The evolution of the inhaler

Inhalers in asthma and COPD

Unlike most disease areas, respiratory medicine relies not only on developing medicines with proven safety and efficacy, but also the development of innovative technology to deliver the medicine to where it’s needed – the surface of the lungs. Inhalers are the most common delivery method for asthma and chronic obstructive pulmonary disease (COPD) treatments, however the technology behind each inhaler varies.

Key challenges in inhaler design

- Inhalers need to work for a range of patients, regardless of age, severity of disease and lung function.
- Often inhalers need to deliver more than one medicine at a time.
- The inhaler needs to deliver a consistent dose every time.
- The inhaler needs to protect the medicines from environmental factors such as moisture.

There are two commonly used types of inhaler

Metered dose inhalers (MDIs)¹-³

- MDIs are pressurised inhalers that deliver a specific amount of medicine in aerosol form while a patient breathes in.
- The patient must press the top of the inhaler to release the aerosol at the same time as they inhale. Varied breaths can mean they do not receive the correct dose of medicine.
- If patients struggle to co-ordinate their breathing with release of the medicine, a ‘spacer’ can be attached between the inhaler and mouth, which holds the medicine until the patient breathes in. More recently, breath-activated MDIs have also been introduced.
- Several steps are involved in the correct use of an MDI, so patients may make mistakes using the inhaler, which could mean they don’t receive the correct dose of medicine.

Dry powder inhalers (DPIs)¹-³

- DPIs deliver medicine as a fine powder that is inhaled. The powder is stored within sealed blisters or capsules.
- DPIs are breath-activated, so the medicine is released when the patient inhales through the inhaler. This simplifies inhalation for patients and eliminates the need for propellants to push the medicine out of the inhaler.
- DPIs are available as single dose (where the patient has to insert a capsule containing the medicine into the inhaler for each dose) or multi-dose (where doses of medicine are already contained within the inhaler, removing the need to refill the inhaler frequently).
- DPIs generally involve few steps to operate, reducing the potential for patients to make mistakes when using their inhalers.

Inhalation of vapour was used in medicine in the ancient civilisations* ¹

Up to 2000 BC

- The word ‘inhaler’ was first used in a book by John Mudge* ¹

1654 ¹

The first ever known image of an inhaler appeared in a book by inventor Christopher Bennet* ¹

1778 ¹

The first ever scientific paper on the use of inhalers in asthma was published by Henry Hyde Salter – this was followed by numerous inhaler designs being patented* ¹

1860 ¹

1969 ¹

The Metered Dose Inhaler (MDI) was developed

1970s

The capsule-based Dry Powder Inhaler (DPI) was developed as an alternative to the MDI

2000s

Dose counters were introduced in MDIs

1990s

Inhalers providing up to a month’s supply of medication were launched