bid, pred 5 mg bid
- Experience btp around 2:00 pm and in am
- Suggest morphine 5 mg 1-2 q4-6h prn btp (10% of total daily dose given q4-6h prn)

DIABETES
- BS: July 28 – August 10
- Average AC breakfast = 9.3 [4.0-7.0]
- Average AC dinner = 7.4 [4.0-7.0]
- Average HS = 9.6 [5.0-10.0]
- Current dose: Novolin 30/70 42IU qam
- Suggest: Add Novolin 30/70 3IU qpm

CONSTIPATION
- Rome Criteria Questionnaire
- No longer constipated (but doesn’t like taste of lactulose)

RENAI FUNCTION
- After lowering dose of Arthrotec 75 mg 2 bid to 1 bid (July 21 to August 31):
  - Creatinine = 94 (August 31)
  - Creatinine clearance = 45 mL/min
- Diabetes – still need to f/u
- Pain – still need to f/u

ANY QUESTIONS

IMPACT • Practice Enhancement Guide — Copyright 2006. All rights reserved
Cockroft-Gault Formula for Creatinine Clearance:

Male:

\[
\text{Cl(cr)} = \frac{1.2 \times (140 - \text{age [y]}) \times \text{weight [kg]}}{\text{serum creatinine (µmol/L)}}
\]

Female: multiply above equation by 0.85

Usually use TBW or IBW if BMI > 30:

IBW (Male) = 51.56 + (1.85 \times [\text{ht - 60}])

IBW (Female) = 48.67 + (1.65 \times [\text{ht - 60}])

Ht in inches

On August 5, JM discontinued her docusate sodium and started lactulose 30mL at bedtime. She now has a bowel movement every other day and does not feel constipated. Compared to June 24, her constipation symptoms from the Rome Criteria questionnaire include:

<table>
<thead>
<tr>
<th>Symptoms in the last week</th>
<th>June 24, 2004</th>
<th>August 11, 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discomfort in the abdomen</td>
<td>Severe</td>
<td>Absent</td>
</tr>
<tr>
<td>Pain in the abdomen</td>
<td>Moderate</td>
<td>Absent</td>
</tr>
<tr>
<td>Bloating in the abdomen</td>
<td>Moderate</td>
<td>Absent</td>
</tr>
<tr>
<td>Stomach cramps</td>
<td>Severe</td>
<td>Mild</td>
</tr>
<tr>
<td>Painful bowel movements</td>
<td>Severe</td>
<td>Absent</td>
</tr>
<tr>
<td>Rectal burning during or after a bowel movement</td>
<td>Moderate</td>
<td>Absent</td>
</tr>
<tr>
<td>Rectal bleeding or tearing during or after a bowel movement</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Incomplete bowel movement, like she didn’t finish</td>
<td>Moderate</td>
<td>Absent</td>
</tr>
<tr>
<td>Bowel movements that were too hard</td>
<td>Severe</td>
<td>Absent</td>
</tr>
<tr>
<td>Bowel movements that were too small</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Straining or squeezing to try to pass bowel movements</td>
<td>Severe</td>
<td>Absent</td>
</tr>
<tr>
<td>Feeling like she had to pass a bowel movement but she couldn’t (false alarm)</td>
<td>Severe</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Therefore, the lactulose has improved her constipation.
Case Study 2 Presentation Example

**OBJECTIVES**
- To review COPD guidelines
- To illustrate the role of the pharmacist in assessing medications

**Reason for referral**
1. Suboptimal control of chronic disease (COPD)
2. Review Inhalers

**Meet the patient**

**Patient Demographics**
- JM, 62 y.o. female
- Dx: COPD, Chronic bronchitis, OA, OP, Swollen ankles/hands
- Smoker, (3-4 cigs/day) since 16 y.o.
- 5’3”, 50.5 kg
- No exercise, no alcohol
- Drinks 2-3 bottles of water/day

**Medication list from the PATIENT**
- Tiotropium 18 ug od
- Ipratropium 20 ug inh – 2 pf 4-6x day
- Salbutamol 100 ug inh - 2 pf qid
- Salbutamol 2.5 mg or 5 mg neb bid
- Fluticasone 250 ug inh – 2 pf bid

**OTHER MEDICATIONS**
- CES 0.625 mg od
- Arthrotec 50 mg qhs
- Lorazepam 1 mg qhs
- Rabeprazole (Pariet) 10 mg prn
- Risedronate (Actonel) 35 mg once/week
- ASA 650 mg – 2 qam
DATA - COPD
- Sx: SOB, wheezing, difficulty breathing
- August 18: FEV1 = 22%
- August 18: FEV1/FVC = 39% [83%]
- Chronic obstructive lung disease, emphysema, and early respiratory failure
- Does not qualify for home oxygen
- ECG: sinus tachycardia, VR=105 bpm, right atrial enlargement

GOALS OF COPD MANAGEMENT
- Smoking Cessation
- Prevent disease progression
- Relieve symptoms
- Improve exercise tolerance
- Improve health status
- Prevent and treat complications and exacerbations
- Reduce mortality
- Prevent or minimize side effects from treatment

PATIENT EDUCATION
Review the use of inhalers with JM
1. No straight posture
2. Neck and chin bent forward
3. Did not hold breath during inhalation
4. Inhaled, then opened mouth – expel drug
5. Shake inhaler between puffs

GLOBAL INITIATIVE FOR COPD, JULY 2004

PHARMACOLOGIC TX
- Short-Acting/Long-Acting B₂-Agonists
- Short-Acting/Long-Acting Anticholinergics
- Methylxanthines (Theophylline)
- Inhaled glucocorticoids
- Systemic glucocorticoids
- Combination products

B₂-AGONISTS
- Bronchodilators
- SABA – wear off within 4-6 hours
- LABA – duration of effect ≥ 12 hours
- Regular tx with LABA is more effective and convenient than tx with SABA
PRACTICE ENHANCEMENT EXAMPLES

Case Presentation to Physicians

**B₂-AGONISTS A/E**
- Resting sinus tachycardia
- Fine tremors of skeletal muscle → hands
- Headache, palpitations, transient muscle cramps, insomnia, nausea, weakness and dizziness

**Anticholinergics**
- The bronchodilating effect of SA inhaled anticholinergics lasts longer than that of SABA, with some bronchodilator effect generally apparent up to 8 hours
- Tiotropium: duration > 24 hours
- A/E: dry mouth, urinary incontinence, bitter metallic taste, acute glaucoma (mask)

**METHYLXANTHINES**
- Theophylline SR is effective in COPD, but due to its potential toxicity, inhaled bronchodilators are preferred
- Small therapeutic window
- A/E: atrial and ventricular arrhythmias, grand mal convulsions, headaches, insomnia, nausea, heartburn

**INHALED GLUCOCORTICOSTEROIDS**
- Regular tx of inhaled glucocorticosteroids does not modify the long-term decline of FEV1 in pts with COPD
- Appropriate to use in Stage III and IV and repeated exacerbations (3 in last year)
- Reduce the frequency of exacerbations and improve health status

**INHALED GLUCOCORTICOSTEROID A/E**
- Oral candidiasis → rinse mouth
- Hoarseness, sore throat
- Skin bruising (forearms)
- Possible decrease in bone density

**ORAL GLUCOCORTICOSTEROIDS**
- Long-term treatment is not recommended in COPD h/e of lack of evidence of benefit
- Beneficial in the management of exacerbations of COPD
- Shorten recovery time and help restore lung function more quickly and may reduce the risk of early relapse
- Prednisone 40 mg od × 10 days
WHAT DO WE DO FOR JM?

1. Identify stage of COPD
2. Simplify her medication
   i. Stop tiotropium or ipratropium
   ii. What is the difference?
3. Consider combination products
   i. Symiptac or Advair?
4. Stop Fluticasone
5. Suggest Salbutamol to be used PRN only

PATIENT EDUCATION

- Smoking Cessation
- Do not stop using inhalers, even when feeling better (she did that the week she was on prednisone and Levaquin)
- Inhaler technique – review with every visit

FOLLOW UP – 1 WEEK

- JM feeling better
- Was able to vacuum

REFERENCES

- Canadian Thoracic Society COPD guidelines, May/June 2003
- Global Initiative for Chronic Obstructive Lung Disease, July 2004
### Common COPD Drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Inhaler (µg)</th>
<th>Nebulizer Solution (mg/ml)</th>
<th>Oral</th>
<th>Injection Vials (mg)</th>
<th>Duration (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B₂-agonists (short-acting)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fenoterol</td>
<td>MDI: 100–200</td>
<td>1</td>
<td>0.5% (syrup)</td>
<td>4–6</td>
<td></td>
</tr>
<tr>
<td>Salbutamol (albuterol)</td>
<td>MDI, DPI: 100, 200</td>
<td>5</td>
<td>5 mg Syrup 0.024%</td>
<td>0.1, 0.5</td>
<td>4–6</td>
</tr>
<tr>
<td>Terbutaline</td>
<td>DPI: 400, 500</td>
<td>2.5, 5</td>
<td>0.2, 0.25</td>
<td>4–6</td>
<td></td>
</tr>
<tr>
<td><strong>B₂-agonists (long-acting)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥12</td>
</tr>
<tr>
<td>Formoterol</td>
<td>MDI, DPI: 4.5–12</td>
<td></td>
<td></td>
<td></td>
<td>≥12</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>MDI, DPI: 25–50</td>
<td></td>
<td></td>
<td></td>
<td>≥12</td>
</tr>
<tr>
<td><strong>Anticholinergics (short-acting)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ipratropium bromide</td>
<td>MDI: 20, 40</td>
<td>0.25–0.5</td>
<td></td>
<td></td>
<td>6–8</td>
</tr>
<tr>
<td>Oxitropium bromide</td>
<td>MDI: 100</td>
<td>1.5</td>
<td></td>
<td></td>
<td>7–9</td>
</tr>
<tr>
<td><strong>Anticholinergics (long-acting)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triotopium</td>
<td>DPI: 18</td>
<td></td>
<td></td>
<td></td>
<td>≥24</td>
</tr>
<tr>
<td><strong>Short-acting B₂-agonists + anticholinergic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fenoterol/Ipratropium</td>
<td>MDI: 200/80</td>
<td>1.25/0.5</td>
<td></td>
<td></td>
<td>6–8</td>
</tr>
<tr>
<td>Salbutamol/Ipratropium</td>
<td>MDI: 75/15</td>
<td>0.75/4.5</td>
<td></td>
<td></td>
<td>6–8</td>
</tr>
<tr>
<td><strong>Methylxanthines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aminophylline</td>
<td></td>
<td></td>
<td>200–600 mg</td>
<td></td>
<td>Up to 24</td>
</tr>
<tr>
<td>Theophylline (SR)</td>
<td></td>
<td></td>
<td>100–500 mg</td>
<td></td>
<td>Up to 24</td>
</tr>
<tr>
<td><strong>Glucocorticosteroids (inhaled)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beclomethasone</td>
<td>MDI, DPI: 50–400</td>
<td>0.2–0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budesonide</td>
<td>DPI: 100, 200, 400</td>
<td>0.20, 0.25, 0.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluticasone</td>
<td>MDI, DPI: 50–500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triamcinolone</td>
<td>MDI: 100</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Long-acting B₂-agonists + glucocorticosteroids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formoterol/Budesonide</td>
<td>DPI: 4.5/80, 160 (9/320)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmeterol/Fluticasone</td>
<td>DPI: 50/100, 250, 500 MDI: 25/50, 125, 250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glucocorticosteroids (systemic)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone</td>
<td></td>
<td>5–60 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl-prednisolone</td>
<td>10–2000 mg</td>
<td>4, 8, 18 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DPI: dry powder inhaler; MDI: metered dose inhaler

LU 132 (Formoterol, Salmeterol, combinations): For the treatment of asthma in patients who are using optimum anti-inflammatory treatment and are still experiencing breakthrough symptoms. The drug is not used for relief of acute symptoms.

---

### Most Common Inhaled Bronchodilators

<table>
<thead>
<tr>
<th>Agent</th>
<th>Short-Acting B&lt;sub&gt;2&lt;/sub&gt;-Agonists</th>
<th>Long-Acting B&lt;sub&gt;2&lt;/sub&gt;-Agonists</th>
<th>Anticholinergics</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Salbutamol</td>
<td>Terbutaline</td>
<td>Salmeterol</td>
<td>Formoterol</td>
</tr>
<tr>
<td>Brand Name</td>
<td>Ventolin® Generics</td>
<td>Bricanyl®</td>
<td>Serevent®</td>
<td>Oxeze®</td>
</tr>
<tr>
<td>System</td>
<td>MDI Diskus® Inhalation</td>
<td>Turbuhaler®</td>
<td>MDI Diskus®</td>
<td>Turbuhaler®</td>
</tr>
<tr>
<td>Colour</td>
<td>Blue</td>
<td>Blue bottom</td>
<td>Green/aqua</td>
<td>Green/aqua bottom</td>
</tr>
<tr>
<td>Onset</td>
<td>5-15 min</td>
<td>5-15 min</td>
<td>20-30 min</td>
<td>5 min</td>
</tr>
<tr>
<td>Duration</td>
<td>4-6 h</td>
<td>4-8 h</td>
<td>12 h</td>
<td>8-12 h</td>
</tr>
<tr>
<td>Adult Dose</td>
<td>1-2 pfs TID-QID PRN</td>
<td>1-2 pfs TID-QID PRN</td>
<td>MDI: 2 pfs BID Diskus®: 1 pf BID</td>
<td>1 pf BID</td>
</tr>
<tr>
<td>Maximum Dose</td>
<td>800 ug (8 pfs)</td>
<td>3 mg (6 pfs)</td>
<td>100 ug</td>
<td>48 ug</td>
</tr>
<tr>
<td>Supplied</td>
<td>MDI (200 dose) 100 mcg/puff Nebules/Soln: 5mg/mL-10mL 1mg/mL-2.5mL 2mg/mL-2.5mL</td>
<td>0.5 mg/inh (200 doses)</td>
<td>MDI: (120 dose) 25 mcg/pf Diskus®: (60 d) 50 mcg/inh</td>
<td>6 mcg/inh 12 mcg/inh (60 doses)</td>
</tr>
<tr>
<td>Ontario Drug Benefit Coverage</td>
<td>Covered</td>
<td>LU (Code 132)</td>
<td>LU (Code 132)</td>
<td>MDI Covered Inhalations - LU (Codes 256-9)</td>
</tr>
<tr>
<td>LU = Limited Use</td>
<td>Covered</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table created by: Margaret Jin, Stratford Family Health Network, Stratford ON; 2005.
### Most Common Inhaled Corticosteroids

<table>
<thead>
<tr>
<th>Agent</th>
<th>Beclomethasone</th>
<th>Budesonide</th>
<th>Fluticasone</th>
<th>Salmeterol + Fluticasone</th>
<th>Budesonide + Formoterol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brand Name</strong></td>
<td>Vanceril®</td>
<td>Pulmicort®</td>
<td>Flovent</td>
<td>Advair Diskus®</td>
<td>Symbicort®</td>
</tr>
<tr>
<td><strong>System</strong></td>
<td>MDI</td>
<td>Turbuhaler®</td>
<td>MDI Diskus®</td>
<td>Diskus®</td>
<td>Turbuhaler®</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>Brown</td>
<td>Brown bottom</td>
<td>Orange</td>
<td>Purple</td>
<td>Bright red bottom</td>
</tr>
<tr>
<td><strong>DOSE</strong></td>
<td>Doses should be delivered BID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Low Dose Adults</strong></td>
<td>200-500 mcg</td>
<td>200-400 mcg</td>
<td>100-250 mcg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medium Dose Adults</strong></td>
<td>500-1000 mcg</td>
<td>400-800 mcg</td>
<td>250-500 mcg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High Dose Adults</strong></td>
<td>&gt; 1000 mcg</td>
<td>&gt; 800 mcg</td>
<td>&gt; 500 mcg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max Daily Dose</strong></td>
<td>1000 mcg</td>
<td>2400 mcg</td>
<td>2000 mcg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supplied</strong></td>
<td>Vanceril®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 mcg/puff (200 doses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>QVAR®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 mcg/puff (200 doses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 mcg/puff (200 doses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NEBUAMP</td>
<td>0.125 mg/mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.25 mg/mL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 mg/mL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ontario Drug Benefit Coverage</strong></td>
<td><strong>MDI Covered</strong></td>
<td>Turbuhaler Covered</td>
<td>* MDI &amp; Diskus® Covered</td>
<td>MDI &amp; Diskus® Covered LU (Code 330)</td>
<td>Covered LU (Code 330)</td>
</tr>
<tr>
<td><strong>LU</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table created by: Margaret Jin, Stratford Family Health Network, Stratford ON, 2005.
The goal of the IMPACT program, as the acronym suggests, is to Integrate family Medicine and Pharmacy to Advance primary Care Therapeutics. A growing body of research supports our belief that having pharmacists working in family practice settings enhances patient care. This guide is the product of more than 10 years of planning and collaboration between investigators, government and community leaders.

IMPACT – Integrating family Medicine and Pharmacy to Advance primary Care Therapeutics.

The IMPACT program is a demonstration project funded by the Ontario Ministry of Health and Long-Term Care (MOHLTC) through the Primary Health Care Transition Fund. © 2006. The views expressed in the reports or materials are the views of the authors and do not necessarily reflect those of the Ministry.
ACKNOWLEDGEMENTS AND KEY CONTACTS

**IMPACT Principal Investigators:**
Lisa Dolovich, BScPhm PharmD MSc
Kevin Pottie, MD MCISc CCFP

**IMPACT Co-Principal Investigators:**
Janusz Kaczorowski, PhD
Barbara Farrell, BScPhm PharmD

**IMPACT Practice Enhancement Guide Editors:**
Lisa Dolovich, BScPhm PharmD MSc
Connie Sellors, BScPhm

**IMPACT Practice Enhancement Guide Staff:**
Christine Rodriguez, IMPACT Research Assistant
Christine LeBlanc, Dossier Communications
Marilyn Birtwistle, CPhA Graphic Communications

**Collaborating Universities:**
McMaster University, University of Ottawa, University of Toronto

**Collaborating Institutions:**
Centre for the Evaluation of Medicines, St. Joseph’s Healthcare, Hamilton, ON
Élisabeth Bruyère Research Institute, a SCO Health Service and University of Ottawa partnership, Ottawa, ON

**IMPACT Co-investigators:**
Zubin Austin, BScPhm PhD
Kelly Babcock, BSP
Robert Bernstein, MD PhD
Ron Goeree, MA
Bill Hogg, MD MCISc CCFP
Gary Hollingworth, MD
Michelle Howard, MSc
Natalie Kennie, BScPharm PharmD
Elaine Lau, PharmD
Lesley Lavack, BScPhm
Carmel Martin, MD PhD
Connie Sellors, BScPhm
John Sellors, MD MSc FCFP
Gary Viner, MD
Kirsten Woodend, PhD
Christel Woodward, PhD

**Intersectorial Advisory Committee:**
Mary Catherine Lindberg, Chair
Marsha Barnes, Ontario Ministry of Health and Long-Term Care
Nick Busing, University of Ottawa
Wayne Hindmarsh, University of Toronto
Jean Jones, Consumers’ Association of Canada*
Cheryl Levitt, McMaster University
Stuart MacLeod, BC Research Institute for Children’s and Women’s Health
Laura Offord, Ontario Ministry of Health and Long-Term Care
Susan Paetkau, Ontario Ministry of Health and Long-Term Care
Jeff Poston, Canadian Pharmacists Association
Deanna Williams, Ontario College of Pharmacists

* Jean Jones passed away in March 2005 after many years of contributing to the Intersectorial Advisory Committee

The IMPACT team would like to acknowledge all the work and effort placed into each practice enhancement by the pharmacists and their practice sites.

Beamsville Medical Centre, Beamsville, ON
Pharmacist: Nita Patel

Bruyère Family Health Network, Ottawa, ON
Pharmacist: Natalie Jonasson

Caroline Medical Group, Burlington, ON
Pharmacist: Shelly House

Claire Stewart Medical Centre, Mount Forest, ON
Pharmacist: Robin Brown

Fairview Family Health Network, Toronto, ON
Pharmacist: Lisa Kwok

Riverside Court Medical Clinic, Ottawa, ON
Pharmacist: Rashna Batliwalla

Stonechurch Family Health Centre, Hamilton, ON
Pharmacist: Lisa McCarthy

Stratford Family Health Network, Stratford, ON
Pharmacist: Margaret Jin/Joanne Polkiewicz

**Contact Information:**
IMPACT Demonstration Project Principal Investigator:
Lisa Dolovich, (905) 522-1155 ext. 3968,
ldolovic@mcmaster.ca

From previous page: