Introduction

The 2012/13 annual report for the British Thoracic Society National Audit Programme provides an important update on the Society’s contribution to quality improvement activities in respiratory care.

A major feature of the past few months has been the preparation for the national COPD audit programme for England and Wales. The Society is leading the secondary care and pulmonary rehabilitation elements of the programme and data collection in both areas will begin in 2014. In the meantime, the Society’s programme of national audits has been amended to accommodate the new national COPD audit programme (further details on page 15).

The individual audit reports show increasing numbers of contributing sites and cases, and some evidence of improving practice – clearly the national reports which summarise data from many contributing sites will only show improving trends where major changes in practice have occurred. Annual summary reports for each national audit appear on the BTS website and we are delighted that a series of articles on individual audits now appear in Thorax. We continue to work on ways to help contributing sites to evaluate results and work on improving the process of care in order to effect change.

Anyone working in the health sector will be aware of the Government’s Transparency and Open Data Agenda which will require that publicly funded services publish comparative performance data in the future to increase the transparency of services to the public. While the BTS audit programme is not publicly funded, there is an expectation that all national audits will, in due course, need to make national audit data available publicly. The Society is starting to plan for this now, and this topic will be discussed in more detail during the 2013 BTS Winter Meeting session on Clinical Audit and Quality Improvement.

BTS continues to take forward other quality improvement activities, and over the past year energies have focussed on the BTS COPD and CAP care bundle project which will report in spring 2014. Twenty hospitals have been engaged in a pilot project to introduce CAP, COPD admission and COPD discharge care bundles. The project began as a collaboration with the NHS Lung Improvement Programme, and we are grateful to all those from NHSI who were involved in the early stages of the project. Since April 2013, BTS has taken forward this project without assistance from the new NHSIQ body which replaced NHS Improvement, but we have been fortunate in attracting enthusiastic engagement from the pilot sites, and we anticipate that the final meeting in March 2014 will highlight some important lessons and key findings.

It is intended that the bundle details and data collection tools will be made available to those who are not part of the main project, but who wish to use them for local quality improvement activities in future. Further details are available on the BTS website - follow the links to audit and quality improvement.

All of this activity means that the BTS Audit Programme, which has been in place for 4 years now, continues to evolve and to spread good practice in audit and quality improvement in respiratory care. We are especially grateful to the clinical leads for each BTS audit: Dr Wei Shen Lim, Dr Liam Heaney, Dr Adam Hill, Dr Mike Ward, Dr Ronan O’Driscoll, Dr Mike Davies, Dr Nick Maskell, Dr Clare Hooper, Dr Jimmy Paton, Professor Mike Shields and Dr Anne Thomson, for their ongoing leadership and advice. The Head Office team, Sally Welham, Chris Routh, and Laura Searle, working with the BTS IT experts, Kerry Reid and Luke Wilson.

Dr James Calvert  
Chair, BTS Professional and Organisational Standards Committee

Dr Jim Finnerty  
BTS Audit Programme Director

November 2013
Adult Asthma Audit Report 2012
Audit Period: 1 September - 31 October 2012
Dr John Lindsay, Professor Liam Heaney

Introduction

The 2012 British Thoracic Society Adult Asthma Audit was carried out over a two month period from 1st September 2012 to 31st October 2012. The audit has been carried out annually in its current form for several years, and focuses on hospital admissions with acute asthma, specifically looking at initial assessment, management and follow-up. It was contributed to by 118 institutions, and 2,484 submissions in total were received.

Assessment at admission

As in the previous BTS adult asthma audits, a female preponderance was evident (69.0% of admissions), and the cause of this remains unclear, although a female preponderance is consistently seen in difficult-to-treat asthma patient cohorts and there may be a relationship between these observations.1,2

Readmission rates remain disappointingly high and relatively unchanged in audits over recent years. In the current audit, 7.5% of patients were admitted within a month of prior discharge, which is the same as the 2011 audit. An additional 8.2% of admissions had been discharged between 1 and 3 months previously. The majority – 65.4% – had either not had a previous admission or none within the last 12 months. Overall these figures seem relatively static over recent years and as readmission rates are a useful overall marker of quality of care, there remains a need to target those patients with recurrent short term readmissions with optimised patient education, the use of self-management plans, and good post-discharge follow-up.

Peak Expiratory Flow (PEF) was measured at initial assessment in 81% of cases, which again was the same figure obtained last year, whereas in 2010 this figure was 87%. Furthermore, only 38% of patients had a post-bronchodilator reading which again has not changed from the previous 2 years’ audits. This test is a core variable in assessing the initial response of a patient with acute asthma to bronchodilator treatment, is very easy to perform and the result informs the decision to admit. It is disappointing that these figures have not improved and again further work in Accident & Emergency departments is needed such as standardised asthma assessment tools, which prompt the admitting clinician to carry out these readings prior to making a decision to discharge.

Oxygen saturation measurements were obtained in 96.1% of patients at admission. This is a reassuringly high figure, although it is surprising that it is not 100%, given that it is a standard assessment which can be easily performed, though this may be due to some data loss in documentation. Of those assessed, 16.3% of patients had oxygen saturations lower than 92% and of these, 71.21% went on to have arterial blood gas (ABG) analysis, which again is the same figure as 2011. The BTS/SIGN Guidelines recommend that all patients with acute asthma and oxygen saturations of less than 92% should have ABG analysis due to the increased risk of hypercapnoea in these patients, which is a feature of life-threatening asthma. It is of concern that this shortfall has remained, as failing to carry out an ABG under these circumstances is a serious omission. Again, standardised asthma admission tools may improve the uptake of these important aspects of assessment. Interestingly, of those who had an ABG on account of low oxygen saturations, 11.9% had evidence of hypercapnoea (17.2% in 2011), but it suggests that relatively small numbers are presenting in hypercapnoeic ventilatory failure, possibly due to earlier presentation, better patient education, or more rapid and efficient assessment and treatment.

Smoking status was incorporated into the audit in 2011, and the figures this year are, perhaps unsurprisingly, much the same. Of those admitted, 33.1% of patients were current smokers, and a further 17.3% were ex-smokers. Around 20% of adults in the United Kingdom smoke cigarettes3 and the worldwide prevalence of cigarette smoking in asthmatics is estimated to be between 20 and 35%.4 The audit figure is towards the upper limit of this estimate. Cigarette smoking in mild to moderate asthmatics has been shown to increase frequency of hospital admissions as well as to create relative corticosteroid resistance which may explain why a third of patients admitted were current smokers.5 It is worth noting also that 8.2% of patients did not have a smoking history documented, which is a significant omission, as this is an important aspect of the respiratory history and an opportunity to provide smoking cessation advice.

Management in Hospital

The time point at which patients were treated with systemic steroids following presentation is unchanged from the last year’s audit (Figure 1). 40% of patients received systemic steroids within the first hour of arrival at hospital suggesting that they were triaged, assessed and managed efficiently. A further 10% had received steroids already from the GP within the 6 hours prior to presentation. However, 12% received them after 4 hours and a further 2% did not receive them until after 24 hours following presentation. Again, it may be that the over 24 hours figure of 2% is due in part to a problem with documentation, e.g. that the GP had already given them but this had not been recorded in the notes and no further doses
were prescribed until the next day, but it is also possible that systemic steroids are prescribed on the admission drug chart for the following morning. Systemic steroids take several hours to exert their anti-inflammatory effect, and therefore prompt administration after presentation is important.

Pre-discharge peak flow was performed in 79.1% of patients had which is similar to previous audits, though again, it is disappointing that this has not improved. Give the issue about readmission and that patients with a PEF of less than 75% of personal best or predicted at discharge are more likely to be readmitted, this may an area worth targeting to improve the high readmission rate noted earlier.

Pre-discharge peak flow variability was measured in 75.0% of patients and average variability was recorded at 19.48%. Variability less than 25% is thought to indicate good control, and again has been shown to reduce the likelihood of readmission.

Figure 1 – The time from presentation at which systemic steroid treatment was administered.

Commencement of systemic steroid treatment

<table>
<thead>
<tr>
<th>No data/not recorded (1%)</th>
<th>No steroid therapy given (5%)</th>
<th>Given by GP within 4 hours of admission (19%)</th>
<th>Later than 24 hours after arrival at hospital (2%)</th>
<th>More than 4 hours after arrival at hospital but within 24 hours (12%)</th>
<th>Between 1 and 4 hours of arrival at hospital (30%)</th>
<th>Within 1 hour of arrival at hospital (40%)</th>
</tr>
</thead>
</table>

Discharge from Hospital

Of those admitted to hospital, 8.5% were new diagnoses of asthma, which is unchanged from 2011. Of concern, 20.4% of these newly-diagnosed asthmatics were discharged without having been commenced on inhaled corticosteroid therapy, which represents a slight increase from the previous year, when the figure was 17.9%. Furthermore, 30.1% of known asthmatics who were receiving beta-2 agonist therapy only prior to admission were not commenced on inhaled corticosteroids at discharge. This is an area of concern, specifically that large numbers of patients who have presented with acute asthma are not being discharged on the appropriate anti-inflammatory treatment and again this may be an area worth targeting to try and reduce readmissions. 8.9% of patients were judged to be non-adherent to asthma treatment which is unchanged from last year. This is likely to be a significant underestimate. Patient self-report is known to give an overestimation and other measures, such as prescription records, should be used in a more systematic manner to reliably identify and target adherence. Of those felt to be non-adherent, 78.3% of patients had the reasons for poor adherence discussed with them and addressed, which is a slight increase from the 2011 audit (73.4% of patients). It is not clear exactly how reasons for non-adherence were specifically addressed in each case, but it is an important step as regular use of inhaled corticosteroids has been shown to reduce asthma-related hospital admissions and readmissions in patients across all grades of severity.

Only 48.6% of patients had their inhaler technique reviewed, although again this is a small improvement from the 2011 audit, when 44.9% of patients had a technique review. This is disappointing, especially as 25.6% of patients were found to have poor technique, but subsequently improved, and a further 6.8% required a change in inhaler due to persistently poor technique with their current device. Better documentation is needed in this area, as 30.1% had no data recorded for this intervention.

A clinic review appointment was scheduled in 66.8% of patients within 4 weeks of discharge, which is unchanged from the 2011 audit. There was an improvement however in the percentage of patients with a written record of advice to see their GP within a week of discharge – 42.6% in this audit, compared with 37.2% in 2011.

Only 42.2% of patients were recorded as having been issued with a written action plan, which is similar to the 2011 audit result. By ensuring that a written action plan is issued or reviewed prior to discharge, the patient is better equipped to respond appropriately to a further exacerbation.

Since the results of the 2011 audit, 22 institutions have increased their respiratory specialist nurse involvement with asthmatics admitted to hospital. A further 13 institutions have developed specific asthma admission proformas or checklists to ensure that guideline-driven assessment and management is optimised, 11 institutions have started to use a written personal action plan, or are using it more regularly. Following the 2011 audit, 13 institutions had specific educational events for healthcare staff working with asthmatic patients.

Conclusion

In spite of the positive steps taken by some institutions following the 2011 audit, the results of the 2012 adult asthma audit are broadly unchanged and further improvement could be made in a number of areas. The audit is useful as it highlights a number of problem areas that could potentially be easily addressed to improve outcomes, specifically peak flow monitoring, use of written action plans, ensuring patients are receiving inhaled corticosteroid therapy prior to discharge and...
checking of inhaler technique. Targeting these areas is likely to reduce the high readmission rate that has remained unchanged for the last few years.

June 2013

References


Bronchiectasis Audit Report 2012

Audit Period: 1 October - 30 November 2012

Adam T Hill, Chris Routh and Sally Welham

A significant step to improving care of patients with non-cystic fibrosis bronchiectasis was the creation of the British Thoracic Society (BTS) National Guidelines (1) and Quality Standards for bronchiectasis in adults (2). A national BTS bronchiectasis audit was conducted 2012, in adult patients with bronchiectasis attending secondary care during the audit period, 1 October – 30 November 2012. The standards for the audit were taken from the BTS Quality Standards for non-cf bronchiectasis in adults. 98 institutions from across the UK took part in the audit, submitting a total of 3,147 patient records (Figure 1). The audit highlighted the variable adoption of the Quality Standards. Participating institutions are able to generate a report which compares their institutional audit data with national audit dataset (https://audits.brit-thoracic.org.uk/). The audit allows the participating institutions to benchmark against UK wide figures, and drive quality improvement programmes to promote the quality standards to improve patient care.

A more detailed discussion of the 2012 audit results has been published in Thorax (3).

Figure 1

- Male 1,249 (39.7%)
- Female 1,898 (60.3%)


April 2013
Adult Community Acquired Pneumonia Audit Report 2012/13

Audit Period: 1 December 2012 - 31 January 2013
Dr Wei Shen Lim, Dr Chamira Rodrigo

The British Thoracic Society (BTS) community acquired pneumonia (CAP) audit has run for the last 4 years with 5652 patients from 132 institutions captured in the latest audit period over the winter of 2012/2013 (data collection period: 1 December 2012 to 31 January 2013). This summary describes facets of the national picture and initiatives arising.

Patient profile: No significant differences noted compared to previous years. The average age of cases was 72 years (range 15–106). Based on the CURB65 score, 43% of patients had low severity CAP (score 0 to 1), 29% moderate severity CAP (score 2) and 28% high severity CAP (score 3 to 5).

Processes of care: Some improvements over the last 4 years. The proportion of patients who received antibiotics within 4 hours of admission has increased over the 4 audit periods (figure 1). Antibiotic concordance with local CAP antibiotic guidelines has also improved. However, the proportion in whom a CXR is obtained prior to antibiotics being given has decreased over the same period.

These results suggest that there may be a move towards giving antibiotics more quickly at the cost of establishing a confirmed diagnosis of CAP radiologically. While it is desirable for antibiotics to be given early when indicated, the cost of misdiagnosis and inappropriate use of antibiotics in patients who do not have CAP must not be ignored. In the US, the lone pursuit of earlier antibiotic administration has been associated with an overall increase in the use of antibiotics, mostly inappropriate. (1)

Figure 1: Comparison of process of care measures over 4 years: 2009/10 to 2012/13

Patient outcomes: Lower 30-day in-patient mortality over 4 years. A trend towards lower mortality over the last 4 years is noted. Median length of stay (LOS) was 5 days, similar to previous years while critical care admission (ICU) was required in 6.0%, which was the same proportion as in 2011/12, but lower compared to the first 2 years of the audit – 7% and 8% in 2009/10 and 2010/11 periods respectively.

These data are very encouraging and suggest that local measures to improve CAP care are having an observable beneficial impact. The BTS is aware of local and regional initiatives around CAP management in different hospitals that have been marked with success. Nationally, the pilot programme involving the BTS CAP Care Bundle is currently running in 25 hospitals in collaboration with NHS Improvement.

Variations in CAP mortality are apparent across the UK. The BTS is working to further understand the reasons behind such variations and to support centres that are striving towards improvements. Issues around the clinical coding of CAP are recognised and will be the focus of a future BTS CAP Audit.

Figure 2: Thirty-day in-patient mortality: 2009/10 to 2012/13

Acknowledgements: The BTS Audit team comprising Sally Welham, Kerry Reid, Chris Routh and Christine Bucknall are invaluable to the running of this audit as are all BTS members who have participated in the audit. Thank you.

Reference


October 2013
Adult NIV Audit Report 2013
Audit Period: 1 February - 31 March 2013
Dr Mike Davies

The British Thoracic Society (BTS) has conducted an annual audit of adult patients treated with acute non-invasive ventilation (NIV) since 2010. Data are collected over a 2 month period (February and March) with questions covering premorbid function, the underlying indications for NIV, the delivery of NIV, and outcomes. By providing a pragmatic snapshot of real-life outcomes, the audit enables participating hospitals to review the composition and effectiveness of their service, benchmarked against the collated national average. This year, the audit is the most successful to date and comprises data on 2,693 patients submitted from 148 UK hospitals. Sincere thanks to all of those who have participated.

Patient characteristics
The mean age was 72 years and, as may be expected, prior performance status was limited in 36% (limited activity, but self-care) and very limited in a further 43% (limited self-care or bed / chair-bound). COPD was the indication for acute NIV in 61%, with cardiogenic pulmonary oedema in 8%, obesity-hypoventilation syndrome in 8% and chest-wall / neuromuscular disorders in 4%. These baseline characteristics have remained essentially unchanged over the 4 audit periods to date.

The chest X-Ray demonstrated consolidation in 40%, a finding that is perhaps surprisingly high for predominantly ward-based NIV, but one which again remains consistent across all audit periods. Oxygen toxicity was thought to contribute to the need for NIV in 17% all patients (18% in 2012); where data was available, hospital care was implicated in 60%, and pre-hospital care in 40%.

Initial management with NIV
Despite the relative stability of the above characteristics, there has been a progressive fall in pre-NIV pH values over the audit periods (Figure 1). This suggests that we are starting acute NIV at a later stage in an otherwise similar patient population. This year, the median pH at the time of starting NIV was 7.24.

The most recent guidance, a joint BTS/RCP document in 2008, stated that COPD patients with a pH < 7.26 may benefit from NIV but should be managed in a high dependency or ICU setting due to the higher risk of treatment failure. Prior to NIV, 893 (47%) COPD patients presented with a pH < 7.26 and it is noteworthy that the majority (91%) were managed in a ward-based environment.

Pressure support ventilation with a back-up rate <16 was the most frequently used setting. Over the first 24 hours, NIV was used for 15 (± 8) hours. The average initial PaCO2 was 10.2 kPa prior to NIV, and fell by 1.3 kPa at 1 hour, and 1.9 kPa at 4-6 hours to 8.3 kPa. The acidosis had resolved in 45% patients by 4-6 hours of NIV.

We asked if a treatment plan covering the possibility of NIV failure was evident. The medical notes documented a treatment plan in 74%; in those recording a plan, NIV was the “ceiling of therapy” in 67%, there was an intention to invasively ventilate if necessary in 21%, and there was a more palliative intent in 9%.

Patient outcomes
NIV success was defined as achieving pH > 7.3 and a reduction in PaCO2 by 0.5 kPa; this was achieved in 66% (69% in 2012). Treatment failure was recorded in 30% and a further 3% failed NIV, but proceeded to intubation. Reasons for NIV failure remain consistent with prior audits; general deterioration and a worsening PaCO2 was implicated in 48%, suggesting a role for more aggressive optimisation of ventilation. General intolerance or agitation was seen in 31%, in which situation sedation was frequently attempted (84%). If NIV failed, then it was discontinued within 6 hours in 24%, at 6-24 hours in 28%, and at a later stage in 47%.

Overall, 66% patients treated with acute NIV were discharged from hospital. The median length of stay was 9 days. Respiratory followup was organised in 71%. 32% were discharged with oxygen therapy and 16% were treated with home ventilation (or referred to a home ventilation centre). The remaining 34% of patients treated with NIV died during the admission, representing a slight increase over the preceding 3 audits (Figure 2). Understandably, NIV failure was associated with a worse outcome. Late NIV failure (>24 hours) was especially ominous. Following NIV failure, 81 (3%) proceeded to intubation. Death due to a respiratory cause was not increased in this group (27%), although it should be noted that they were younger (63 ± 14 years) and had less prior functional limitation (45% either
unrestricted or limited by strenuous exertion only) than the wider patient cohort.

As in prior audits and studies, hospital mortality was higher in those with consolidation evident on the chest X-Ray than in those without (43% vs. 28%), as was NIV failure (37% vs. 25%).

Figure 2 Hospital Mortality (%)

Outcomes in the COPD group were analysed separately. Hospital mortality was higher in those who presented with more severe acidosis (36% if pH < 7.26 on arrival; 26% if pH 7.26-7.35). In the severe acidosis group, hospital mortality was 28% in a HDU/ICU setting, and 40% if started outside HDU/ICU. Whilst initial blood gas measurements were similar, evidence of consolidation was more likely in those receiving ward-based care (37% vs. 26%). The differing outcomes could reflect differences in the delivery of care, but equally may represent a more severely ill patient group within the ward environment. Neither possibility is entirely satisfactory. If there is positive treatment intent (as appears to be the case), these findings reinforce the need to consider a more intensive environment for patients who present with markers of adverse outcome such as consolidation and significant respiratory acidosis.

Whilst the current audit demonstrates little overall change in outcomes, it is encouraging to note that the data provided has enabled individual trusts to take action as a result of their participation. In a separate part to the audit, we invited individual centres to reflect upon the impact of the audit upon their service. The results of the preceding audit were discussed in 79% institutions. More importantly, 40% participating centres reported that they have made changes as a result of the last audit. Such changes include improved education, better utilisation of oxygen alert cards, and plans to increase ICU bed availability for patients requiring acute NIV.

Summary

Across all audit periods, acute NIV is usually employed as the ceiling of therapy in a ward-based setting. Its utilisation does reflect the evidence-base for the majority of patients, but is often attempted in situations where there is a high risk of failure (severe acidosis and consolidation). Such treatment plans and outcomes perhaps reflect the evolution of acute NIV services within the UK. The development of UK acute NIV services was driven, at least in part, by key evidence demonstrating that the early use of NIV in a ward setting clearly benefited patients with COPD exacerbations complicated by acidotic ventilatory failure (1). In light of the current audit data, it is timely to reiterate the findings of this study, now more than a decade after publication. As noted clearly by the authors, a survival benefit was demonstrated in those with milder acidotic ventilatory failure (pH 7.30 – 7.35). However, no significant benefit was identified in those with a pH < 7.30. They argued that patients presenting with more severe acidosis should be managed in a more intensive environment. Ward-based NIV has expanded in the UK, whereas its use within ICU in acute COPD patients remains uncommon. There are also significant issues around access to higher dependency areas in the UK, where ICU bed provision is extremely limited; the UK has 3 ICU beds per 100,000 population, whereas Germany has 25, for example (2). Even assuming an expertise in acute NIV and a willingness to treat, current UK ICU services would struggle to meet the possible demand. In the current audit, 43% of the whole cohort presented with pH < 7.25.

One solution, of course, is the earlier delivery of care when possible and this returns us to the principle of the ward-based study (1). Alongside appropriate patient selection, the successful delivery of acute NIV relies upon timing; once a downward spiral of worsening ventilatory failure towards hypercapnic coma develops, then its reversal with acute NIV becomes increasingly difficult. This audit did not look at “door to mask” time or factors affecting it, but the progressive fall in pre-NIV pH values suggests an increasing opportunity to intervene at an earlier stage. It is perhaps timely that next year will see a wider analysis of primary and secondary care outcomes in patients with COPD. The core aim of this COPD audit programme is to drive improvements in the quality of care and services provided for COPD patients. It will provide a greater understanding of the patient journey during severe exacerbations. It is hoped that this will identify further strategies to improve the delivery of acute NIV in this patient group, and that this may be transferrable to other patients.

With the national secondary care COPD audit covering data collection in secondary care between February – April 2014, the next NIV audit will take place in early 2015. The strength of the current NIV data rests in the large numbers of real-life outcomes that are available. The British Thoracic Society sincerely thanks all who have participated to date and we look
forward to a successful audit in 2015. Such national benchmarks are essential in striving to improve the delivery of care. Overall, the findings reinforce the need to continue to focus upon achieving the best quality of care in patients with a proven indication for acute NIV and to consider the most appropriate time and location for this care to be delivered.

November 2013

References


Emergency Oxygen Audit Report 2012

Audit Period: 15 August - 15 November 2012
Dr B Ronan O’Driscoll

The British Thoracic Society (BTS) Guideline for Emergency Oxygen Use in Adult Patients (1), the first national (or international) guideline on this topic, aimed at simplifying oxygen delivery and enhancing the management of acutely ill patients, was published in October 2008.

The Guideline was prepared by a multidisciplinary working group and published with the endorsement of 22 professional institutions, across emergency medicine, intensive care, physiotherapy, primary care, anaesthetics and the ambulance service.

The Guideline’s key recommendations include:

• Oxygen therapy should be adjusted to achieve target saturations rather than giving a fixed dose to all patients with the same disease.
• Oxygen will require a prescription in all situations except for the immediate management of critical illness.

The fifth audit of emergency oxygen use in UK hospitals took place in August – November 2012.

The 2008 baseline audit provided data from 99 hospitals, involving 14,830 patients in 712 wards. The 2009 audit gave data from 47 hospitals, involving 7,113 patients in 300 wards. The 2010 audit obtained data from 90 hospitals, involving 22,017 from 1026 wards. The 2011 audit collected data from 156 hospitals, involving 41,009 patients in 1919 wards.

In 2012, 145 hospitals submitted data on 38,094 patients in 1733 wards.

A summary of the main elements of the audits over the past 5 years is given in Table 1.

In 2008, 32% of patients who were using oxygen had some sort of written order for oxygen use. In 2012, this figure had risen to 52% of patients.

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent on Oxygen</td>
<td>17.5%</td>
<td>18.4%</td>
<td>15.5%</td>
<td>13.7%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Target Range</td>
<td>10%</td>
<td>40%</td>
<td>41%</td>
<td>43%</td>
<td>46%</td>
</tr>
<tr>
<td>No Written Order</td>
<td>68%</td>
<td>31%</td>
<td>44%</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Percent of all hospital patients on oxygen with no written order</td>
<td>11.9%</td>
<td>5.7%</td>
<td>6.8%</td>
<td>7.1%</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

The national audits from 2008 to 2011 have shown that oxygen prescribing has improved since the publication of the BTS Emergency oxygen Guideline in October 2008 but many patients were still being given oxygen with no prescription in late 2012 and there is some evidence that clinical staff may not always respond appropriately to patients with high or low oxygen saturation levels.

The 2013 National Emergency Oxygen Audit takes in August - November 2013 and further details are available on the BTS audit system at: https://audits.brit-thoracic.org.uk/

May 2013
Paediatric Asthma Audit Report 2012

Audit Period: 1 - 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.

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.

Table 2: Sex and age profile of children submitted over the last 3 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Sex (males)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>62.8</td>
<td>1 - &lt;2 yrs</td>
</tr>
<tr>
<td>2010</td>
<td>63.9</td>
<td>2 - &lt;5 yrs</td>
</tr>
<tr>
<td>2011</td>
<td>59.4</td>
<td>5 - &lt;12 yrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 12</td>
</tr>
</tbody>
</table>

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.

These data have 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.
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 received ipratropium, and will be switched to spacer treatment when their condition has improved sufficiently. 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.

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

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.

### Table 3

<table>
<thead>
<tr>
<th>Age group</th>
<th>Initial Respiratory rate</th>
<th>Minimum</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - &lt;2 yrs</td>
<td>22</td>
<td>45</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>2 - &lt;5 yrs</td>
<td>15</td>
<td>42</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>5 - &lt;12 yrs</td>
<td>14</td>
<td>32</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Over 12</td>
<td>14</td>
<td>26</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Pulse rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - &lt;2 yrs</td>
</tr>
<tr>
<td>2 - &lt;5 yrs</td>
</tr>
<tr>
<td>5 - &lt;12 yrs</td>
</tr>
<tr>
<td>Over 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Saturation Measured in Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - &lt;2 yrs</td>
</tr>
<tr>
<td>2 - &lt;5 yrs</td>
</tr>
<tr>
<td>5 - &lt;12 yrs</td>
</tr>
<tr>
<td>Over 12</td>
</tr>
</tbody>
</table>

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

### Figure 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.

### Figure 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.

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.

Figure 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.

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)

August 2013
Paediatric Pneumonia Audit Report 2012-13
Audit Period: 1 November 2012 - 31 January 2013
Dr Anne Thomson

A record number of hospitals took part in the BTS Paediatric Pneumonia audit last winter (data collection from November 2012 – January 2013). 127 hospitals submitted data on 3,571 patients. Admissions were mainly in young children with 26% aged 1–2 years and 73% of cases under the age of 5 years. There was a male predominance (53%) consistent with previous years. At admission 41% of children had oxygen saturation less than 92% (Figure 1), 29% a temperature exceeding 39o C and 26% were wheezing; all features consistent from year to year.

The BTS guidelines are clear that investigations do not aid management and should be selective, but just over 50% of cases had blood cultures taken, and disappointingly other blood investigations including blood count and CRP were unchanged from last year and performed in 63% of cases.

A causative organism was found in 18% of cases with RSV identified in 157 cases (4% of total and 23% of cases investigated for viral ideology); influenza was responsible for 48 cases (cf 12 in 2011/12) and adenovirus 24 cases. S. pneumoniae was the commonest bacterial aetiology (53 cases) and Group A streptococcus was found in 10 cases. S. Aureus was seen in 16 patients with 3 cases of methicillin resistance. M. pneumonia was thought to be the causative organism in 16 cases.

Guideline advice on antibiotic choice was not followed with oral amoxicillin prescribed for only 17% of cases (stubbornly the same as in 2011/12) and amoxicillin with another antibiotic for a further 11%. The commonest oral (n = 1070) and intravenous antibiotic used was co-amoxiclav with oral azithromycin also popular. There was a small decrease in the number of children receiving any iv antibiotics from 52% to 50%. The evidence is that most children will do well on oral antibiotics, oral antibiotics are cheaper, and oral co-amoxiclav is twice the price of amoxicillin, so considerable savings are possible in some hospitals.

Most children improved rapidly with a median hospital stay of 2 days; 81% were discharged within 4 days. Only 4% of children experienced complications but despite this 31% of children had a hospital follow up (down from 33% in 2011/12) and 11% a follow up chest x-ray. It is difficult to see why so many children are being followed up in hospital. If only 8% were seen for follow up (double the number of those with complications) then at 20 minutes per follow up appointment and a tariff of £125 there would be a saving to the NHS of 273 hours of paediatric time and £102,625.

Figure 1. Lowest Saturation in Air
The new National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme

The National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme for England and Wales is led by the Royal College of Physicians (RCP), working in close partnership with a number of organisations including the British Thoracic Society (BTS), British Lung Foundation (BLF), Primary Care Respiratory Society (PCRS-UK) and Royal College of General Practitioners (RCGP). The audit programme is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP).

This new audit programme brings together primary care, secondary care, rehabilitation and patient experience, marking a ground breaking partnership approach with multidisciplinary, collaborative working to drive improvements in the quality of care and services provided for COPD patients. The programme supports the Department of Health’s (DH) aims to improve the quality of services for people with COPD, by measuring and reporting the delivery of care as defined by guidance standards.

Through extensively and innovatively collecting and linking data, which maps the patient journey, the audit programme will enable the comparison of performance and practice, highlight variations in patient care and outcomes, and seek to innovatively drive up standards of patient care.

The new national COPD audit comprises five key elements:

1. Primary care audit – Extraction of audit data via remote access from General Practice patient record systems.
2. Secondary care snapshot audit – Snapshot audits of admissions to hospital with COPD exacerbation and outcomes at 30 and 90 days.
4. Organisational snapshot audits – Snapshot audits of the resources and organization of COPD services in Secondary Care and Pulmonary Rehabilitation.
5. PREMs – One year development work exploring the potential/feasibility for Patient Reported Experience Measures to be incorporated into the audit programme in the future.

Work started some time ago to develop the Secondary Care audit, and following a short pilot audit in September/October 2013, the main data collection for the secondary care audit will open in February 2014. This element of the audit programme will comprise two parts: an audit of COPD exacerbations and, second, a survey of organisation/resourcing of COPD care within Units. The datasets have been developed and refined during 2013 by a small working group, with input from NHS and BTS COPD leads. The clinical dataset will focus on the provision of timely care, recording of key clinical information, managing respiratory failure, oxygen therapy, the in-patient stay and integration of care at discharge.

Work has also begun to develop the Pulmonary Rehabilitation element of the audit, which will take account of the forthcoming BTS Quality Standards for Pulmonary Rehabilitation which are based on the recently published BTS Guideline on Pulmonary Rehabilitation in adults.

More information on the COPD audit programme as a whole, and the secondary care and pulmonary rehabilitation elements in particular will be available via the RCP and BTS websites over the coming weeks.

The national COPD audit programme currently covers England and Wales only (as the funding provided via the NCAPOP programme does not include Scotland and Northern Ireland). We are very much aware that colleagues in Scotland, NI and the Channel Islands may wish to audit their practice in both secondary care and pulmonary rehabilitation, and while this presents challenges in relation to commissioning and Information Governance rules that differ from country to country, the COPD Audit Programme team are looking at ways in which this could be achieved.

All enquiries to audittools@brit-thoracic.org.uk and more information can be found on the RCP website: www.rcplondon.ac.uk/COPD

The British Thoracic Society is working closely with the RCP to provide the secondary care and pulmonary rehabilitation elements of the audit programme, under the clinical leadership of Dr Robert Stone and Dr Michael Steiner respectively.
**COPD Audit Programme**

**Important dates:**

<table>
<thead>
<tr>
<th>Audit</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>National COPD Audit - secondary care snapshot audit - clinical cases</td>
<td>1/2/2014 - 30/4/2014</td>
</tr>
<tr>
<td>Data entry to be completed by 31/5/2014</td>
<td></td>
</tr>
<tr>
<td>National COPD Audit - secondary care snapshot audit - organisational information</td>
<td>1/2/2014 - 30/4/2014</td>
</tr>
<tr>
<td>Data entry to be completed by 31/5/2014</td>
<td></td>
</tr>
<tr>
<td>National COPD Audit - pulmonary rehabilitation snapshot audit - clinical cases</td>
<td>Expected audit period - November 2014 onwards Dates to be confirmed</td>
</tr>
<tr>
<td>National COPD Audit - pulmonary rehabilitation snapshot audit - programme information</td>
<td>Expected audit period - November 2014 onwards Dates to be confirmed</td>
</tr>
</tbody>
</table>

**BTS Audit Programme: 2013/15**

<table>
<thead>
<tr>
<th>Audit</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Emergency Oxygen Audit:</td>
<td>15 August – 1 November 2013</td>
</tr>
<tr>
<td>Data entry: 15 August 2013 - 1 November 2013</td>
<td></td>
</tr>
<tr>
<td>National Paediatric Bronchiectasis Audit:</td>
<td>1 October – 30 November 2013</td>
</tr>
<tr>
<td>Data entry: 1 October 2013 to 31 January 2014</td>
<td></td>
</tr>
<tr>
<td>National Paediatric Asthma:</td>
<td>1 November – 30 November 2013</td>
</tr>
<tr>
<td>Data entry: 1 November 2013 – 31 January 2014</td>
<td></td>
</tr>
<tr>
<td>National Pleural Disease:</td>
<td>1 June – 31 July 2014</td>
</tr>
<tr>
<td>Data entry: 1 June 2014 – 30 September 2014</td>
<td></td>
</tr>
<tr>
<td>National Bronchiectasis Audit:</td>
<td>1 October – 30 November 2014</td>
</tr>
<tr>
<td>Data entry: 1 October 2014 to 31 January 2015</td>
<td></td>
</tr>
<tr>
<td>National Paediatric Pneumonia Audit:</td>
<td>1 November 2014 – 31 January 2015</td>
</tr>
<tr>
<td>Data entry: 1 November 2014 - 31 March 2015</td>
<td></td>
</tr>
<tr>
<td>National Adult Community Acquired Pneumonia Audit:</td>
<td>1 December 2014 – 31 January 2015</td>
</tr>
<tr>
<td>Data entry: 1 December 2014 to 31 May 2015</td>
<td></td>
</tr>
<tr>
<td>National Adult NIV Audit:</td>
<td>1 February 2015 – 31 March 2015</td>
</tr>
<tr>
<td>Data entry: 1 February 2015 to 31 May 2015</td>
<td></td>
</tr>
<tr>
<td>National Emergency Oxygen Audit:</td>
<td>15 August 2015 – 1 November 2015</td>
</tr>
<tr>
<td>Data entry: 15 August 2015 - 1 November 2015</td>
<td></td>
</tr>
<tr>
<td>National Adult Asthma Audit:</td>
<td>1 September – 31 October 2015</td>
</tr>
<tr>
<td>Data entry: 1 September 2015 to 15 January 2015</td>
<td></td>
</tr>
</tbody>
</table>

https://audits.brit-thoracic.org.uk/

auditools@brit-thoracic.org.uk