The Leeds Inhaler Device Guide:
Inhaler Technique Instructions for Healthcare Professionals and Patients

1st Edition
May 2018

Authors:  Dr Toby Capstick, Lead Respiratory Pharmacist
          Kelly Atack, Specialist Clinical Pharmacist

Reviewers:
Contents

How to Use the Leeds Inhaler Device Guide 3
Types of Inhaler Device 3
Use of placebo inhalers 4
Use of In-Check DIAL Inspiratory Flow Meters 4
Other Tools Available to Assess Inspiratory Flow 4
Recommendations for Performing Inhaler Technique Assessments 4
Inhaler Device Monographs:
- Accuhaler 5
- Aeroliser 6
- Autohaler 7
- Breezhaler 8
- Diskhaler 9
- Easi-Breathe 10
- Easyhaler 11
- Ellipta 12
- Forspiro 13
- Genuair 14
- HandiHaler 15
- K-haler 16
- NEXThaler 17
- Novolizer 18
- pMDI (Pressurised Metered Dose Inhaler) 19
- pMDI + Spacer (Multiple Breath Method) 20
- pMDI + Spacer (Single Breath Method) 21
- Podhaler 22
- Respimat 23
- Spiromax 24
- Turbohaler 25
- Tubospin 26
- Twishtaler 27
- Zonda 28
Monograph References 29
Aerosol science & inhaled medication 30

Glossary of Drug Classes

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SABA</td>
<td>Short-Acting Beta2-Agonist</td>
</tr>
<tr>
<td>SAMA</td>
<td>Short-Acting Muscarinic Antagonist</td>
</tr>
<tr>
<td>LABA</td>
<td>Long-Acting Beta2-Agonist</td>
</tr>
<tr>
<td>LAMA</td>
<td>Long-Acting Muscarinic Antagonist</td>
</tr>
<tr>
<td>ICS</td>
<td>Inhaled Corticosteroid</td>
</tr>
</tbody>
</table>

The following brand names and registered trademarks mentioned throughout this guide are acknowledged:

Inhaler Devices:

Brand names:

Photo credits:
Acknowledgement for the use of promotional product images is specified in each monograph. Where no promotional product images were available, photos of placebo inhalers are used.
Components of Inhaler Device Monographs

Types of Inhaler Device

- **Pressurised metered-dose inhalers**
  - pMDIs are widely prescribed as they are cheap and can deliver a wide variety of medications. Despite their wide prescription many patients cannot use pMDIs correctly, even with education and training. One study reported that only 79% of patients could use a pMDI correctly after expert training. Many of the difficulties with pMDIs are related to the need to coordinate activation of the device while inhaling slowly and deeply, and approximately 60 and 92% of patients with COPD and asthma, respectively, inhaling too fast from a pMDI. The optimal inspiratory flow rate through a pMDI is 25-60 L/min, equivalent to taking a full deep inspiration over 3-5 seconds. When patients are taught to use pMDI devices, they should be advised to inhale slowly and steadily through the inhaler.

- **Breath-actuated metered-dose inhalers**
  - BA-MDIs, such as Autohaler and Easi-Breathe devices, are a development from the original pMDIs. They contain a flow trigger, and the drug is released only when the patient inhales through the inhaler device. This promises to reduce aerosol deposition within the lungs of patients who have difficulty coordinating inhalation and actuation of pMDIs. When patients are taught to use BA-MDIs, they should be advised to inhale slowly and steadily through the inhaler.

- **Soft mist inhalers**
  - The only current device on the European market is the Respimat. This does not require a propellant or the patient’s inspiratory flow to generate an aerosol. The aerosol is generated by a spring that forces the liquid drug formulation through an extremely fine nozzle system, resulting in an aerosol containing a high fine particle fraction. When patients are taught to use a Respimat, they should be advised to inhale slowly and steadily through the inhaler.

- **Dry powder inhalers**
  - There are a number of DPIs currently available on the market. Some of these devices are single dose, such as the HandiHaler, Breezhaler or Aerolizer, which require loading of a capsule containing the drug in powder form. Others are multiple dose, such as Turbohaler, Accuhaler, Genuair, Ellipta or NEXThaler. One of the main advantages that DPIs have over pMDIs are that the generation of the drug aerosol is driven by the patient’s inhalation. As a consequence there is no need for an aerosol propellant, or for coordination between actuation of the device and inhalation. DPIs are designed so that force of inhalation creates turbulence within the device, which deaggregates (breaks down) the powder into fine particles that are small enough to be deposited in the lungs. This turbulence is created by the inspiratory flow generated by the patient through the inhaler device and the internal resistance of the inhaler device itself. This means that low-resistance inhaler DPI devices (such as the Breezhaler) require much faster inspiratory flows than through high-resistance DPI devices (such as the Easyhaler or HandiHaler). If a person cannot generate sufficient inspiratory flow then the drug may not be delivered optimally, as insufficient deaggregation of the dry powder will occur, and large drug particles will be inhaled, which will deposit mainly in the mouth and oropharynx rather than in the lungs. When patients are taught to use any DPI device, they should be advised to inhale as quickly and deeply as possible through the inhaler.

How to Use the Leeds Inhaler Device Guide

Prior to prescribing any new inhaler, each patient should receive training and education in the use of the inhaler device and have demonstrated satisfactory inhaler technique. Additionally, correct inhaler technique should be assessed regularly at each clinic visit, and following an exacerbation. However, it is important to remember that the critical steps required to use each device correctly.

The Leeds Inhaler Device Guide does not aim to make any recommendation about which inhaler device should be prescribed for any patient. The choice of device to prescribe will depend on a number of factors, including indication, local formularies, how easy the inhaler device is for any individual to use, patient preference, and cost. However, it is important to remember that the best inhaler device is the one that the individual patient can use.

Components of Inhaler Device Monographs

This section provides background information on the type of inhaler device in each monograph, whether it is a pressurised metered dose inhaler (pMDI), a breath-actuated pMDI, Soft Mist Inhaler, or a dry powder inhaler.

If patients require more than one inhaler device to manage their respiratory disease, a list of drugs available in each device is provided, divided by class of drug. This may aid prescribing decisions, to ensure consistency of prescribing patterns.

As many inhaler devices may have relatively short in-use life span, this information is provided in the ‘Expiry’ section.

The Instructions for Use section of the monograph provides detailed guidance on exactly how to use each inhaler device.

To provide a consistent approach to using inhaler devices, this has been standardised into 7 steps.

The important critical steps that are required to obtain the most benefit from each inhaler device are highlighted in bold text.

The Key Features section outlines different aspects of inhaler devices that may help healthcare professionals and patients understand how easy or hard different devices are to use.

A subjective assessment has been made of the complexity of the inhaler device and the level of Dexterity that patients may need to have to operate it effectively.

Devices described as requiring a high level of dexterity may not be suitable for people with physical impairment.

Description of the Feedback mechanisms of each inhaler device illustrates ways in which patients may know that they have used their inhaler correctly, or know whether it is empty. Some devices have a Lock-Out mechanism that prevents anyone operating an empty inhaler device, making it clear when a new inhaler is required.

The Dose consistency describes the variation in the dose received by the patient, as this often depends on how hard or fast they inhale through the device.

The Device Resistance describes how hard it feels when inhaling through this inhaler device. Further explanation of this is given later. This information will be useful to adjust settings of In-Check DIAL inspiratory flow meter (available quarter 2 2016) to measure whether patients can inhale through different inhaler devices at the correct speed of inhalation. This required speed of inhalation to receive a clinically effective dose is described in the Inspiratory Flow section.

This section describes the essential ‘need to know’ details to explain the critical steps required to use each device correctly.

This section is provided in the ‘Expiry’ section.

The use of extra-fine particle pMDIs (e.g. Qvar, Fostair) has been shown to demonstrate equivalent efficacy to other pMDIs but with a reduced equivalent dose of corticosteroid. These have been reported to be less dependent upon good inhaler technique than other pMDIs due to longer duration of aerosol emission and lung deposition being affected less by inspiratory flow and coordination. A spacer is a device that is attached to a pMDI, and produces a reservoir into which the drug aerosol can be generated. This allows the patient to actuate the pMDI without having to coordinate inhalation. There is evidence that the addition of a spacer can increase deposition within the lung of the patient.

Pressurised metered-dose inhalers

Pressurised metered-dose inhalers (pMDIs) are widely prescribed as they are cheap and can deliver a wide variety of medications. Despite their wide prescription many patients cannot use pMDIs correctly, even with education and training. One study reported that only 79% of patients could use a pMDI correctly after expert training. Many of the difficulties with pMDIs are related to the need to coordinate activation of the device while inhaling slowly and deeply, and approximately 60 and 92% of patients with COPD and asthma, respectively, inhaling too fast from a pMDI. The optimal inspiratory flow rate through a pMDI is 25-60 L/min, equivalent to taking a full deep inspiration over 3-5 seconds. When patients are taught to use pMDI devices, they should be advised to inhale slowly and steadily through the inhaler.

The use of extra-fine particle pMDIs (e.g. Qvar, Fostair) has been shown to demonstrate equivalent efficacy to other pMDIs but with a reduced equivalent dose of corticosteroid. These have been reported to be less dependent upon good inhaler technique than other pMDIs due to longer duration of aerosol emission and lung deposition being affected less by inspiratory flow and coordination. A spacer is a device that is attached to a pMDI, and produces a reservoir into which the drug aerosol can be generated. This allows the patient to actuate the pMDI without having to coordinate inhalation. There is evidence that the addition of a spacer can increase deposition within the lung of the patient.

Breath-actuated metered-dose inhalers

Breath-actuated metered-dose inhalers (BA-MDIs), such as Autohaler and Easi-Breathe devices, are a development from the original pMDIs. They contain a flow trigger, and the drug is released only when the patient inhales through the inhaler device. This promises to reduce aerosol deposition within the lungs of patients who have difficulty coordinating inhalation and actuation of pMDIs. When patients are taught to use BA-MDIs, they should be advised to inhale slowly and steadily through the inhaler.

Soft mist inhalers

Soft mist inhalers are the only current device on the European market is the Respimat. This does not require a propellant or the patient’s inspiratory flow to generate an aerosol. The aerosol is generated by a spring that forces the liquid drug formulation through an extremely fine nozzle system, resulting in an aerosol containing a high fine particle fraction. The Respimat has a long aerosol generation time and a low aerosol velocity. These features reduce problems with coordination of actuation and inhalation, and result in a higher lung and lower oropharyngeal deposition. When patients are taught to use a Respimat, they should be advised to inhale slowly and steadily through the inhaler.

Dry powder inhalers

Dry powder inhalers (DPIs) are single dose, such as the HandiHaler, Breezhaler or Aerolizer, which require loading of a capsule containing the drug in powder form. Others are multiple dose, such as Turbohaler, Accuhaler, Genuair, Ellipta or NEXThaler. One of the main advantages that DPIs have over pMDIs are that the generation of the drug aerosol is driven by the patient’s inhalation. As a consequence there is no need for an aerosol propellant, or for coordination between actuation of the device and inhalation. DPIs are designed so that force of inhalation creates turbulence within the device, which deaggregates (breaks down) the powder into fine particles that are small enough to be deposited in the lungs. This turbulence is created by the inspiratory flow generated by the patient through the inhaler device and the internal resistance of the inhaler device itself. This means that low-resistance inhaler DPI devices (such as the Breezhaler) require much faster inspiratory flows than through high-resistance DPI devices (such as the Easyhaler or HandiHaler). If a person cannot generate sufficient inspiratory flow then the drug may not be delivered optimally, as insufficient deaggregation of the dry powder will occur, and large drug particles will be inhaled, which will deposit mainly in the mouth and oropharynx rather than in the lungs. When patients are taught to use any DPI device, they should be advised to inhale as quickly and deeply as possible through the inhaler.

Types of Inhaler Device

There is a wide variety of different inhalers currently on the market, and can be broadly classified into pressurised metered dose (pMDI), dry powder (DPI), breath-actuated MDI (BA-MDI) and soft mist.
Use of placebo inhalers

For infection control reasons, placebo inhaler devices should be for ‘single patient use’ only.

Placebo inhaler devices are obtained free-of-charge from manufacturers via their drug reps, or by directly contacting the manufacturer. Ordering information for placebo devices has been collated by the London Medicines Evaluation Network, and is available at: [http://www.medicinesresources.nhs.uk/upload/Availability%20of%20placebo%20inhalers%20FINAL_June13_LMEN.pdf](http://www.medicinesresources.nhs.uk/upload/Availability%20of%20placebo%20inhalers%20FINAL_June13_LMEN.pdf)

As it is often difficult to obtain enough placebo inhalers to assess inhaler technique prior to prescribing every new inhaler device, their use is often rationed to use with patients where there is deemed to be a greatest need to teach inhaler technique prior to prescribing inhalers. Decisions about whether or not to use placebo inhalers may be assisted through the use of an In-Check DIAL inspiratory flow meter, which provides an objective measure of a person’s ability to inhale correctly through different devices.

- Placebo devices might be used for patients where it is less certain that they would be able to use an inhaler device. These patients must receive training and assessment prior to being given a prescription.
- If patients are judged to be more likely to be able to use an inhaler device, a prescription may be written before inhaler technique training and assessment, which would be performed using their new inhaler devices.

Use of In-Check DIAL Inspiratory Flow Meters

This is a useful device to aid inhaler technique assessment. It mimics the internal resistance of a range of inhaler devices allowing the measurement of inspiratory flow rate and ensuring the patient can inhale through devices at clinically effective inspiratory flow rates.\(^ {21,22}\)

The current In-Check DIAL G16 (Clement Clarke Ltd, Harlow, UK) is validated to measure inspiratory flow for all inhaler devices, classified by the intrinsic airflow resistance of each device. The Leeds Inhaler Device Guide documents the airflow resistance of each inhaler device currently available in the UK, and we recommend the use of these new In-Check DIAL inspiratory flow meters for routine inhaler technique assessment, once they are available in the UK.

The In-Check DIAL G16 and disposable one-way mouthpieces can be ordered directly from Clement Clarke (www.clement-clarke.com), or from wholesalers such as AAH.
- In-Check DIAL G16 (Product code : 3109300). RRP £22.44

Other Tools Available to Assess Inspiratory Flow

- **Inhaler device whistles**

  - [Accuhaler](https://www.accuhaler.com) [GlaxoSmithKline]
  - [Ellipta](https://www.ellipta.com) [GlaxoSmithKline]
  - [Turbohaler](https://www.turbohaler.com) [AstraZeneca]

  Inhaler device whistles are used to assess and ensure patients are able to inhale at, or above, the optimal inspiratory flow necessary to be able to use the device correctly. These are available from the manufacturer.

- **Flo-tone Trainer [Clement Clarke]**

  The Flo-Tone trainer is whistle device that attaches to the mouthpiece of a pMDI inhaler device, which is used to teach patients how fast to inhale through pMDI devices. During inhalation, the Flo-Tone will ‘whistle’, providing an audible signal that the user is inhaling through the pMDI at the correct inspiratory flow and should actuate the inhaler.

Recommendations for Performing Inhaler Technique Assessments

**Stepwise Prescribing of Inhaled Medication**

1. Confirm the diagnosis
2. Determine the severity of respiratory disease
3. Decide on the class of drug required
4. Teach and assess inhaler technique in order to Objectively assess which device the patient can use
   - Is the patient happy with that device?
5. Select the drug that is available in that device

**Tips for Practical Inhaler Device Selection**

1. Inhaler technique should be assessed prior to prescribing inhalers in patients who have never used inhaled medication before.
2. The In-Check DIAL inspiratory flow meter should be used to determine which device(s) the patient is physically able to inhale through.
3. Assess whether your patient is likely to be able to use the device they can achieve the optimal inspiratory flow through. (Take into account age, dexterity, level of understanding, confusion status etc.)
   - If likely to be competent, prescribe required drug and train and assess inhaler technique using new inhaler devices.
   - If competency is doubtful or uncertain, train and assess inhaler technique using placebo device.

**Inhaler Technique Assessments**

**Step 1 - Check inspiratory flow**

The In-Check DIAL inspiratory flow meter should be used. Depending on the patient and the drug classes required (e.g. SABA, LAMA, LABA, LAMA/LABA, ICS/LABA etc.), check the patient’s inspiratory flow through a range of different devices. It is useful to check inspiratory flow two or three times through each device to ensure that the patient achieves the same inspiratory flows consistently.

**Step 2 - Teach correct inhaler technique**

Where possible, education on correct inhaler technique requires the healthcare professional to demonstrate correct inhaler technique to the patient. It will be useful to keep your own set of placebos for you to use.

- Data from a small study in asthmatic patients identified that the most successful method of teaching correct inhaler technique is to demonstrate correct inhaler technique using placebo inhalers so that the patient can copy the demonstrator, and to explain each step with emphasis on the critical steps (those that if the patient fails to perform they receive no dose e.g. failing to remove the cap on a pMDI).\(^ {23}\)

**Step 3 - Check inhaler technique and check understanding**

Once the patient has been taught and shown how to use their inhaler, they should be asked to demonstrate how they would use it. This allows the healthcare professional to check they understand how to use their inhaler device, and to reinforce any steps they are unable to perform correctly.

**Step 4 - Educate patient on rationale for using inhaled medication**

Adherence to prescribed inhaled medication may be improved if the rationale for using each medicine is explained to the patient. This should also include when and how to use their inhaler devices.
**ACCUHALER**

**Type of inhaler:** Single dose DPI - doses contained in separate blisters in a foil strip

**In use expiry:** No restrictions

**Available as**

- **SABA** Ventolin (salbutamol)
- **SAMA**
- **LABA** Serevent (salmeterol)
- **LAMA**
- **LAMA/LABA**
- **ICS** Flixotide (fluticasone)
- **ICS/LABA** Seretide (fluticasone/salmeterol)

---

**Instructions for Use**

1. **Preparation**
   Check dose counter before use, and then open inhaler.

2. **Priming**
   Hold inhaler horizontally, or with mouthpiece uppermost. **Push lever back completely**

3. **Exhaling**
   Exhale fully and away from mouthpiece

4. **Mouth**
   Place mouthpiece between teeth and lips

5. **Inhalation**
   Inhale strongly and deeply.

6. **Breath holding**
   Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Close cover after use.

---

**Key Features**

- **Dexterity**
  Low-Moderate dexterity required

- **Feedback: Dose Counter**
  Has a dose counter. Counts individual doses. Last 5 numbers highlighted in red text

- **Feedback: Taste/Feel**
  Taste of powder (contains lactose)

- **Feedback: Sound**
  n/a

- **Feedback: Visual**
  n/a

- **Device Lock-Out**
  No lock-out - lever can continue to be pushed back when device is empty

- **Dose Consistency**
  Relatively consistent dosing across range of inspiratory flow rates (30-90 L/min)

- **Device Resistance**
  Medium-low airflow resistance

- **Inspiratory Flow**
  Test with In Check DIAL G16 inspiratory flow meter. Inspiratory flow - test with Accuhaler whistle

---

**What you need to know / Critical Steps**

- **Priming**
  Ensure lever is pushed back completely. Do not close device before inhalation

- **Multi-Dosing**
  Risk of multi-dosing from multiple actuations

- **Dose Wasting**
  Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.

- **Vents**
  n/a

- **Inspiratory Method**
  Quick and deep

- **Other information**
  Inhaler may sound/feel gritty if incomplete inhalation of dose

- **Cleaning**
  Wipe the mouthpiece with a dry tissue

---

Photo. ©GlaxoSmithKline
AEROLISER

Type of inhaler: Single dose DPI - doses contained in separate capsules

In use expiry: No restrictions

Available as

- SABA
- SAMA
- LABA - Foradil (formoterol)
- LAMA
- LAMA/LABA
- ICS
- ICS/LABA

Instructions for Use

1. Preparation
   Remove the cap and rotate the mouthpiece of the inhaler towards the arrow on the bottom of the inhaler to open.

2. Priming
   Remove one capsule from the blister and place into the chamber in the middle of the inhaler. Twist the mouthpiece in the opposite direction to close, until you hear a click. Press the side buttons inward to pierce the capsule and release.

3. Exhaling
   Exhale fully and away from the mouthpiece.

4. Mouth
   Place mouthpiece between teeth and lips

5. Inhalation
   Inhale strongly and deeply - you should hear a whirring noise

6. Breath holding
   Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Remove the capsule and replace cap.

Key Features

<table>
<thead>
<tr>
<th>Dexterity</th>
<th>High dexterity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Dose Counter</td>
<td>No dose counter. Placement of capsule for each dose.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Whirring sound during inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Transparent capsule should be empty</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Relatively consistent dosing across range of inspiratory flow rates</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

What you need to know / Critical Steps

- **Priming**: Capsule must be placed into the chamber and pierced. Do not place capsule in the chimney of the mouthpiece.
- **Multi-Dosing**: Single dose – use one capsule at a time.
- **Dose Wasting**: Exhaling into device will lose the dose. Full dose not received if inhalation not repeated and capsule not emptied.
- **Vents**: n/a
- **Inspiratory Method**: Strong and deep
- **Other information**: Occasionally small fragments of the capsule may be inhaled (usually if the capsule is pierced more than once). This is not harmful. Capsules can get stuck in the inhaler and no ‘whirring’ noise will be heard during inhalation. If this occurs tap the base of inhaler on a hard surface to release the capsule.
- **Cleaning**: Wipe the mouthpiece and capsule compartment with a dry cloth or a soft clean brush.
## AUTOHALER

**Type of inhaler:** Breath-actuated MDI  
**In use expiry:** No restrictions  

### Available as
- SABA: Airomir (salbutamol)  
- SAMA  
- LABA  
- LAMA  
- LAMA/LABA  
- ICS: Qvar (beclometasone)  
- ICS/LABA

### Instructions for Use

**To prime the inhaler (first use, or if not used for 2 weeks)**

1. Remove the cap.  
2. Hold the inhaler upright, lift the lever to the vertical position.  
3. Release a puff of medicine by pushing the plastic slide underneath the inhaler in the same direction as the arrow.  
4. Lower the lever, then repeat steps 2-6 for a second time

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Remove the cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Priming</td>
<td>Shake the inhaler. Keeping the inhaler upright, without blocking any airholes, <strong>lift the lever to the vertical position.</strong></td>
</tr>
<tr>
<td>3. Exhaling</td>
<td>Exhale fully and away from the mouthpiece.</td>
</tr>
<tr>
<td>4. Mouth</td>
<td>Place mouthpiece between teeth and lips</td>
</tr>
<tr>
<td>5. Inhalation</td>
<td>Inhale slowly and deeply - do not stop when device ‘clicks’</td>
</tr>
<tr>
<td>6. Breath holding</td>
<td>Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.</td>
</tr>
<tr>
<td>7. Closing &amp; Repeating</td>
<td>Lower the lever to the horizontal position. Wait a few seconds before repeating steps 2-6 to ensure you inhaled the full dose.</td>
</tr>
</tbody>
</table>

### Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Low dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>No dose counter</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of aerosol. Both Autohalers contain small amounts of ethanol (maybe unpleasant taste for children)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Click on inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Lever should be in upright position before inhalation and lowered down after each puff.</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>No lock-out - lever can continue to be pushed up when device is empty</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent metered dose across a range of inspiratory flow rates (30-60 L/min); significantly reduced at fast inspiratory flow rates (&gt;60L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

### What you need to know / Critical Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Must be primed in the vertical position. Ensure the lever is pushed upright.</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Sliding the dose release slide at the bottom of the inhaler will waste doses.</td>
</tr>
<tr>
<td>Vents</td>
<td>Air vents at the bottom of the device</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Slow and steady</td>
</tr>
<tr>
<td>Other information</td>
<td>Lever must be pushed into upright position before each dose.</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Clean the mouthpiece weekly with a dry tissue or cloth</td>
</tr>
</tbody>
</table>
**BREEZHALER**

<table>
<thead>
<tr>
<th>Type of inhaler:</th>
<th>Single dose DPI - doses contained in separate capsules</th>
</tr>
</thead>
<tbody>
<tr>
<td>In use expiry:</td>
<td>30 days after first use</td>
</tr>
</tbody>
</table>

**Available as**

- **SABA**
- **SAMA**
- **LABA**
  - Onbrez (indacaterol)
- **LAMA**
  - Seebri (glycopyrronium)
- **LAMA/LABA**
  - Ultibro (glycopyrronium/indacaterol)
- **ICS**
- **ICS/LABA**

---

**Instructions for Use**

1. **Preparation**
   - Remove the cap and tilt the mouthpiece to open the inhaler.

2. **Priming**
   - Remove one capsule from the blister and place into the chamber in the middle of the inhaler. Close the mouthpiece and press down until you hear a click. Press the side buttons inward to pierce the capsule and release.

3. **Exhaling**
   - Exhale fully and away from the mouthpiece.

4. **Mouth**
   - Place mouthpiece between teeth and lips

5. **Inhalation**
   - Inhale strongly and deeply - you should hear a whirring noise

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Remove the capsule and replace cap.

---

**Key Features**

<table>
<thead>
<tr>
<th>Dexterity</th>
<th>High dexterity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Dose Counter</td>
<td>No dose counter. Placement of capsule for each dose.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Whirring sound during inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Transparent capsule should be empty</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Relatively consistent dosing across range of inspiratory flow rates (50-100 L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

---

**What you need to know / Critical Steps**

- **Priming**
  - Capsule must be placed into the chamber and pierced. Do not place capsule in the chimney of the mouthpiece.

- **Multi-Dosing**
  - Single dose – use one capsule at a time.

- **Dose Wasting**
  - Exhaling into device will lose the dose. Full dose not received if inhalation not repeated and capsule not emptied.

- **Vents**
  - n/a

- **Inspiratory Method**
  - Strong and deep

- **Other information**
  - Occasionally small fragments of the capsule may be inhaled (usually if the capsule is pierced more than once). This is not harmful. Capsules can get stuck in the inhaler and no ‘whirring’ noise will be heard during inhalation. If this occurs tap the base of inhaler on a hard surface to release the capsule.

- **Cleaning**
  - Clean the mouthpiece inside and outside weekly with a dry tissue or lint-free cloth
**DISKHALER**

**Type of inhaler:** Single dose DPI - doses contained in separate blisters in a rotadisk

**In use expiry:** No restrictions

**Available as**

| Antiviral | Relenza (zanamivir) |

---

**Instructions for Use**

1. **Preparation**
   - Remove blue cover and pull out white sliding tray until it stops. Then gently squeeze the finger grips on the side of the tray and remove from the inhaler.
   - Place a rotadisk on to the wheel with the blisters pointing down into the wheel.
   - Push the white sliding tray back into the inhaler.

2. **Priming**
   - Hold inhaler horizontally. Flip the lid up as far as it will go, then push it back down.

3. **Exhaling**
   - Exhale fully and away from mouthpiece.

4. **Mouth**
   - Place mouthpiece between teeth and lips.

5. **Inhalation**
   - Inhale strongly and deeply.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 5 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds. To prepare the next dose, pull out white sliding tray until it stops, then repeat steps 2-6 to take the second dose. Replace blue cover after use.

---

**Key Features**

<table>
<thead>
<tr>
<th>Feedback: Dose Counter</th>
<th>Remaining blisters can be counted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>No lock-out - lever can continue to be pushed back when device is empty</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Medium-low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

---

**What you need to know / Critical Steps**

<table>
<thead>
<tr>
<th>Priming</th>
<th>Ensure sliding tray is pulled out and re-inserted completely. Ensure lid is raised vertically to pierce the rotadisk blister.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Dosing</td>
<td>There is a potential risk of multi-dosing if several blisters are pierced</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.</td>
</tr>
<tr>
<td>Vents</td>
<td>Do not cover air holes</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Quick and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>Inhaler may sound/feel gritty if incomplete inhalation of dose</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Wipe the mouthpiece with a dry tissue</td>
</tr>
</tbody>
</table>
EASI-BREATHE

Type of inhaler: Breath-actuated MDI
In use expiry: No restrictions

Available as
SABA Salamol (salbutamol)
SAMA
LABA
LAMA
LAMA/LABA
ICS Qvar (beclometasone)
ICS/LABA

Key Features

Dexterity Low dexterity required
Feedback: Dose Counter No dose counter
Feedback: Taste/Feel Taste of aerosol
Feedback: Sound Audible aerosol spray when dose delivered
Feedback: Visual n/a
Device Lock-Out n/a
Dose Consistency Consistent metered dose across a range of inspiratory flow rates (20-60 L/min); significantly reduced at fast inspiratory flow rates (>60 L/min)
Device Resistance Low airflow resistance
Inspiratory Flow Test with In Check DIAL G16 inspiratory flow meter

Instructions for Use

To test spray the inhaler (first use, or if not used for 5 days)
1. Unscrew the top of the inhaler so you can see the metal canister insider.
2. Hold the inhaler upright, shake it well and open the cap fully.
3. Spray the aerosol into the air by pressing the canister with your finger or thumb
4. Then close cap fully.

1. Preparation Ensure the inhaler is not empty. If uncertain, spray a test dose as above.
2. Priming Hold the inhaler upright and shake the inhaler. Then hold it upright, and do not cover the vents at the top of the inhaler.
3. Exhaling Exhale fully and away from the mouthpiece.
4. Mouth Place mouthpiece between teeth and lips
5. Inhalation Inhale slowly and deeply- do not stop when device ‘puffs’
6. Breath holding Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.
7. Closing & Repeating For a second dose, close the cap. Wait 30-60 seconds and shake then repeat the steps. Replace cap after use.

What you need to know / Critical Steps

Priming Must be primed in the upright position
Multi-Dosing Single dose - cannot multi-dose
Dose Wasting n/a
Vents Do not block air vents at the top of the device
Inspiratory Method Slow and deep
Other information Do not unscrew top half of Easi-Breathe device, unless for cleaning as below.
Cleaning Salamol: Unscrew and remove the top of the inhaler and remove the metal cannister. Rinse the bottom of the empty inhaler in warm running water for 30 seconds. Then dry thoroughly (leave overnight if possible) and reassemble.
Qvar: Clean the mouthpiece weekly with a dry tissue or cloth.
EASYHALER

Type of inhaler: Reservoir Multidose DPI

In use expiry: 6 (salbutamol, beclometasone and budesonide) and 4 (formoterol) months after removing from foil pouch

Available as

- SABA: Easyhaler salbutamol
- SAMA: 
- LABA: Easyhaler formoterol
- LAMA: 
- LAMA/LABA: Easyhaler beclometasone; Easyhaler budesonide
- ICS/LABA: Fobumix (budesonide/formoterol); Fusacomb (fluticasone/salmeterol)

Instructions for Use

1. Preparation
   - Check dose counter before use, and then remove cap.

2. Priming
   - Shake the inhaler, then whilst holding the inhaler upright press the button all the way down and then release it. You should hear a click sound.

3. Exhaling
   - Exhale fully and away from mouthpiece

4. Mouth
   - Place mouthpiece between teeth and lips

5. Inhalation
   - Inhale strongly and deeply.

6. Breath holding
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Replace cap after use.

Key Features

- Dexterity: Low dexterity required
- Feedback: Dose Counter: Has a dose counter. Counts down in steps of 10 doses. Red indicator begins to show with 20 doses remaining.
- Feedback: Taste/Feel: Taste of powder (contains lactose)
- Feedback: Sound: n/a
- Feedback: Visual: n/a
- Device Lock-Out: n/a
- Dose Consistency: Consistent dosing across range of inspiratory flow rates (30-60 L/min)
- Device Resistance: High airflow resistance
- Inspiratory Flow: Test with In Check DIAL G16 inspiratory flow meter

What you need to know / Critical Steps

- Priming: Must be primed in the vertical position
- Multi-Dosing: Single dose - cannot multi-dose
- Dose Wasting: Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.
- Vents: n/a
- Inspiratory Method: Quick and deep
- Other information: Unused doses collect in bottom chamber with clear window
- Cleaning: Clean the mouthpiece weekly with a dry tissue or cloth.
ELLIPTA

Type of inhaler: Single dose DPI - doses contained in separate blisters in a foil strip

In use expiry: 6 weeks after opening the tray

Available as
- SABA
- SAMA
- LABA
- LAMA
- LAMA/LABA
- ICS
- ICS/LABA
- ICS/LABA/LAMA

In use expiry:
- Incruse (umeclidinium)
- Anoro (umeclidinium/vilanterol)
- Relvar (fluticasone furoate/vilanterol)
- Trelegy (fluticasone furoate/vilanterol/umeclidinium)

Instructions for Use

1. Preparation
Check dose counter before use.

2. Priming
Hold inhaler in the upright position. **Open the cover completely.**

3. Exhaling
Exhale fully and away from mouthpiece

4. Mouth
Place mouthpiece between teeth and lips

5. Inhalation
Inhale strongly and deeply.

6. Breath holding
Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Close cover after use.

Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Low dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Has a dose counter. Counts down each dose. Red indicator when less than 10 doses remain.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent dosing across range of inspiratory flow rates (43.5-130 L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium-low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
<tr>
<td></td>
<td>Test with Ellipta whistle</td>
</tr>
</tbody>
</table>

What you need to know / Critical Steps

- **Priming**: Ensure cover is pushed back completely. Do not close device before inhalation.
- **Multi-Dosing**: Single dose - cannot multi-dose
- **Dose Wasting**: Doses are wasted if cap is opened and closed more than once without inhalation. Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.
- **Vents**: Do not block air vents
- **Inspiratory Method**: Quick and deep
- **Other information**: No coordination is required.
- **Cleaning**: Use a dry tissue to clean the mouthpiece
FORSPIRO

Type of inhaler: Single dose DPI - doses contained in separate blisters in a foil strip
In use expiry: No restrictions

Available as

<table>
<thead>
<tr>
<th>SABA</th>
<th>SAMA</th>
<th>LABA</th>
<th>LAMA</th>
<th>LAMA/LABA</th>
<th>ICS</th>
<th>ICS/LABA</th>
</tr>
</thead>
</table>

AirFluSal (fluticasone/salmeterol)

Instructions for Use

1. Preparation
   Ensure side chamber is closed. Open cap, then check dose counter before use.

2. Priming
   Hold inhaler horizontally, or with mouthpiece uppermost. Push white lever open completely until it clicks, then close it again.

3. Exhaling
   Exhale fully and away from mouthpiece.

4. Mouth
   Place mouthpiece between teeth and lips.

5. Inhalation
   Inhale strongly and deeply.

6. Breath holding
   Remove inhaler from your mouth and hold your breath for 5 to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Close cap after use.

Key Features

<table>
<thead>
<tr>
<th>Dexterity</th>
<th>Moderate-high dexterity required. Requires significant manipulation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Dose Counter</td>
<td>Has a dose counter. Counts individual doses. Last 10 doses highlighted with red border.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Loading and priming of each dose can be observed. Used foil blisters will appear in the side chamber (although used blisters will not appear until 2 days after each one is used)</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>No lock-out - lever can continue to be pushed back when device is empty</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Relatively consistent dosing across range of inspiratory flow rates (30-90 L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium-low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter (same airflow resistance as an Accuhaler)</td>
</tr>
</tbody>
</table>

What you need to know / Critical Steps

Priming
   Ensure white lever is pushed open completely until it clicks, then closed again fully until it clicks back into original position.

Multi-Dosing
   Single dose - reportedly cannot multi-dose

Dose Wasting
   Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.

Vents
   Do not block air inlets to the side of the mouthpiece

Inspiratory Method
   Quick and deep

Other information
   The foil strip must be torn away against the ‘teeth’ of the side chamber. Failure to do so may cause the inhaler to jam.

Cleaning
   Clean the outside of the mouthpiece with a dry tissue
GENUAIR

Type of inhaler: Reservoir Multidose DPI
In use expiry: 90 (Eklira) or 60 (Duaklir) days after removal from foil pouch

Available as

<table>
<thead>
<tr>
<th>SABA</th>
<th>LABA</th>
<th>LAMA</th>
<th>LAMA/LABA</th>
<th>ICS</th>
<th>ICS/LABA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Eklira (aclidinium)</td>
<td>Duaklir (aclidinium/formoterol)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Instructions for Use

1. Preparation
   Check dose counter and ensure that the coloured control window is red before use. Remove the cap.

2. Priming
   Hold the inhaler upright with the button facing up. Press the button all the way down and then release it.

3. Exhaling
   Exhale fully and away from mouthpiece

4. Mouth
   Place mouthpiece between teeth and lips

5. Inhalation
   Inhale strongly and deeply - do not stop when device ‘clicks’

6. Breath holding
   Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Replace cap after use.

Key Features

<table>
<thead>
<tr>
<th>Dexterity</th>
<th>Low dexterity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Dose Counter</td>
<td>Dose counter. Counts down in steps of 10 doses. Red indicator shows for last 10 doses.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>‘Click’ on inhalation, and ‘whirring’ noise during inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Coloured control window changes from red to green after priming (pressing the button), then back to red after inhalation</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>Device locks when empty</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent dosing across range of inspiratory flow rates (so long as inhalation speed &gt;35L/min to cause device to click)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

What you need to know / Critical Steps

<table>
<thead>
<tr>
<th>Priming</th>
<th>Must be primed in the vertical position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Quick and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>Device will not 'click' with low inhalation speed (low emitted dose), preventing further doses to be primed</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Wipe the mouthpiece with a dry tissue.</td>
</tr>
</tbody>
</table>

Photo. ©AstraZeneca
**HANDIHALER**

**Type of inhaler:** Single dose DPI - each dose contained in separate capsules.

**In use expiry:** Capsules: 9 days after opening the blister. HandiHaler device: discard after 12 months.

Available as
- SABA
- SAMA
- LABA
- LAMA
- Spiriva (tiotropium)
- LAMA/LABA
- ICS
- ICS/LABA

---

**Key Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>High dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Remaining capsules may be counted.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose). Capsule will vibrate during inhalation</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Vibration of capsule heard and/or felt during inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Open to visualise empty capsule after use.</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent dosing over low to moderate inspiratory flow (28-60 L/min), but significant reduction at lower inspiratory flows.</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>High airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

---

**Instructions for Use**

1. **Preparation**
   - Open dust cap and mouthpiece

2. **Priming**
   - Remove capsule from blister strip and insert capsule into centre chamber. Close mouthpiece until a click is heard and keeping the inhaler upright, **press the piercing button once and release.**

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece between teeth and lips

5. **Inhalation**
   - Inhale slowly and deeply, but at a rate sufficient to hear the capsule vibrate.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Open mouthpiece to empty the used capsule and close the mouthpiece and dust cap.

---

**What you need to know / Critical Steps**

- **Priming**: Capsule must be placed into the chamber and pierced. Do not place capsule in the chimney of the mouthpiece.
- **Multi-Dosing**: Single dose - cannot multi-dose.
- **Dose Wasting**: Exhaling into device will lose the dose. Full dose not received if inhalation not repeated and capsule not emptied.
- **Vents**: n/a
- **Inspiratory Method**: Quick and deep
- **Other information**: Occasionally small fragments of the capsule may be inhaled (usually if the capsule is pierced more than once). This is not harmful.
- **Cleaning**: Clean monthly. Open the dust cap and mouthpiece, and also the base by lifting the piercing button. Rinse the inhaler with warm water to remove any powder. Leave to dry for 24 hours. If needed, the mouthpiece may be cleaned with a moist tissue.
K-haler

**Type of inhaler:** Breath-actuated MDI

**In use expiry:** No restrictions

**Available as**

- SABA
- SAMA
- LABA
- LAMA
- LAMA/LABA
- ICS
- ICS/LABA Flutiform (fluticasone/formoterol)

**Key Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dexterity</strong></td>
<td>Low dexterity required</td>
</tr>
<tr>
<td><strong>Feedback: Dose Counter</strong></td>
<td>A dose counter and counts down each dose. A red bar appears in the window when there are 28 doses remaining</td>
</tr>
<tr>
<td><strong>Feedback: Taste/Feel</strong></td>
<td>Taste of aerosol</td>
</tr>
<tr>
<td><strong>Feedback: Sound</strong></td>
<td>Audible aerosol spray when dose delivered</td>
</tr>
<tr>
<td><strong>Feedback: Visual</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Device Lock-Out</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Dose Consistency</strong></td>
<td>Consistent metered dose across a range of inspiratory flow rates (20-60 L/min); significantly reduced at fast inspiratory flow rates (&gt;60L/min)</td>
</tr>
<tr>
<td><strong>Device Resistance</strong></td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td><strong>Inspiratory Flow</strong></td>
<td>Test with In Check DIAL G16 inspiratory flow meter (pMDI setting)</td>
</tr>
</tbody>
</table>

**Instructions for Use**

To prime inhaler (first use, or if not used for 3 days)
1. Hold the inhaler upright, shake it well and open the cap fully.
2. Then close cap fully. The inhaler will spray a dose into the air as you close the cap.
3. Repeat this four times in total. For new inhalers, the dose counter will now read 120

1. Preparation
   - Check the dose counter before use.

2. Priming
   - Hold the inhaler upright and shake it well. **Open the cap** and check there is nothing inside the mouthpiece.

3. Exhaling
   - Exhale fully and away from the mouthpiece.

4. Mouth
   - Place mouthpiece between teeth and lips, making sure you’re not covering the air holes in the middle.

5. Inhalation
   - Inhale slowly and deeply - do not stop when device ‘puffs’

6. Breath holding
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   - If you need to take another puff, close the cap. Wait 30-60 seconds and then repeat the steps. Close cap after use.

**What you need to know / Critical Steps**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Must be primed in the upright position</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>n/a</td>
</tr>
<tr>
<td>Vents</td>
<td>Do not block air vents above the mouthpiece</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Slow and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>Do not unscrew top half of Easi-Breathe device, unless for cleaning as below.</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Clean the mouthpiece weekly with a dry tissue or cloth.</td>
</tr>
</tbody>
</table>

Anticipated launch: September 2018
### Instructions for Use

1. **Preparation**
   - Check dose counter before use.

2. **Priming**
   - **Hold inhaler in the upright position**, and shake the device. **Open the cover completely.**

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece between teeth and lips

5. **Inhalation**
   - **Inhale strongly and deeply** - do not stop when device ‘clicks’.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Close cover after use.

### Key Features

#### Dexterity
- Low dexterity required

#### Feedback: Dose Counter
- Has a dose counter. Counts down each dose. Red arrows indicate when less than 10 doses remain.

#### Feedback: Taste/Feel
- Taste of powder (contains lactose)

#### Feedback: Sound
- ‘Click’ on inhalation

#### Feedback: Visual
- n/a

#### Device Lock-Out
- n/a

#### Dose Consistency
- Relatively consistent dosing across range of inspiratory flow rates (30-90 L/min)

#### Device Resistance
- Medium-high airflow resistance

#### Inspiratory Flow
- Test with In Check DIAL G16 inspiratory flow meter. Breath actuated mechanism - device will only release dose with correct speed of inhalation.

### What you need to know / Critical Steps

#### Priming
- Must be primed in the vertical position.

#### Multi-Dosing
- Single dose - cannot multi-dose

#### Dose Wasting
- Contains dose protector - exhaling into device will NOT lose the dose

#### Vents
- Do not block air vents

#### Inspiratory Method
- Quick and deep

#### Other information
- Device will not ‘click’ with low inhalation speed (no dose will be released).

#### Cleaning
- Use a dry tissue or cloth to clean the inhaler
NOVOLIZER

**Type of inhaler:** Reservoir Multidose DPI

**In use expiry:**
- Cartridge: 3 months after opening.
- Novolizer device: 1 year or 2,000 doses (which ever comes first)

**Available as**
- SABA: Salbulin (salbutamol)
- SAMA
- LABA
- LAMA
- LAMA/LABA
- ICS: Budelin (budesonide)
- ICS/LABA

---

### Instructions for Use

**Inserting the Cartridge**
1. Lightly press together the ribbed buttons on the lid, and pull gently forwards to lift it off.
2. Take the new cartridge out of the aluminium foil packaging.
3. Insert the cartridge into the Novolizer with the dose counter facing the mouthpiece.
4. Replace the lid on the Novolizer device.

**1. Preparation**
- Check dose counter and ensure that the coloured control window is red before use. Remove the cap.

**2. Priming**
- Hold the inhaler upright with the button facing up.
- Press the button all the way down and then release it.

**3. Exhaling**
- Exhale fully and away from mouthpiece

**4. Mouth**
- Place mouthpiece between teeth and lips

**5. Inhalation**
- Inhale strongly and deeply - do not stop when device 'clicks'

**6. Breath holding**
- Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

**7. Closing & Repeating**
- Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Replace cap after use.

---

### Key Features

<table>
<thead>
<tr>
<th><strong>Dexterity</strong></th>
<th>Low-moderate dexterity required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feedback: Dose Counter</strong></td>
<td>Dose counter. Counts down in steps of 20 doses. Shaded indicator shows for last 20 doses.</td>
</tr>
<tr>
<td><strong>Feedback: Taste/Feel</strong></td>
<td>Taste of powder (contains lactose)</td>
</tr>
<tr>
<td><strong>Feedback: Sound</strong></td>
<td>'Click' on inhalation, and 'whirring' noise during inhalation</td>
</tr>
<tr>
<td><strong>Feedback: Visual</strong></td>
<td>Coloured control window changes from red to green after priming (pressing the button), then back to red after inhalation</td>
</tr>
<tr>
<td><strong>Device Lock-Out</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Dose Consistency</strong></td>
<td>Inconsistent dosing across range of inspiratory flow rates (lower effective dose with low inhalation speed)</td>
</tr>
<tr>
<td><strong>Device Resistance</strong></td>
<td>Medium-low airflow resistance</td>
</tr>
<tr>
<td><strong>Inspiratory Flow</strong></td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

---

### What you need to know / Critical Steps

<table>
<thead>
<tr>
<th><strong>Priming</strong></th>
<th>Must be primed in the vertical position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multi-Dosing</strong></td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td><strong>Dose Wasting</strong></td>
<td>Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.</td>
</tr>
<tr>
<td><strong>Vents</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Inspiratory Method</strong></td>
<td>Quick and deep</td>
</tr>
<tr>
<td><strong>Other information</strong></td>
<td>Device will not 'click' with low inhalation speed (low emitted dose), preventing further doses to be primed</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
<td>Clean regularly and when the cartridge is changed. Remove the cap and then the mouthpiece by twisting it anticlockwise. Turn the device upside down and remove the lid. Tap to remove any remaining powder. Clean the mouthpiece, dispensing slide and powder inhaler with a soft, lint-free dry cloth.</td>
</tr>
</tbody>
</table>

---

---
Instructions for Use

1. Preparation
   Remove the cap.

2. Priming
   Shake the MDI inhaler, and then hold it upright, with your thumb on the base.

3. Exhaling
   Exhale fully and away from the mouthpiece.

4. Mouth
   Place mouthpiece between teeth and lips

5. Inhalation
   Inhale slowly and deeply, pressing the canister down to release the medicine at the start of inhalation, and continue to inhale deeply.

6. Breath holding
   Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. Closing & Repeating
   Replace cap after use.

Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Moderate dexterity required. Haleraid available for GSK MDIs to assist actuation for people with physical limitations</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Usually no dose counter. (Exceptions: Flutiform, Seretide, Sirdupla - counts each dose)</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of aerosol. Some MDIs contain small amounts of ethanol (maybe unpleasant taste for children)</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Audible aerosol spray</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent metered dose across a range of inspiratory flow rates (25-60 L/min); significantly reduced at fast inspiratory flow rates (&gt;60L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter Inspiratory flow - test with Flo-Tone whistle &amp; Trainhaler</td>
</tr>
</tbody>
</table>

What you need to know / Critical Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Must be primed in the vertical position</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Doses are wasted if the canister is actuated more than once during a single breath</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Slow and steady</td>
</tr>
<tr>
<td>Other information</td>
<td>Good co-ordination of inhalation and actuation is required</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Clean the mouthpiece with a dry tissue or cloth</td>
</tr>
</tbody>
</table>

Type of inhaler: Pressurised Metered Dose Inhaler

In use expiry:
- No restrictions, except:
  - Atimos Modulite: 3 months at room temp.;
  - Flutiform: 3 months after opening foil pouch;
  - Fostair: 5 months at room temp.;
  - Trimbow: 4 months at room temp.

Available as
- SABA: Airomir, AirSalb, Salamol, Ventolin (salbutamol)
- SAMAX: Atrovent (ipratropium)
- LABAX: Atimos Modulite (formoterol);
  - Neovent, Serevent, Vertine (salmeterol)
- LAMA: Clenil Modulite, Qvar (beclometasone);
  - Flixotide (fluticasone)
- LABAX: Fostair (beclometasone/formoterol);
  - Symbicort (budesonide/formoterol);
  - Flutiform (fluticasone/formoterol);
  - AirFluxal, Alloflute, Sereflo, Seretide, Sirdupla (fluticasone/salmeterol)
- LAMA/LABA: Trimbow (beclometasone/formoterol/glycopyrronium)
**pMDI + SPACER (Multiple breath method)**

<table>
<thead>
<tr>
<th>Available Spacers</th>
<th>Volumatic ± mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of inhaler:</td>
<td>Pressurised Metered Dose Inhaler + large volume spacer</td>
</tr>
<tr>
<td>In use expiry:</td>
<td>Replace after 6 to 12 months</td>
</tr>
<tr>
<td>Compatible MDIs:</td>
<td>Ensure MDI is compatible with spacer before prescribing. Volumatic Spacer is generally only compatible with GSK MDIs</td>
</tr>
</tbody>
</table>
| When to use:      | Useful for:  
|                   | • Infants and toddlers.  
|                   | • Reducing side effects with high doses of inhaled corticosteroids.  
|                   | • People with poor co-ordination.  
|                   | • People who are unable to hold their breath after inhalation, and during exacerbations. |

### Instructions for Use

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preparation</td>
<td>Remove the cap from inhaler, and assemble the two parts of the Volumatic spacer.</td>
</tr>
<tr>
<td>2. Priming</td>
<td>Shake the inhaler, then place the mouthpiece of the inhaler into flat end of the spacer and hold it upright, with your thumb on the base</td>
</tr>
<tr>
<td>3. Exhaling</td>
<td>Exhale fully and away from mouthpiece</td>
</tr>
<tr>
<td>4. Mouth</td>
<td>Place mouthpiece of spacer between teeth and lips and actuate one dose into spacer</td>
</tr>
<tr>
<td>5. Inhalation</td>
<td>Inhale slowly and deeply through the mouth for 5 to 6 breaths.</td>
</tr>
<tr>
<td>6. Breath holding</td>
<td>Then remove the mouthpiece of the spacer from your mouth. No breath-holding manoeuvre is required.</td>
</tr>
<tr>
<td>7. Closing &amp; Repeating</td>
<td>Remove inhaler from the spacer and replace cap. Repeat steps 3-6 for additional puffs.</td>
</tr>
</tbody>
</table>

### Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Low-moderate dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>May reduce taste of pMDI aerosol</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Click of valve audible when breathing in and out</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent dosing when used correctly.</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>No validated test available</td>
</tr>
</tbody>
</table>

### What you need to know / Critical Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Delay between actuation of MDI into Spacer and inhalation results in reduced effective dose</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Multiple actuations of MDI into Spacer results in large particle sizes and reduced effective dose.</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Important only to use single actuations into the spacer.</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Slow and steady. Multiple breath</td>
</tr>
<tr>
<td>Other information</td>
<td>Useful for people with poor co-ordination. Useful when high doses of inhaled corticosteroid are prescribed</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Clean once a month. Take the two halves apart and wash with warm water containing a mild detergent, using a soft toothbrush or bottle brush if necessary. Do not rub with a cloth as this creates static. Rinse with clean water and dry at room temperature. Ensure the valve runs freely prior to re-use.</td>
</tr>
</tbody>
</table>
**pMDI + SPACER (Single breath method)**

**Available Spacers:**
- AeroChamber Plus (+/- mask)
- AeroChamber Plus for Infant or Toddler (+ mask)
- Able Spacer (+/- mask)
- A2A (+/- mask)
- DispozABLE Spacer
- Optichamber Advantage
- Optichamber Diamond (+ mask)
- Pocket Chamber (+/- mask)
- Space Chamber Plus
- Volumatic Spacer (+/- mask)
- Vortex (+/- mask)

**Instructions for Use**

1. **Preparation**
   - Remove the cap from inhaler (and from the spacer if using an Aerochamber)

2. **Priming**
   - Shake the inhaler, then **place the mouthpiece of the inhaler into flat end of the spacer** and hold it upright, with your thumb on the base

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece of spacer between teeth and lips and **actuate one dose into spacer**

5. **Inhalation**
   - **Inhale slowly and deeply through the mouth** (if using Aerochamber, a whistling sound indicates that the inspiratory rate is too fast)

6. **Breath holding**
   - Remove spacer from your mouth and hold breath for 10 seconds (or as long as comfortable), then breathe out slowly.

7. **Closing & Repeating**
   - Remove inhaler from the spacer and replace cap(s). Repeat steps 3-6 for additional puffs.

**Key Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dexterity</strong></td>
<td>Low-moderate dexterity required</td>
</tr>
<tr>
<td><strong>Feedback: Dose Counter</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Feedback: Taste/Feel</strong></td>
<td>May reduce taste of pMDI aerosol</td>
</tr>
<tr>
<td><strong>Feedback: Sound</strong></td>
<td>Click of valve audible when breathing in and out</td>
</tr>
<tr>
<td><strong>Feedback: Visual</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Device Lock-Out</strong></td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Dose Consistency</strong></td>
<td>Consistent dosing when used correctly.</td>
</tr>
<tr>
<td><strong>Device Resistance</strong></td>
<td>Low airflow resistance</td>
</tr>
<tr>
<td><strong>Inspiratory Flow</strong></td>
<td>No validated test available</td>
</tr>
</tbody>
</table>

**What you need to know / Critical Steps**

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Delay between actuation of MDI into Spacer and inhalation results in reduced effective dose</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Multiple actuations of MDI into Spacer results in large particle sizes and reduced effective dose.</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Important only to use single actuations into the spacer.</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Slow and steady. Single breath</td>
</tr>
<tr>
<td>Other information</td>
<td>Useful for people with poor co-ordination. Useful when high doses of inhaled corticosteroid are prescribed</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Check manufacturer’s instructions. AeroChamber Plus: remove flat end of the spacer, and soak in lukewarm soapy water for a few minutes. Air dry in a vertical position, then reassemble when dry.</td>
</tr>
</tbody>
</table>
**PODHALER**

<table>
<thead>
<tr>
<th>Type of inhaler:</th>
<th>Single dose DPI - each dose contained in separate capsules</th>
</tr>
</thead>
<tbody>
<tr>
<td>In use expiry:</td>
<td>Discard Podhaler device and case after 7 days of use</td>
</tr>
</tbody>
</table>

**Available as**

| Antibiotic | Tobi (tobramycin) |

---

**Instructions for Use**

1. **Preparation**
   - Wash and fully dry your hands. *Unscrew the top of the case. Then unscrew the mouthpiece.*

2. **Priming**
   - Remove capsule from blister strip and insert capsule into inhaler chamber. Screw the mouthpiece on until it stops. Do not overtighten. Hold the inhaler with the mouthpiece pointing down, then pierce the capsule by pressing the blue button **once** and release.

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece between teeth and lips, to make a tight seal

5. **Inhalation**
   - Inhale strongly and deeply.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 5 seconds, then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds, and breath normally, before repeating steps 3-6 to ensure you inhaled the full dose. Unscrew mouthpiece to empty the used capsule and take the other 3 capsules in the same way. When the full dose (4 capsules) have been inhaled, replace the mouthpiece and place the inhaler back in the storage case.

---

**Key Features**

<table>
<thead>
<tr>
<th>Dexterity</th>
<th>High dexterity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback: Dose Counter</td>
<td>Remaining capsules may be counted.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Capsules can be inspected to see if they are empty after inhalation.</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Relatively consistent dosing across range of inspiratory flow rates (40-85 L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium-low airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>No validated test available</td>
</tr>
</tbody>
</table>

---

**What you need to know / Critical Steps**

<table>
<thead>
<tr>
<th>Priming</th>
<th>Capsules must only be removed immediately before use. Never place a capsule directly into the inhaler mouthpiece.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Quick and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>Occasionally small capsule fragments may be inhaled (usually if the capsule is pierced more than once). This is not harmful.</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Wipe the mouthpiece with a clean, dry cloth</td>
</tr>
</tbody>
</table>

---

23
**RESPIMAT**

**Type of inhaler:** Soft Mist MDI

**In use expiry:** 3 months after canister has been loaded

**Available as**

- SABA
- SAMA
- LABA
  - Striverdi (olodaterol)
- LAMA
  - Spiriva (tiotropium)
- LAMA/LABA
  - Spiolto (tiotropium/olodaterol)
- ICS
- ICS/LABA

---

**Instructions for Use**

**Inserting the Cartridge**

1. With cap closed, press safety catch and pull off clear base.
2. Push the cartridge into the inhaler completely & replace clear base.
3. Whilst holding the inhaler upright with the cap closed, turn the base in the direction of the red arrows until it clicks, and then open cap.
4. Point inhaler towards the ground, and press the dose release button
5. Repeat steps 3-4 until a cloud is visible, then three further times (to fully prime the inhaler)

---

**What you need to know / Critical Steps**

| Priming | Must be loaded and primed before first use. If not used for 7 days, spray one puff towards the ground; if not used for 21 days, re-prime device using spraying 3 puffs towards the ground |
| Multi-Dosing | Single dose - cannot multi-dose. |
| Dose Wasting | Ensure cap is closed when priming the device, to prevent inadvertent actuation of a dose |
| Vents | Do not block air vents |
| Inspiratory Method | Slow and steady |
| Other information | People with physical limitations may struggle to load the device |
| Cleaning | Clean the mouthpiece and metal part of the inhaler once a week with a damp cloth or tissue |

---

**Key Features**

| Dexterity | High dexterity required |
| Feedback: Dose Counter | Has a dose indicator |
| Feedback: Taste/Feel | Taste of aerosol |
| Feedback: Sound | Audible ‘click’ on pressing the button to release a dose |
| Feedback: Visual | n/a |
| Device Lock-Out | Device locks when empty |
| Dose Consistency | Lung deposition may be reduced with fast inspiratory flow rates |
| Device Resistance | Low airflow resistance |
| Inspiratory Flow | No validated test available |

---

**Instructions for Use**

**1. Preparation**

Ensure cartridge has been inserted into the inhaler and the device primed for use correctly.

**2. Priming**

Whilst holding the inhaler upright with the cap closed, turn the base in the direction of the red arrows until it clicks, and then open cap.

**3. Exhaling**

Exhale fully and away from mouthpiece

**4. Mouth**

Place mouthpiece between teeth and lips

**5. Inhalation**

Inhale slowly and deeply, pressing the button to release the medicine at the start of inhalation, and continue to inhale deeply

**6. Breath holding**

Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

**7. Closing & Repeating**

Discard capsule from central chamber and replace cap.
**SPIROMAX**

<table>
<thead>
<tr>
<th>Type of inhaler:</th>
<th>Reservoir Multidose DPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>In use expiry:</td>
<td>After removed from foil pouch: 6 months (DuoResp); 3 months (Aerivio)</td>
</tr>
</tbody>
</table>

**Available as**

- SABA
- SAMA
- LABA
- LAMA
- LAMA/LABA
- ICS
- ICS/LABA

**Instructions for Use**

1. **Preparation**
   - Check dose counter before use.

2. **Priming**
   - Hold inhaler in the horizontal or upright position, and shake the device. Open the cap completely.

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece between teeth and lips

5. **Inhalation**
   - Inhale strongly and deeply.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Close cover after use.

**Key Features**

- **Dexterity**: Low dexterity required
- **Feedback: Dose Counter**: Has a dose counter. Counts down in steps of 2 doses.
- **Feedback: Taste/Feel**: Taste of powder (contains lactose), and gritty texture of powder
- **Feedback: Sound**: n/a
- **Feedback: Visual**: n/a
- **Device Lock-Out**: n/a
- **Dose Consistency**: Increased dose delivery at higher inspiratory flow rates (90L/min vs. 40L/min), but likely insignificant clinical impact.
- **Device Resistance**: Medium airflow resistance
- **Inspiratory Flow**: Test with In Check DIAL G16 inspiratory flow meter

**What you need to know / Critical Steps**

- **Priming**: Must be primed in the horizontal or vertical position
- **Multi-Dosing**: Single dose - cannot multi-dose. Multiple actuations of device winds dose counter down, but does not load dose (appears empty before it actually is).
- **Dose Wasting**: Exhaling into device will lose the dose
- **Vents**: Do not block air vents
- **Inspiratory Method**: Quick and deep
- **Other information**: Dose emission from Spiromax is less dependent on airflow than the Turbhaler
- **Cleaning**: Wipe the mouthpiece with a dry tissue
## TURBOHALER

<table>
<thead>
<tr>
<th>Type of inhaler:</th>
<th>Reservoir Multidose DPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>In use expiry:</td>
<td>No restrictions</td>
</tr>
</tbody>
</table>

### Available as

<table>
<thead>
<tr>
<th>Category</th>
<th>Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>SABA</td>
<td>Bricanyl (terbutaline)</td>
</tr>
<tr>
<td>SAMA</td>
<td></td>
</tr>
<tr>
<td>LABA</td>
<td>Oxis (formoterol)</td>
</tr>
<tr>
<td>LAMA</td>
<td></td>
</tr>
<tr>
<td>LAMA/LABA</td>
<td></td>
</tr>
<tr>
<td>ICS</td>
<td>Pulmicort (budesonide)</td>
</tr>
<tr>
<td>ICS/LABA</td>
<td>Symbicort (budesonide/formoterol)</td>
</tr>
</tbody>
</table>

### Instructions for Use

**To prime inhaler (first use only)**
1. Hold the inhaler upright, and unscrew cap.
2. Rotate grip as far as it will go in one direction, then back as far as it will go in the other direction (it does not matter which way you turn it first). You should hear a click sound.
3. Repeat this sequence a second time.

**1. Preparation**
- Check dose counter before use, and then unscrew cap.

**2. Priming**
- Shake the inhaler, then whilst keeping it upright, rotate grip as far as it will go in one direction. Then turn it as far as it will go in the other direction (it does not matter which way you turn it first). You should hear a click sound.

**3. Exhaling**
- Exhale fully and away from mouthpiece

**4. Mouth**
- Place mouthpiece between teeth and lips

**5. Inhalation**
- Inhale strongly and deeply.

**6. Breath holding**
- Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

**7. Closing & Repeating**
- Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Replace cap after use.

### Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Moderate dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Has a dose counter (Symbicort), which counts in steps of 20 doses; or dose indicator (Bricanyl, Oxis, Pulmicort), indicates empty when red mark reaches bottom of indicator window.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Generally no taste</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Inconsistent dosing across range of inspiratory flow rates (lower effective dose with low inhalation speed)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium airflow resistance (Symbicort); Medium-high airflow resistance (Pulmicort, Oxis, Bricanyl)</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter. Test with Turbohaler whistle.</td>
</tr>
</tbody>
</table>

### What you need to know / Critical Steps

**Priming**
- Must be primed in the vertical position

**Multi-Dosing**
- Single dose - cannot multi-dose. Multiple actuations of device winds dose counter down, but does not load dose (appears empty before it actually is)

**Dose Wasting**
- Exhaling into device will lose the dose

**Vents**
- Do not block air vents

**Inspiratory Method**
- Quick and deep

**Other information**
- Turn Aid available for people with physical limitations. Desiccant can be heard when shaking the device - it is not the amount of drug remaining.

**Cleaning**
- Wipe the mouthpiece with a dry tissue once a week
**TURBOSPIN**

- **Type of inhaler:** Single dose DPI - each dose contained in separate capsules
- **In use expiry:** Discard Turbospin inhaler after completion of each treatment pack

**Available as**
- Antibiotic: Colobreathe (colistimethate sodium)

---

### Instructions for Use

1. **Preparation**  
   Remove the cap. Then unscrew the mouthpiece.

2. **Priming**  
   Remove capsule from blister strip and insert capsule into inhaler chamber with the widest end first. Screw the mouthpiece on until it stops. Do not overtighten. Hold the inhaler with the mouthpiece pointing upwards then pierce the capsule by gently pushing the piston upwards **once and release**.

3. **Exhaling**  
   Exhale fully and away from mouthpiece

4. **Mouth**  
   Place mouthpiece between teeth and lips, to make a tight seal

5. **Inhalation**  
   Inhale slowly and deeply, but at a rate sufficient to hear the capsule vibrate. (If the capsule does not vibrate, the chamber of the inhaler device should be tapped gently and the inhalation repeated.)

6. **Breath holding**  
   Remove inhaler from your mouth and hold your breath for about 10 seconds, then breathe out slowly.

7. **Closing & Repeating**  
   Wait a few seconds, and breathe normally, before repeating steps 3-6 to ensure you inhaled the full dose. Unscrew mouthpiece to empty the used capsule then replace the mouthpiece and replace the cap.

---

### Key Features

- **Dexterity:** High dexterity required
- **Feedback: Dose Counter:** Remaining capsules may be counted.
- **Feedback: Taste/Feel:** Taste of powder (may be unpleasant)
- **Feedback: Sound:** n/a
- **Feedback: Visual:** Capsules can be inspected to see if they are empty after inhalation.
- **Device Lock-Out:** n/a
- **Dose Consistency:** Relatively consistent dosing across range of inspiratory flow rates (30-90 L/min)
- **Device Resistance:** Medium-low airflow resistance
- **Inspiratory Flow:** No validated test available

### What you need to know / Critical Steps

- **Priming:** Capsules must only be removed immediately before use. Do not pierce the capsule more than once.
- **Multi-Dosing:** Single dose - cannot multi-dose
- **Dose Wasting:** Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.
- **Vents:** Do not cover the air slits with your fingers or mouth during inhalation.
- **Inspiratory Method:** Quick and deep
- **Other information:** Occasionally small capsule fragments may be inhaled (usually if the capsule is pierced more than once). This is not harmful.
- **Cleaning:** Clean after each dose. Press the piston down firmly a few times, whilst keeping the chamber upside down. Clean the chamber using a tissue or cotton bud, then screw the mouthpiece back on and replace the cap.
### TWISTHALER

**Type of inhaler:** Reservoir Multidose DPI  
**In use expiry:** 3 months after removed from foil pouch  

**Available as**  
- SABA  
- SAMA  
- LABA  
- LAMA  
- LAMA/LABA  
- ICS  
- Asmanex (mometasone)  
- ICS/LABA

### Instructions for Use

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preparation</td>
<td>Check dose counter before use, and ensure that the counter and the pointer on the cap are lined up.</td>
</tr>
<tr>
<td>2. Priming</td>
<td>Shake the inhaler, then whilst keeping it upright, grip the base and twist the cap anticlockwise to remove it. Ensure that the counter and the pointer on the inhaler device are now lined up.</td>
</tr>
<tr>
<td>3. Exhaling</td>
<td>Exhale fully and away from mouthpiece</td>
</tr>
<tr>
<td>4. Mouth</td>
<td>Place mouthpiece between teeth and lips</td>
</tr>
<tr>
<td>5. Inhalation</td>
<td>Inhale strongly and deeply.</td>
</tr>
<tr>
<td>6. Breath holding</td>
<td>Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.</td>
</tr>
<tr>
<td>7. Closing &amp; Repeating</td>
<td>Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Replace cap after use, and ensure that the counter and the pointer on the cap are lined up again.</td>
</tr>
</tbody>
</table>

### Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>Low-moderate dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Dose counter. Counts individual doses. Shaded indicator shows for last 20 doses.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Generally no taste</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>n/a</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>n/a</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>Cap locks in place when empty</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Consistent dosing across range of inspiratory flow rates (28-70 L/min)</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>Medium-high airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter</td>
</tr>
</tbody>
</table>

### What you need to know / Critical Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Must be primed in the vertical position. Removal of cap primes the device</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Multiple actuations of device winds dose counter down, but does not load dose (appears empty before it actually is)</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Exhaling into device will lose the dose. Tilting, inverting or shaking the device may lose the dose.</td>
</tr>
<tr>
<td>Vents</td>
<td>Do not block the air vents</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Quick and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>Removing the cap causes the dose counter to count down</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Wipe the outside of the mouthpiece with a dry cloth or tissue.</td>
</tr>
</tbody>
</table>
**ZONDA**

<table>
<thead>
<tr>
<th>Type of inhaler:</th>
<th>Single dose DPI - each dose contained in separate capsules.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In use expiry:</td>
<td>Capsules: 60 days after opening the bottle.</td>
</tr>
</tbody>
</table>

**Available as**

- SABA
- SAMA
- LABA
- LAMA: Braltus (tiotropium)
- LAMA/LABA
- ICS
- ICS/LABA

---

**Instructions for Use**

1. **Preparation**
   - Open dust cap and mouthpiece

2. **Priming**
   - Remove capsule from bottle and insert capsule into centre chamber. Close mouthpiece until a click is heard and keeping the inhaler upright, press the piercing button once and release.

3. **Exhaling**
   - Exhale fully and away from mouthpiece

4. **Mouth**
   - Place mouthpiece between teeth and lips

5. **Inhalation**
   - Inhale slowly and deeply, but at a rate sufficient to hear the capsule vibrate.

6. **Breath holding**
   - Remove inhaler from your mouth and hold your breath for up to 10 seconds (or as long as possible), then breathe out slowly.

7. **Closing & Repeating**
   - Wait a few seconds before repeating steps 3-6 to ensure you inhaled the full dose. Open mouthpiece to empty the used capsule and close the mouthpiece and dust cap.

---

**Key Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexterity</td>
<td>High dexterity required</td>
</tr>
<tr>
<td>Feedback: Dose Counter</td>
<td>Remaining capsules may be counted.</td>
</tr>
<tr>
<td>Feedback: Taste/Feel</td>
<td>Taste of powder (contains lactose). Capsule will vibrate during inhalation</td>
</tr>
<tr>
<td>Feedback: Sound</td>
<td>Vibration of capsule heard and/or felt during inhalation</td>
</tr>
<tr>
<td>Feedback: Visual</td>
<td>Transparent capsule should be empty.</td>
</tr>
<tr>
<td>Device Lock-Out</td>
<td>n/a</td>
</tr>
<tr>
<td>Dose Consistency</td>
<td>Lack of data</td>
</tr>
<tr>
<td>Device Resistance</td>
<td>High airflow resistance</td>
</tr>
<tr>
<td>Inspiratory Flow</td>
<td>Test with In Check DIAL G16 inspiratory flow meter (high resistance setting)</td>
</tr>
</tbody>
</table>

---

**What you need to know / Critical Steps**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priming</td>
<td>Capsule must be placed into the chamber and pierced. Do not place capsule in the chimney of the mouthpiece.</td>
</tr>
<tr>
<td>Multi-Dosing</td>
<td>Single dose - cannot multi-dose.</td>
</tr>
<tr>
<td>Dose Wasting</td>
<td>Exhaling into device will lose the dose. Full dose not received if inhalation not repeated and capsule not emptied.</td>
</tr>
<tr>
<td>Vents</td>
<td>n/a</td>
</tr>
<tr>
<td>Inspiratory Method</td>
<td>Quick and deep</td>
</tr>
<tr>
<td>Other information</td>
<td>No information from SPC about risk of inhaling small fragments of the capsule may be inhaled (usually if the capsule is pierced more than once).</td>
</tr>
<tr>
<td>Cleaning</td>
<td>If needed, the mouthpiece may be cleaned with a dry cloth or tissue.</td>
</tr>
</tbody>
</table>


44. Giraud V et Roche N. Misuse of corticosteroid metered dose inhalers in people with severe asthma. Thorax 2001;56:734-739.


Aerosol science & inhaled medication

• Effects of particle size on lung deposition
Depending on their particle size, inhaled drug particles will deposit in different regions of the lung. Particles <1 μm are likely to reach the peripheral airways and alveoli or will be exhaled, particles 1–5 μm will deposit in the large and conducting airways, while particles >5 μm will predominate deposit in the oropharynx.\(^\text{24,25}\)

There are three different mechanisms of deposition of aerosols: inertial impaction, sedimentation and diffusion (figure 1). However for the particle size used in aerosol therapies of approximately 1 – 10 μm, only two of these mechanisms predominate: inertial impaction and gravitational sedimentation. The third mechanism, Brownian motion/diffusion is only relevant in aerosols less than 1 micron in diameter, and consequently is unlikely to be important for inhaled drugs.

Inertial impaction occurs in either the oropharynx, or at bifurcations of main branches of the bronchial tree, particularly in the large central airways. It occurs mainly with large particles or high velocity particles (i.e. those with high inertia), where they are unable to follow the airstream when it changes direction, thus impacting on the airway wall.\(^\text{24,26}\)

Gravitational sedimentation occurs for smaller particles that are able to follow the airstream and penetrate the more peripheral bronchioles and alveoli. Here, the airstream flows slower, allowing the particles to settle on to the airway surfaces either during the course of slow steady breathing or during breath-holding.\(^\text{24,26}\) Breath-holding is important for smaller particle sizes owing to the increased chance of exhalation of the drug, because they can remain airborne for a considerable time.\(^\text{16}\)

![Figure 1. Particle deposition in the respiratory tract. (Adapted with permission)](image)

**Implications for practice:**
Particle size is important: those that are too small may be exhaled; those that are too large experience inertial impaction in the oropharynx and large conducting airways.
Increased aerosol particle speed increases the probability of deposition by impaction in the oropharynx and large conducting airways; slow aerosol particle speed allows more particles to penetrate the peripheral bronchial tree.
Increasing the inhalation volume allows the aerosol to penetrate peripheral bronchioles. Breath-holding increases gravitational sedimentation.

**Effects of inspiratory flow on lung deposition**
The total lung deposition of an inhaled drug is strongly affected by the speed of inhalation. DPIs require a fast and deep inhalation to ‘suck up’ the drug in the inhaler device. A fast inhalation rate generates a large internal turbulent force in the inhaler device, which is required to break up the formulation of the metered dose to produce particles of a size distribution that will penetrate the peripheral airways.\(^\text{24,27,28}\) Failure to achieve this high internal force increases the likelihood of the dose impacting in the mouth and throat. By contrast, aerosol inhalers, such as the MDI, require a slow and deep inhalation, with an inspiratory flow rate of less than 60 l/min. This is owing to the device generating its own aerosol, and so a slower inhalation rate is required to ensure that the drug deposits in the peripheral airways, since a fast inhalation will increase the velocity of the drug particles, thus increasing inertial impaction in the oropharynx as described above.\(^\text{10,27}\) Some of the effect of excessive inspiratory flow with a pMDI can be mitigated by using pMDI devices with smaller particle sizes in the aerosol, which may have a greater lung deposition if the inspiratory flow from 30.8 to 67.1 l/min.\(^\text{16}\) However these faster inspiratory flows will reduce lung deposition of 6-μm particles.\(^\text{14}\)

Faster inspiratory flow rates through a pMDI (180 vs. 30 L/min) increases inertial impaction of aerosols in the oropharynx and at bifurcations in the large central airways, thus reducing lung deposition in the peripheral airways by 33%.\(^\text{29}\) A significant proportion of patients with asthma and COPD have been shown to have an inspiratory flow that is much too high for an MDI, which may reduce the clinical effectiveness of inhaled drugs.\(^\text{9,10}\)

Other studies have demonstrated that lung deposition from DPI devices increases as inspiratory flow increases. The is particularly so for Turbobaluer, and to a lesser degree for Accuhaler, devices where lung deposition increases with faster inspiratory flows.\(^\text{29,30}\)

As a consequence, when a patient uses an aerosol inhaler such as the MDI, a slow inspiratory flow rate will produce significantly greater lung deposition than when used at a faster inspiratory flow rate. In contrast, when dry powder inhalers such as a Turbobaluer or Accuhaler are used, a faster inspiratory flow rate will produce significantly greater lung deposition than a slower inspiratory flow rate.

The ability of patients to use specific inhalers can vary with time. During times of increased hyperinflation, such as acute exacerbations of asthma, or progression to severe emphysema, patients may not be able to generate sufficient inspiratory flow through high-resistance devices. In this situation, a low-resistance device, such as a pMDI or pMDI plus spacer, may be more appropriate.
References
22. Chrystyn H. Is inhalation rate important for a dry powder inhaler? Using the In-check Dial to identify these rates. Respir Med 2003;97:181–7

This section is adapted from: