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*Breathing better –  
action plans for asthma control.*

*Gain asthma knowledge, make informed decisions & achieve control.*

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*Asthma basics*

**A**sthma is a common medical condition of breathing difficulty. Doctors sometimes call these difficulties ‘airway limitation’.

Asthma affects about one-in-five Australian children and about one-in-ten adults.

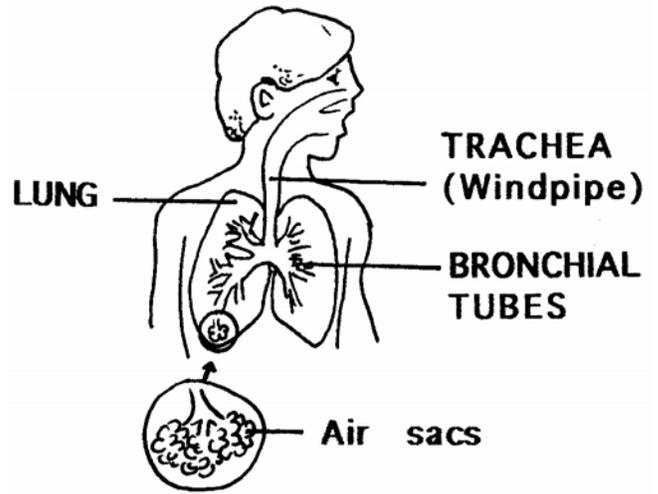
**Breathing**

To understand the symptoms of asthma it helps to know a bit about breathing and the purpose of our lungs.

Breathing is something most of us seldom think about. Take a long, slow deep breath until you can’t inhale any more air. Now breathe out— ... ahhh — at a like rate. Wasn’t that easy? It’s so natural.

Air moves in and out of our lungs as we breathe. It passes through airways with a tree-like, brand structure. The air we inhale first moves through a large trunk-like tube—called the windpipe or trachea—which branches into smaller and smaller tubes known as airways or bronchioles. The bronchioles end in very small air sacs called aveoli where gases—oxygen and carbon dioxide—interchange. Breathing in (inhaling) and out (exhaling), and the exchange of gases, happen every second of every day.

Feel what it is like breathing under circumstances that limit the flow of air in and out to appreciate the symptoms of asthma. To create these circumstances, you will need a drinking straw. With straw at hand, run on the spot for about three minutes.



<b>Breathing</b>
<p>We breathe in (inhale) and out (exhale) without being conscious of this ongoing process. The medical term for breathing is ‘respiration’. Under normal circumstances, a child will breathe 20–25 times a minute, an adult 12–17 times.</p>
<p>By inhaling and exhaling, our body absorbs, exchanges and excretes certain airborne gases, oxygen and carbon dioxide.</p>
<p>In the tiny air sacs (alveoli) of our lungs, oxygen from the air we inhale exchanges for blood-borne carbon dioxide (a waste product from our body’s cells). Oxygen-rich blood is pumped by our heart, through our arteries, to supply the cells of the body with life-sustaining energy. At the level of the cell, there is a further exchange of oxygen and carbon dioxide. Carbon dioxide-rich blood is borne back to our lungs where it passes into the air when we exhale.</p>



## Breathing

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Place the straw in your mouth. Close your lips firmly around the straw. Now breathe in *only through the straw*. Not so easy, is it? Breathing out is even more difficult. Are you surprised?

Pinch the straw in the middle to create further narrowing of this part of your airflow pipeline.

*You have just experienced what breathing feels like during an asthma flare.*

### Airflow limitation

Airways, during a flare, swell. Airway tubes narrow. The passage of air in and out of the lungs requires effort. The swollen airways sometimes produce extra mucus resulting in further narrowing. Breathing is harder, requires more effort. Doctors call *difficulty breathing out* 'airflow limitation'.

Breathing, between flares, can be normal or seem that way (a). But breathing with airflow limitation can seem as challenging as breathing through a straw (b).

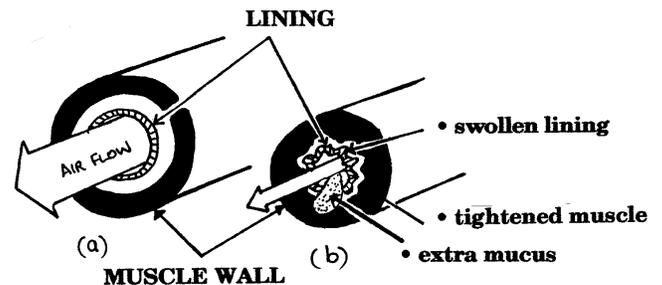
A kid with asthma may have shortness of breath, wheezing—a whistling sound as they exhale—cough, and a feeling of tightness in their chest. Some kids have only mild, occasional asthma symptoms or only show symptoms after physical activity. Others have more severe asthma.

An asthma flare can be very scary. A 'serious' flare can be life-threatening.

If the kid with asthma doesn't use their medication properly, then the flare can get worse ... and worse. Airflow limitation can dramatically limit everyday activities and cause changes in lung function. But with medication and proper self-management, the airways almost always return to the way they were before the flare. This can take several days.

### Flares limit breathing

- Airway linings become inflamed & swollen
- Airways produce thick mucus with further limitation to breathing
- Muscles around the airways tighten further limiting the flow of air in & out of the lungs.



(a) NORMAL BRONCHIAL TUBE

(b) BRONCHIAL TUBE IN ASTHMA

### Asthma symptoms

- Shortness of breath
- A feeling of tightness in the chest
- Coughing
  - At night
  - After physical activity
  - For more than a week
- Waking at night with these symptoms.



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### Why asthma happens

Who gets asthma?

Doctors believe there is a genetic disposition, that is, vulnerability to airflow limitation is inherited.

On top of this, there are strong allergic elements (adverse body reaction to substances called allergens) or irritant elements. Substances with allergic or irritant properties are called asthma 'triggers'.

Some triggers are inhaled. Others are ingested (taken into the body by mouth). Some reflect a change in body state such as an infection.

Common trigger substances include:

- Virus infections of the airways — cold or flu;
- Inhaled allergens such as house dust mites, cockroach particles, pet dander (flakes of skin, hair or feathers from warm-blooded companion animals), pollens, moulds & yeast spores;
- Change in body state with physical exertion, more likely in cold weather;
- Inhaled irritants such as smoke—tobacco, wood, or coal—or strong chemical odours;
- Climate changes—indoor or outdoor—including humidity & temperature change;
- Food chemicals such as preservatives, additives & colourings as well as specific foods or beverages;
- Certain medications such as aspirin & drugs used to treat elevated blood pressure, glaucoma & arthritis; and
- A change in body state associated with stress or emotional upsets (very occasionally).

For detailed self-management information, see

[AsthmaTriggers](#).

### Common 'trigger' factors for flares



### Many children get asthma flares

Asthma flares are prevalent if not controlled. Among pre-school and school age children, asthma is a common chronic illness. At least two, in a class of 20–30, are likely to experience airflow limitation.

The No. 1 reason why kids miss school?  
Asthma flares.

The No. 1 reason why children with a chronic illness are admitted to hospital accident & emergency departments? Asthma flares.

### Expect nothing less than control

Asthma cannot be cured but it can be controlled. The person with asthma—thanks to self-management skills and medication—doesn't have to sit on the sidelines of mainstream life. The person with asthma, today, has the same lifestyle choices as their peers.

### Child with asthma

If your child has asthma, then you and your child work with your doctor and asthma educator to agree on a personalised management plan. Working as a team, you learn how to control asthma symptoms and flares. With airflow limitation under control, your child can do just about anything they choose.

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## Steps to asthma control

**A**sthma, for most, is a mild condition. Airflow limitation can be effectively treated and self-managed. Asthma flares can be prevented.

You self-manage asthma by:

- Learning all that you need to know about asthma;
- Working with your doctor, asthma educator & chemist to implement treatment & management control regimens; and
- Reviewing, methodically, your control accomplishments.

With confidence and skill at self-management you:

- Minimise flares;
- Maintain your breathing;
- Learn to recognise & manage your trigger exposures; and
- Contain medication side-effects.

With good asthma control you:

- Lead a normal lifestyle;
- Reduce the frequency & acuteness of symptoms; and
- Protect your breathing capacity.

### Six step management plan

The *National Asthma Council*—health professionals involved in asthma care working with self-help groups—has developed a simple *Six Step Asthma Management Plan*.

#### 1. Know your vulnerability

Make a list of the symptoms that you experience during a flare, how often these occur, and whether symptoms occur when you are doing anything in particular.



Discuss these patterns of events with your doctor — this will help you, your doctor and involved others to make informed decisions on the control of your asthma.

#### 2. Achieve your best lung function

Your doctor will inform you about your best ‘peak expiratory flow’ measurement (PEF). You will methodically check your lung function (the integrity of your breathing) using PEF measures (see [PeakExpiratoryFlow](#)).

Your doctor will also prescribe medication to reduce the inflammation causing your symptoms (see [AsthmaMedicationsPreventers](#)).

Your breathing improves when you manage your medication properly. You have fewer symptoms. Your susceptibility to flares diminishes.

#### 3. Identify & avoid ‘trigger’ factors

You may be able to work out which triggers, for you, are important (see [AsthmaTriggers](#)).

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Think about pre-conditions and circumstances — what were you doing when your symptoms occurred, or got worse? Discuss your understandings, or insights, with your doctor or asthma educator.

Your doctor may recommend that you have some special tests to identify allergen sensitivities.

Informed insights help your doctor work with you to diminish symptom vulnerability and contain the threat of severe or serious flares.

#### 4. *Maintain your best lung function*

To maintain control over your breathing you need to continue, systematically, with your personalised treatment (medication) and management regimens.

Agree with your doctor on your medication regimen — preventer, reliever, symptom controller, or combination medicine (see [AsthmaMedication](#)).

#### 5. *Have an Asthma Action Plan*

Sometimes asthma will flare unexpectedly.

Your doctor will counsel you on how to recognise the symptoms and signs of increasing vulnerability and how to respond with a stepwise approach to getting your breathing under control.

You will be able to diagnose whether your asthma is simply ‘getting worse’, becoming ‘severe’, getting ‘serious’ or possibly even ‘life-threatening’.

Agree with your doctor what you will do—what should happen—when your asthma is no longer well controlled.

Your personalised *Asthma Action Plan* gives you precise info on what to do (see [AsthmaActionPlan](#)). Always keep your *Asthma Action Plan* handy.

#### 6. *Be health-responsible*

Your doctor, asthma educator and chemist will equip you to do all that you have to do, by way of self-help and self care, to achieve asthma control.

Medicare makes provision to visit your doctor regularly for review of your breathing capacity (lung function) and whether your medication regimen should be adjusted.

Your doctor will agree with you, following review, on any changes to your asthma management plan and *Asthma Action Plan*.



## Medications & delivery devices

**T**here are three main groups of asthma medication—preventive, symptom relief, and symptom control—classified by how they work to achieve better breathing control.

Delivery devices are used to supply the proper amount of medication directly to the airways. Less medication is required. Medication is more effective. Medication side-effects are less.

## Medications

### Preventers

Preventer medications help either prevent asthma flares or minimise the risk of flares. Preventers reduce the inflammation that brings on airway limitation. Medication makes the airways less reactive.

Preventer medication, to be effective, should be taken daily.

### Relievers

Reliever medications—also called ‘bronchodilators’—open up (dilate) airways.

Relievers are mainstay medications for acute relief of asthma symptoms. They act quickly to improve breathing.

### Symptom controllers

Symptom controllers are long-acting relieving medications. A symptom controller should only be used in conjunction with regular preventive inhaled corticosteroid medication (see [AsthmaMedicationsPreventers](#)).

### Asthma medications – types & names

*Preventers* – beclomethasone dipropionate (brand names *Qvar*, *Becloforte*, *Becotide*, *Respocort*); budesnoide (*Pulmicort*); fluticasone propionate (*Flixotide*), sodium cromoglycate (*Intal*); nedocromil sodium (*Tilade*).

*Relievers* – salbutamol (*Ventolin*, *Airomir*, *Asmol*, *Epaq*); terbutaline (*Bricanyl*).

*Symptom controllers* – salmeterol (*Serevent*); eformoterol (*Foradile*, *Oxis*).

### Know your medications

Know what you need to know about medications prescribed for breathing control.

Your personalised *Asthma Action Plan* will document:

- Preventer, reliever & symptom controller medications;
- Your known asthma triggers; and
- What to do before physical exertion.

The plan details your self-management regimen for everyday control and when you experience airflow limitation. Make sure you can always put your hands on your Action Plan.

Any questions about your self-management regimen? If ‘Yes’, then talk your doctor or asthma educator. Your chemist is a further valuable resource for advice on asthma medications and how to take them.



## Delivery devices

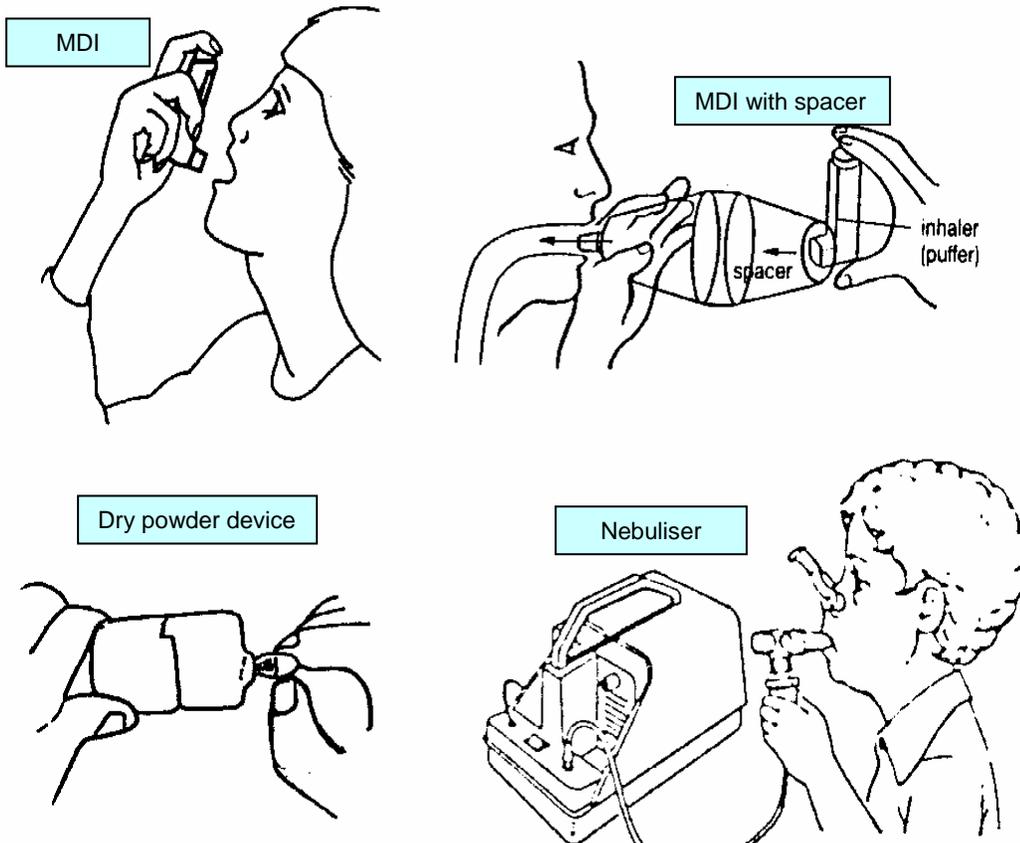
Most asthma medications are delivered directly to the airways using metered dose inhalers, or 'puffers'.

Medication acts more quickly. A lower dose is required. Side-effects are fewer.

### Delivery devices for asthma medication:

- Metered dose inhaler (MDI) or 'puffer' ;
- MDI plus spacer;
- Dry powder device; or
- Nebuliser.

### Delivery devices for breathing in a measured dose of asthma medication



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## Preventers

**P**reventive therapy is recommended for children and adults with persistent symptoms of airflow limitation.

Asthma preventer medications work by decreasing the amount of airway swelling due to inflammation. Preventer medications do not relieve wheeze or cough symptoms.

Preventer medication used regularly—every day—maintains best possible breathing capacity (lung function). Preventer medication minimises asthma symptoms. The beneficial effects of preventer medication on lung function are measured, at home, by way of ‘peak expiratory flow’ (PEF, [AsthmaActionPlan](#)).

The main classes of preventer medications are:

### Corticosteroids

Asthma ‘steroids’—corticosteroids—decrease airway inflammation and swelling. Corticosteroids are the main preventive therapy for asthma. Asthma steroids are *not* the same steroids that some people take for bodybuilding and competitive sports.

Asthma corticosteroids come in two forms — inhaled (breathed in) or oral (taken by mouth).

#### *Inhaled corticosteroids*

The majority of children and adults in need of regular preventive medication use inhaled corticosteroids.

Inhaled corticosteroids—taken daily—include beclomethasone dipropionate (*Qvar*, *Becloforte*, *Becotide*, *Respocort*); budesnoide (*Pulmicort*); and fluticasone propionate (*Flixotide*).

**Metered dose inhaler delivers a measured dose of inhaled corticosteroid medication.**



An inhaled corticosteroid works within hours; it may be several weeks, however, before full beneficial effects are achieved. Your doctor will determine a minimum maintenance dose once targets for symptom control and breathing capacity have been realised.

Side-effects from inhaled corticosteroids may include hoarseness, sore throat, thrush (small whitish spots in the mouth) and loss of taste.

Medication side-effects can be reduced or minimised by combining the metered dose inhaler with a spacing device (see [MedicationDeliveryDevices](#)). Meticulous oral hygiene is recommended after each dose — rinse mouth with water, gargle and spit.



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### Oral corticosteroids

Oral corticosteroid drugs are the most effective 'rescue' medication for severe (acute) asthma flares not responding to reliever medication—see [Asthma Medication Relievers](#)—and not responding to *inhaled* corticosteroids.

Rescue medication is administered by way of the patient's general circulatory system either by mouth or injection.

This class of medication includes prednisone and panafcortelone (*Panafcort*). These systemic corticosteroids work within minutes. They act to reduce airway mucus and swelling. They help increase the effect of bronchodilators (relievers). Full beneficial effects can take several weeks.

### Sodium cromoglycate

Sodium cromoglycate—*Intal*—is a non-steroidal anti-inflammatory medication.

Sodium cromoglycate has a variety of uses. First, it makes the airways less sensitive to triggers. Secondly, it inhibits physical activity induced asthma if used immediately before exertion.

Sodium cromoglycate usually starts to work within minutes; the beneficial effect lasts about 6–8 hours. It can take 2–4 weeks to get the full beneficial effect. Sodium cromoglycate is generally free of side-effects.

Normally taken by metered dose inhaler—with or without a spacer—sodium cromoglycate is also available as:

- A dry powder (*Spincaps* for use in a *Spinhaler* (see [Medication Delivery Devices](#)); and

- As a solution using a nebuliser (see [Nebuliser](#)). The nebuliser converts the solution into a medication spray or vapour for inhalation.

### Nedocromil sodium

Nedocromil sodium—*Tilade*—is a non-steroidal anti-inflammatory medication delivered by metered dose inhaler.

Nedocromil sodium medication is used for:

- Children older than 2 years who experience frequent asthma attacks; and
- Adults who get persistent mild-to-moderate asthma.

Nedocromil sodium will prevent exercise induced asthma symptoms

Adverse symptoms from nedocromil sodium medication are infrequent; symptoms include headache, nausea, minor throat irritation, and cough. Some patients complain of the taste.

### Leukotrienes

Leukotrienes—oral medications taken in tablet form—include montelukast sodium (*Singulair*).

These are preventive medications. Exactly how they work in asthma management is still being determined.

Leukotrienes treat asthma differently to other currently available medications. Being an oral medication is said to be an advantage.

Adverse symptoms and signs from leukotrienes can include abdominal pain (pain in the stomach or intestine), headache, bruising or bleeding.

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## Relievers

**R**eliever medications—bronchodilators—are mainstay drugs for the acute relief of asthma symptoms.

Reliever medications help open up the airways during a flare. They relax the muscles lining the bronchial tubes. The medication brings rapid onset symptom relief.

Reliever medications do not reduce the underlying inflammation that causes the symptoms of asthma.

There are four main types of reliever medications.

### Short acting beta<sub>2</sub> agonists

The most widely used short acting beta<sub>2</sub> agonists are salbutamol (*Ventolin, Airomir, Asmol, Epaq*) and terbutaline (*Brycanyl*). Beyond acute symptom relief, short acting beta<sub>2</sub> agonists are also used to prevent exertion-induced asthma.

The preferred deliver method is by metered dose inhaler (a spacer improves treatment effectiveness), breath-activated MDI (*Autohaler*) or dry powder inhaler (*Turbuhaler, Rotahaler*). Inhalers work faster to relieve asthma symptoms. The medication goes directly to the lungs to open up blocked airways.

Short acting beta<sub>2</sub> agonists act within minutes; symptom relief lasts for about 3–6 hours.

Side-effects, usually temporary, can include tremors, nervousness and increased heart rate.

Reliever medication taken by mouth is an option for the person unable to use an inhaler but is not encouraged. Usually there is a better alternative.

When the medication is taken by mouth, relief comes more slowly, 30–60 minutes. Relief lasts about 4–6 hours. Side-effects are more common and more marked.

### Long acting beta<sub>2</sub> agonists

Long acting beta<sub>2</sub> agonists include salmeterol (*Serevent*) and eformoterol (*Foradile, Oxis*).

These long acting medications are adjunct (subordinate) therapy to regular inhaled corticosteroids (preventers). Side-effects are similar to short acting beta<sub>2</sub> agonists but may include insomnia.

### Ipratropium bromide

Ipratropium bromide (*Apoven, Atrovent, Ipratrin, Ipratropium*) is another form of bronchodilator.

Ipratropium bromide medication takes effect more slowly than the beta-agonists. It is usually used as an adjunct treatment when asthma is severe.

Side-effects from ipratropium bromide include dryness of the mouth and an unpleasant taste.

### Theophylline

Theophyllines (*Austyn, Nuelin*)—supplied either as tablets or syrups—take more time to work than inhaled relievers. Theophylline medication may be given together with the inhalants to increase their effect.

Theophyllines are less commonly prescribed due to the frequency of side-effects. They have more side-effects than the other bronchodilators. Side-effects include upset stomach, dizziness, diarrhoea and irritability.



## Metered dose inhalers

**A**sthma medication works more effectively when inhaled from a metered dose inhaler, often referred to as an MDI or ‘puffer’. The most favourable small dosage of medication is delivered directly to the airways. Smaller doses mean fewer side-effects.

Your doctor, asthma educator and pharmacist are all available to explain and demonstrate correct MDI inhalation technique.

Make sure you are getting the proper inhaled dose and therefore the planned medication benefit. Get your MDI technique checked from time to time.

### Metered dose inhalers

A ‘puffer’ is a pressurised MDI delivering medication in an aerosol form.

An MDI typically contains very a fine powder—the asthma medication—a dispersal agent and a propellant system to create a measured dose for inhalation. MDIs deliver a defined number of doses. Medication transfer from MDI to the user’s airways requires coordination between dose actuation by the user and inhaling the aerosol mist. Drug release and inhalation must happen together — inhalation effort, not aerosol pressure, gets the medication to the lungs.

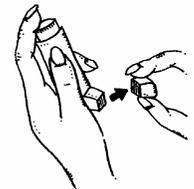
### Autohaler

The *Autohaler* is a breath-activated MDI. The *Autohaler* consistently delivers a measured dose independently of the patient’s rate of inhalation (breathing in). Medication, once activated, is released by inhalation through the device. The *Autohaler* benefits patients unable to coordinate MDI dose actuation and inhalation.

### Correct ‘puffer’ technique

- Remove dust cap from mouthpiece.
- Hold puffer upright. Shake well.
- Put mouthpiece between teeth. Do not bite. Close lips around mouthpiece.
- Breathe out slowly & gently, through the puffer, until your lungs are comfortably empty.
- Tilt your head back slightly with chin up.
- As you slowly start to breathe in, press the metal canister down & fire one puff.
- Continue to breathe in slowly & deeply for about 3–5 seconds.
- Remove puffer from mouth & hold your breath for about 10 seconds
- Breathe out gently.
- If you need further inhalation, wait for about a minute, then repeat the procedure.
- Replace dust cap after use.

Remove dustcap



Breathe out before inhalation



Slow, deep inhalation for 3–5 seconds



## Metered dose inhalers

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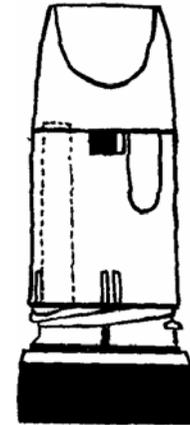
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### Dry powder inhalers

Some inhaled medications come in the form of dry powder delivered using 'breath-activated' MDIs. Dry powder inhalers are easier to use than aerosol puffers. Children or adults who have difficulty properly using a puffer are often given dry powder inhalers. The MDI, however, must still be used with correct technique.

#### *Turbuhaler*

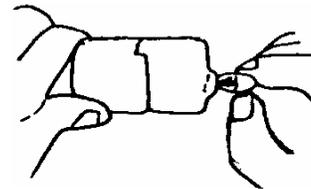
The *Turbuhaler* seems to be the most popular dry powder inhaler at the moment. The *Turbuhaler* delivers *Bricanyl* and *Pulmicort*; it contains 60 or 200 doses depending on the medication. The *Turbuhaler* is not usually suitable for children under 5–7 years of age.



Turbuhaler

#### *Rotahaler*

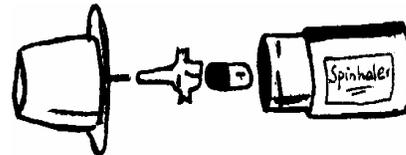
The *Rotahaler* delivers capsules—*Rotocaps*<sup>™</sup>—of *Ventolin* and *Becotide*. A capsule is loaded each time the *Rotahaler* is used.



Rotahaler

#### *Spinhaler*

The *Spinhaler* delivers *Intal*, a single dose at a time.



Spinhaler

#### *Accuhaler*

The *Accuhaler* delivers *Flixotide* and *Serevent*. The *Accuhaler* contains 60 doses of medication. A counter shows the number of doses remaining.

### Cleaning your inhaler

*MDI or puffer:* Remove, regularly, the metal canister from the plastic holder. Rinse the holder in warm water, dry well, and then replace the metal canister in the holder.

*Dry powder inhaler:* Make sure that the inhaler is clean and dry. Wet powder clumps; medication will not be delivered when breathing in.

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# Spacers

A spacer is a valved delivery device attached to a metered dose inhaler. Spacers are used for:

- Children of all ages;
- Patients with inadequate MDI coordination skills;
- Medication delivery during an acute asthma flare; and
- Patients on inhaled steroids (preventers)-.

Benefits from a spacer include:

- Delivering the aerosol dose more effectively;
- Making coordination easier;
- Lower dosage levels; and
- Fewer side-effects.

Your doctor will advise you on the most suitable spacing device for your purposes.

## Large volume Volumatic

The *Volumatic* for delivery of *Becloforte*, *Ventolin* and *Becotide* medication is widely used. *Intal* can also be delivered with a special adaptor. The *Volumatic* is suitable for children over four years of age.

## Nebuhaler

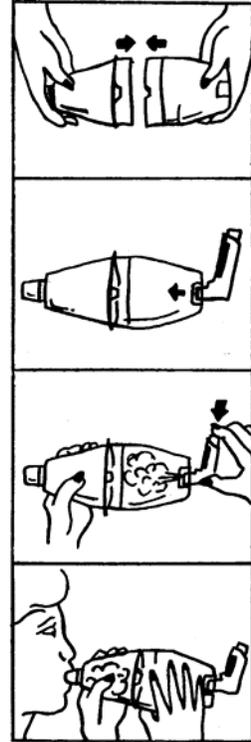
*Nebuhaler* is designed specifically for use with *Bricanyl* and *Pulmicort* puffers; an adaptor is available for *Intal*.

## Fisonair

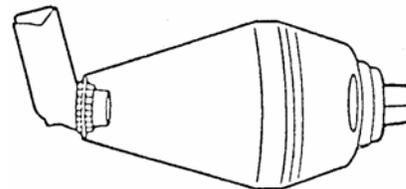
The *Fisonair* is mostly used with *Intal* but any aerosol puffer can be attached by way of a universal socket.

### Using the Volumatic spacer

- Join the two parts of the *Volumatic* together.
- Remove dust cap from puffer & shake.
- Insert puffer into side of the *Volumatic*.
- Pump one puff into the spacer.
- Place lips around spacer mouthpiece & breathe in slowly. You can either take in one deep breath or 2–3 small breaths.
- Hold breath for 10 seconds. Then breathe out slowly.
- Wait one minute. Then repeat as instructed by your doctor.



Nebuhaler



Fisonair



## Spacers

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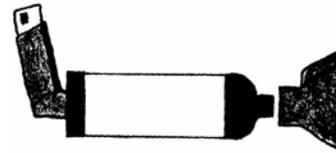
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### Small volume

Small volume spacers—commonly used by children under four years of age—come with several different-size masks. Examples include:

#### *Breath-a-tech*

The *Breath-a-tech* spacer—suitable for both children and adults—can be used with either a mouthpiece or face mask. *Breath-a-tech* has a universal socket to fit all types of puffers.



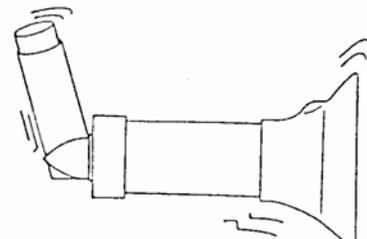
Breath-a-tech

#### *Aerochamber*

The *Aerochamber* spacer has three different masks available according to user characteristics:

- Infant or toddler;
- Older child; or
- Adult.

The *Aerochamber* has a universal socket for use with all puffers.



Aerochamber

### Cleaning your spacer

Always ensure that, when being used, your spacer is clean and dry.

Dilute kitchen detergent in warm water. Wash before using for the first time and then regularly every 1–2 weeks. Do not rinse after washing. Leave spacer to drain air dry — do not dry by wiping with a cloth.

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# Nebuliser

**A** nebuliser delivers asthma medication to people who have difficulty with dose-delivery technique for an MDI or puffer. Valved spacers, today, have largely taken over from nebulisers.

Nebulisers are usually used with the very young—under 2 years of age—or the very old. A nebuliser may also be used with sudden or severe asthma flares. Nebulisers can be hired or bought from most pharmacies.

**How it works**

The nebuliser is a device holding asthma medication in a single dose container called a nebule. A fine aerosol mist is inhaled into the lungs from the nebuliser using either a face mask or mouthpiece.

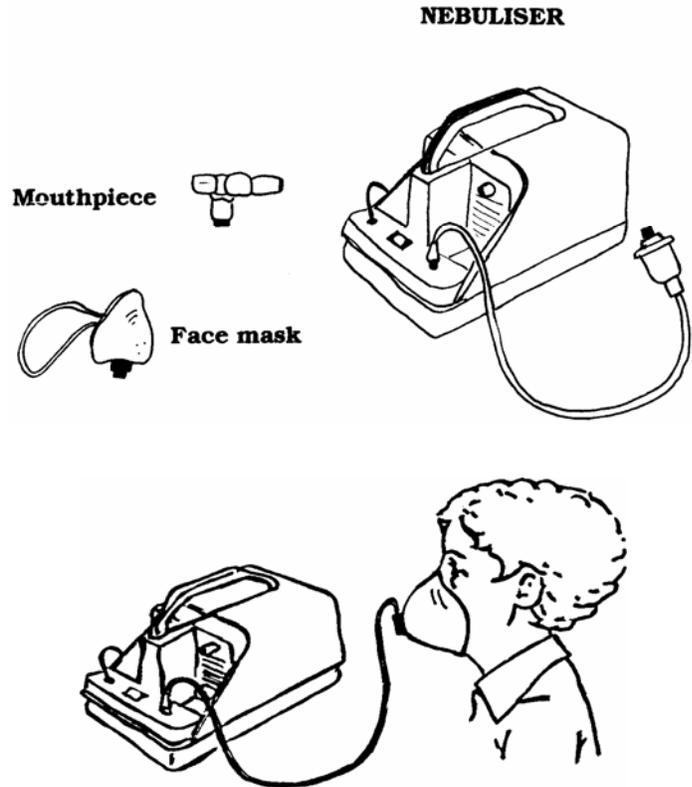
**Cleaning & maintenance**

Proper nebuliser cleaning and maintenance is essential for:

- Correct medication delivery, and
- Protection against airways' infection.

Nebuliser bowl, mouthpiece, mask and plastic tubing must all be kept clean:

- Rinse bowl, mask and tubing with water.
- Place bowl, mask and tubing in a sterilising solution for about an hour. Do not use antiseptics containing Phenol. Do not boil plastic parts.
- Rinse well with water to remove cleaning solution. Leave overnight to dry.



**Using a nebuliser**

- Attach tubing to nebuliser pump outlet.
- Unscrew bowl of nebuliser from lid. Break nebule open. Tip contents into bowl.
- Screw lid back on. Attach mouthpiece or face mask to tubing end.
- Put mouthpiece in mouth—or face mask on face—and switch nebuliser 'On'.
- Breathe in normally — it is not necessary to take deep breaths for a good medication effect.
- Leave nebuliser on until no more mist is coming from the mouthpiece or mask. To finish the solution usually takes about 10 minutes.
- Clean out any solution left in the bowl before next using the nebuliser.



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Nebuliser bowls are disposable; they should be replaced as indicated:

- Short-term bowls last about a week;
- Medium-term bowls last up to three months; and
- Long-term bowls can last up to one year.

### Points to remember

1. Check with your doctor or chemist that the nebuliser is being used correctly.
2. Always keep the nebuliser clean & properly maintained.
3. Contact your doctor, asthma educator or pharmacist if you have any questions on nebuliser use.

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*Self-management*

# Peak Expiratory Flow

**S**ystematic measurement of your breathing capacity is a feature of asthma self-management and control processes.

Home use of a *peak flow meter* for monitoring lung function away from the doctor’s office may be recommended.

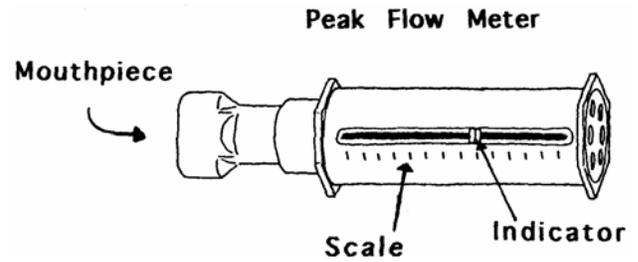
The peak flow meter, a simple medical device, measures how well you are breathing. Lung function measures taken over time, before and after medication, help you and your doctor assess how well your treatment regimen is working. You can use the peak flow meter, at any time, to determine breathing status.

**Peak flow measures**

The peak flow meter records how fast, after taking a deep breath, you can blow air out (exhale). The resulting measurement is called your ‘peak expiratory flow rate’ or PEF. Peak expiratory flow is usually recorded in ‘litres per minute’.

Identify, and document, your PEF ‘personal best’ — the best expiratory flow that you are able to achieve over a 2–3 week period when your asthma is under good control — you feel good and do not have any symptoms. You will record PEF when you have airway limitation. You will get to know your asthma through the pattern of PEF measures.

Your treatment plan will be based on your ‘personal best’ PEF readings. PEF measures tell you whether your asthma is controlled, getting worse, or improving. Variations from your best PEF indicate the presence and degree of airflow limitation for self-management purposes. You know, given the circumstances, what you should do.



**PEF readings depend first, on the meter and secondly, on how hard you blow.**

- For self-management decision making, use the same meter to give measures that you can compare.
- Holding the meter straight (horizontal), push the pointer back to zero. With the peak flow meter set to measure, keep fingers clear of the sliding scale.
- In a standing position, inhale deeply.
- Now close lips tightly around the mouthpiece. Keep your tongue away from the opening.
- Blow out as hard & fast as you can for 1–2 seconds. Identify your PEF reading. Repeat two times. Record the highest of the three readings.
- Take your puffer medication. Wait 10 minutes.
- Repeat the PEF measurements. Record the highest of the three readings.



**Guidelines on when**

Your doctor will advise on when to take PEF readings. Some guidelines are:

- *Daily* — if taking medications daily.
- *Within the day* — in the morning on arising from bed & in the evening before retiring to bed.
- *If taking medication* — just before your puffer dose and then 10 minutes after. If you are taking tablets or syrups instead of an aerosol inhalant, then wait 60–90 minutes before taking the second set of readings.

**Feedback for decision making**

PEF patterns make you and your doctor better informed for decisions on how to manage your asthma.

Follow your personalised *Asthma Action Plan* guidelines ([AsthmaActionPlan](#)) or contact your doctor, should your PEF pattern show a trend such as:

- Lower readings in the morning than at any other time of the day;
- A bigger than expected difference between morning & evening readings;
- Low readings followed by a big rise after puffer medication; or
- Readings gradually getting lower & lower.



**Peak expiratory flow**Self-help & self-care  
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# Peak flow diary

<i>PEF diary — best reading</i>															
For electronic version: Click in each form field, or Press Tab to move from field to field, to enter text—name and month— and PEF numbers.															
Record	Surname				Given names										
Instructions:	Measure morning & evening, before & after medication						Up to three readings to get the best result; record the highest result								
Month commencing:															
	Mon		Tue		Wed		Thu		Fri		Sat		Sun		
Time	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	
<b>Week 1</b>															
<i>before</i>															
<i>after</i>															
<b>Week 2</b>															
<i>before</i>															
<i>after</i>															
<b>Week 3</b>															
<i>before</i>															
<i>after</i>															
<b>Week 4</b>															
<i>before</i>															
<i>after</i>															
<b>Week 5</b>															
<i>before</i>															
<i>after</i>															

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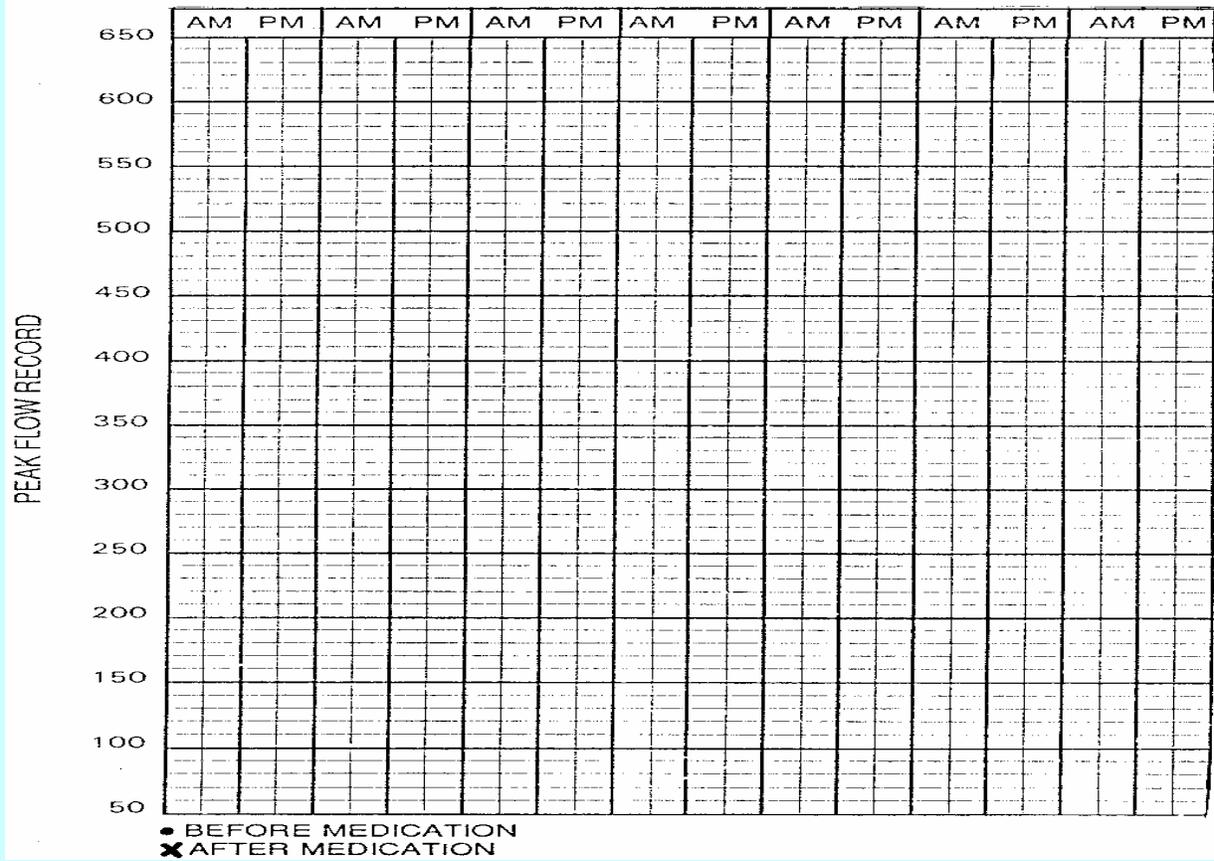
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**PEF patterns**



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## Asthma Action Plan

**D**ifficulty breathing during an acute asthma flare can be stressful, even distressing. But with a self-management *Asthma Action Plan*, when a flare occurs, you know exactly what to do.

Medicare makes provision for your GP/family physician to work with you on a personalised written *Asthma Action Plan*. Actions are structured according to the degree of breathing difficulty experienced during events of airflow limitation:

### Well controlled asthma

Criteria for *well controlled* asthma are:

- No regular wheeze, or cough or chest tightness at night-time, on waking, or during the day;
- Able to take part in normal physical activity without wheeze, cough or chest tightness;
- Need reliever medication less than three times a week (except when used before physical exertion);
- Peak flow above  (this benchmark PEF reading will be determined by your doctor).

### Getting worse

Action Plan criteria for airway limitation *getting worse* are:

- First signs of a cold;
- Waking from sleep due to coughing, wheezing or chest tightness;
- Using reliever medication more than three times a week (not including use before physical activity);
- Peak flow between  and  (doctor determined).

### Severe airway limitation

Action Plan criteria for *severe* airway limitation are:

- Need reliever puffer every three hours or more often;
- Increasing wheezing, coughing, chest tightness;
- Waking each night & most mornings with wheezing, coughing or chest tightness;
- Feeling that asthma is out of control;
- Peak flow between  and  (doctor determined).

### Serious to life-threatening attack

A *serious asthma attack* is indicated by:

- Symptoms quickly getting worse;
- Severe shortness of breath or difficulty speaking;
- Feeling frightened or panicky;
- Peak flow below  (determined by doctor).

Danger signs of *life-threatening* airway limitation are:

- Extreme difficulty breathing;
- Little or no improvement from reliever puffer;
- Lips turning blue.

Action under these circumstances—for self and/or significant involved other—requires dialling 000 for an ambulance and/or 112 from a mobile phone and, while waiting for the ambulance to arrive, following the *Asthma First Aid Plan* which forms part of the Action Plan.

Your GP/family physician will take you through each set of symptoms and signs and the appropriate responses. Your doctor or asthma educator will explain implementation of the Asthma First Aid Plan to you and any significant other such as a family member or carer.



## Asthma triggers

If you have read this far, then you either self-manage asthma or are caring for someone who gets asthma. Within a self-management regimen, checking for likely asthma triggers is an important preventive feature for achieving control.

Triggers, in medical techno-speak, are substances—typically in the environment—to which the body has an adverse reaction. The trigger may be either inhaled in the normal course of breathing or taken into the body by way of mouth (ingested). Triggers are classified into *allergens* and *irritants* according to how the body reacts.

### Allergens

When the body reacts in a way called an allergic response, the trigger is classified as an allergen. The allergic response can be asthma, conjunctivitis (inflammation of the skin under the eyelids), hayfever (sneezing, runny nose, itching and watering of eyes) or eczema (an itchy disease of the skin). As the self-assessment form for profiling asthma triggers shows asthma allergens come in many forms (see [SelfAssessmentforTriggers](#)).

*Inhaled* allergic triggers include house dust mites, cockroach particles, pet dander, pollens, moulds and yeast spores.

*Ingested* allergic triggers include certain foods—peanut allergies and seafood allergies are well known—certain food additives and certain medications such as aspirin and penicillin.

### Irritants

The body can also react to substances called *irritants*.

*Inhaled* irritant triggers include various forms of smoke, strong chemical odours and changes to the outdoor climate or indoor micro-climate.

*Systemic* irritants—the body reacting to irritants within the body—include medical problems such as cold and flu but also, unfortunately, physical activity (an essential habit for physical and mental wellbeing).

### Check for likely triggers

Those vulnerable to breathing difficulties have their own specific sensitivities. The degree of reaction to a given trigger varies widely between individuals.

Triggers can be obvious as, for example, allergy to shellfish, medication allergy or airflow limitation associated with physical activity or a thunderstorm.

But in many instances, diagnosing the specific trigger, or mix of triggers, can be challenging. Following an asthma flare, think through the pre-conditions and circumstances to the flare. The self-assessment form plus assistance from you doctor, asthma educator or local Asthma Foundation will help you identify triggers that might be relevant to you.

Feel you are on the track of some allergen or irritant? Then document what you think is happening so that you can discuss the circumstances with your GP/family physician or asthma educator. Only when the trigger has been properly established can expert resources such as your doctor, asthma educator or local Asthma Foundation assist with an effective approach to reducing risk exposure.



## Asthma triggers

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### House dust mites

House dust and house dust mites, in Australia, are major asthma allergens.

Who among us doesn't live with house dust and the mites that house dust nourishes? It's all a matter of degree.

House dust is a mixture of:

- Dirt from outside;
- Materials from furniture & carpets;
- Particles of skin & hair from human occupants & accompanying companion animals, and
- Particles from house dust mites.

The house dust mite is a microscopic insect that feeds on house dust.

House dust mites live in our carpets, soft furniture and fittings, bedding, clothing and soft toys.

When dust containing particles of mite faeces (excretions) or dead mites is inhaled, symptoms and signs of allergy can result. Those who are sensitive react on going into a dusty room or on wearing clothes that have been hanging up or put away for a long time.

Containment or reduction of exposure to house dust mite allergens, while important for some, comes at a cost. The management approaches listed below, in aggregate, are time consuming and can be expensive:

- Regularly clean or shampoo carpets, bedding, blankets & upholstered furniture;
- Dry clean or wash clothing—before wearing—that has not been worn for a long time;

- Select bedding, especially doonas or blankets, that can be washed or dry cleaned;
- Using mite-proof mattress & pillow covers;
- Remove carpets & loose fittings, where practical, especially in bedrooms;
- Regularly wash clothes, sheets, & bed covers in hot water (over 55°C); and
- Deep freeze cuddly toys — about 12 hours a week is recommended.

### Trigger self-assessment

Identify the trigger factor, preconditions and circumstances, and, one way or another, your doctor, asthma educator and local Asthma Foundation can help you work out a solution for reducing asthma risk.

The self-assessment form on pp. 24–26 following will help you think through possible trigger factors for you.

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**Self-assessment forms for profiling asthma triggers — check your *pattern of triggers* for breathing difficulties or airflow limitation. Trigger not obvious? Then think through the pre-conditions & circumstances to your breathing difficulties.**

### Allergic responses

#### Inhaled allergens

- |     |   |                          |
|-----|---|--------------------------|
| 1.1 | <i>House dust mites</i>   | <input type="checkbox"/> |
| 1.2 | <i>Cockroach particles</i> — dried droppings & remains  | <input type="checkbox"/> |
| 1.3 | <i>Pet dander</i> — skin flakes, hair or feathers from warm- blooded animals such as a cat, a dog or a bird | <input type="checkbox"/> |
| 1.4 | <i>Pollens</i> — from trees, weeds, grasses & flowers   | <input type="checkbox"/> |
| 1.5 | <i>Moulds, yeast spores</i> — indoor, outdoor   | <input type="checkbox"/> |

### Irritants — non-allergic

#### Inhaled irritants

- |         |   |                          |
|---------|---|--------------------------|
| 2.1     | <i>Smoke:</i>   | <input type="checkbox"/> |
| 2.1.1   | tobacco   | <input type="checkbox"/> |
| 2.2.1.2 | wood  | <input type="checkbox"/> |
| 2.2.1.3 | coal  | <input type="checkbox"/> |
| 2.2     | <i>Strong odours:</i>   | <input type="checkbox"/> |
| 2.2.1   | school or workplace chemicals                                     | <input type="checkbox"/> |
| 2.2.2.2 | cleaning products   | <input type="checkbox"/> |
| 2.2.2.3 | gas, wood, coal or kerosene used for heating or cooking           | <input type="checkbox"/> |
| 2.2.2.3 | <i>Other — specify</i>  | <input type="checkbox"/> |
|         | <b>Climate—indoor, outdoor (weather) <input type="checkbox"/></b> |                          |
| 3.1     | <i>Indoor</i>   | <input type="checkbox"/> |
| 3.1.1   | heating   | <input type="checkbox"/> |
| 3.1.2   | cooling   | <input type="checkbox"/> |
| 3.2     | <i>Outdoor</i>  | <input type="checkbox"/> |
| 3.2.1   | cold  | <input type="checkbox"/> |
| 3.2.2   | hot   | <input type="checkbox"/> |
| 3.2.3   | dusty   | <input type="checkbox"/> |
| 3.2.4   | humid   | <input type="checkbox"/> |
| 3.2.5   | air pollution, smog   | <input type="checkbox"/> |
| 3.2.6   | sudden changes in temperature                                     | <input type="checkbox"/> |
| 3.2.7   | thunderstorm.   | <input type="checkbox"/> |

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### Allergic responses & irritants — non-allergic

#### Food chemical intolerance & food allergy

- 4.1 *Food chemical intolerance*
- 4.1.1 sulphites
- sulphur dioxide
- sodium metabisulphites
- 4.1.2 food colours — tartrazine
- 4.1.3 monosodium glutamate — MSG
- 4.1.4 salicylates
- 4.1.5 other — specify
- 4.2 *Food allergy*
- 4.2.1 peanuts
- 4.2.2 shellfish
- 4.2.3 eggs
- 4.2.4 wheat
- 4.2.5 soy
- 4.2.6 dairy foods
- 4.2.7 health tonic — royal jelly
- 4.2.8 other — specify
- 4.3 *Beverages*
- 4.3.1 wine
- 4.3.2 beer
- 4.3.3 other — specify
- 4.4 *Other* — specify.

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### Allergic responses

### Irritants — non-allergic

#### Medications & medical problems

- 5.1 *Certain medications*
- 5.1.1 aspirin
- 5.1.2 other non-steroidal anti-inflammatory drugs like ibuprofen
- 5.1.3 penicillin
- 5.1.4 beta blockers
- 5.1.5 beta blocker eye drops for glaucoma
- 5.1.6 ace inhibitors
- 5.1.7 other — specify
- 5.2 *Medication interactions*

- 5.4 *Viral respiratory infections* — cold, flu
- 5.5 *Sinus infection*
- 5.6 *Heartburn* — gastroesophageal reflux

#### Physical activity, sports & play

- 6.1 *Physical activity & exercise:*
- 6.1.1 during
- 6.1.2 after

#### Infant

- 7.1 *Symptoms*
- vomits then coughs
- 7.1.2 wheezy cough at night
- 7.1.3 symptoms worse after feeding

#### Allergens & irritants in farming communities

- 8.1 *Mix of trigger factors*

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