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Asthma management:
the role of the pharmacy technician

by Olivia Ng, BScPhm, RPh, PharmD

Learning objectives

After successful completion of this lesson, pharmacy technicians will be able to do the following:

1. Provide an overview of the current Canadian guidelines for asthma management.
2. Distinguish between controller versus reliever asthma medications.
3. Discuss the pharmacy technician's role in asthma management in light of the pharmacist's expanded scope of practice.
4. Identify practical ways pharmacy technicians can assist in implementation of optimal services for asthma patients.

Introduction

Asthma is a respiratory disorder characterized by airway inflammation and hyper-responsiveness.[1] This chronic disease affects 2.4 million people in Canada[2] and is one of the most common diseases of childhood.[3] Although death rates are low, 80%–90% of asthma deaths are preventable and the key to prevention is patient education.[4] It has been said that management of asthma is 10% medication and 90% education.[5] Pharmacy technicians can play an important role in educating patients with asthma, particularly on appropriate inhaler technique.

Clinical Presentation and Triggers

Asthma has a widely variable clinical presentation, with symptomatic episodes

occurring particularly with asthma triggers, such as exercise or known allergens (see Table 1).[3] These episodes may consist of:[3]

- Dyspnea (shortness of breath)
- Chest tightness
- Coughing (particularly at night)
- Wheezing (whistling sound when breathing)

During symptomatic episodes of asthma, or asthma exacerbations, the patient may use more reliever medication (to be defined later).

Treatment

The primary goal of treatment for asthma patients is to reduce asthma symptoms, maintain daily activity levels, prevent exacerbations and mortality. Table 2 lists targets for achieving optimal asthma control.[1]

The inhaler medications used in managing asthma can be classified into two categories: controller (also called preventer) or reliever.[1] Controllers are used whether patients are symptomatic or not, whereas relievers are used to provide quick relief of asthma symptoms. Controllers generally include the following medication classes: inhaled corticosteroids (ICSs), long-acting beta-agonists (LABAs) and long-acting anticholinergics (LAACs). Relievers generally include the following medication classes: short-acting beta-agonists (SABAs) and short-acting anticholinergics (SAACs). Specific medications in each of these categories, including combination products, are listed in Table 4.[6] Budesonide/formoterol is unique, because it can be used as both a controller and reliever. As a reliever, it is only indicated in patients 12 years of age and older with moderate asthma and poor control who are prone to exacerbation, despite use of an ICS/LABA combination product as a controller.

Oral medications available include the following medication classes: leukotriene receptor antagonists (LTRAs: montelukast and zafirlukast) and methylxanthines (theophylline and oxtriphylline). Oral corticosteroids (prednisone) may be used for asthma exacerbations. The only subcutaneous medication available is omalizumab, an immunoglobulin E (IgE) antibody. Table 3 provides an overview of the mechanism of action for the various asthma medication classes.[3]

The Canadian asthma guidelines provide a stepwise approach for starting and escalating therapy, as depicted in Figure 1.[1] For mild asthma, some patients may achieve controlled asthma with a reliever used as needed, with SABAs as the preferred class.[1] However, most patients require a controller. Current guidelines recommend an ICS as the foundation of chronic asthma management for all age groups, while keeping a reliever as needed for symptoms.[1] LTRAs are a second-line option for children six years of age and older and adults.[1] If a patient fails on low doses of an ICS, further evaluation should be conducted. Factors to consider include an incorrect diagnosis of asthma, poor inhaler device technique, poor adherence to ICSs or ongoing exposure to asthma triggers. Controller therapy should only be escalated after ruling out these factors.[1]

TABLE 1 - Potential asthma triggers[3]

- Exercise
- Allergens: airborne pollens, dust mites, animal dander, cockroaches, fungal spores
- Environment: cold air, fog, tobacco smoke, wood smoke
- Emotions: anxiety, stress, laughter
- Drugs/preservatives: acetylsalicylic acid (ASA), nonsteroidal anti-inflammatory drugs (NSAIDs), sulfites, nonselective beta-blockers (e.g., propranolol)
- Occupations with specific stimuli: bakers (flour dust), farmers (hay mould), spice and enzyme workers, printers (arabic gum), chemical workers (dyes), plastics, rubber and wood workers (formaldehyde)

For escalation of therapy, options include increasing the ICS to medium or high doses (see figure 1), adding a LABA or adding an LTRA:[1]

- For children six to 11 years of age, an increase to a medium-dose ICS is recommended. If asthma remains uncontrolled, adding a LABA or LTRA should be considered.
- For patients 12 years of age or older, a LABA should be added to the low-dose ICS, ideally in the form of a combination product. If asthma remains uncontrolled, adding an LTRA should be considered.

The Canadian asthma guidelines recommend against using LABAs alone as monotherapy for asthma in any age group, due to increased risk of adverse effects and respiratory-related deaths when used as monotherapy. In addition, high doses of an ICS should only be used by asthma specialists, as these doses may be associated with significant side effects in both children and adults.[1]

TABLE 2 - Measures of optimal asthma control[1]

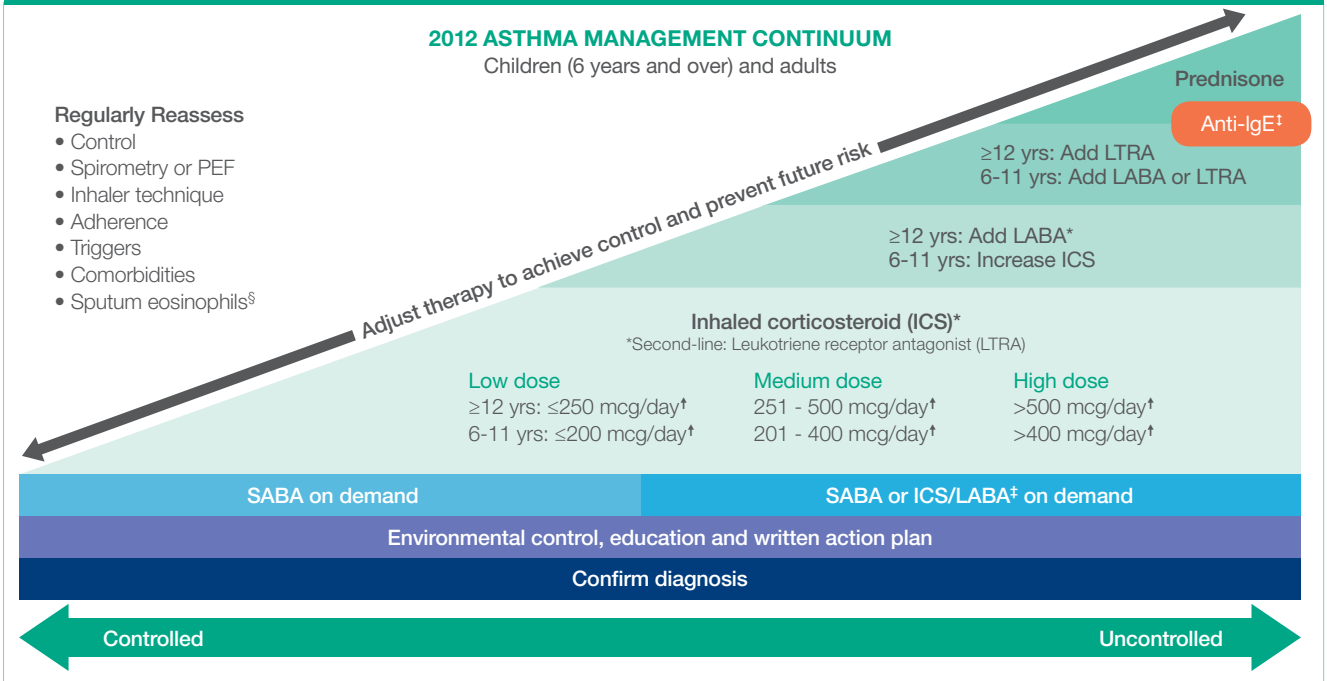
Characteristic	Frequency or value
Daytime symptoms	< 4 days/week
Nighttime symptoms	< 1 night/week
Physical activity	Normal
Exacerbations	Mild, infrequent
Absence from work or school due to asthma	None
Need for a short-acting beta-agonist (SABA)	< 4 doses/week

TABLE 3 - Mechanism of action for asthma medications[3]

ICSs	Reduce inflammation in the airway
LABAs, SABAs	Relax the smooth muscles in the airway, leading to bronchodilation
LAACs, SAACs	Reduce cholinergic-mediated bronchoconstriction
LTRAs	Inhibit leukotrienes, leading to reduced inflammation
Methylxanthines	Inhibit phosphodiesterase enzyme (PDE), leading to bronchodilation
IgE antibody	Neutralizes IgE, leading to reduced allergen mediators
Oral corticosteroids	Reduce inflammation throughout the body

ICSs–inhaled corticosteroids; IgE–immunoglobulin E; LAACs–long-acting anticholinergics; LABAs–long-acting beta-agonists; LTRAs–leukotriene receptor antagonists; SAACs–short-acting anticholinergics; SABAs–short-acting beta-agonists

FIGURE 1 - Canadian guidelines for asthma treatment[1]



† HFA Beclomethasone or equivalent; *Second-line: LTRA; Approved for 12 years and over;
¶ Using a formulation approved for use as a reliever;
§ In adults 18 years and over with moderate to severe asthma.

HFA–hydrofluoroalkane, a propellant; ICS–inhaled corticosteroid; LABA–long-acting beta-agonist; LTRA–leukotriene receptor antagonist; PEF–peak expiratory flow; SABA–short-acting beta-agonist
Figure 1 reprinted from: Lougheed MD, Lemiere C, Ducharme FM, et al. Canadian Thoracic Society 2012 guideline update: diagnosis and management of asthma in preschoolers, children and adults. Can Respir J 2012;19(2):127-64.

Role of the Pharmacy Technician

As front-line pharmacy staff, pharmacy technicians are in an optimal position to help educate patients with asthma. Pharmacy technicians can help by identifying patients with asthma and recognizing lack of asthma control. Lack of asthma control may be identified by the failure to meet clinical targets (see Table 2), including increased refill frequency for relievers or decreased refill frequency for controllers.

As the pharmacist's scope of practice expands, the pharmacy technician's role also expands. Pharmacy technicians can educate patients on the importance of adherence to controllers and confirm appropriate inhaler technique. Patients may be non-adherent to controllers if asthma symptoms are absent, but it is important for pharmacy technicians to educate patients on the importance of regular use of controllers. They can ensure patients understand that asthma is characterized by inflammation in the airways, and ICSs remain the foundation of asthma treatment because they reduce inflammation in the airways. Unless instructed otherwise by their physician, patients should continue regular use of their ICS despite lack of symptoms.

Pharmacy technicians can also ensure that patients are aware of the importance of appropriate inhaler technique, as this is vital in ensuring appropriate delivery of the medication. Improper inhaler technique has been associated with poor asthma control and increased emergency room visits. The use of spacer devices may be helpful for patients with poor technique or difficulties with synchronization of the inhalation with the release of the medication. Information on appropriate inhaler technique can be found in the product inserts and on multiple patient education websites (see Table 5). These educational websites can be shared with patients as accessible, reliable and patient-friendly information on asthma and its management.

In community pharmacy practice or in hospital pharmacy practice on discharge, the pharmacy team can implement an asthma education program for patients. Some of the possible interventions conducted by the pharmacy team could include being alert for medication refills indicating overuse of relievers, nonadherence to controllers and use of LABAs without a controller.[8] Smoking

TABLE 4 - Controllers and relievers for asthma[6]

Controllers	
ICSs	Beclomethasone Budesonide Ciclesonide Fluticasone Mometasone
LABAs	Formoterol Salmeterol
LAACs	Tiotropium
ICS/LABA combinations	Budesonide/formoterol* Fluticasone/salmeterol Mometasone/formoterol
Relievers	
SABAs	Salbutamol Terbutaline
SAACs	Ipratropium
SAAC/SABA combinations	Ipratropium/fenoterol Ipratropium/salbutamol
ICS/LABA combinations	Budesonide/formoterol*

*May be used as both controller and reliever.
ICS–inhaled corticosteroid; LAAC–long-acting anticholinergic; LABA–long-acting beta-agonist; SAAC–short-acting anticholinergic; SABA–short-acting beta-agonist

cessation can be advised when appropriate. Patient education can be provided on relievers versus controllers and the importance of adherence, and inhaler technique can be reviewed at each visit.[8]

To assist in providing optimal services to asthma patients, pharmacy technicians can ask the following questions when prescriptions are dropped off:[8]

- Do you or a member of your household smoke? If yes, inform the pharmacist.
- Do you have an asthma action plan? If no, inform the pharmacist.
- For ICS metered-dose inhalers and children < 8 years of age: Do you have a spacing device? If no, inform the pharmacist.
- For oral corticosteroids: Have you recently been hospitalized or visited the emergency room for a breathing problem? If yes, inform the pharmacist.

This approach encourages collaboration within the pharmacy team, including pharmacy students rotating through community pharmacies. A Canadian practice model focusing on medication assessment determined that lack of time by pharmacists was the greatest barrier to implementing comprehensive asthma services for patients, and that this barrier could be overcome by sharing tasks with pharmacy technicians or others employed in the pharmacy.

Conclusion

Asthma is one of the most common diseases of childhood. Patient education is the key to reducing acute asthma episodes and the risk of death from asthma. As front-line pharmacy staff, pharmacy technicians can play an important role in asthma management, particularly given the expanding role of the pharmacist. Technicians can be involved in patient educational interventions. They can also ask appropriate questions when patients drop off prescriptions, with referral of patients to the pharmacist when needed. All of these interventions would benefit patients and lead to improved asthma control.

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TABLE 5 - Educational websites for patients with asthma

- Allergy/Asthma Information Association
  http://aaia.ca/en/aboutAsthma.htm
- Asthma Society of Canada
  www.asthmameds.ca
- Canadian Allergy, Asthma and Immunology Foundation
  www.allergyfoundation.ca/website/index.html
- Canadian Lung Association
  www.lung.ca/lung-health/lung-disease/asthma/medications
- Centre for Addiction and Mental Health (CAMH) Smoking Treatment for Ontario Patients (STOP) Program
  www.nicotinedependenceclinic.com
- Children's Hospital of Eastern Ontario
  www.cheo.on.ca/en/asthmamedication
- HealthLink BC
  www.healthlinkbc.ca/medications/content.asp?hwid=ug2865

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BIOGRAPHY

Olivia Ng is a clinical pharmacist in thoracic surgery and respirology at Toronto General Hospital, University Health Network, and an adjunct lecturer at the Leslie Dan Faculty of Pharmacy, University of Toronto. She is on the executive committee for the Respiratory Health Educators Interest Group with the Ontario Lung Association and is currently the Education Chair for the Ontario Branch of the Canadian Society of Hospital Pharmacists (CSHP).

QUESTIONS

Please select the best answer for each question and answer online at www.CanadianHealthcareNetwork.ca for instant results.

1. Asthma is a respiratory disorder characterized by:
a) Airway inflammation
b) Airway hyper-responsiveness
c) Airway obstruction
d) Both A and B
e) All of the above

2. Approximately _____% of asthma deaths are preventable.
a) 10-20 b) 20-30
c) 40-50 d) 60-70
e) 80-90

3. Symptoms of asthma typically include all of the following, EXCEPT:
a) Dyspnea
b) Whistling sound when breathing
c) Coughing
d) Dark sputum
e) Chest tightness

4. Which of the following may trigger symptoms in a patient with asthma?
a) Warm air
b) Acetaminophen
c) Acetylsalicylic acid (ASA)
d) Alpha-blockers
e) Lack of exercise

5. To achieve optimal asthma control, one of the targets includes:
a) Daytime symptoms < 5 days per week
b) Nighttime symptoms < 2 nights per week
c) Absence from school or work 1-2 days per week
d) Mild, frequent exacerbations
e) Need for a short-acting beta-agonist (SABA) < 4 doses per week

6. Which of the following medications is a controller?
a) Budesonide b) Salbutamol
c) Terbutaline d) Ipratropium
e) Ipratropium/fenoterol

7. Which of the following medications is sometimes used as a reliever?

a) Tiotropium b) Formoterol
c) Salmeterol d) Budesonide
e) Budesonide/formoterol

8. Which medication class do current Canadian guidelines recommend as the foundation for chronic asthma patients in all age groups?
a) ICSs b) LABAs
c) LAACs d) SABAs
e) SAACs

9. Which medication class do current Canadian guidelines recommend AGAINST as monotherapy for asthma in all age groups?
a) ICSs b) LABAs
c) LAACs d) SABAs
e) SAACs

10. If a patient fails on a low-dose ICS, an evaluation to determine the reason for lack of efficacy should be conducted. This evaluation should include all of the following, EXCEPT:
a) Improper diagnosis of asthma
b) Ongoing exposure to asthma triggers
c) Lack of exercise
d) Poor adherence to the ICS
e) Poor inhaler technique

11. For children 6-11 years of age who fail low-dose ICS, the recommended next step in therapy is:
a) Add LTRA
b) Increase to medium-dose ICS
c) Add LABA (as a separate product)
d) Add LABA (as a combination product)
e) Add IgE antibody

12. For patients 12 years of age and older who fail low-dose ICS, the recommended next step in therapy is:
a) Add LTRA
b) Increase to medium-dose ICS
c) Add LABA (as a separate product)
d) Add LABA (as a combination product)
e) Add IgE antibody

13. The role of the pharmacy technician in helping patients with asthma may include all of the following, EXCEPT:
a) Providing information on appropriate inhaler technique
b) Prescribing smoking cessation products
c) Educating patients on the importance of controllers
d) Identifying increased refills of relievers
e) Recognizing lack of asthma control

14. Questions that might be helpful for pharmacy technicians to ask when patients with asthma drop off a prescription include all of the following, EXCEPT:
a) Do you or a member of your household smoke?
b) Have you been recently hospitalized or visited the emergency room for a breathing problem?
c) Do you have a spacing device?
d) Do you have an asthma action plan?
e) Do you take any acetaminophen?

15. An asthma education model for patients may:
a) Lead to more emergency room visits for patients
b) Lead to more refills of inhalers
c) Encourage collaboration within the pharmacy team
d) Discourage patients to adhere to medications
e) Reduce the scope of the pharmacy technician

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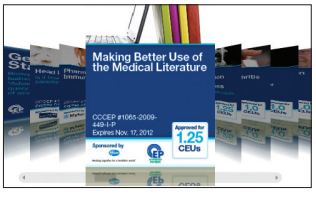

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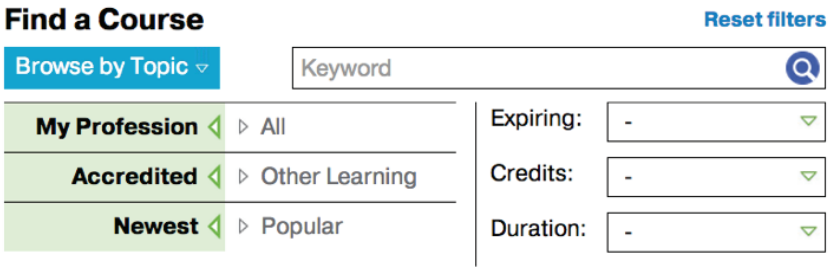

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