Selecting inhalers for children 1–5 years

Before selecting inhalers

- Choose initial treatment according to exacerbation history and pattern of symptoms
- Understand options for adjusting treatment

Recommendation

Use a pressurised metered-dose inhaler and spacer to deliver inhaled medicines.

For younger children (e.g. ≤3 years) unable to form a tight lip seal around the spacer mouthpiece, attach a closely fitting mask to a small spacer. After the dose is actuated into the spacer, the child breathes in and out (5 breaths).

For children aged 4–5, use a small spacer and mouthpiece. After the dose is actuated into the spacer, the child takes 2 deep breaths in and out, ideally following by breath-holding for 5–7 seconds.

Sources & rationale

Recommendation type: Consensus recommendation

Delivery of the medicine to the small airways is important for both SABAs and ICS.[van Aalderen 2015] Young children have a higher proportion of airways classified as small and have high airway resistance.[van Aalderen 2015]

Pressurised metered-dose inhalers with spacers

pMDIs with spacers (with or without mask) are suitable for children of all ages.[van Aalderen 2015]

pMDIs without spacers require coordination between actuation and inhalation. Most children and many adults cannot do this correctly. Poor coordination results in reduced lung deposition. The use of a spacer overcomes the need for this coordination.[van Aalderen 2015]

The use of spacers reduces oropharyngeal deposition and associated local side effects such as candidiasis and hoarseness, and increases deposition to the target site (lower airways).[van Aalderen 2015]

Most children aged 4 years or older can use a spacer with a mouthpiece. Younger children require a closely fitting mask attached to the spacer.[van Aalderen 2015]

Multiple breaths in and out of the spacer may increase drug delivery into the airways.[van Aalderen 2015]

Breath-holding is recommended after inhaling, to improve deposition to the lungs.[van Aalderen 2015]

Breath-actuated metered-dose inhalers (not recommended for children <5 years)

Breath-actuated MDIs release a dose of aerosol triggered by a relatively low inspiratory flow rate. These do not require coordination of actuation with inhalation. They require normal deep inhalation, ideally followed by breath-holding for 5–7 seconds (e.g. 5 seconds for children younger than 10 years). However, they are generally unsuitable for preschool children.[van Aalderen 2015]

Dry-powder inhalers (not recommended for children 1–5 years)

DPIs are not recommended for children 5 years and younger.

DPIs require a quick and forceful deep breath to release particles of the active ingredient from carrier particles, ideally followed by breath-holding for 5–7 seconds.[van Aalderen 2015]

DPIs do not require coordination between actuation and inhalation, but can be difficult for younger children to use correctly.

In children ≤6 years, inspiratory flow may be effective when the child is well but insufficient during an episode of worsening wheezing.[van Aalderen 2015]

References

van Aalderen WM, Garcia-Marcos L, Gappa M, et al. How to match the optimal currently available inhaler device to an individual child with asthma or recurrent wheeze. NPJ Prim Care Respir Med 2015; 25: 14088.

Resources

National Asthma Council Australia's **videos demonstrating correct use of inhalers**

National Asthma Council **Spacer use and care**

National Asthma Council Australia's **fact sheet on spacers for pressurised metered-dose inhalers**

Notes

The proportion of medicine deposited in the lower airways is generally low in children.[van Aalderen 2015] Recommended doses of SABAs for small children are therefore relatively high with respect to bodyweight, compared with recommended doses for adults.

Technical information on pMDIs and spacers

Recommendation

When using a pMDI, choose a spacer suitable for the child's age and size.

Sources & rationale

Recommendation type: Consensus recommendation

Small-volume spacers, which achieve a higher concentration of the aerosol, are recommended for children up to age 7 years because they have low tidal volumes.[van Aalderen 2015]

The electrostatic charge in a plastic spacer reduces delivery into the lung. These require correct priming and care. Metal spacers (rarely used) have no electrostatic charge.[van Aalderen 2015]

References

van Aalderen WM, Garcia-Marcos L, Gappa M, et al. How to match the optimal currently available inhaler device to an individual child with asthma or recurrent wheeze. NPJ Prim Care Respir Med 2015; 25: 14088.

Resources

National Asthma Council Spacer use and care

National Asthma Council Australia's fact sheet on spacers for pressurised metered-dose inhalers

Notes

A mask is used with a spacer if the child cannot form tight lip seal around the spacer mouthpiece.

Parents should follow instructions for use and care of spacers.

Technical information on pMDIs and spacers

Recommendation

Do not prescribe or recommend nebulised medicines.

Sources & rationale

Recommendation type: Consensus recommendation

The use of nebulisers is not recommended. Delivery of inhaled medicines by nebuliser is unnecessary,[Cates 2013] except in some patients with severe acute asthma unable to breathe through a spacer.

Nebulisers may transmit respiratory viruses.[Hui 2009]

In children and adults, the use of nebulisers for SABA is associated with a higher risk of exacerbations than the use of inhalers.[Paris 2008]

Nebulised salbutamol is associated with more systemic adverse effects than pMDIs. In studies of children with acute asthma, higher rates of tremor have been reported among children treated with nebulised salbutamol than salbutamol via pMDI with spacer.[Cates 2013] Nebulised ICS can damage the child's eyes if the face mask is not well fitted. Nebulised ICS can cause rash and atrophy of skin around the nose and mouth.[GINA 2025]

The use of home nebulisers could also lead to delays in treatment, compared with the prompt use of readily transportable pMDIs anywhere outside the home, whenever the child has asthma symptoms.

References

Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention, 2025. Available from: www.ginasthma.org

Hui DS, Chow BK, Chu LC, et al. Exhaled air and aerosolized droplet dispersion during application of a jet nebulizer. Chest 2009; 135: 648-654

Paris J, Peterson EL, Wells K, et al. Relationship between recent short-acting beta-agonist use and subsequent asthma exacerbations. Ann Allergy Asthma Immunol 2008; 101: 482-487.

Resources

National Asthma Council Australia Nebuliser use and care

Practice point

Few medicines are approved by TGA and reimbursed by PBS for the treatment of asthma in children 1–5 years.