



**British Thoracic Society**  
**Paediatric Wheeze /Asthma Audit Report 2012**  
**(national audit period 1 November 2012 – 30 November 2012)**

Dr James Paton

**Background**

This is the 4th year that the BTS paediatric asthma audit has been on the list of national audits approved for inclusion in Department of Health Quality Accounts for England. Inclusion on this list has led to a sharp increase in both the numbers of units participating and the number of cases submitted.

Year	Institutions	Submissions
2010	97	2,164
2011	724	3,195
2012	144	4,060

To be eligible for inclusion children have to be over 1 year of age and admitted into participating units for more than 4 hours during November 2012 with a diagnosis of wheezing/asthma. These inclusion criteria have remained the same since the audit started over a decade ago.

The audit collects basic demographic data and information on 4 domains in the management of acute wheezing/asthma in children: initial hospital assessment; initial hospital treatment; discharge planning and follow-up. Units can quickly compare their submitted cases against the aggregated national data. The standards for acute asthma management are drawn from the BTS/SIGN asthma guideline management. Since November is generally a busy month, the annual audits have provided a snapshot of the management of acutely wheezy children at a time when paediatric units are busy.

While the units are asked to submit data on every child admitted in November, the exigencies of tracking down notes means that not every unit is able to return details on every child. Nevertheless data on over 4,000 children represents a very substantial pragmatic sample of acute paediatric asthma care in the UK.

**Basic Demographics**

Despite the increasing number of cases submitted there has been little shift in the age and sex profile of children. The most striking point is that currently over 70% of children admitted are under 5yr of age. It is precisely in young children where the evidence base for the management of acute asthma is weakest.

In keeping with the fact that wheezing and asthma are more common in boys in younger children, there is a male preponderance overall with around 60% of children admitted being male, a proportion that has remained relatively stable. This disguises a well-recognized shift in the sex ratio with age. At 2yrs the ratio is around males:females 1.5:1 but by 12yrs the ratio has reversed to around 0.7:1 with girls admitted exceeding boys. Overall, 54% of children had not been previously admitted.

Year	2009	2010	2011
Sex (males)	62.8	63.9	59.4
Age			
1 – <2 yrs	25.1	22.3	28.7
2 – <5 yrs	44.4	45.4	44.4
5 – 12<yrs	24.2	28.3	23.1
Over 12	6.4	4.0	3.8

**Illness severity**

One continuing finding from past audits audit is that measurements of vital signs at presentation have remained stable. For example, the mean pulse, breathing rate and oxygen saturation for different age bands of children has changed little since the audit began suggesting that underlying the severity of asthma in children presenting to hospital has also remained similar.

This data has been used in the past to adjust the clinical features for assessment of severity in the BTS/SIGN asthma guideline. The current guideline criteria for acute severe asthma for respiratory rate (>40bpm in children aged 2-5yrs and >30bpm in children over 5yrs) now seem well matched to the current data but the pulse rate (>140bpm in children aged 2-5yrs and >125bpm in children over 5yrs) is probably set too low. Children currently presenting have a normal saturation in air at presentation and are on average not significantly desaturated.

**Table 3: Initial respiratory rate, pulse rate and saturation of children submitted over the last 3 years**

	Minimum	Median	Maximum
<b>Age group</b>			
<b>Initial Respiratory rate</b>			
1 – <2 yrs	22	45	90
2 – <5 yrs	15	42	90
5 – 12<yrs	14	32	74
Over 12	14	26	60
<b>Initial Pulse rate</b>			
1 – <2 yrs	56	155	210
2 – <5 yrs	52	147	203
5 – 12<yrs	73	131	200
Over 12	74	117	164
<b>Initial Saturation Measured in Air</b>			
1 – <2 yrs	80	95	100
2 – <5 yrs	64	94	100
5 – 12<yrs	60	94	100
Over 12	83	96	100

### Hospital Treatment

The initial treatment children receive generally follows the BTS/SIGN asthma guidelines. So ninety eight percent received beta agonist bronchodilators. About half the children also receive ipratropium and oxygen is only required in about 40% of children. There has been change in the proportion of children who received corticosteroids. This may reflect the developing evidence base about the lack of efficacy of steroids in children under 5 years with viral associated wheezing.

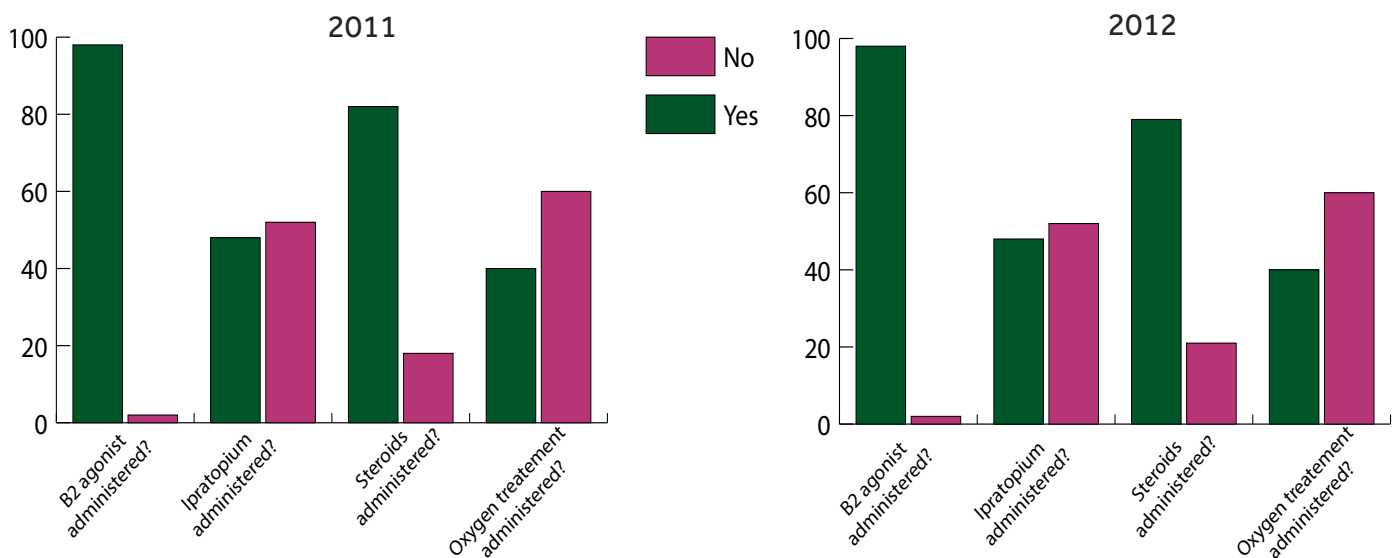


Fig 1. Percentage of children receiving in B2-agonists, steroids and oxygen treatment in 2011 and 2012.

2011

2012

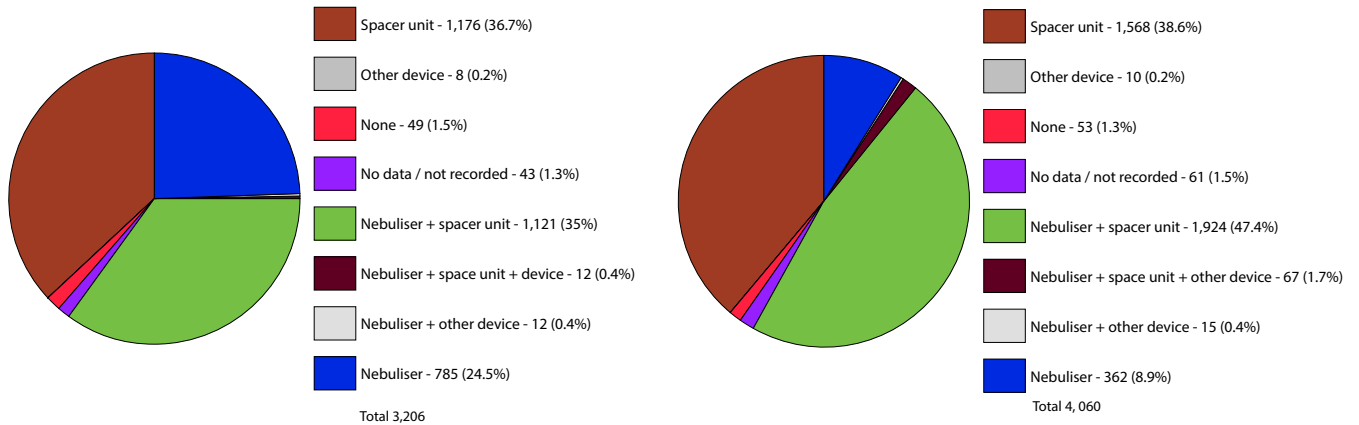


Fig 2. Inhaled devices used to deliver medication during admissions (responses n =4060)

It is also interesting to note a change in to inhaler devices used during an acute exacerbation.

Very few children now are treated only with nebulized treatment. Children with less severe episodes can be treated with spacer alone and this now amounts to around 38% of children. Those with more severe asthma will usually be treated with nebulized salbutamol, initially often in combination with ipratropium, and will be switched to spacer treatment when their condition has improved sufficiently.

For most children, this treatment continues to be highly effective with short lengths stay of a day or less. The proportion of children receiving second line treatment or being admitted to PICU is very low overall and has remained steady in recent years.

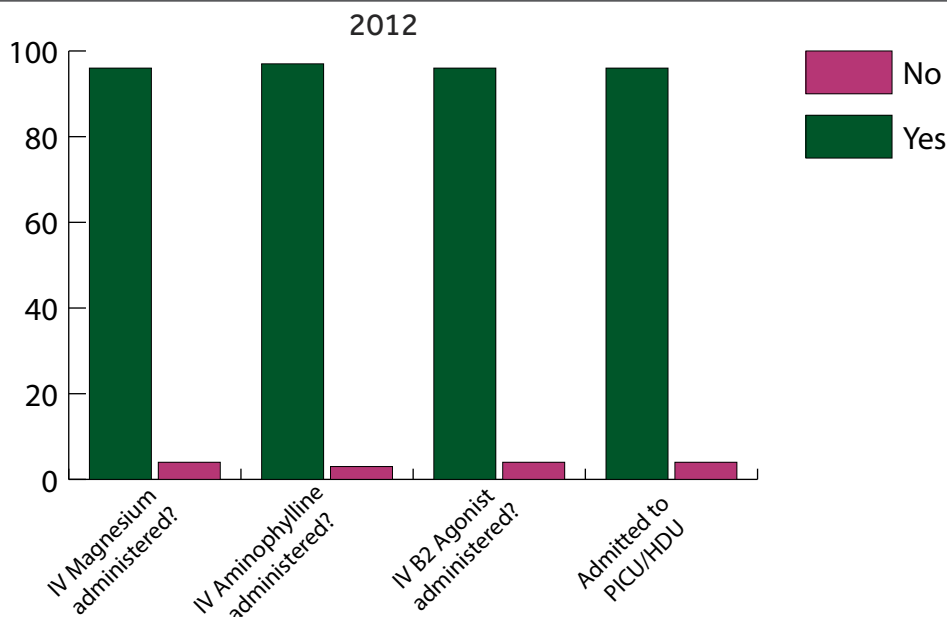


Fig 3. Number of children receiving intravenous therapy and HDU/PICU admission in 2012 audit (responses n =4060)

One area where there has been little change is in relation the use of CXR and antibiotics. Twenty nine percent of children were x-rayed and 27% received antibiotics. A review of the published evidence suggests only 10-12% of children with acute wheeze/asthma should have a CXR. In a previous analysis (Arch Dis Child 2008; 93:952-58), having a CXR was associated with antibiotic prescription. Driving down X-ray use is, therefore, likely to be associated with a reduction in the use of antibiotics.

## Discharge planning

Finally, discharge planning remains the area where opportunities for improvement are most evident.

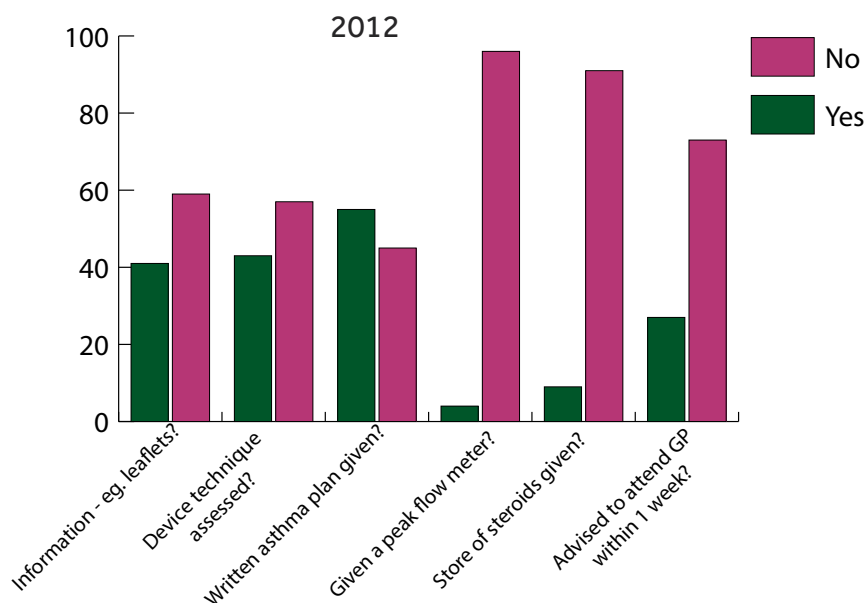


Fig 4. Proportion of children receiving different components of discharge planning in 2012 (responses n =4060)

Published randomised trials suggest this is an important part of acute asthma management to address because good discharge planning and education can reduce the number of future asthma readmissions substantially. However, in the audit only 43% of children are recorded as having their device use checked and only 55% are recorded as being given a written discharge plan. The graph of the percentage of children in each unit recorded as given (or given previously) a discharge plan illustrates the wide difference in performance between units.

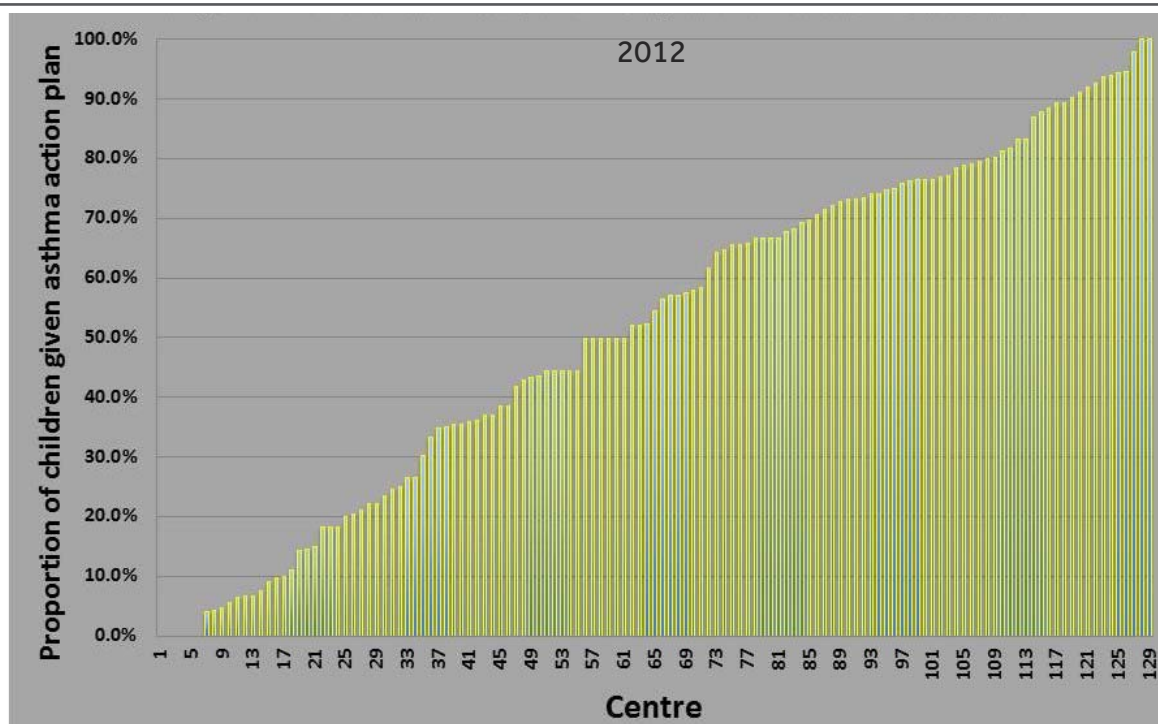


Fig 5. Proportion of children documented as receiving an asthma action plan in 2012 (responses n =4060)

These percentages have been at this level for some time. It is likely that audit and feedback will not be enough to shift performance in this area and that a more focused approach using quality improvement techniques such as short cycle audits and run charts will be required.

### **What are units doing with the data?**

It is over a hundred years since the great Victorian physicist Lord Kelvin said: "If you cannot measure it you cannot improve it." Data on acute asthma management is now available to participating units for relatively little effort. However, often audit data does not lead to any significant improvements in practice over time eg the data on discharge planning. In this light, there is some encouragement from the fact that about 20 units reported back on the various ways that they have used the audit data to start to address changing practice.

### **Improving the audit for the future**

Through the period of the audit, we frequently receive valuable feedback. Sometimes, this feedback highlights issues with the audit that need addressing. One example this year is the question about advice to see the GP within one week of discharge. This is now out of line with the guidance in the BTS/SIGN guideline. This has been changed in the data form for the next audit cycle.

Another area where we are investigating change is the potential for collecting information about readmissions within a period of time after discharge. Driving down the risk of readmission should be an important goal of any hospital asthma admission. Thus the ability to link particular hospital practices with readmissions would potentially be a significant step forward in the power of the audit.

Finally, it is important to acknowledge and thank once again the BTS and their staff for their excellent support of audit in respiratory medicine, including paediatric respiratory medicine. If you have comments or suggestions the audit team would be pleased to hear from you.

James Paton  
(james.paton@glasgow.ac.uk)

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