

## EDITORIAL

### Treatment of acute asthma in children. Which approach is best?

The emergency management of children presenting with acute exacerbations of asthma is a huge burden to healthcare systems, both in the developed and developing nations of the world<sup>1</sup>. The delivery of simple, cheap and effective therapy at the point of contact is most important and can be provided in different ways depending on a number of factors. These include the age of the child, affecting his or her ability to use different inhalation devices and systems, the type and cost of medication available locally and the level of provision and availability of acute health services in each country. The study by Rodriguez et al<sup>2</sup> in this issue of the journal attempts to address some of these issues but also raises other important aspects worthy of discussion. Until recently nebulized therapy has been widely regarded as the most effective treatment, especially in young children unable to coordinate inhalation from a pressurised aerosol device. Nebulizers are, however, relatively expensive to provide on a large scale basis, particularly in areas of economic deprivation. This can, however still be done, even in developing countries, if it is made a positive healthcare priority by the relevant Ministry of Health<sup>3</sup>. Recently, an increasing evidence base exists to suggest that beta-agonists delivered by pressurized aerosol through a spacer device are just as effective, easier to deliver to small children and at lesser cost<sup>4,5</sup>. An increasing number of emergency departments are now using this as first line therapy for acute asthma in the pediatric age group.

Powdered inhalation of these agents (including Formoterol) has also been shown to be as effective as nebulized salbutamol in this situation<sup>6</sup>. This dry powder preparation can also be dissolved in normal saline and nebulized effectively<sup>7</sup>. It seems therefore that there are a number of different ways of approaching this problem, each of which may be appropriate to individual countries depending on local circumstances. The paper by Rodriguez et al in this issue compared a single dose of nebulized Formoterol (prepared from 2 capsules of powdered Formoterol) with 3 standard doses of nebulized Al-

buterol. One methodological point is that the study is described as "double blind" but one limb was with a single dose of Formoterol where the other limb used three doses of Albuterol. The blinded part relates only to the review by the clinical observers at the beginning and end of the study period. Overall both groups improved significantly on each treatment except for an unexpected failure of improvement in FEV1 in the Albuterol group. This could have occurred because of the heterogeneity of the response in these children as evidenced by the large standard deviation of the results obtained. Overall this study is useful in providing supporting evidence for the fact that nebulized powdered Formoterol is a cheap and effective treatment for asthma in developing countries providing that suitable nebulizers are available. The authors also indicate that one reason why there is a preference for nebulizers is cultural. This is an example of how previously established practices can reflect attitudes which will vary from one country to another. This is not necessarily a reason in itself why newer, more simple to deliver treatments, cannot be introduced so long as they are accompanied by appropriately targeted patient education programmes. The authors of the present study clearly indicate why, in their case, the nebulized approach is so important in Venezuela. The preparation of novel formulations such as the use of powdered Formoterol to make a nebulized solution is another important factor to keep in mind. Quality control of methods developed for use in carefully supervised research studies cannot always be guaranteed in busy and often understaffed emergency departments. Fortunately, as far as Formoterol is concerned, a commercially available nebulized solution has recently been approved by the FDA<sup>8</sup>.

As already mentioned, the use of spacer devices is increasingly recommended for the treatment of acute asthma exacerbations, especially in young children<sup>9</sup>. Commercially available spacer devices also have cost implications and although much less than those of a nebulizer they are not insubstantial, especially in developing countries. Effective spacer devices can how-

ever be made at virtually no cost from readily available materials such as used large soft drink bottles<sup>10</sup>. These have been assessed in the acute situation and have been shown to be efficacious in treatment. Another advantage of spacers is that they are readily available at home and elsewhere, such as at school and outside where unexpected acute wheezy episodes are well known to occur.

In conclusion, because asthma is so common worldwide, the effective treatment of acute exacerbations remains a major challenge both in developing and developed countries. It appears that the best approach will vary from one country to another but each must be evidenced based. The study of Rodriguez et al reported in this issue takes us one step further in this important area of healthcare for children. Overall considerations to be thought about include the cost and availability of the appropriate medication and effective delivery devices, local cultural attitudes and the availability of patient targeted education in asthma management given the limitation on healthcare budgets in all countries. Last, but not least, health care professionals need constantly to update their own knowledge of current best practice in the acute management of this very important illness.

**R. Dinwiddie**

Great Ormond Street Hospital for Children.  
London. United Kingdom.

## REFERENCES

1. Peroni D, Coghi A. Recurrent Emergency Department visits for asthma in children: an opportunity for asthma care improvement? *Allergol Immunopathol*. 2008;36:57-8.
2. Rodríguez E, Vera V, Perez-Puigbo A, Capriles-Hulett A, Ferro S, Manrique J, Abate J. Equivalence of a single saline nebulised dose of formoterol powder vs three doses of nebulised albuterol every twenty minutes in acute asthma in children: a suitable cost effective approach for developing nations. *Allergol Immunopathol*. 2008;36(4):196-200.
3. Capriles E, Do Campo A, Verde O, Pluchino S, Capriles-Hulett A. Children's asthma in the third world: an approach. *J Invest Allergol Clin Immunol*. 2006;16:11-18.
4. Global Strategy for Asthma Management and Prevention, Global Initiative for Asthma (GINA) 2006. Available from: <http://www.asthma.org>
5. Cates C. Spacers and nebulisers for the delivery of beta agonists in non-life threatening acute asthma. *Respir Med*. 2003;97:762-69.
6. Lee-Wong M, Chou V, Ogawa Y. Formoterol fumarate inhalation powder vs albuterol nebulizer for the treatment of asthma in the acute setting. *Ann Allergy Asthma Immunol*. 2008;100:164-52.
7. Perez Puigbo A, Capriles Behrens E, Giannoni Delgado L. Nebulized Saline Solution of Dry Powder Formoterol is useful for Acute Bronchospasm. *Arch Venez Farmacol Terap*. 2001;20:128-130.
8. FDA approves DEY LPs Performomist (Formoterol Fumarate) inhalation solution for maintenance treatment of COPD. [www.medicalnewstoday.com](http://www.medicalnewstoday.com). Respiratory/Asthma News 12 May 2008.
9. BTS/SIGN British guidelines on the management of asthma. *Thorax*. 2008;63 (Suppl 4):1-121.
10. Teo JT, Kwang LW, Yip WLC. An inexpensive spacer for use with metered inhalers in young asthmatic children. *Ped Pulmonol*. 1988;5:244-46.