

PEDIATRIC ASTHMA: TALK THE SAME TALK

Asthma Knowledge for Pediatric Health Care Professionals
Ensuring Medically Accurate and Consistent Messages
are Provided to All

**“Effective asthma control will almost never be achieved
by medications alone.”**



PEDIATRIC ASTHMA: TALK THE SAME TALK

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Note:

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i. FOREWORD

Asthma represents a significant number of children and adults who visit emergency departments and hospitals. Healthcare professionals and families are frustrated that much of the information they receive about asthma conflicts with other information they have received. My objective with this document is to promote a medically accurate, consistent, asthma information resource for asthma educators and healthcare professionals who teach families about asthma.



In March 2006, the Alberta Children’s Hospital (in Calgary, Alberta, Canada) introduced a pediatric asthma pathway which provides medical guidelines to facilitate continuity in care. The Alberta Childhood Asthma Pathway (ACAP) was launched in 2015. For resources, connect with the [Respiratory Health Strategic Clinical Network-
www.albertahealthservices.ca/scns/Page11113.aspx](http://www.albertahealthservices.ca/scns/Page11113.aspx)

The “Talk the Same Talk” document:

- had many contributors who provided both expertise and resource tools
- is written from a Canadian medical perspective and considers both the Canadian Asthma Consensus Guidelines and the Global Initiative for Asthma (GINA) Guidelines
- will be consistently reviewed for updates, edits and revisions to ensure medical accuracy
- has grown over the years and will continue to evolve with feedback

Thanks to the many Respiratory Educators, Nurses, Respiratory Therapists, Pharmacists and Physicians from the Alberta Children’s Hospital for their contributions.

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ii. ACRONYMS

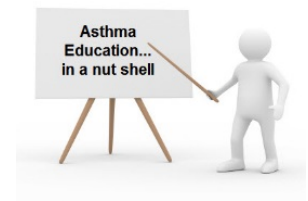
Within both the healthcare profession and this document, acronyms are frequently used. Please refer to the list below for a definition to acronyms used throughout this document.

ACRONYM USED	DEFINITION
ACAP	Alberta Childhood Asthma Pathway
AHS	Alberta Health Services
ARIA	Allergic Rhinitis and its Impact on Asthma
CAE	Certified Asthma Educator
CANA	COPD & Asthma Network of Alberta
CCAP	Calgary COPD & Asthma Program
CMAJ	Canadian Medical Association Journal
CPAS	Community Pediatric Asthma Service
CRE	Certified Respiratory Educator
CTE	Certified Tobacco Educator
CTS	Canadian Thoracic Society
GERD	Gastro Esophageal Reflux Disease
GINA	Global Initiative for Asthma
GSK	GlaxoSmithKline
ICS	Inhaled Corticosteroids
ILO	Induced Laryngeal Obstruction
RHSCN	Respiratory Health Strategic Clinical Network
RN	Registered Nurse
RRT	Registered Respiratory Therapist

1. WHAT IS ASTHMA EDUCATION?

Asthma education involves:

- teaching the patient
- helping the patient to learn



As an asthma educator, you must be aware and sensitive to different learning styles. Being able to adapt to each patient's/family's needs is crucial for patient learning.

Asthma education is comprised of five key, equally important, goals:

- ✓ The educator must be able to assess the patient and family history, physical and objective findings and, if available, perform spirometry. As educators, we also actively enter the patient's world to explore the patients' feelings about having asthma, their understanding of asthma, how asthma is affecting them and their families and what they expect from the visit
- ✓ To integrate what you have learned with an understanding of the whole person. The educator needs to be aware of the multiple aspects of the patients and families lives, personality, learning style and culture
- ✓ Finding common ground and realistic goals between patient and educator. This often involves creative thinking and problem-solving. When patients achieve a benefit, they are more likely to sustain change
- ✓ Incorporating prevention and health promotion into the visit, asking about sleep, diet, exercise and stress
- ✓ Building relationships. Building trust, showing compassion, and sharing of power and healing helps build relationships

**A message from Dr. Ken Chapman
President
Canadian Network for Respiratory Care**

*“To be effective, education must be supported
by a physician and
provided by trained educators.”*

2. **DID YOU KNOW...**

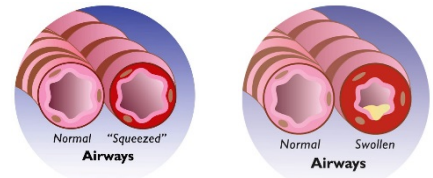
- approximately 12 -15% of Canadian children have doctor diagnosed asthma
- an estimated 3 million Canadians have asthma. Canada has one of the highest rates of asthma in the world
- asthma associated with colds and flu is the leading cause of absenteeism from school in North American
- approximately 250 people (adults and children) die from asthma every year in Canada
- estimated 80% of asthma deaths could be prevented with proper asthma education
- 60% of people with asthma are poorly controlled. That is, they do not achieve acceptable levels of control on at least two key criteria according to the national guidelines
- 75% of children with eczema also have asthma
- approximately 85-90% of people who suffer from asthma also suffer from allergic rhinitis
- up to 90% of patients using asthma/COPD medications have poor technique
- approximately 30% of patients with a physician diagnosis of asthma do NOT have asthma
- different types of asthma present with different underlying disease processes



3. **PATHOPHYSIOLOGY - INFLAMMATION, BRONCHOSPASM, MUCOUS PRODUCTION**

Asthma, a heterogeneous condition (diverse in character or content) is usually characterized by:

- smooth muscle tightening in the airways
- chronic inflammation
- increased mucous production
- reversible airways obstruction
- inflammation in the small airways contributes significantly to asthma pathology approximately 50% of total resistance



NORMAL AIRWAYS	“ASTHMATIC AIRWAYS
The inside of the airways are not inflamed or swollen	You are exposed to a “trigger” which causes your lungs to react and your airways to become inflamed and swollen
Muscles around the airways are relaxed	The muscles around your airways tighten
The airways are clear of mucous	Mucous is produced and builds up in the airways
	All of this results in your airways becoming narrower, blocking the flow of air. This may cause you to have symptoms such as cough, wheeze, tightness of chest or difficulty in breathing

Asthma phenotypes:

- Allergic asthma: Eosinophilic airway inflammation. Patients respond well to ICS
- Non-allergic asthma: May be neutrophilic, eosinophilic or only a few inflammatory cells. This is less responsive to ICS
- Asthma with obesity: Prominent respiratory symptoms and little eosinophilic airway inflammation
- Asthma with fixed airflow limitation: Thought to be caused by airway wall remodeling
- Late-onset asthma: Some adults, particularly women, present with asthma for the first time in adult life

4. DIAGNOSIS

Asthma is the presence of airways hyper-reactivity in the absence of underlying lung or airway disease. Only a medical doctor can diagnose asthma with the aid of objective testing (spirometry). It may take some time to establish the presence of airways hyper-reactivity, to be certain there is no underlying lung disease. It is unclear why some people get asthma and others do not. This document may help parents who ask “[Does My Child have Asthma?](#)”



https://www.ucalgary.ca/icancontrolasthma/files/icancontrolasthma/cpas-263-does-my-child_0.pdf

Asthma diagnosis is based on:

- medical history: Both patient and family
- signs and symptoms of asthma: Cough, Wheeze, Tightness of chest, Shortness of breath, (remember the acronym - “Can’t Wait Till Summer”)
- family history: If a parent or close relative have allergies and/or asthma, the chance of having asthma is increased
- eczema: If you have eczema, you are more likely to develop asthma
- allergies: If you have allergies, you are also more likely to develop asthma
- response to asthma treatment. A documented response to a bronchodilator in an acute asthma episode is helpful. A response over 2 - 4 weeks to an inhaled corticosteroid (ICS) will assist in deciding the diagnosis and guiding a decision for the best long term therapy
- spirometry measures volume and airflow. Generally children 6 years of age and older can perform spirometry. This test is not 100% diagnostic. If the patient’s airways are not narrowed at the time of the test, the test results can be normal. Spirometry is only one tool to help with the diagnosis of asthma. The most important function of spirometry is to assess the severity of airway obstruction. An increase in FEV1 Post bronchodilator $\geq 12\%$ helps confirm the diagnosis of asthma. Since asthma can be intermittent and variable, a patient can have normal breathing test results but still have a diagnosis of asthma



According to the Canadian Pediatric Asthma Consensus Guidelines (2003), and the Canadian Thoracic Society, Canadian Pediatric Society position paper (2015), there is criteria to support a diagnosis of preschool asthma. The greater number of criteria met; the greater the likelihood of asthma:

- Severe episode of wheezing/dyspnea
- Wheezing/dyspnea after 1 year of age
- 3 or more episodes of wheezing
- Chronic cough (especially at night or exercise-induced)
- Clinical benefits from asthma medications. Most importantly, improved asthma symptoms and control with the use of inhaled corticosteroids

Preschool wheeze can be divided into 3 categories:

- Transient early onset wheeze (before age 3) that is often outgrown in the first 3 years
- Persistent early onset wheeze (before age 3) that persists through school ages
- Late-onset wheeze (after age 3) is less likely to resolve

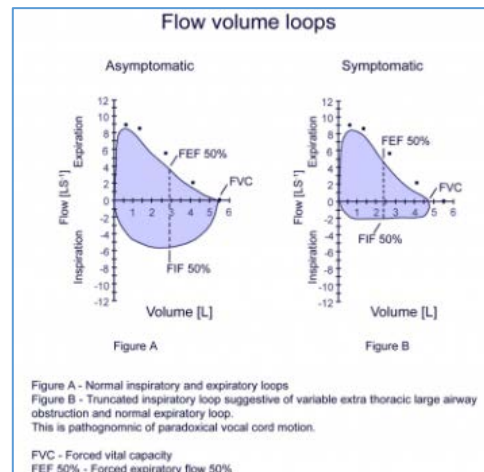
Among preschool children with wheezing, approximately 50% outgrow the problem.

According to the Canadian Pediatric Asthma Consensus Guidelines (2003), the clinical index for the diagnosis of asthma includes:

- **stringent index:** 3 or more episodes of wheeze during the first 3 years of life with either one of the major risk factors: parental history of asthma or eczema; or 2 of 3 minor risk factors; eosinophilia, wheezing without colds, allergic rhinitis
- **loose index:** any wheezing during the first 3 years of life plus 1 major or 2 minor risk factors

Correct diagnosis of asthma is essential and patients can often have more than one reason for presenting with asthma like symptoms. There are many conditions which can result in symptoms suggestive of asthma including:

- Post nasal drip
- Inducible Laryngeal Obstruction (ILO)
 - Also known as Vocal Cord Dysfunction (VCD), Factitious Asthma, Paradoxical Vocal Cord Fold Motion
 - The signs, symptoms and triggers are similar to asthma, therefore; it is often misdiagnosed as asthma. ILO is vastly under-diagnosed, with only 20% of family physicians and <5% of allied health having ever heard of ILO. Some studies report up to 50% of patients with an asthma diagnosis may have this condition. Diagnosis can be challenging, and some patients can have both asthma and ILO
 - The gold standard for diagnosing is a laryngoscopy to rule out a pathological cause, for example polyps on the vocal cords. At the time of scope, try to induce ILO, although this may not always be possible, making diagnosis very difficult to confirm
 - Symptoms reported include:
 - difficulty breathing in or out; typically harder breathing in
 - patient feeling it more in upper chest, throat area
 - inspiratory stridor/wheeze or cough
 - sudden onset and disappearance of symptoms
 - change in voice quality
 - Poor response to asthma medications is also helpful with diagnosis
 - Device check is essential as patients that report that the medication works or sometimes works while technique is poor, raising suspicion of VCD or other diagnosis
 - Spirometry testing during an episode typically shows a flattened inspiratory loop which can also be helpful. Proper diagnosis is essential and treatment by a healthcare provider trained in VCD is critical, this includes speech therapist, and psychologist
 - Treatment includes proper diaphragmatic breathing. Sniff technique, visualization.
 - Speech therapy, physio therapy, respiratory therapists and psychiatrists are health care professionals that can help patients.
 - Currently, knowledgeable professionals on this topic are limited which can make it challenging to find someone to help.
 - As an alternative, the patient can be given a handout or given a link on YouTube
 - Refer to VCDQ Questionnaire in Handout Package



- Dysfunctional Breathing/Hyperventilation Syndrome

- Natural breathing pattern is breathing in and out through the nose; low chest/abdominal pattern; 10-14 breaths per minute; a relaxed pause at the end of the out breath

- Typical dysfunctional breathing symptoms include:

- feeling “air hunger”
- breathing discomfort
- anxious and uptight
- disturbed sleep
- frequent yawning or sighing
- sore muscles (back/neck)
- tiredness

- Patients often describe continued feelings of SOB/air-hunger, even with good asthma control. This may potentially lead to over treatment of asthma patients with co-existing dysfunctional breathing

- It may be helpful to do a brief assessment, to make the patient aware that their breathing pattern is abnormal and may be contributing to their symptoms. Giving simple exercises is a consideration

- To improve proper breathing pattern, a referral to a trained physiotherapist is recommended for full assessment of the breathing muscles and exercises

- The importance of proper breathing is becoming more recognized and in the diagnostic repertoires of many clinicians in all areas of health care. Discussing and assessing patients about dysfunctional breathing is critical in their asthma management as patients want to live well, this includes medication and drug-free options for proper breath. Physiotherapists are important members of the patient’s team.

- Obesity/Physically unfit

- Being obese and physically unfit can mimic symptoms of asthma. Obesity rates are rapidly increasing amongst our youth, and as educators, we have a role to play in helping fight obesity

- Proper diagnosis, treatment and maintaining asthma control is critical

- Educators should encourage patients to lead a healthy lifestyle of physical activity, healthy diet and good quality sleep

- Bronchiolitis
- Croup
- Foreign Body Aspiration
- Gastroesophageal Reflux Disease (GERD)
- Laryngopharyngeal Reflux (LPR), also known as silent reflux
- Cystic Fibrosis
- Congestive anomalies of respiratory, gastrointestinal or cardiovascular systems
- Alpha1 antitrypsin deficiency
- Croup- Viral and Spasmodic croup

Symptom	Never	Rarely - 1	Sometimes - 2	Often - 3	Very Often - 4
Chest Pain	0	1	2	3	4
Feeling Tense	0	1	2	3	4
Blurred Vision	0	1	2	3	4
Sticky Spittle	0	1	2	3	4
Feeling Confused	0	1	2	3	4
Fast/Deep Breathing	0	1	2	3	4
Short of Breath	0	1	2	3	4
Tight Feelings in Chest	0	1	2	3	4
Blocked Feeling in Stomach	0	1	2	3	4
Tingling Fingers	0	1	2	3	4
Unable to Breathe Deeply	0	1	2	3	4
Stiff Fingers or Arms	0	1	2	3	4
Tight Feelings around Mouth	0	1	2	3	4
Cold Hands or Feet	0	1	2	3	4
Puffaloes	0	1	2	3	4
Feelings of Anxiety	0	1	2	3	4

Source: <https://www.bradcliff.com/for-the-client/questionnaire>

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Bradcliffe Breathing Method	www.bradcliff.com/
Nijmegen Questionnaire	www.bradcliff.com/for-the-client/questionnaire
National Jewish Medical Centre Vocal Cord Dysfunction	www.nationaljewish.org/conditions/vocal-cord-dysfunction-vcd
American Thoracic Society Vocal Cord Dysfunction	www.thoracic.org/patients/patient-resources/resources/vocal-cord-dysfunction.pdf
Canadian Thoracic Guidelines	https://cts-sct.ca/guideline-library/

5. ASTHMA CONTROL

- Different guidelines have different criteria for control
- Broadly accepted “Well-controlled asthma means no symptoms”
- Presence of symptoms, that is, answering “Yes” to any of the questions below, indicates asthma is not well controlled and the patient should re-visit their family doctor or adjust their medication(s) as directed by their asthma management plan



CANADIAN THORACIC SOCIETY 2012 GUIDELINE UPDATE CHILDREN SIX YEARS OF AGE AND OVER, ADULTS

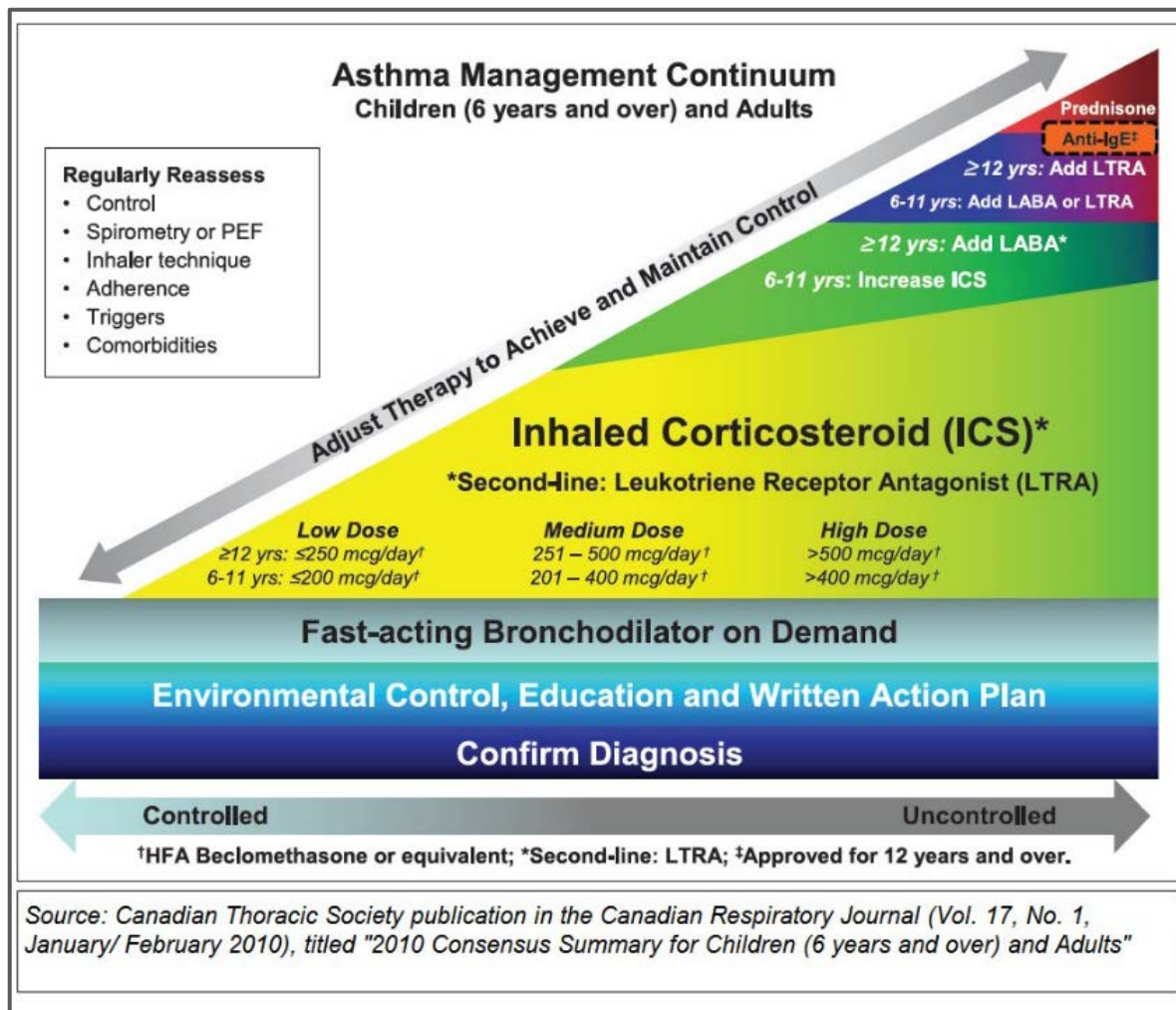
Daytime symptoms	< 4 times week
Nighttime symptoms	< 1 night week
Physical activity	Normal
Need for fast-acting beta ₂ -agonist	< 4 times a week May use 1 dose/day to prevent exercise induced symptoms
Exacerbations	Mild, infrequent
Absent from school/work due to asthma	None
FEV ₁ or PEF	≥ 90% of personal best
PEF diurnal variation (infrequently used)	<10 – 15%

*Sputum Eosinophils ideally all of these values should be 2-3% ZERO

GINA REPORT - GLOBAL INITIATIVE FOR ASTHMA 2018 (PAGE 10 OF GINA DOCUMENT)

Characteristic	Controlled (All of the following)	Partially Controlled (Any measure present in any week)	Uncontrolled
Daytime symptoms	None (twice or less/week)	More than twice a week	Three or more features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms/awakening	None	Any	
Need for Reliever/Rescue treatment	None (twice or less/week)	More than twice a week	
Lung function (PEF or FEV ₁)	Normal	<80% predicted or personal best (if known)	
Exacerbations	None	One or more/year	One in any week

In 2010, the Canadian Thoracic Society published a special article in the Canadian Respiratory Journal (Vol. 17, No. 1 January/February 2010) titled "2010 Consensus Summary for Children (6 years and over) and Adults."



Above Figure: Very mild, intermittent asthma may be treated with fast-acting beta2-agonists taken as needed. Inhaled corticosteroids (ICS) should be introduced early as the initial maintenance treatment for asthma, even in individuals who report asthma symptoms less than three times a week. Leukotriene receptor antagonists (LTRAs) are second-line monotherapy for mild asthma. If asthma is not adequately controlled by low doses of ICS, additional therapy should be considered. In children six to 11 years of age, the ICS should be increased to a moderate dose before an additional agent such as a long-acting beta2-agonist (LABA) or LTRA is added. In children 12 years of age and over, and adults, a LABA should be considered first as add-on therapy only in combination with an ICS. Increasing to a moderate dose of ICS or addition of a LTRA are third-line therapeutic options. Theophylline may be considered as a fourth-line agent in adults. Severely uncontrolled asthma may require additional treatment with prednisone. Omalizumab may be considered in individuals 12 years of age and over with poorly controlled atopic asthma despite high doses of ICS and appropriate add-on therapy, with or without prednisone. Asthma symptom control and lung function tests, inhaler technique, adherence to asthma treatment, exposure to asthma triggers in the environment and the presence of comorbidities should be reassessed at each visit and before altering the maintenance therapy. After achieving proper asthma control for at least a few weeks to months, the medication should be reduced to the minimum necessary to achieve adequate asthma control.

HFA Hydrofluoroalkane; IgE Immunoglobulin E; mcg Micrograms; PEF Peak expiratory flow; yrs Years

KEY POINTS

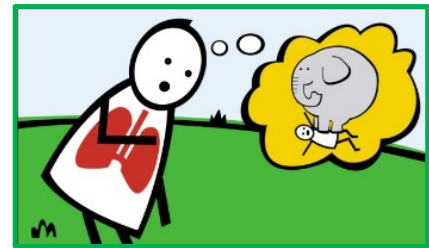
- A child's pattern of asthma may help to predict whether the child will "outgrow" the condition. Children with viral triggered asthma have a greater chance of outgrowing asthma than a child whose asthma is triggered by allergies
- Inhaled steroids are the controller medication of choice for children
- To be effective, inhaled corticosteroids must be given regularly, for at least one season (three or more months) at a time, not just during asthma attacks
- Leukotriene receptor antagonists may be helpful for asthma triggered by colds
- Most children who are seen in the Emergency Department with mild/moderate presentation, can be given bronchodilator therapy with a metered-dose inhaler and a valved spacer

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Global Initiative for Asthma (GINA) Guidelines	https://ginasthma.org/2018-gina-report-global-strategy-for-asthma-management-and-prevention/
Canadian Thoracic Guidelines	https://cts-sct.ca/guideline-library/

6. SYMPTOMS

- The most common asthma symptom for children is cough
- Cough, wheezing, shortness of breath, chest tightness are reported by parents occurring most often at night
- Many patients/parents become accustomed to these symptoms and ignore them, learning to live with them. These symptoms are typical for asthma and recognizing symptoms early, avoiding triggers and starting medication all contribute to increased quality of life and improved lung function



ASSESSMENT OF SYMPTOMS

- Coughing, wheezing, shortness of breath, chest tightness
- Accessory muscle use: This includes increased intercostal muscle use, suprasternal indrawing (sometimes referred to as "tracheal tug")-the skin at the base of the neck pulls in, and scalene retractions
- Increased respiratory rate/work of breathing
- Breath sounds: Assessment before and after Ventolin is given
- Decreased activity level or tolerance
- Decreased appetite
- Vomiting from excessive cough
- Pale
- Coughing with or following activity

Taking a video of the symptoms is helpful, as describing these symptoms may often be difficult and subjective.

Family doctors can and should order spirometry on anyone 6 years and older. Specialists may order further testing including:

- full pulmonary function studies
- bronchial provocation
- sputum eosinophils
- nitric oxide
- blood work to assess adrenal insufficiency
- blood work to assess alpha 1 antitrypsin
- methacholine challenge

7. TRIGGERS

Trigger Avoidance: The goal is to minimize or eliminate as many triggers as possible to achieve good asthma control with the least amount of medication.

Triggers are irritants to the lungs which can cause asthma to worsen. Avoiding known triggers will result in improved asthma control, requiring less medication. Each individual has their own different set of triggers.

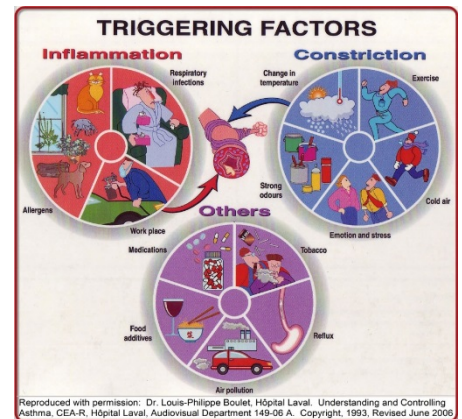
Triggers are divided into two main categories, those which cause inflammation and those caused by muscle constriction leading to immediate symptoms.

Inflammatory Triggers cause inflammation of the airways and/or tightening of the airway muscle. Inflammatory triggers require environmental control and anti-inflammatory medication.

- Allergic triggers
 - Outdoor allergens including pollen, tree, weeds, grass, mold
 - Indoor allergens including animal dander, dust mite, mold
- Non allergic triggers
 - Viral infection (most common trigger for children)
 - Certain air pollutants and smoke

Symptom Triggers (Irritants) Non-allergic triggers generally do not cause inflammation, but can provoke “twitchy” airways, especially if the airways are already inflamed. Symptom triggers alone require environmental control, possible medications, possible psychological counseling. Examples include exercise, cold air, strong smells, certain air pollutants, weather changes, intense emotions.

- Tobacco and cannabis smoke and vaping irritates everybody’s airways. (Refer to Smoking section 14 in this document for more information).
 - Ask the questions! Do you smoke? Are you interested in quitting smoking?
 - Ask Teenagers: Are your friends smoking? If yes, they are probably smoking too. Provide appropriate smoking information
 - Second-hand smoke exacerbates asthma symptoms. **Eliminating** exposure to second-hand smoke in the home and car is beneficial for children with asthma
 - Smoke on clothing is an irritant. Recommend no smoking in the car, no smoking in the house and a separate smoking jacket that is removed when re-entering the house



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- **Pets:**
 - Identify and avoid pets which the individual is allergic to
 - There is **no such thing as a hypoallergenic pet**. (e.g. Bichon or Poodle). It is the dander (skin flakes), saliva and urine that can be triggers. The animals' hair or fur can also collect pollen, dust, mold and other allergens and bring them into the home
 - If the family is unwilling or unable to find a new home for their pet, keeping the pet out of the bedroom (keep the door closed at all times) may be helpful
- **Molds:**
 - Keep humidity in homes between 35-50%
 - Avoid outside molds usually found in composts, yards, gardens and school fields
- **Pollen:**
 - Pollen counts are higher in the morning
 - Playing/exercising later in the morning or day is recommended
 - Check pollen counts in your area by visiting the [Weather Network](#) website
- **Dust Mites:**
 - Keep humidity <50%
 - Washing bed linens weekly in hot water will help control dust mites
 - Special coverings for pillows and mattresses can also be effective in reducing exposure
- **ASA/NSAIDS:**
 - Patients with ASA induced asthma need to be cautious of non-steroidal anti-inflammatory drugs (NSAIDs) such as Ibuprofen (Motrin/Advil) and Naproxen (Naprocin). The better analgesic and antipyretic choice for asthmatics is acetaminophen (Tylenol)
- **Pollution/Air Quality Index:**
 - Forest fires and pollution can cause poor air quality.
 - Recommend to stay inside on days when the air quality is poor
- **Gastro Esophageal Reflux Disease (GERD)**
 - GERD is uncommon in children but worth asking about

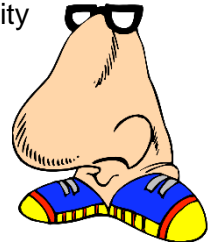


RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Air Quality Health Index	https://weather.gc.ca/airquality/pages/index_e.html
Ontario Lung Association, All About Asthma Triggers	http://lungontario.ca/disease/asthma/asthma-facts/causes-of-asthma/
The Weather Network Pollen Counts	www.theweathernetwork.ca/forecasts/pollen

8. ALLERGIC RHINITIS (Don't forget the nose!)

- Allergic rhinitis is a major chronic respiratory disease due to its links with asthma
- All asthma patients should be evaluated for allergic rhinitis and its impact on quality of life, sleep, school/work
- 10-20% of the population have allergic rhinitis
- 85-90% of patients with asthma suffer from allergic rhinitis
- The group, Allergic Rhinitis and its Impact on Asthma (ARIA), makes the distinction between intermittent and persistent rhinitis, as treatment varies
- Treatment may include saline nasal rinse/spray, antihistamine, decongestants, glucocorticosteroids - oral/intranasal, leukotriene antagonists and intranasal anticholinergics
- Non Allergic Rhinitis (Vasomotor Rhinitis)
 - Symptoms are similar to allergic rhinitis of sneezing, congestion, runny nose and post nasal drip. It differs in that it does not involve the immune system like allergic rhinitis.
 - Unlike allergic rhinitis it rarely causes itchy eyes, nose or throat
 - Airborne pollutants or odors, certain foods or beverages, some medications, changes in the weather or underlying chronic health problems can all trigger symptoms of nonallergic rhinitis. These symptoms can come and go, or be constant.
 - Accurate diagnosis is important for treatment.
 - Treatment includes saline rinse or over the counter or prescription medications



RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Allergic Rhinitis and its Impact on Asthma (ARIA)	www.whiar.org/

9. ALLERGIES

Patients with asthma often have allergies. Below is a list of frequently asked allergy questions.

How do I know if my child has allergies?

You should consider that your child may have allergies if he/she has one or more of the following symptoms:

- nasal congestion and sneezing
- red, itchy, watery eyes
- hives
- eczema
- asthma
- anaphylaxis: Swelling of the facial features, throat closing, sudden difficulty breathing, vomiting/diarrhea, fall in blood pressure (symptoms may vary for each person and from one reaction to another)



Should my child have allergy testing? If so, at what age?

Allergy testing can be done as early as 6 months old in the case of milk or other food allergies. Food allergies can and should be tested for once the child starts showing symptoms to certain foods. Environmental testing is also a good idea when the child starts to show symptoms.

Will my child outgrow their allergies?

It depends on the type of allergy. Many children will outgrow food allergies like milk and egg allergies. Even peanut allergy can be outgrown, although this does not happen frequently. We like to test kids periodically to see if food allergies have resolved as they get older. Children are not likely to outgrow environmental allergies and some may get worse rather than better with time. We do see some older adults who outgrow environmental allergies.

Is there anything I can do to help my child with allergies?

First, meet with your doctor and ask for a referral to an allergist. In some cities, it may take a year or so to get an appointment with an allergist. In the meantime, there are things you can do to help your child.

- **Environmental control** measures are key to managing allergies. Learn to avoid your child's triggers while still having them lead a normal, active life
- **Antihistamines:** For signs of environmental allergies like sneezing, nasal congestion, itchy, red watery eyes or asthma, it is important to control the level of histamine in the body with antihistamines. Avoid taking Benadryl as this is a sedating medication and since it is short-acting, it means you must give multiple doses throughout the day. Children who take Benadryl regularly, can have poor attention, poor school performance and have more playground accidents. Instead, try children's formulations of Reactine, Claritin or Aleris which are all in liquid form and are long-acting so only one dose per day is typically needed
- **Special eye drops** by prescription, may be needed to control the redness and itching of the eyes. Patanol particularly effective as it is composed of antihistamine. Regular use of over-the-counter decongestant allergy drops is not recommended
- For **nasal congestion**, antihistamines and flushing with a saline rinse can give some relief. These are over-the-counter options. If these are ineffective, a prescription from your doctor for a nasal steroid spray may be needed. Nasal steroid spray is incredibly safe as very little enters the bloodstream, yet it can be very effective to decrease the swelling in the nose. Avoid the regular use of nasal decongestants like Otrivin because your child could develop a dependence on them. In some cases, where medications are not working well, immunotherapy (allergy shots) could be considered, but this must be done under the supervision of an allergist
- Carry an **EpiPen** at all times if your child has a true food, medication or insect sting allergy which has a risk of causing anaphylaxis. This is a life saving device which will reverse the symptoms of anaphylaxis. Ask your doctor if your child should carry one and make sure you are taught how and when to use it properly. EpiPen dosing includes:
30 kg (66 lbs) and over .3 mg. 15-30 kg (33-65 lbs) .15 mg
- Remember, the **medication will expire** so the device needs to be renewed every year even if you don't use it
- Wear a **medical alert bracelet** (www.medicale.ca) if your child has serious life threatening allergies like a food or medication allergy is important. A medical alert bracelet will ensure your child will not be given something they are allergic to and that they will be treated quickly and in the right way, if they have a medical emergency



We have a pet, but my child's asthma triggers are viral colds and grasses. Should we find a new home for our pet?

This depends on the importance of the animal to each individual family member and the severity of the allergy. You could seek the advice of an allergist before making this decision. If the child's asthma is mild, you could take steps to keep the animal out of the bedroom and take measures to control the level of allergen in the home. If there is a history of oral steroid use, severe persistent symptoms, hospital visits or hospital admissions, then consideration should be made to protect the child's health and find a new home for the pet.

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Allergic Living Magazine	www.allergicliving.com
Allergy/Asthma Information Association	www.aaia.ca
American Academy of Allergy, Asthma and Immunology	www.aaaai.org
Canadian Society of Allergy and Clinical Immunology	www.csaci.ca
EpiPen Canada	www.epipen.ca
Food Allergy Canada	www.foodallergy.ca
MedicAlert Canada	www.medicalert.ca
World Allergy Organization Allergic Diseases Resource Center	www.worldallergy.org

10. MEDICATIONS

The goal of asthma management is to achieve asthma control using the least amount of medication to control asthma symptoms. Most asthma medications are inhaled and must be taken daily as prescribed by the doctor.



Asthma medications are often used “off label” which means they are used on children younger than recommended. Medication studies generally are not done on children and therefore no statistical data exists.






Preventers/Controllers - Anti-Inflammatories

a) Inhaled Corticosteroids (ICS)

The Canadian Medical Association Journal November 2009 recommends that Inhaled steroids are the controller medication of choice for children. To be effective, inhaled steroids must be given regularly for at least one season at a time, not just during asthma attacks.

- At a cellular level, ICS reduces the numbers of inflammatory cells in the airways, reducing eosinophils and reducing airway hyper-responsiveness.
- Asthma patients who smoke, are relatively corticosteroid resistant and require higher doses of ICS to gain control.
- The use of ICS and their side effects are the most common concern of parents. Reassuring parents that if taken in the prescribed doses, the chance of their child having any side effect from ICS is uncommon.

AVAILABLE INHALED CORTICOSTEROIDS MEDICATIONS

						
	Alvesco	Arnuity	Asmanex	Flovent	Pulmicort	Qvar
Color	Red/Brown	Orange Lid	Pink/Grey	Orange	Brown	Burgundy/ Light Brown
Medical Name	Ciclesonide	Fluticasone furoate	Mometasone furoate	Fluticasone propionate	Budesonide	Beclomethasone dipropionate
Dosage Available	100, 200 mcg	100, 200 mcg	100, 200, 400 mcg	50, 125, 250 mcg	100, 200, 400 mcg	50, 110 mcg**

** Minimum Therapeutic dose 100 mcg daily

DOSING CONSIDERATIONS FOR ADULTS AND ADOLESCENTS ≥ 12 YEARS
(SOURCE: CANADIAN THORACIC SOCIETY CONSENSUS SUMMARY)

PRODUCT	LOW	MEDIUM	HIGH
Asmanex	200	≥400-800	800
Beclomethasone HFA MDI - QVAR® ¹ • Valeant Canada)	≤250	251-400	>400
Budesonide Turbuhaler - Pulmicort® ² • AstraZeneca Inc, Canada • Licensed for once daily dosing in Canada	≤400	401-800	>800
Ciclesonide MDI - Alvesco® ³ • Nycomed Canada Inc. • Licensed for once daily dosing in Canada	≤200	201-400	>400
Fluticasone MDI & spacer or Diskus - Flovent® ⁴ • GlaxoSmithKline Canada Inc, Canada	≤250	251-500	>500

- Must be used daily as prescribed to help heal and prevent the swelling in the airways
- Inhaled Corticosteroids take 2 - 3 days before you begin to see a noticeable effect
- After 2 weeks, you should notice a dramatic improvement
- ICS gradually reduce the swelling and heal the airways
- ICS are very safe due to the way they are delivered. They are inhaled and go directly into the lung tissue and only a very small amount is available systemically to cause unwanted side effects when taken as directed
- Long term untreated or under treated asthma can cause airway remodeling
- Use of ICS can prevent airway remodeling
- Regular use of ICS can reduce exacerbations, decrease bronchial hyper responsiveness and prevent loss of lung function

Growth Suppression: The symptoms of asthma can affect growth. Patients with poorly controlled asthma may have sleep interrupted by asthma symptoms which may adversely affect production of growth hormone. The increased work of breathing resulting in more calories being consumed, can also affect growth.

ICS is low risk at the doses used to treat asthma. This medication has **rarely** been shown to cause significant clinical growth retardation, weak bones, weight gain or cataracts when given in low to medium doses.

Thrush: Use of a spacer device helps decrease the risk of thrush. It is recommended after each dose to rinse mouth and spit or for younger children, they can take a drink to rinse their mouth. Taking these steps will decrease the risk of Candida (yeast) infection. Consider wiping face with cloth if using a mask/spacer.

Hoarse voice. Uncommon side effect, especially if a spacer is used. Consider medication change to Alvesco as it is a pro-drug (i.e. only active in lungs) if this occurs.

Change in mood/behavior. The mechanism for this is unclear. Changing from one brand of ICS to a different brand usually works (e.g. switch Flovent and to Qvar).

- b) Leukotriene Receptor Antagonists – LTRAs (asthma pill)
Canadian Medical Association Journal November 2009, Achieving control of asthma in preschoolers recommends LTRAs may be useful for asthma triggered by colds

Available medications: Singulair and Montelukast (generic)

- Leukotrienes are a potent bronchoconstrictor, 1000 times more powerful than histamine.
- LTRAs block the chemical reaction which can lead to inflammation in the airways
- Taken once a day, typically at night
- Has bronchodilator and mild anti-inflammatory properties
- Considered a preventer/controller medication
- Not usually a first line treatment, but an add-on therapy
- Does not contain steroids and has few side effects
- Any side effects or concerns including headache, nausea, diarrhea, depression or changes in behavior, should be reported to the doctor
- Can be used intermittently with colds or seasonally to help relieve seasonal allergies such as hay fever.
- Some children do not respond to Montelukast so we suggest to start on Singulair and if a good response is received, then go onto try the generic Montelukast.



AGE	RECOMMENDED DOSAGE
<2 years	4 mg Sprinkles for Children
2 - 5 years	4 mg/day, chewable cherry flavoured tablet
6 – 14 years	5 mg/day, chewable cherry flavoured tablet
>14 years	10 mg/day

c) Oral Corticosteroids

Examples:

- Prednisone
- Dexamethasone
- Prednisolone
- Pediapred
- Potent anti-inflammatory medications are important for use in severe asthma exacerbations
- These medications are delivered orally, entering directly into the bloodstream and have the potential to cause either major or minor side effects
 - Major side effects include adrenal suppression, impaired bone metabolism, linear growth delay in children, and hyperglycemia in diabetics, or steroid induced diabetes.
 - Less important side effects include bruising, weight gain, mood change, and acne
 - Side effects are dose and duration dependent
- Similar to cortisone, which is produced by the adrenal gland
- Powerful anti-inflammatory, effective within 4 hours
- Use of oral corticosteroids are reserved for exacerbations which are unresponsive to inhaled corticosteroids or needed to quickly treat inflammation
- Not to be used as regular asthma management medication because of systemic side effects





Relievers

a) Relievers/“Rescue” Bronchodilators



- **Start working quickly.** Temporarily relaxes the smooth muscles around the airways allowing the airways to widen, relieving asthma symptoms, making it easier to breathe.
- Relieves symptoms of cough, wheeze, SOB, tight chest, difficulty breathing
- Used as needed to relieve asthma symptoms
- Should **not** be used regularly for relief (i.e. < 4 times a week)-indication of poor asthma control. Re-evaluate triggers and consider starting ICS.
- Decreasing the number of doses needed indicates increasing asthma control
- May be used to prevent exercise induced bronchospasm. The number of doses used for exercise is independent of using bronchodilators for relief of asthma symptoms.
- Possible side effects may include shakiness, increased heart rate, hyperactivity, headache and/or nervousness. One benefit of the presence of these side effects is an immediate marker of proper inhaler technique

b) Short-Acting Relievers

- Rapid onset, within 5 minutes
- Works on the smooth muscles for approximately 3 - 4 hours

AVAILABLE RELIEVERS/“RESCUE” BRONCHODILATORS MEDICATIONS				
				
Name	Airomir	Bricanyl	Ventolin	Ventolin Diskus
Color	Blue	Blue	Blue	Blue
Medical Name	Salbutamol sulfate	Terbutaline sulfate	Salbutamol sulfate	Salbutamol sulfate
Dosage Available	100 mcg	5 mg	100 mcg	200 mcg

c) Long-Acting Beta Agonists (LABAs)

AVAILABLE LONG-ACTING BETA AGONISTS MEDICATIONS		
		
Name	Oxeze	Serevent
Color	Green	Green
Medical Name	Formoterol fumarate dehydrate	Salmeterol xinafoate
Onset	Rapid onset, within 5 minutes	Slower onset, within 20-30 minutes
Age	6-16 years/>16	>4 years
Recommended Dosage	24 ug/day/48 ug/day	100 ug/day

- Duration of action up to 12 hours
- Generally, LABAs are not suitable for acute relief and patients should also have a short-acting reliever. In some situations, Oxeze may be prescribed for relief of sudden SOB and wheeze since it does have a quick onset of action
- LABAs **should not be prescribed alone**; ICS are prescribed with these medications

Anti-cholinergics

- a) Atrovent MDI, 20 mcg/dose (Ipratropium bromide) Clear case with green cap
- Blocks the neurotransmitter acetylcholine. It inhibits parasympathetic nerve impulses by blocking the binding to its receptor in nerve cells. The nerve fibers of the parasympathetic system cause involuntary constriction of the smooth muscle.
 - Rarely used for chronic asthma control
 - Atrovent has a synergistic effect when administered with salbutamol for the first 24-48 hours of emergency treatment only
 - Onset of action 15 - 20 minutes, peak effect 1-2 hours. Duration of action 4 - 6 hours
 - Currently, Atrovent is used as an adjunct to Beta 2 agonists in the Emergency Departments in Alberta, particularly with children as per the Pediatric Asthma Pathway
 - Children should **not** be discharged from the Emergency Department with Atrovent. **Not for at home use:** Patients are confused when sent home with this medication.
 - If Atrovent is nebulized, caution should be taken to avoid getting the medication in the eyes to avoid eye irritation, pupil dilation and aggravation or possible development of glaucoma

- b) Spiriva (Tiotropium bromide monohydrate), 2.5 mcg Respimat
- Indicated for patients 18 years of age and older and rarely by Pediatric Respiriologists in the most difficult to manage cases
 - Inhalation spray



Biologic IgE blocker

Xolair (Omalizumab)

- Used to treat allergic asthma
- Soaks up the IgE as it is an anti-IgE antibody. The IgE is then excreted
- Used subcutaneous and administered by a healthcare professional
- Used on >6 years of age, with persistent, difficult to control allergic asthma
- Can be used to treat chronic idiopathic urticaria that is not responding to antihistamine



Nucala (Mepolizumab) IL-5 Inhibitor
 Cinqair (Rezilizumab) IL-5 Inhibitor
 Fasenna (Benralizumab) IL-5 Inhibitor






- Used to treat severe eosinophilic asthma
- Subcutaneous injection
- Not currently indicated in patients <18 years of age.



Combination Therapy

- Combination therapy is not recommended as first line therapy for children under the age of 12 years
- Combines an Anti-Inflammatory with a long-acting Bronchodilator

AVAILABLE COMBINATION THERAPY MEDICATIONS

					
Name	Advair MDI	Advair Diskus	Breo Ellipta	Symbicort	Zenhale
Color	Purple	Purple	Light Blue	Red	Blue
Medical Name	Salmeterol xinafoate	Fluticasone propionate	Fluticasone forate vilanterol trifernatate	Salbutamol sulfate	Mometasone formoterol
Dosage Available	125, 250, 500 mcg Fluticasone; 25 mcg Salmeterol	100 ,250, 500 mcg Fluticasone, 50 mcg Salmeterol	100 ,200 mcg Fluticasone, 25 mcg Salmeterol	100 mcg, 200 mcg Budesonide, 6 mcg Formoterol	50, 100, 200 mcg Mometasone; 5 mcg Formoterol
Recommended Dosage	4 puffs	2 puffs	Take Q24 hours*	4 puffs per day	4 puffs per day
Maximum Daily Dosage		200 mcg	*Indicated for patients 18 years and older	48 mcg	20 mcg

Adrenal Suppression-Cortisol Deficiency

The adrenal gland is located above the kidney. The adrenal cortex (outside the adrenal gland):

- produces hydrocortisone commonly referred to as cortisol
- helps regulate your metabolism
- keeps your blood sugar normal
- helps your body respond to stress
- also produces aldosterone which helps control blood pressure

The adrenal medulla, inside the adrenal gland, produces epinephrine and norepinephrine.

Cortisol deficiency is when the body does not make enough cortisol to meet its needs, resulting in side effects which can range from flu-like symptoms to life-threatening.

Causes: There are many causes of cortisol deficiency but the most common is when medications containing corticosteroids are used as treatment. In the treatment of asthma, allergic rhinitis and eczema, this includes using medications containing corticosteroids. Asthma medications (oral and inhaled), nasal sprays, eczema creams, all contain corticosteroids. Sometimes the cumulative effect of all these medications or long-term use, can cause the adrenal gland to produce less. While this is normal, it can cause problems if the body suddenly needs more, for example, with a fever of 38.5C or higher, infections, broken bones or surgery requiring an anesthetic.

Signs and Symptoms: Often vague but include flu-like symptoms including tiredness, vomiting, stomach/back/leg pain, pale, fainting, hyperkalemia, hypercalcemia, hypotension and can result in death.

Diagnosis: Performing a cortisol level blood test (ordered at 0800 hours when cortisol levels are the lowest in the body), ACTC, serum potassium and calcium.

Treatment: Cortisol type medication is given and slowly weaned over weeks/months as the adrenal, glands start making enough cortisol on their own for the body's needs.

Healthcare workers should keep this in the back of their mind when taking a patient history and asking what type of medications the patient is taking for their asthma/rhinitis/eczema and how many oral courses of steroids they have taken within a one year period.

Future of Medication

Personalized medicine, also called precision medicine, is a relatively new field in which medical decisions, practices, interventions and/or products are being tailored to the individual based on their specific symptoms and unique genetic profile.

Pharmacogenomics (PGx), also referred to as pharmacogenetics, focus on understanding how genes affect individual responses to medications, for example, the relationship between drug responses and genetic variants.

Current practice of "standards of care" is where the best prevention or treatment for the average person is done, a trial and error approach. Personalized medicine is the prevention and treatment based on the genetics of the individual. This is in the early stages of development.

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Alberta Health Services, Canadian Drug News Resources for staff	Insite→Clinical Tools→Drug Information

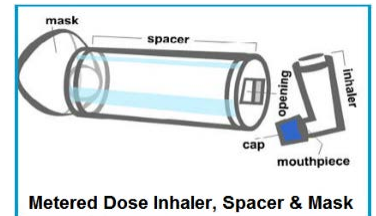
11. DEVICES

Assess technique at each and every visit.




Metered Dose Inhalers (MDI's)/ Spacers: ("Puffers")

Common Mistakes/Frequently Asked Questions

- Always recommend spacer device, regardless of age
- Using an MDI alone is difficult for many patients and almost impossible for children
- A spacing device allows the particles to slow down before being inhaled and maximizes the amount of medication that reaches the lungs, increasing the amount of particle deposition in the lungs
- 66% of the medication is trapped in the nose when using a mask, so it is important to assess a child's ability to switch from mask to mouthpiece
- Using a spacer may not be ideal for adolescents. If they are unlikely to use a spacer, consider changing to a dry powder inhaler. Another option could be to increase the number of puffs used, from 2 to 4 as needed. More puffs may be required to relieve symptoms and overcome decreased deposition by using MDI alone
- Children can change from mask/spacer device to spacer device with mouthpiece when they learn to breathe in and out of their mouth – generally 4 years of age
- Children should breathe 6 breaths in and out of spacer or take one slow, deep breath and hold
- If the child is resisting and you have doubts whether a full dose of medication was received, repeat the dose
- No whistle should be heard on inspiration. If you hear a warning whistle on inspiration, have patient slow their breathing to improve deposition of medication into the lungs
- Do not spray medication into chamber before applying mask to face. Gravity starts pulling the medication down into the spacer immediately.
- Always apply mask to face, or place spacer in mouth first before depressing canister
- Mask size: Ensure a proper fit to cover nose and mouth. Masks come in multiple sizes.



AVAILABLE RELIEVERS/"RESCUE" BRONCHODILATORS MEDICATIONS

				
Type	Neonate	Pediatric	Larger Pediatric	Adult
Color	Orange	Yellow	Purple	Blue
Age Range	Newborn to 1 year	1 year to 6 years	For children unable to use a mouthpiece spacer	Developmentally delayed adolescent or physically challenged child or adult

- Mask/Face seal: If seal is poor, it dramatically decreases amount of medication inhaled
- A calm child receives more medication than a crying child
- Most spacers do not allow a soother in mouth when using an MDI, but there are new MDIs which can incorporate one, for example Inspira Chamber
- Rinse mouth or give a drink after ICS to rid mouth of medication and decrease chance of thrush or hoarse voice. This is a very uncommon side effect if child uses a spacer (seen in <4% of children)



Priming the Spacer: Priming is the release of medication into the device before you use it. Priming decreases electrostatic charge. If your spacer is not anti-static, you should prime it.

- Optichambers prime with 10 puffs OR rinse with soapy water, do not rinse and drip dry

Priming the MDI: Priming ensures each activation of the device has a full dose of medication.

- If MDI has not been used for more than 2 weeks, prime MDI with 2 puffs
- When MDI is new, prime with 1 puff

Storage

- Extremely cold temperatures can affect MDI's (like leaving in the car overnight in the winter); however, arenas such as indoor hockey rinks are not generally cold enough to affect them
- Allow an extremely cold device to come to room temperature before you use it as it may not activate

Cleaning instructions for MDI's: If using MDI regularly, wash the plastic actuator sleeve once a week or as needed:

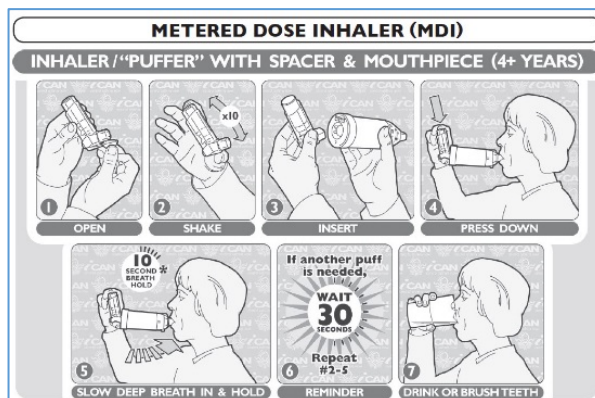
- Step 1. Remove the metal canister and mouthpiece cap. Wash the mouthpiece through the top and bottom with warm running water. Never put the metal canister in water, as water may get into the MDI
- Step 2. Shake off excess water and let the mouthpiece air dry thoroughly (overnight). Reassemble the canister and cap

Cleaning instructions for Spacer: If using spacer regularly, wash spacer once a week or as needed:

- Aerochamber MAX. Wash in warm soapy water, rinse with water and dry
- Optichambers. Wash in warm soapy water, DO NOT rinse, let air dry. The soap puts a coating on the inside of the chamber that helps decrease the static electricity that can build inside the spacer

MDI Instructions with mouthpiece or mask

1. Take off mouthpiece cap
2. Shake MDI 10 times
3. Place MDI into spacer device
4. Place mouthpiece in mouth, between teeth, or mask over face
5. Depress MDI once
6. Breathe in and out 6 times **OR** take 1 deep breath in and hold for 10 seconds
7. Remove spacer or spacer/mask from child's face
8. Wait 30 seconds before each activation of MDI
9. Repeat if necessary
10. If medication contains an ICS, rinse and spit, brush teeth or give child a drink

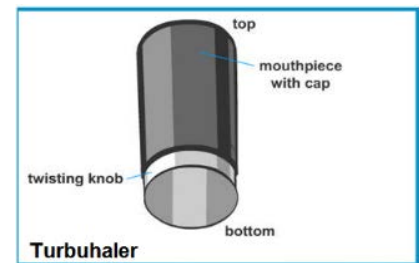


Common Technique Mistakes

- MDI without spacer
- Teeth closed in front of mouthpiece
- Fast and shallow breaths
- Inspiratory flow too fast
- Tucking chin – like playing an instrument

Dry Powders (Turbuhaler)

Examples: Bricanyl, Pulmicort, Symbicort, Oxeze



Common Mistakes/Frequently Asked Questions

- Teeth and/or tongue block device (closed mouth technique)
- Inspiratory flow needs to be high enough to get medication into lungs. Each device requires minimum 30 LPM inspiratory flow
- Breathing into the device. These devices are susceptible to humidity; so breathing into them can clog the medicine in the device and cause you to lose a dose
- Generally, children 6 years and older should be considered to use dry powder inhalers
- Do not twist and click two times together for two doses; twist once, inhale and then twist again, inhale, to get two doses.

Storage

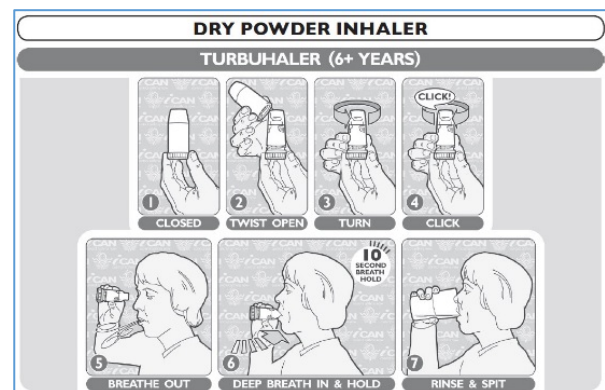
- Can be stored in the bathroom with the lids/caps secured in the closed position
- Not affected by heat or cold

Cleaning

- Wipe mouth piece as necessary with cloth. Do not get the inside of the mouthpiece wet

Turbuhaler Instructions

1. Remove cap
2. Turn one way
3. Turn back. You should hear a click sound
4. Breathe out away from the device
5. Place between teeth and lips, deep breath in
6. Remove Turbuhaler from mouth. Close lips
7. Hold breath for 10 seconds
8. Breathe out
9. Replace cap
10. If medication contains an ICS, encourage patient to rinse and spit rather than rinse and swallow. Spitting helps to decrease the amount of ICS going to the GI tract for absorption and possible systemic side effects

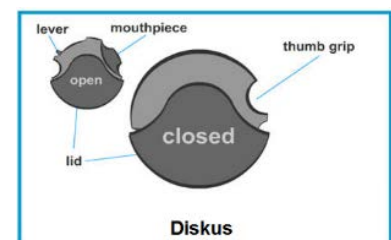


Dry Powders (Diskus)

Examples: Ventolin, Flovent, Advair, Serevent

Common Mistakes/Frequently Asked Questions

- Teeth and/or tongue blocking device
- Inspiratory flow needs to be high enough to get into lungs. Each device requires minimum 30 LPM inspiratory flow
- Breathing into the device. These devices are susceptible to humidity; so breathing into them can clog the medicine in the device and cause you to lose a dose
- Generally, children 6 years and older should be considered to use dry powder inhalers



Storage

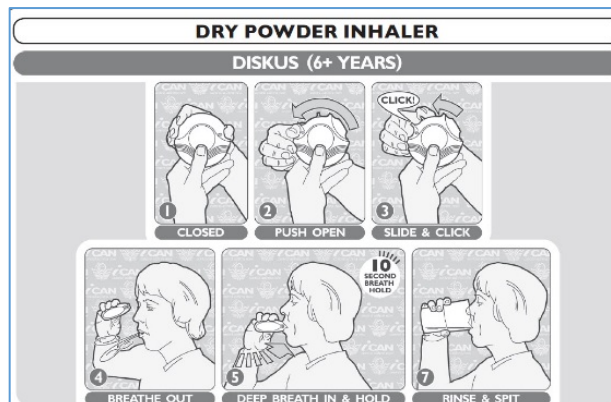
- Can be stored in the bathroom with the cover secured in the closed position
- Not affected by heat or cold

Cleaning

- Wipe mouth piece as necessary with cloth. Do not get the inside of the mouthpiece wet

Diskus Instructions

1. Push open cover
2. Slide button down until it clicks
3. Breathe out
4. Place between teeth and lips, deep breath in.
5. Remove Diskus from mouth
6. Hold for 10 seconds
7. Breathe out
8. Close cover
9. If medication contains an ICS, encourage patient to rinse and spit rather than rinse and swallow. Spitting helps to decrease the amount of ICS going to the GI tract for absorption and possible systemic side effects



Ellipta Device:

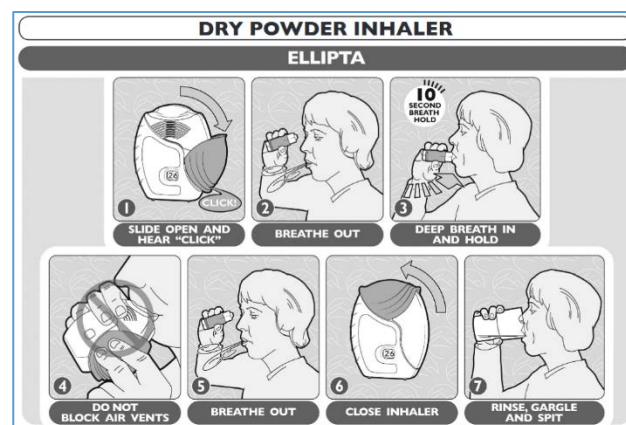
Examples: Arnuity (fluticasone furoate)

- Arnuity-, available in 100 mcg and 200 mcg
- Once a day therapy ages 12 and over
- In the future, over time, all dry powders produced by GSK will be placed in the Ellipta device replacing the Diskus



Ellipta Instructions:

1. Open the foil package and discard the desiccant package
2. Write the "discard by" date on the space provided (six weeks from the time foil packaged is opened)
3. Open the cover until you hear a click. Dose counter will count down by one
4. Breathe out as much as comfortable
5. Put mouthpiece between teeth (do not block the air vent with your fingers)
6. Take one long, steady breath in and hold for as long as comfortable
7. Exhale, close cover
8. Rinse mouth and spit



Cleaning:

- Wipe mouthpiece with close, as needed

Wet Nebulizers (Aerosolized medication)

- A jet of gas collides with a liquid in the nebulizer to produce a particle mist of varying sizes, many of which are too big to be effective
- Ideal particle size for inhaled medications to reach the bronchi is between 1-5 microns. With wet nebulizers, 2/3 of the medication is lost to the environment. The Canadian Asthma Consensus Guidelines suggest wet nebulizer devices are rarely needed to treat asthma, either chronically or for exacerbations. They are more cumbersome and expensive than spacers with MDI
- Encourage MDI with spacer



PARTICLE SIZE AND DEPOSITION OF ASTHMA DEVICES			
Device	Medication	Average Particle size MMAD*	Maximum Deposition in airways with proper technique
Wet Nebulizers		3.0 - >10 µm	Variable 10 – 30%
Turbuhaler	Pulmicort, Symbicort, Bricanyl, Oxese	4 µm	22 – 42%
Diskus	Flovent, Ventolin, Advair	4-6 µm	15%
Twisthaler	Alvesco	1.1-2.1 µm	Up to 50%
	Qvar	1.1-2.1 µm	
	Flovent, MDI	2.2 µm	
<i>*Mars Median Aerodynamic Diameter</i>			

PARTICLE SIZE AND DEPOSITION OF ASTHMA MEDICATIONS					
Medication	Aerosol	MDI Spacer		MDI Alone	
		Particle size	Maximum Deposition in airways with proper technique	Particle size	Maximum Deposition in airways with proper technique
Advair and Flovent MDI	Suspension (like oil/vinegar)	2.5 µm	Up to 20%	2.5 µm	Up to 12%
Alvesco and QVAR MDI	Solution (like sugar water)	1.0 µm	50-60% With spacer	1.0 µm	50-60% Variable

The relationship of particle size (MMAD) and better lung deposition to clinical efficacy is unknown

Important Device Information



Expired Medications

- Check expiry dates on devices, especially if not used regularly

HOW CAN I TELL IF MY DEVICE IS EMPTY?				
MDI	Turbuhaler	Diskus	Twisthaler	Ellipta
Shake it and feel liquid moving inside	Window is clear or has numbers on it when medication is present	Numbers counts backward from 60 to 0	Number counts backward	Numbers count backwards to 0
Count the number of doses that you use	When window shows red, there are 20 doses left		Cap locks onto device when empty	Discard device if it has been out of foil packaging more than 6 weeks
Qvar and Alvesco will fire until no more medication comes out. The dose is constant from start to finish	Completely red window when empty			9 doses left when red square next to number
Do not float MDI's in water as this is not accurate	The powder you hear when you shake the device is the desiccant (powder drying agent) not medication			Red square with no number, means empty
	You will still hear powder shaking when the medication is empty			

Broken Device Check

- Check spacers for valve movement, for the valves broken/bent/missing. If valve is missing, replace spacer
- Check spacers for cracks and replace if cracked

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Asthma Society of Canada About Inhalers	www.asthma.ca/adults/treatment/howToUse.php
Community Pediatric Asthma Service Device Demos	www.ucalgary.ca/icancontrolasthma 13 languages
Saskatchewan Lung Association Inhalers	https://sk.lung.ca/lung-diseases/inhalers

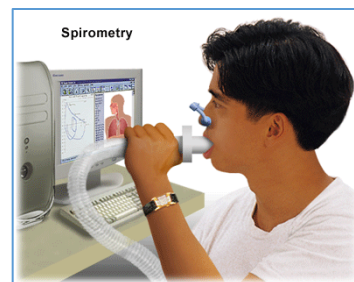
12. SPECIALIZED TESTS

Spirometry - Objective Measure of Airflow

- Detects airflow limitation with seemingly normal respiratory examination and discussion of asthma symptoms
- Reduced FEV₁ /FVC. Less than lower limit of normal based on age, gender, height, and ethnicity
- An increase of the FEV₁ by 12% (normally .8-.9 in children) from baseline after Bronchodilator helps confirm the diagnosis of asthma (2018 CTS Clinical Practice Guideline)
- Can also help detect other co-morbidities and alternative diagnoses
- Helps evaluate response to treatment and monitoring of airway disease.
- Provides an opportunity to teach regarding the mechanism and processes involved in airway disease
- Patient effort dependent test
- Generally children ≥ 6 years of age can be coached to perform this test
- Key values:

FEV₁ – Forced Expired Volume in one second. Maximal volume of air expired in 1 second following maximal inspiration

- FVC – Forced Vital Capacity. Maximal volume of air exhaled using maximal effort, following maximal inspiration
- FEV₁/FVC – Ratio between the above values

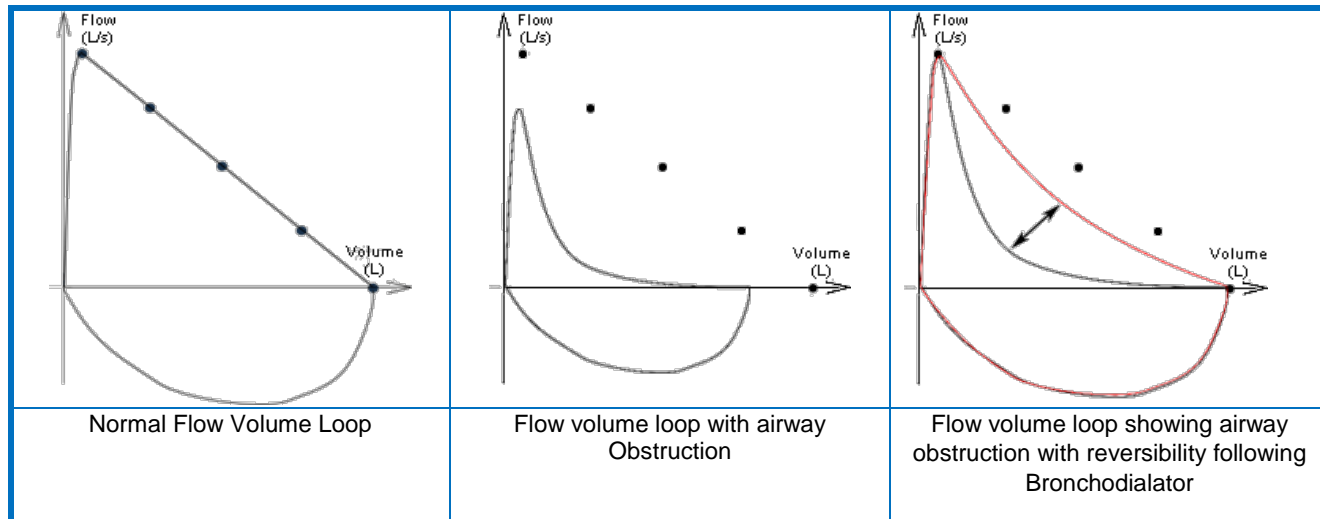


Pulmonary Function Criteria

Pulmonary Function Measurement	Children (6 years of age and over)	Adolescents and Adults
PREFERRED: Spirometry showing reversible airway obstruction		
Reduced FEV ₁ /FVC	Less than lower limit of normal* (<0.8–0.9)**	Less than lower limit of normal* (<0.75–0.8)**
AND Increase in FEV ₁ after a bronchodilator or after course of controller therapy	AND ≥12%	AND ≥12% (and a minimum ≥200 mL)
ALTERNATIVE: Peak Expiratory Flow (PEF) variability		
Increase after a bronchodilator or after course of controller therapy	≥20%	60 L/min (minimum ≥20%)
OR Diurnal variation [‡]	OR Not recommended	OR >8% based upon twice daily readings; >20% based upon multiple daily readings
ALTERNATIVE: Positive Challenge Test		
a) Methacholine Challenge	PC ₂₀ <4 mg/mL (4–16 mg/mL is borderline; >16 mg/mL is negative)	
OR b) Exercise Challenge	≥10–15% decrease in FEV ₁ , post-exercise	

*Based on age, sex, height and ethnicity.

**Approximate lower limits of normal ratios for children and adults



Normal Flow Volume Loop

Flow volume loop with airway Obstruction

Flow volume loop showing airway obstruction with reversibility following Bronchodilator

Sputum Eosinophils

- Specialized test ordered by Pediatric Respiriologists
- A non-invasive test involving the patient having sputum induction, which microscopically visualizes the different types of cells
- A test high in Sputum Eosinophils indicates the patient has more allergic-type triggers
- Test helps guide treatment plan for the doctors

Nitric Oxide (NO) Measurement

- Nitric oxide (NO) is endogenously produced when airways are inflamed
- Asthma patients have elevated NO levels in exhaled air which decreases with anti-inflammatory treatment
- Measuring exhaled NO is a simple non-invasive test. It takes about the same time to perform as spirometry. It is not a tool to diagnose asthma, but plays a role in monitoring patient's response to anti-inflammatory treatment. It does not replace spirometry
- Available at Alberta Children's Hospital, Calgary, Alberta, Canada

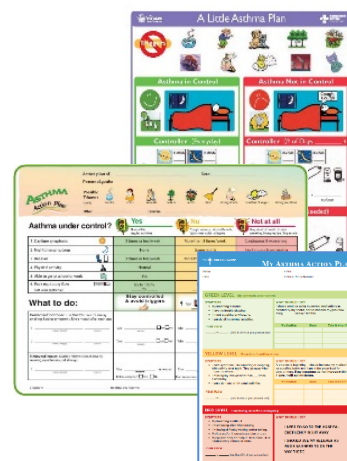
RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Community Pediatric Asthma Service Spirometry Video	www.ucalgary.ca/icancontrolasthma/files/icancontrolasthma/679_Katie_Spirometry_.mov
Lung Association, Saskatchewan Spirometry Demo	www.youtube.com/LungAssociationSK

13. ACTION PLANS

Key component of care which should outline:

- avoidance of triggers
- daily preventive management to maintain control
- when and how to adjust reliever and controller therapy for loss of control i.e. increased asthma symptoms
- clear instructions regarding when to seek urgent medical attention
- reviewed and adjusted as necessary with physician on a regular basis, minimum each year



RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Asthma Canada Action Plans	www.asthma.ca/get-help/asthma-3/control/asthma-action-plan/
Canadian Lung Association Asthma Treatment	www.lung.ca/lung-health/lung-disease/asthma/asthma-action-plan
Community Pediatric Asthma Service Action Plans	www.ucalgary.ca/icancontrolasthma/tools/asthma-action-plans
Alberta Health Services MyHealth.Alberta	https://myhealth.alberta.ca/health/Pages/conditions.aspx?hwid=uq2879

14. SMOKING

All healthcare providers should ask about tobacco use at every interaction. Cessation should be addressed with all current smokers. Providers vary in their own comfort with this topic so just accept where you are and try to learn and add tools to your own tool kit as you go along. Within your group, you could encourage others to improve their messages and work as a team to find the tools that work best for you and share them. The health of everyone will benefit from every small step you take toward improvement.



Prevention

Children experiment with smoking as early as the age of 9. Using tobacco is a health concern for everyone, especially people with asthma. Our hope is to provide parents with relevant information, practical tools and helpful links. Together we can empower children to make the healthy choice to not experiment with smoking.

[Health Canada](#) provides great practical tips for children of all ages and with their permission, we have listed these tips below.

Keep Your Kids Smoke-free - Talk to them often

The best thing you can do is talk to your kids – as soon as you can. A reported 9% of Alberta kids have their first cigarette between the ages of 5 and 11. It's never too early to talk to your children about tobacco. As children grow, their view of the world changes. As these changes occur, children pass through stages in their awareness and use of tobacco. A variety of factors can lead to tobacco use and to regular smoking among youth.

6 Years Old and Under:

- Children begin to form their attitudes and beliefs about tobacco at an early age. Be aware that the people your child sees on a daily basis will influence their perception of the world around them and shape their attitudes and beliefs about tobacco

7 to 11 Years Old:

- Up until they are about 7, most Canadian children do not experiment with tobacco, but they may be exposed to older youth and family members who smoke or use chewing tobacco. However, by the time they are about 10 or 11, they begin to move toward the stage of experimenting with tobacco

12 to 14 Years Old:

- By this age, youth may have moved from experimenting with tobacco to occasional use (i.e. on weekends or at a party). This is also the age when youth start to test their parents' authority and it is an extremely risky time for smoking to start. Peer pressure begins to build at this stage and it is quite possible that your child will have friends who smoke

15 to 19 Years Old:

- The period between 15 - 19 years is a critical time for young people who are most at risk for taking up smoking. Fortunately, recent Canadian statistics show that the percentage of youth aged 15 - 19 who smoke is decreasing. While this is encouraging, it's important to note that over half of smokers have tried their first whole cigarette by age 15, and 90% of smokers have smoked their first whole cigarette by age 19

For Parents of Tweens and Teens

- In Alberta, there are more than 62,400 smokers between the ages of 12 and 19. Will your child be one of them? We believe you can make a difference.

- Remember, your first conversation shouldn't be your last. The pressures that contribute to a child's decision to experiment with tobacco continue from adolescence to adulthood. Keep up the conversation!



For Parents who smoke

- Yes, you can still talk to your children about smoking. Research clearly indicates that children whose parents talk to them about smoking are less likely to start. That's especially true if a parent is a smoker.

Talking about tobacco works

- Despite the impact of movies, music, and TV, parents can be the greatest influence in their kids' lives. Take a stand at home, early and often. Talk directly to children about the risks of tobacco use; if friends or relatives died from tobacco-related illnesses let your kids know
- Chances are you have tried to quit at least once before. Tell your child about it – how hard it is to quit and why you wish you could
- If you live in Alberta and it's time to try quitting again, call AlbertaQuits Helpline 1-866-710-7848 or visit www.albertaquits.ca , sponsored by Alberta Health Services

For Youth and Parents together

- Create ways to say NO. Practice makes perfect
- Chances are your child will be offered a cigarette. Try to prepare him or her to say no – before the situation arises. Ask if any of the following options would work for them or make up new ones together:

“Is this what you do to be cool?”

“No thanks, I don't want my clothes to stink.”

“My girlfriend has a problem with kissing ashtrays, so I'll say no.”

“Why would I want to smoke?”

“I'm excited about making the team and I think smoking will slow me down.”

“No thanks, I don't want to get hooked. I see people spending \$75 a week on cigarettes.”

“Cancer runs in our family, so I don't want to push my luck.”

- Here's the best news. Youth who make it to age 19 without smoking will probably never smoke in their lives

Cessation

For current smokers

Health Canada recommends quitting smoking.

- Cessation is the best thing you can do to improve your life and health. Any attempt to quit smoking will make you stronger. It's never too late to reap the benefits, some of which happen within the first few days. With the right combination of practice, determination and support, you will be able to stop smoking for good!
- You will start feeling better within 24 hours of quitting. The minute you stop smoking, your body will begin cleansing itself of tobacco toxins. Two days after you quit, your risk of heart attack will start decreasing ... and that's just the beginning!

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Health Canada, Tobacco	<ul style="list-style-type: none"> • Make Your Home and Car Smoke-free: A guide to protecting your family from second-hand smoke • On The Road to Quitting: A Guide to becoming a non-smoker • Canadian Tobacco Monitoring Use Survey (CTUMS) • Smokeless TobaccoQuit4Life
Alberta Quits	www.albertaquits.ca/quitting/groups
Community Pediatric Asthma Program <ul style="list-style-type: none"> • Tobacco, Nicotine and More... • Nicotine in Disguise 	<ul style="list-style-type: none"> • www.ucalgary.ca/icancontrolasthma/tobacco-nicotine-more • www.ucalgary.ca/icancontrolasthma/files/icancontrolasthma/cpas-257-.pdf
Drug Free Kids Canada <ul style="list-style-type: none"> • Cannabis Talk Kit 	<ul style="list-style-type: none"> • https://www.drugfreekidscanada.org/order-cannabis-talk-kit/ • http://www.ccsa.ca/Resource%20Library/CCSA-Cannabis-Communication-Guide-2018-en.pdf
Quit4Life	www.canada.ca/en/health-canada/services/health-concerns/tobacco/youth-zone/quit4life.html

15. ALTERNATIVE MEDICINE FOR THE TREATMENT OF ASTHMA

- Alternative therapies have a long tradition and are the primary form of treatment in many cultures
- The term “natural” does not imply, and should not be taken to mean, that a product is **safe**
- There are no evidence-based studies on alternative medicine demonstrating anti-inflammatory effects. There are a very small number of studies demonstrating some short-term bronchodilator effects
- No adequate studies have been done to ensure the safety of alternative medicine
- Having the healthcare provider acknowledge alternative therapy is often a relief to the patient and families
- Ask the families if alternative medicine is something they use or are thinking about looking into in the future. Estimated that 25% of the general population use alternative therapy, yet many families are reluctant to tell medical staff they use alternative medicine
- Encourage families to let every practitioner know what other therapies they may be using
- Contact the Drug and Herbal Information Line 1-800-332-1414 for information regarding herbal medications



FORMS OF ALTERNATIVE MEDICINE		
Acupuncture	Exercise	Naturopathy
Aromatherapy	Herbs	Nutritional Supplements
Biofeedback	Homeopathy	Reflexology
Breathing exercises (Buteyko method)	Hypnosis	Religion
Chiropractic	Imagery Therapy	Yoga
	Massage	

RESOURCE WEBSITE:

ORGANIZATION	WEBSITE
National Center for Complementary and Alternative Medicine	www.nccam.nih.gov

16. PATIENT TERMINOLOGY

Try using the word “asthma” when helping a family understand how a doctor confirms an asthma diagnosis. For example:

- Your child may have asthma
- Your child probably has asthma
- Your child has asthma



Below is a list of terminology which parents may hear or tell you they have heard.

Airway Remodeling:

- Changes in the airways that are permanent and may result in ongoing asthma symptoms into adulthood and decreased lung function

Anaphylaxis:

- This is a potentially life-threatening systemic allergic reaction, taken from the Greek word “without protection”
- Hypotension and shock are the dominant features
- Anaphylaxis is the most extreme allergic reaction, and can cause death. It may involve the skin, respiratory, cardiovascular, gastrointestinal systems
- Symptoms can vary from person to person and can be different from one reaction to another.
- No contraindication to using it

Bronchitis:

- Inflammation and swelling of the bronchi (the larger breathing tubes) caused by either a bacterial or viral infection and usually causing a painful cough with greenish mucous
- Asthma is a disease that not only affects the bronchi but the bronchioles (the smaller breathing tubes in the respiratory system)
- Chronic bronchitis is a disease seen almost exclusively in adults exposed to tobacco smoke that causes the airways to produce more mucous

Collapsed lung:

- Some patients use this term when they have had an x-ray. They likely did not have a pneumothorax, but are referring to the atelectasis or consolidation that can be present with mucous plugging in asthma and this is an interpretation or how it was explained to them

Croup:

- A viral infection of the larynx and trachea, typically with a cough sounding is like a bark
- Generally improves quickly when exposed to cold air
- Patients can have croup and then progress to asthma
- Describing a cough is often subjective and a “barking” cough may not necessarily mean croup, consider asthma or foreign body aspiration

Double pneumonia/Walking pneumonia:

- Pneumonia is an infection caused by a bacteria or virus that causes the alveoli to fill with pus and fluid. The key signs are fever, cough, rapid breathing, lethargy and chest pain
- Asthma can worsen with pneumonia which is why a confirmed diagnosis for pneumonia needs to be made by a doctor
- Fever is generally present when you have a viral or bacterial pneumonia and not when you have worsening asthma

Eczema:

- Dry, itchy, red patches of skin that weep with excessive scratching and crack
- Allergies in infants often show up as eczema

Emphysema:

- A disease primarily seen in adult smokers and former smokers
- It is permanent damage in the lungs caused by the destruction of alveoli and increase of the lung's rigidity, with a decreased or absent response to inhaled bronchodilators

Reactive Airway Disease:

- Term used by some doctors when the diagnosis of asthma is a possibility. Asthma experts discourage the use of this term because there is no such disease
- Physician may use this term when the diagnosis of asthma has not yet been made
- Physicians will likely continue to use this term until they can mutually agree on another phrase

Rhinitis/Hay fever:

- Stuffy, runny nose caused by an allergen
- Also called allergic rhinitis or non-allergic rhinitis

Sinusitis:

- Inflammation in the sinuses

Ventilator:

- Probably means Ventolin/puffer or Nebulizer

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
American Academy of Allergy Asthma & Immunology Rhinitis	www.aaaai.org
Anaphylaxis Canada	www.anaphylaxis.org
Eczema Society of Canada	www.eczemahelp.ca
National Eczema Association	www.nationaleczema.org

17. FREQUENTLY ASKED QUESTIONS AND SUGGESTED RESPONSES



Does my child have asthma?

Asthma must be diagnosed by a doctor. The diagnosis of asthma considers medical history, family history, allergies, response to asthma treatment and spirometry. (Refer to [Does My Child Have Asthma?](#) included in handout package) It generally takes a period of time to determine if a child has asthma—weeks, months and sometimes years.

Will my child outgrow asthma?

As some children get older, their asthma symptoms may disappear while others will continue to have symptoms. Asthma symptoms depend on what triggers they encounter in the future. Generally, the more triggers children are exposed to, the greater the chances of having asthma symptoms.

If you carry the genetic makeup for asthma, and although symptoms may disappear, asthma symptoms often return when you are older (i.e 30's or 40's). If there are strong personal or family allergies, it is much more likely your child will not outgrow their asthma symptoms.

Will I become resistant to my asthma medication?

No. If asthma medications become less effective, contact a healthcare provider for advice. Your healthcare provider may increase or change your medications.

When should I stop taking my medications?

When your asthma is under control (See [Asthma Control Criteria](#) section) you need to talk to your doctor about adjusting the dose. Stopping your controller medications too soon may cause your airway inflammation to return. A written asthma action plan from your doctor is a helpful tool you can refer to when you need to use/change the amounts of your medication.

For viral triggered asthma, a good rule of thumb is if the child has a minimum two viral colds with non-asthma symptoms, a trial of medication can be done. Be conscious of timing and do not stop if going on a holiday or important events if the trial is unsuccessful.

I am lactose intolerant and I heard that some medications have lactose in them.

Some dry powder medications contain lactose (Flovent, Advair Diskus, Oxeze Turbuhaler and Symbicort Turbuhaler). The amount of lactose in these medications is very small and should have no effect on lactose intolerant people but talk to your doctor about other medications that can be substituted (e.g. Metered Dose Inhalers or Pulmicort Turbuhaler).

I gag on the medicine when I take it.

For people with a strong gag reflex or patients that do not like the taste of their medications, the use of other medications should be explored with your doctor. Using spacers with MDI's and changing from a Diskus to a Turbuhaler could be an option. QVAR and Alvesco have an alcohol base and some children do not like this.

When I use my turbuhaler, I don't think that I am getting anything.

The amount and particle size of medication from this device is very small. Proper device technique is very important. Make sure that your device is not empty, expired or broken. Monitoring your asthma symptoms and asthma control will ultimately help you decide how this medication is working for you. Talk to your doctor about your concerns.

How do I know when my child is old enough NOT to use a spacer with his puffer?

Everyone should use a spacer with MDIs, regardless of age. You get more medication in your lungs using a spacer. If your child is 6+ years, other medication devices like dry powder inhalers can be considered. Device technique should be reviewed with a healthcare professional at least once a year, preferably at every visit with your doctor or healthcare provider.

My child has RSV. Is that asthma?

No. RSV is the name of a common respiratory virus called “Respiratory Syncytial Virus”. It is a contagious virus that is spread through the air from one person to another often by coughing and sneezing and by hands. It is a common cause of colds in winter and early spring and can affect all ages. RSV symptoms may look like a cold; fever, runny stuffy nose, red eyes, sore throat/ears, and other cold symptoms. Symptoms may get worse and include wheezing, shortness of breath, increase respiratory rate, which look like asthma symptoms, but it is not asthma. The relationship between RSV and children developing asthma is unclear and there continues to be research on this topic.

Do the steroids cause weak bones and/or stunted growth?

Corticosteroids are a hormone which your body produces naturally. Inhaled corticosteroids, at the doses recommended to treat asthma, have not been shown to cause weak bones, growth suppression, weight gain or cataracts.

Steroids may cause thrush in the mouth and a hoarse voice. Rinsing the mouth or brushing teeth will help eliminate these potential side effects. When corticosteroids are taken orally and in higher doses for long periods of time, they can cause weak bones and growth suppression. The doctor is aware of this and will monitor it.



Should I have a humidifier in my child’s room?

Having a humidifier in the bedroom does not help someone with asthma symptoms. Avoiding your asthma triggers and proper medication help control asthma. If you use a humidifier, it is important to monitor the humidity level and keep the level below 50%. The water in the reservoir should be replaced at least every 24 hours, and the reservoir should be cleaned with soap and water at least once a week. Damp homes are bad for lung health and are a source of mold and bacteria.

Dust mites do not survive well in humidity levels of less than 50 %. A hygrometer is a gauge that measures the humidity in your home and can be bought from most hardware stores.

Should I use a HEPA (High Efficiency Particulate) filter?

It is still unclear whether HEPA filters reduce asthma and allergy symptoms. Having a filter is a personal choice. Good housekeeping is very important in removing indoor and outdoor particles which can irritate the lungs. Regular vacuuming, dusting and eliminating clutter, especially in the bedroom, helps eliminate exposure to triggers. Central vacuums should be exhausted to the outside. HEPA filters are available on some vacuum cleaners as well as furnace filters. Price and effectiveness vary between filters. [IQAir](#) produce one of the most effective air purifiers, but it is also one of the most expensive.

Should I use the Inhaled corticosteroid first or the short-acting bronchodilator first?

The action of these medications is different. You should take your inhaled corticosteroid regularly to reduce inflammation in your lungs. The short-acting bronchodilator only temporarily reduces asthma symptoms such as coughing, shortness of breath or chest tightness. Studies indicate it does not matter which medication you take first. Most healthcare professionals suggest using relievers first to stop the cough, making it easier to take the preventer medication.

My child is coughing, should I give him cough syrup?

No. Cough syrup should not be used to treat asthma symptoms. Cough due to asthma requires asthma medications, not cough syrup. If the cough is due to rhinitis, then a cough syrup may help. Suppressing the cough due to asthma may cause the mucous that is produced during an asthma exacerbation to stay in the lungs where bacteria can grow and increasing the chance of bacterial pneumonia.

No medications containing containing acetylsalicylic acid (Aspirin, Motrin or Advil) or cough suppressant (DM) should be taken. Consult a pharmacist about over the counter and prescription medications for asthma. Generally speaking, decongestants are acceptable.

The medication box says “Not recommended for children under 12 years of age.” Is it safe to use in younger children?

Only 20% of all medications used in pediatrics has approval—meaning most medication is used “off label”. Generally, medication trials are not done on children and takes years to receive approval for younger ages.

Pediatric respirologists and doctors have found asthma medications to be very safe and effective in treating asthma in children less than 12 years of age.

The dentist says medications can cause tooth decay?

The saliva in your mouth rinses the medication away. It is the pH of some medications can cause tooth decay. People with dry mouth need to be more aware of good daily oral hygiene and regular dental care.



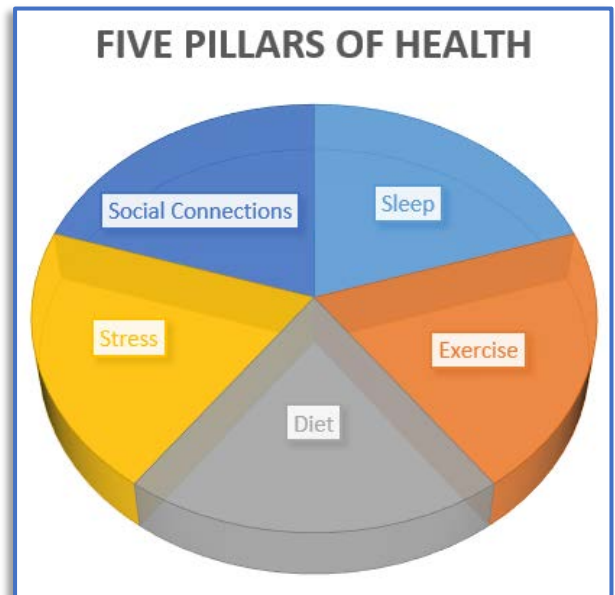
Does my child need allergy tests if she/he has asthma?

Allergies are an important determinant of long-term asthma. Although not all children need allergy tests, a full allergy assessment is often helpful in confirming triggers. Determining what allergies are present, makes it easier to plan how to avoid them but an allergy test cannot always pinpoint exactly what allergy your child has.

Is there anything I can do for prevention?

The “Five Pillars of Health” are important discussion points

1. **Sleep:** Quality of sleep, not just quantity is important. It is important that we breathe through our nose. If you have a congested nose because of allergic rhinitis, or if children have large tonsils or adenoids which cause them to breathe through their mouth, this can affect their sleep quality. Treating the nose so the child can breathe properly is important.
2. **Exercise:** “Canadian kids are sitting too much and moving too little to reach their full potential”-quote from expert statement on PARTICIPACTION. “For better brain health, all children and youth should be physically active on a regular basis. In addition to physical health benefits, physical activity also improves cognition, brain function and mental health.” Children who are “out of shape”, can confuse shortness of breath with asthma symptoms.
3. **Diet:** There is no diet which will eliminate asthma symptoms. Eating a healthy diet is important to overall health and supporting your immune system.
4. **Stress:** When exposed to stress, like bullying or a volatile home life, this trigger can worsen asthma symptoms.



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Families are routinely asked about Domestic Violence Screening. Questions such as: “The threat of violence is a problem for many people and can affect their health. Abuse comes in many forms so we ask all patients and their families about violence or the fear of maltreatment in their lives”. Is this a concern for you/your children? Do you feel safe right now?
5. **Social Connections:** Having friends and family are important to the mental and physical health of people. With more social media in our lives, it is having an impact on how we connect with people and for some, they find themselves more isolated.

18. BARRIERS AND SOLUTIONS FOR OPTIMAL ASTHMA CONTROL:
 Establish goals of child and parent and balance goals with therapy



MEDICATION SIDE EFFECTS	
Barriers/Concerns	Strategies/Solutions
Use of ICS is parents' top concern	<ul style="list-style-type: none"> • Reassure parents that they are very safe to use. Not using them as directed may cause poor quality of life and decrease growth (calories spent breathing versus growing) • Benefits of treating asthma include child can play with his friends, improved sleep quality, better school performance, not missing school or going to the hospital • Not related to anabolic steroids • Use of ICS daily as directed by the doctor will reduce the inflammation and mucous in the airways and help make the lungs less sensitive to triggers • ICS does not affect growth in the doses used to treat asthma (i.e. children will reach their full adult height)
Change in behaviour/personality	<ul style="list-style-type: none"> • Talk to the doctor about changing from one brand of medication to another. i.e. Flovent to Qvar to Alvesco
Would rather take an oral medicine than an inhaled medication	<ul style="list-style-type: none"> • Inhaled corticosteroids are the primary treatment for asthma. Oral corticosteroids are distributed throughout the body, increasing the risk of unwanted side effects on the body and are taken at a much higher dose than ICS. • Inhaled corticosteroids are delivered right to the lungs with minimal absorption in the rest of the body (i.e. fewer systemic side-effects)
Will I become dependent on the medicine?	<ul style="list-style-type: none"> • No. People do not become physically addicted to asthma medications. With β_2 use, some tolerance with time and frequency of use can occur, but it still retains a significant bronchodilator (reliever) action

COMPLIANCE/ADHERENCE

Barriers/Concerns	Strategies/Solutions
Ask about understanding asthma	<ul style="list-style-type: none"> • Asking and understanding what the patient knows is critical • What are the biggest consequences for you having asthma? • Use language the family understands, not healthcare language. • Use words like “4 hour muscle medicine” versus short-acting bronchodilator or Beta2-agonist
Difficulty remembering to take medication as prescribed	<ul style="list-style-type: none"> • Place medications in a location the child goes morning and night. i.e. bathroom, kitchen and bedroom • Do they need 2 sets of medications, i.e. one for upstairs bathroom and one for the downstairs bathroom? • Use sticker calendar • Program electronic device. i.e. alarm, cell phone, asthma app
Will they only take medication once a day or use as needed	<ul style="list-style-type: none"> • Let the doctor know and consider once a day therapy or combination therapy
Let child/teen take responsibility	<ul style="list-style-type: none"> • Provide options and have patient suggest a goal and plan. Establish a plan, check on it and change as needed. • For example, parents can check device every 2 weeks to see if doses have been taken
Child fights medication	<ul style="list-style-type: none"> • Let child use it on a stuffed animal, parent or sibling, then on self • Be consistent; do it the same way, every day • Let child use it independently • Distractions: television, sibling, parent. If parent sings, do not have child singing or talking during treatment, just breathing • Wrap child in blanket, or place child in lap, parent crosses legs over top and holds arms to secure patient
Giving Oral corticosteroids	<ul style="list-style-type: none"> • Mix with some food (i.e. jam) and give small amounts • Give small amount over 30 minutes • Give popsicle first which numbs the mouth. Flavored juice or soda (Mountain Dew) can help mask the taste
Parents do not believe child has asthma and do not want to give medications	<ul style="list-style-type: none"> • Ask the child what their main complaint is. It is almost always not being able to play with friends. This will help convince the parents. • Motivational Interviewing. Listen and establish why the family feels this way, then work with their concerns in a collaborative way
School policy on the administration of medication	<ul style="list-style-type: none"> • Check with the school and teacher about their policies. • Let the school know of medications/triggers
Compliance/Adherence	<ul style="list-style-type: none"> • Reward. What kinds of things would the child be motivated by – an extra bedtime story, a movie, a penny, a jelly bean, family game

LANGUAGE AND CULTURAL DIFFERENCES

Barriers/Concerns	Strategies/Solutions
Language	Translation Services are available 24 hours a day, 7 days a week in 150 languages 1-800-874-9426 (170 languages)
Cultural	The iCAN website has asthma information in 13 languages

ACCESS TO MEDICATIONS

Barriers/Concerns	Strategies/Solutions
Do they have a drug plan?	<ul style="list-style-type: none"> • Are there any problems paying for prescribed medications?
If cost of medication is a factor...	<ul style="list-style-type: none"> • Costco, Wal-Mart, Superstore are budget-friendly. • Patient does not need to have a Costco membership to purchase drugs
Cannot afford the medication.	<ul style="list-style-type: none"> • Inpatient – Have Social work get involved • Inpatient/Emergency – Dispense medication to the child prior to discharge from hospital • Does the family qualify for Child Health Benefit? • Qualifying income approximately \$17,000-\$47,000, dependent on number of children. See form for details. • If yes, give family Child Benefit Package information • Make the family doctor/pediatrician aware so they can provide samples or apply for compassionate drug plan • Contact the Asthma Clinic 403-955-7324 to discuss option
Parents separated/ divorced; Child lives in two homes.	<ul style="list-style-type: none"> • Is it easier to have a set of medication at each house? • Dispense instructions to read dispensing 2 at a time, one for each house

RESOURCE WEBSITES:

ORGANIZATION	WEBSITE
Alberta Health Services Diversity Resources Child Health Benefit	<ul style="list-style-type: none"> • www.alberta.ca/public-agency-governance-resources.aspx • www.alberta.ca/alberta-child-health-benefit.aspx



PEDIATRIC ASTHMA MANAGEMENT PEARLS

Goal is asthma control = No asthma symptoms, no emergency room visits, run and play, no missed school, reliever < 3 X/week

Medication dose is adjusted until asthma control is achieved – using the lowest dose of medication possible

- All ICS provide excellent anti- inflammatory abilities
- Most asthma can be controlled on daily low dose Inhaled Corticosteroid using proper technique
- Because of breathing patterns and the narrow size of the airways for a child – higher doses may be required
- If patients have current medications that they have been prescribed, and the medications are not expired – consider using the prescribed medications and check technique and assess why patient not adhering to medication regime before changing the medication
- How to decrease or stop the medication? General guidelines – Maintain good control for minimum 3 months or 2 viral colds before decreasing or considering a trial off of medication
- Why do we use medications off label? Testing of medication on children is not done and takes years to receive approval for younger ages. Only 20% of medications used in Pediatrics has approval. Most medications are used off label.
- Do not forget to treat the nose with asthma. Improving rhinitis improves asthma symptoms, improves sleep quality, and proper breathing pattern
- Adrenal Insufficiency /Crisis - Is rare, but one should be aware of it.
Cortisol is a hormone that helps keep the body blood pressure and blood sugar normal. When corticosteroids are given to treat inflammation through asthma medications, nasal sprays, eczema creams etc., the adrenal glands can slow or stop making its own cortisol. When the body becomes stressed due to injury/sickness, the body cannot make enough of its own cortisol resulting in low blood pressure and blood sugars.
The signs of adrenal insufficiency are often vague flu like symptoms including tiredness and joint pain, extreme cases death. Treated by giving corticosteroids and slowly weaning so the adrenal gland starts to function normally again.
- Proper diagnosis of asthma is important – Studies show up to 30% of people with physician diagnosed asthma, actually do not have asthma
- Estimated that 60% of patients with asthma do not meet asthma control guidelines.
- Spirometry is a helpful test for purposes of diagnosis and management and all patients with asthma should have spirometry. Keep in mind that asthma is intermittent and having a normal breathing test does not rule out asthma diagnosis and should be correlated with symptoms.

This document accompanies the Pediatric Respiratory Medication Guide. The Guide, together with this document was developed with input from respiratory educators, physicians, respirologists, nurses, pharmacists.