

sometimes below 10%. The remaining solution is left in the nebuliser as residual volume or it is deposited in the mouthpiece and tubing. The extent to which the nebulised solution is deposited in the airways or alveoli depends on particle size. Particles with a median diameter of 1–5 microns are deposited in the airways and are therefore appropriate for asthma whereas a particle size of 1–2 microns is needed for alveolar deposition. The type of nebuliser is therefore chosen according to the deposition required and according to the viscosity of the solution.

Nebulised bronchodilators are appropriate for children with chronic persistent asthma or those with severe acute asthma. In chronic asthma, nebulised bronchodilators should only be used to relieve persistent daily wheeze, however, with the development of spacers with facemasks, it is now unusual for a child to require long-term nebulised asthma therapy. The use of nebulisers in chronic persistent asthma should be considered only:

- after a review of the diagnosis and use of current inhaler devices;
- if the airflow obstruction is significantly reversible by bronchodilators without unacceptable side-effects;
- if the child does not benefit from use of conventional inhaler device, such as pressurised metered-dose inhaler plus spacer;
- if the child is complying with the prescribed dose and frequency of anti-inflammatory treatment including regular use of high-dose inhaled corticosteroid.

When a nebuliser is prescribed, the child or child's carer must:

- have clear instructions from a doctor, specialist nurse, physiotherapist, or pharmacist on the use of the nebuliser (and on peak-flow monitoring);
- be instructed not to treat acute attacks without also seeking medical help;
- have regular follow up with doctor or specialist nurse.

#### Jet nebulisers

Jet nebulisers are more widely used than ultrasonic nebulisers. Most jet nebulisers require an optimum flow rate of 6–8 litres/minute and in hospital can be driven by piped air or oxygen; in acute asthma the nebuliser should always be driven by oxygen. Domiciliary oxygen cylinders do not provide an adequate flow rate therefore an electrical compressor is required for domiciliary use.

Some jet nebulisers are able to increase drug output during inspiration and hence increase efficiency.

#### Safe practice

The Department of Health has reminded users of the need to use the correct grade of tubing when connecting a nebuliser to a medical gas supply or compressor.

#### Nebuliser diluent

Nebulisation may be carried out using an undiluted nebuliser solution or it may require dilution beforehand. The usual diluent is sterile sodium chloride 0.9% (physiological saline).

In England and Wales nebulisers and compressors are not available on the NHS (but they are free of VAT); some nebulisers (but not compressors) are available on form GP10A in Scotland (for details consult Scottish Drug Tariff).

## Oral

Systemic side-effects occur more frequently when a drug is given orally rather than by inhalation. Oral corticosteroids, theophylline p. 171, and leukotriene receptor antagonists are sometimes required for the management of asthma. Oral administration of a beta<sub>2</sub> agonist is generally not recommended for children, but may be necessary in infants and young children who are unable or unwilling to use an inhaler device.

## Parenteral

Drugs such as beta<sub>2</sub> agonists, corticosteroids, and aminophylline p. 170 can be given by injection in acute severe asthma when drug administration by nebulisation is inadequate or inappropriate; in these circumstances the child should generally be treated in a high dependency or intensive care unit.

## Peak flow meters

Peak flow meters may be used to assess lung function in children over 5 years with asthma, but symptom monitoring is the most reliable assessment of asthma control. They are best used for short periods to assess the severity of asthma and to monitor response to treatment; continuous use of peak flow meters may detract from compliance with inhalers.

Peak flow charts should be issued to patients where appropriate, and are available to purchase from:

3M Security Print and Systems Limited, Gorse Street, Chadderton, Oldham, OL9 9QH. Tel: 0845 610 1112

GP practices can obtain supplies through their Area Team stores.

NHS Hospitals can order supplies from [www.nhsforms.co.uk/](http://www.nhsforms.co.uk/) or by emailing [nhsforms@mmm.com](mailto:nhsforms@mmm.com).

In Scotland, peak flow charts can be obtained by emailing [stockorders.dppas@apsgroup.co.uk](mailto:stockorders.dppas@apsgroup.co.uk).

## NICE decisions

### Inhaler devices for children under 5 years with chronic asthma (August 2000) NICE TA10

When selecting inhaler devices for children under 5 years with chronic asthma, a child's needs and likelihood of good compliance should govern the choice of inhaler and spacer device; only then should cost be considered.

- corticosteroid and bronchodilator therapy should be delivered by pressurised metered-dose inhaler and spacer device, with a facemask if necessary;
- if this is not effective, and depending on the child's condition, nebulised therapy may be considered and, in children over 3 years, a dry powder inhaler may also be considered.

[www.nice.org.uk/TA10](http://www.nice.org.uk/TA10)

### Inhaler devices for children 5–15 years with chronic asthma (March 2002) NICE TA38

When selecting inhaler devices for children between 5–15 years with chronic asthma, a child's needs, ability to develop and maintain effective technique, and likelihood of good compliance should govern the choice of inhaler and spacer device; only then should cost be considered.

- corticosteroid therapy should be routinely delivered by a pressurised metered-dose inhaler and spacer device;
- for other inhaled drugs, particularly bronchodilators, a wider range of devices should be considered;
- children and their carers should be trained in the use of the chosen device; suitability of the device should be reviewed at least annually. Inhaler technique and compliance should be monitored.

[www.nice.org.uk/TA38](http://www.nice.org.uk/TA38)

# 1 Airways disease, obstructive

## Asthma, chronic

05-Apr-2018

### Description of condition

Asthma is a common chronic inflammatory condition of the airways, associated with airway hyperresponsiveness and variable airflow obstruction. The most frequent symptoms of