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BTS National Respiratory Audit Programme Annual Report 2011/12

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Introduction

The 2011/12 annual report for the British Thoracic Society National Respiratory Audit Programme shows the scale of the Society’s contribution to quality improvement activities in respiratory care.

A major feature of the past year, which is not apparent from the individual reports reproduced in this document, has been the increased level of engagement with the Department of Health in England and with other agencies - the National Advisory Group on Clinical Audit and Enquiries (NAGCAE) and the Healthcare Quality Improvement Partnership (HQIP), as well as the Royal College of Physicians, London, and the NHS Lung Improvement Programme. This has improved our external profile and reputation for delivering effective tools for quality improvement and makes BTS a major partner with RCP London and other respiratory care organisations in the next round of national COPD audit (see page 19).

The individual audit reports show increasing numbers of contributing sites and cases and even some evidence of improving practice in some – clearly the national reports which summarise data from many contributing sites will only show improving trends where major changes in practice have occurred. We have always posted summaries of national audits on line, but publication of these in Thorax has been a recent development, which subjects the data to peer review and preserves reports in a publicly accessible/quotable format. We continue to work on ways to help contributing sites to evaluate results and work on improving the process of care, since this is the key requirement if deficiencies are identified in order to effect change.

Developmental work is still underway to present the variability of key care processes in more statistically meaningful ways in order to allow outliers to identify themselves more easily. We are working on adding funnel or caterpillar plots for key items to the existing reports

Our collaboration with the NHS Lung Improvement Programme has led to a major evaluation of care bundles for COPD and CAP being led by Dr James Calvert, chairman of the BTS Professional and Organisational Standards Committee, and consultant respiratory physician in Bristol. This joint BTS/NHSI project has now recruited participating sites and is in the early stages of implementation. 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 improvements activities. Further details are available on the BTS website at:


All of this activity means that the BTS Audit Programme, which has been in place for 3 years now, is both dynamic and developing. 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, and Dr Anne Thomson, for their ongoing leadership and advice.

The Head Office team, Sally Welham, Chris Routh, and Mary Stapleton, working with the BTS IT experts, Kerry Reid and Luke Wilson, continue to support this expanding programme which I commend to Dr Jim Finnerty, Consultant Respiratory Physician at the Countess of Chester Hospital, as he takes on the role of BTS Audit Programme Director at the 2012 BTS AGM in December.

Dr Christine E Bucknall

BTS Audit Programme Director

December 2012
Adult Asthma Audit Report 2011
Audit Period: 1 September - 31 October 2011
Dr John Lindsay, Professor Liam Heaney

Introduction

This audit looks at hospital admissions due to asthma and builds on the information from similar audits in previous years. Responses were received from 114 hospitals in 100 different trusts; there were 2093 submissions in total. This is a larger number from 2010 when there were 87 hospitals and 1932 submissions. The audit looks at the admission assessment and subsequent management in hospital, discharge and follow-up.

Assessment at admission

In the 2011 audit, 69.4% of patients admitted were female. This female preponderance has been the observed pattern in previous audits, and is similar to the 2010 audit (68.4%). Difficult-to-manage asthma tends to have a female preponderance 1,2, and the gender difference in this audit may be a manifestation of this, although the precise reason cannot be identified.

Disappointingly, there remains a high readmission rate, which has remained relatively static in recent years. The audit reveals that 9.5% of admissions were readmissions within 1 month, which represents a rise from 7.4% in 2010. There was also a rise in the number of those readmitted between 3 and 12 months after original discharge: 15.10% in 2011 compared with 12.32% in 2010. Patients who had not been admitted in the previous year and those who had never been admitted totalled 60.5%, a fall from 66.7% in 2010. The overall picture remains disappointing, given the strong evidence base for asthma action plans with resultant avoidance of hospital admission, and further focus is necessary on this specific issue.

As with previous audits, initial assessment remains sub-optimal and in the current audit, there was a further disappointing fall in the number of peak expiratory flow (PEF) measurements being carried out at presentation. This seems surprising given that it is a simple but key method of stratifying severity and treatment plan (81.4% of admissions had PEF observed in 2011, compared with 86.2% in the previous year and 87.4% in 2009). There was a fall in peak flow observations recorded post-bronchodilator: 36.6% compared with 39.3% in 2010 and again this is disappointing as this is also a fundamental step in initial management, specifically informing the decision to admit to hospital.

Oxygen saturation was documented in 96.2%, compared with 97.5% in 2010. Although this is a reassuringly high figure, it seems disappointing that it does not hit 100%, given the ease with which it is measured – this may relate to documentation. Interestingly, there were fewer patients with oxygen saturations less than 92% on air in the 2011 audit (16.2% compared with 19.0% in 2010), but as before, there is concern that arterial blood gases were only performed on 72.0% of these patients (17.2% of these patients had hypercapnia). This is a BTS/SIGN Guideline recommendation 3 and one can only speculate about why the low oxygen saturation does not trigger a blood gas measurement. Many of the concerning findings related to assessment have been consistent in recent years, and future audits should try and identify the reasons for some of these important deficiencies.

Discharge from Hospital

Systemic steroids take some time to work, thus early administration is central to all acute asthma management guidelines 1,5,6. They were initiated within one hour of arrival at hospital in 39% of cases, unchanged from 2010 and in a further 7% they had been commenced by their GP in the preceding six hours (Figure 1). A small number of subjects consistently do not receive them, (5% in 2011 and 3% in 2010). This is unlikely to be due to failure of documentation, as the audit has a section for “No Data / Not Recorded” (2% of patients), therefore implying an active omission of steroids, which may be due to patient choice.

Management in hospital

Smoking status has been incorporated into the 2011 audit. Interestingly, 32.5% of patients admitted to hospital were current smokers and a further 18.8% were ex-smokers. The British Heart Foundation Statistics Database reported the prevalence of current cigarette smoking in the UK to be 21% in 2008 4, so a significantly greater number of asthmatics reported themselves to be smokers over the general population data. The prevalence of cigarette smoking amongst adult asthmatics in the UK and USA has been cited to be between 17% and 35% 4, so the figure from the audit is at the upper end of this estimation. There is evidence that smoking causes steroid resistance in asthma 4,6 and it may also be that smoking is associated with other ‘risk’ behaviours, which may make this group more likely to be admitted to hospital.
in 2010). Again, the audit does not identify why almost one fifth of these new cases are not being started on appropriate treatment; it would be important to explore this in future audits.

Non-adherence with medication was deemed to be present in 9% of cases, which is the same as 2010. This is very likely to be a gross underestimation – non-adherence is poorly identified by clinicians and poorly reported by patients unless objective measures are utilised and is associated with admission to hospital\(^9,10\). It seems likely that a more systematic approach to non-adherence would identify the true prevalence and allow it to be targeted at the time of admission.

Approximately a quarter (25.7%) of admissions had a step-up in their maintenance treatment prior to discharge, although it is difficult to interpret the appropriateness of this intervention. Only 44.9% of these patients had documented evidence of inhaler technique review, with a further 35.2% of “No data/Not recorded” (Figure 2). This figure is disappointing, particularly since it is also noted that of the 927 patients who had their technique assessed, a quarter (23.19%) were found to have poor technique which improved with education. Given that their poor inhaler technique is likely to have been a key factor in relation to the exacerbation, the necessity of such assessments is important. A further 7.12% of patients needed a change of inhaler on the grounds of their inhaler technique.

Follow-up plans for patients in this audit are very similar to those obtained in previous reports (Figure 3); 68.6% had a review in hospital planned within the four weeks following discharge and only 37.2% were advised to attend their GP within 7 days of discharge. An admission with asthma represents an opportunity to review the reason for the admission and put in place an action plan for future events. Disappointingly, only 41% had a written action plan on discharge suggesting this important opportunity is being missed in the majority of patients. More widespread implementation of action plans and review of inhaler technique are likely to have a significant impact on readmission rate and clearly more work is needed in this area.

**Conclusion**

The 2011 BTS audit, as in previous years, gives a revealing insight into the acute management of asthma throughout the UK, and highlights a number of deficiencies, which disappointingly have been consistently identified in recent years. Plans should be put in place to address deficiencies in implementation of action plans and inhaler technique and medication adherence. Smoking asthmatics need to be specifically targeted and educated, given that 33% of all admissions were current smokers. Future audits should be more ambitious and try and identify why some of the deficiencies are occurring to allow strategies to address these in the future.

**References**


FIGURES - Adult Asthma Audit Report

Figure 1 – Timing of administration of first dose of systemic corticosteroid

- No data/not recorded (2%)
- No steroid therapy given (3%)
- Given by GP within 6 hours of admission (7%)
- Less than 24 hours after arrival at hospital (2%)
- More than 4 hours after arrival at hospital but less than 24 (14%)
- Between 1 & 4 hours (31%)
- Within 1 hour of arrival at hospital (39%)

Figure 2 – Results of inhaler technique check (only 45% of patients with observations)

- Poor and needed change of inhaler (7%)
- No comment on technique (12%)
- Initially poor, improved with education (23%)
- Good (58%)

Figure 3 – Follow-up arrangements

- No data/not recorded (2%)
- No steroid therapy given (5%)
- Given by GP within 6 hours of admission (7%)
- Less than 24 hours after arrival at hospital (2%)
- More than 4 hours after arrival at hospital but less than 24 (14%)
- Between 1 & 4 hours (31%)
- Within 1 hour of arrival at hospital (39%)
Bronchiectasis Audit Report 2011
Audit Period: 1 October - 30 November 2011
Dr. Adam T. Hill, Sally Welham, Kerry Reid, Dr. Christine Bucknall

Thank you to everyone who participated in the second BTS secondary care audit of non-cystic fibrosis bronchiectasis. The audit captured data from the period of 1 October until 30 November 2011. Standards for the audit were drawn from the BTS Guideline for non-CF Bronchiectasis and is available from: http://www.brit-thoracic.org.uk/clinical-information/bronchiectasis/bronchiectasis-guideline-(non-cf).aspx. We present the gold standards and the results from the National Audit.

Patient profile
There were 2,404 records throughout the UK from 93 institutions. 62% of those participated were female with a mean (SD) age of 64 years ± 16. From the sputum microbiology in the preceding year Pseudomonas aeruginosa, MRSA or enteric gram negative organisms (latter if isolated on two or more occasions (e.g. E Coli)) were isolated in 26%. In the group with Pseudomonas aeruginosa or enteric gram negative organisms, 18% were resistant to ciprofloxacin and 9% to gentamicin. In the last year the mean (SD) number of exacerbations was 2.6 (2.5).

Standard 1
90% of patient diagnosed with bronchiectasis should have had the diagnosis confirmed with a chest CT.

In this audit, 93% were diagnosed with a CT of the chest, 1% by bronchogram, 2% had a clinical diagnosis only and 4% there was no data.

The first standard was met.

Standard 2
90% of patients diagnosed with bronchiectasis should see a respiratory physiotherapist.

In this audit, 69% said their patient had seen a respiratory physiotherapist, 18% said no and in 14% there was no data.

The second standard was not met which is in keeping with clinical experience that not all patients with bronchiectasis have a respiratory physiotherapist to be taught chest clearance techniques.

Standard 3
All patients being seen should have a record of cough, sputum purulence, estimated or measured 24 hour sputum volume and breathlessness when clinically stable.

In this audit, 73% recorded cough, 66% sputum colour, 54% 24 sputum volume and 62% breathlessness.

The third standard was not met. These standardised questions allow a consistent assessment to help the ongoing management of such patients.

Standard 4
All patients diagnosed with bronchiectasis should have there immunoglobulins and protein electrophoresis checked along with Immunoglobulin E (IgE) and IgE to aspergillus or skin prick testing to aspergillus and for those aged <40 years old tests to exclude cystic fibrosis (CF).

In this audit, 73% had their immunoglobulins checked, 60% had serum sent for protein electrophoresis, 62% had IgE measured and 54% had aspergillus fumigates RAST or skin prick test to aspergillus. For those aged <40, 33% had CF gene analysis and 46% had a sweat test carried out.

The fourth standard was not met. This is an area that would merit improvement to standardise baseline investigations in secondary care for all patients with bronchiectasis. The management of patients may differ if an immunodeficiency or CF was identified.

Standard 5
All children who are old enough (usually age over 5 years) and adults should have measures of FEV1, FVC and PEF. Repeat assessment of FEV1, FVC and PEF should be made at least annually in those patients attending secondary care. FEV1 and FVC should be measured before and after intravenous (IV) antibiotic therapy as this may give objective evidence of improvement. Spirometry should be measured in all patients before and after commencing long term oral or nebulised antibiotic therapy.

In this audit, 30% had PEFR measured and 55% had spirometry measured at day of consult. 17% had received IV antibiotics in the past 1 year. For patients that received IV antibiotics, 22% had spirometry assessed before and after a course of IV antibiotics, 56% did not and 22% there was no data. 10% had received nebulised antibiotics for more than 28 days within the past 12 months. Of those receiving nebulised antibiotics, 61% had spirometry checked at the start and later on during the treatment, 13% did not and 26% there was no data. On those
that were on nebulised antibiotics, 83% had spirometry checked at least 6 monthly.

The fifth standard was not met. Spirometry may be useful to monitor disease progression and response to treatments.

**Standard 6**

This was a snapshot view on the frequency of what long term patients were being prescribed. 78% were on inhaled corticosteroids with a mean (SD) dose of 1094 (679) mcg/day. This is despite the guidelines not recommending the long term use of inhaled steroids unless there is clear clinical benefit or those with co-existent asthma or COPD. The audit did not provide any data on these.

Regarding bronchodilators, 67% were on a short acting beta 2 agonist and 9% were on a short acting anticholinergic. 62% were on a long acting beta 2 agonist and 30% on a long acting anticholinergic.

For agents that improve mucociliary clearance 30% used carbocysteine, 8% nebulised saline (37% used 0.9% saline and the remainder used higher concentrations varying from 3-7%), 0.4% used inhaled mannitol and 0.2% nebulised DNAase.

Regarding long term antibiotics 33% used long term oral antibiotics (>28 days) and 10% nebulised antibiotics (76% nebulised colomycin, 12% gentamicin and 6% tobramycin).

**Standard 7**

90% of patients with an exacerbation should have a sputum sample sent for microbiological culture prior to empirical antibiotic treatment.

In this audit, 57% did, 33% did not and 10% no data.

The seventh standard was not met. Monitoring sputum microbiology is key to providing appropriate antimicrobial prescribing.

**Standard 8**

Pulmonary rehabilitation should be offered to individuals who have MRC grade three breathlessness affecting their activities of daily living.

In this audit, 52% this was not applicable and 16% no data. 15% had been referred but 13% had not. 5% were unable to participate in pulmonary rehabilitation.

The eighth standard was not met. Pulmonary rehabilitation in such patients has the potential to improve patients exercise capacity and general wellbeing.

**Summary**

This national audit has provided a key snapshot how non cystic fibrosis is managed in secondary care. The majority of standards were not met. The profile of bronchiectasis has been very low and it is hoped that the implementation of national guidelines, audit and research these will raise the profile of the disease. The standards from the BTS guideline would be good quality indicators and will be useful to monitor in future audits.

**Reference**

Adult Community Acquired Pneumonia Audit Report 2011/12

Audit Period: 1 December 2011 – 31 January 2012
Dr Wei Shen Lim, Dr Chamira Rodrigo

The national BTS adult community acquired pneumonia (CAP) audit has run for the last 3 years with 5430 patients from 104 institutions captured in the latest audit period over the winter of 2011/2012. This summary describes facets of the national picture and initiatives arising.

Patient profile and outcome: The median age of cases was 77 years (range 63-85); 71.3% were aged ≥ 65 years. Based on the CURB65 score, 43.5% of patients had low severity CAP (score 0 to 1), 29.0% moderate severity CAP (score 2) and 27.5% high severity CAP (score 3 to 5). The median length of stay (LOS) was 5 days (range 3-10) and critical care admission (ICU) was required in 5.9%. Overall, 18.5% patients died while an in–patient within 30 days of admission. These figures were comparable to previous years – 2009/10 LOS 5 days, 7 % ICU; 2010/11 LOS 5 days, 8 % ICU.

Processes of care & antibiotic use: A chest x-ray was obtained within 4 hours of admission in 83.6% of patients, and the first dose of antibiotics was given < 4 hours after admission in 58.7%. This was relatively unchanged over 3 years (Fig 1). Patients admitted via Emergency Departments (EDs) were more likely to have a CXR and receive antibiotics within 4 hours, compared to other patients (90.2% v 77.1% and 67.9% v 55.9% respectively).

Figure 1: Comparison of processes of care over 3 years

Antibiotics were given in accordance with local CAP guidelines in 51.7% of cases. Overall, initial empirical antibiotics were given intravenously in 74% (n=4016) of cases. A beta-lactam + macrolide combination was given in 44.4%, 50.3% and 55.1% of cases with low, moderate and high severity CAP respectively.

Of 318 patients admitted to ICU, 85 were mechanically ventilated and 39.6% died. Of 305 patients who received NIV, 35.7% had underlying COPD and only 52% were managed in ICU.

Specific considerations:
- Adherence to CAP antibiotic recommendations, including the use of combination (beta-lactam + macrolide) antibiotics in patients with moderate and high severity CAP has been shown in the BTS audit dataset (see Figure 2) and in other cohort studies to be associated with improved outcomes. Currently, around 45 – 50% of patients with moderate and high severity CAP are empirically treated with single agent beta-lactams alone. Further efforts to determine reasons for this, and to improve guideline adherence where appropriate, are needed.
- The value of NIV in patients with CAP remains unproven. Delay to intubation has been associated with a worse outcome. Therefore, it is recommended that if a trial of NIV is indicated, it should only be conducted in a critical care area where immediate expertise is available to enable a rapid transition to invasive ventilation.
- Overall, there has been comparatively little change in CAP care over 3 years. The hurdles facing local respiratory services in influencing practice in emergency and acute medicine departments can be considerable. Together with NHS Improvement, the BTS have started a pilot of a CAP Care Bundle in collaboration with 25 hospitals, each with high-level trust support for the pilot. The BTS is also working with the Department of Health Respiratory Programme Board to develop broader strategies to improve the care of patients with CAP. Hopefully, the fruit of these initiatives will provide seed for local improvement programmes in the near future.

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.
Figure 2: Association of mortality and empirical antibiotic choice according to CAP severity: data from the BTS CAP Audit years 2009 to 2011. (Figure drawn from data reported in ref 2)

References


Adult NIV Audit Report 2012

Audit Period: 1 February - 31 March 2012

Dr Mike Davies

The third BTS national acute non-invasive ventilation (NIV) audit continues to build on the preceding two and is the biggest yet. 130 hospitals have submitted data on 2490 patients, an increase of 14% on last year. Sincere thanks to Dr Craig Davidson, who stands down this year, for leading such a successful audit to date.

Patient characteristics

The average age in 2012 was 72 years (56% female). Of the 2490 patients, 42% were documented to have a poor performance status (very limited, or bed/chair-bound) prior to admission and a further 38% were limited, but self-caring. 26% had been treated with acute NIV previously.

COPD was the presumptive diagnosis in 70%, Obesity-hypoventilation in 9% and cardiogenic pulmonary oedema in 10%. However, spirometry measurements were available in only 22% patients in whom a diagnosis of COPD was listed. This limited use of simple diagnostic tests in respiratory patients is consistent with other studies and contrasts with the widespread utilisation of echocardiography in patients with suspected heart failure.

Oxygen-associated hypercapnia (toxicity) was felt to be implicated in 453 patients (18%), a slight reduction in comparison to 2011, but remaining significant nonetheless. Hospital teams appear to be more aware of the danger of excessive oxygen than in previous years (52% of the total in 2012 vs. 62% in 2011). More important is the real increase in pre-hospital oxygen toxicity. Ambulance services should provide acutely unwell COPD patients with 28% oxygen (unless in extremis). The importance of these universal recommendations is emphasised.

Outcomes

A notable finding across the three audits is the marked consistency of blood gas measurements. This year, median PaCO₂ at the start of NIV was 10.2 kPa, falling to 8.9 kPa at 1-2 hours, and 8.3 kPa by 4-6 hours. Median pH was 7.25 at the onset of NIV, 7.30 at 1-2 hours and 7.33 at 4-6 hours. Positive findings include the fact that fewer non-hypercapnic patients are being treated with NIV in a non-ITU setting (6.3% in 2012 vs. 8.4% in 2011). In addition, non-acidotic patients appear less likely to be treated with NIV (13.3% in 2011, 9.5% in 2012), suggesting increasing adherence to guidelines.

NIV was documented to be an effective therapy in 69% (68% in 2011). NIV failure was noted in 27%, and a further 2.7% failed NIV, but proceeded to intubation (Figure 1). In keeping with blood gas results, ventilator modes and settings were similar to previous audits. NIV was employed for an average of 15 of the first 24 hours at median pressure settings of IPAP 16.5 cmH₂O and EPAP 5 cmH₂O. As reported last year, such IPAP pressures are quite modest. This year, less than 10% patients reached an IPAP > 20 cmH₂O by the first hour and a further 9% received IPAP < 10 cmH₂O. Whether there is any link between ventilatory settings and outcome cannot be determined from the data available. However, the most common reason for NIV failure was a worsening PaCO₂ or conscious level (45%), suggesting a role for more aggressive early optimisation of ventilation. There is clearly a therapeutic window for some and it would be interesting to see if a shift towards increased IPAP in subsequent audits leads to an improved rate of NIV success.

The medical notes document a plan for NIV failure in 76%. In those recording a plan, NIV was the ceiling of therapy for 66% and there was a plan to proceed to intubation for 17%. Doctors below ST3 grade appear less likely to be making decisions about what to do if NIV fails (FY2 1.2%, ST1–2 3.3%, ST3+ 34.5%, consultant 38.9%, not recorded 21%). There remains a mix of speciality involvement in decision-making; respiratory in 45%, acute and general medicine in 38%, and intensivists in 12%.

Deaths due to a respiratory cause for the whole group were 26% (25% in 2011). Unsurprisingly, outcomes were poor in the group failing on NIV, in whom 74% died due to a respiratory cause. Intubation rates remain low (2.7% total vs. 3.8% in 2011 and 2.3% in 2010). However, outcomes following invasive ventilation were perhaps encouraging with respiratory mortality recorded at 33%. The reasons around the low rate of referral to ITU cannot be determined, but one hopes that therapeutic nihilism is not relevant here. The data does show that most patients failing on NIV with a prior plan for intubation do actually proceed to intubation. Whether a greater proportion should be considered is uncertain. Whilst prior performance status is only one of the factors considered, attention is drawn to the fact that 13% of the total group were unrestricted / restricted on strenuous exertion beforehand, and 38% were limited, but self-caring.

Regarding patient selection, those with probable pneumonia continue to receive acute NIV, with documentation of consolidation in 40%. Treatment intent appeared to be more active in this group, with NIV as the ceiling of therapy in a smaller proportion (52%). Outcome data is available this year and is in keeping with NCROP data. NIV failure was more likely in those with consolidation (34%) than those without (22%); death due to a respiratory cause was also considerably higher (34% vs. 18%...
without consolidation). The 2008 NCROP audit reported the presence of pneumonia in 21% of NIV-treated patients, in whom the mortality was 30% and so our current audit data suggests movement in the wrong direction. If the decision would be to intubate the patient in the event of NIV failure, then this writer feels that the presence of pneumonia should lead to careful consideration of the merits and pitfalls of applying NIV outside an ITU environment.

Median length of stay in this audit was 10 days. Respiratory follow-up was planned for a smaller proportion of patients this year (67%), despite the clear evidence showing high readmission rates and poorer outcomes in this group. Pulmonary rehabilitation was organised for 8%. On discharge, 10% (n = 248) were supported with domiciliary NIV, 32% (n = 534) were discharged home on LTOT and 16% (n = 242) of the total group were issued with an oxygen card. It is noteworthy that the median PaCO2 on discharge was 7.2 kPa. We draw attention to the ongoing UK multi-centre clinical trial (HOT-HMV), comparing domiciliary NIV vs. home oxygen treatment in COPD patients following acute acidotic respiratory failure.

On a positive note, outcomes on NIV in real life remain consistent with results from clinical trials. The 2012 audit tool remains available on the BTS website, enabling units to benchmark their own performance. We are very grateful to those who submitted data in the current audit and have made suggestions regarding the audit tool for 2013. I hope that everyone who participated will continue to provide such valuable data and encourage others to join. This audit identifies a number of areas where simple changes could potentially improve the delivery of care and patient outcomes; more spirometry, more careful consideration of the hypercapnic patient with consolidation, more rigorous decision-making in the event of NIV failure, more IPAP (perhaps), and more follow-up on discharge. Finally, please consider COPD patients for the HOT-HMV trial if available in a centre near to you. Let’s make the 2013 audit one in which we can celebrate a notable improvement in service delivery!

Dr Mike Davies, October 2012

References


**Figure 1 Outcome of NIV**

- No data/not recorded (1.0%)
- Failure but proceeded to intubation (2.7%)
- Failure (27.0%)
- Success (69.3%)
This is the first BTS National Audit looking at the discharge of patients from hospital following an emergency admission for an acute exacerbation of COPD.

Seventy-four acute hospitals in the UK took part and we were able to gather a large sample of 2,428 patients over this two month period.

The results allow trusts to compare their results with the National mean, however the results also show very wide variation in discharge practice.

**Discharge results**

The NCROP National COPD Admission Audit demonstrated in 20101 that readmission within 28 days was not uncommon and following the report several recommendations were made. At that time only about a half of these patients were reviewed by a respiratory specialist. It is therefore of interest that there now appears to be a change and in this audit 81% were reviewed by a respiratory specialist team member prior to discharge (Figure 1).

**Figure 1: Record of respiratory review**

This first audit of COPD discharge has demonstrated wide variation in practice. There has also been significant change and improvement when results are compared with the NCROP data. The use of BTS ‘Care Bundles’ will improve data collection and to improve links with Stop Smoking Services in the community.

**Conclusion**

This first audit of COPD discharge has demonstrated wide variation in practice. There has also been significant change and improvement when results are compared with the NCROP data. The use of BTS ‘Care Bundles’ will improve data collection and care.
References

1. www.rcplondon.ac.uk/resources/national-chronic-obstructive-pulmonary-disease-resources-and-outcomes-project-ncrop

2. www.brit-thoracic.org.uk/Portals/0/Delivery%20of%20RespCare/CareBundleDocuments/BTS%20NHIS%20Care%20Bundle%20project%20document%2026%20July%202012.pdf


4. Morgan MDL. Action plans for COPD self-management. Integrated care is more than the sum of its parts. Thorax 2011;66:935-936

5. www.bmj.com/content/340/bmj.c187
Emergency Oxygen Audit Report 2011

Audit Period: 15 August - 1 November 2011
Dr B Ronan O'Driscoll

The British Thoracic Society (BTS) Guideline for Emergency Oxygen Use in Adult Patients, 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 fourth audit of emergency oxygen use in UK hospitals took place in August – November 2011.

The 2008 baseline audit provided data from 99 Trusts, involving 14,830 patients in 712 wards. The 2009 audit gave data from 51 trusts, involving 7,381 patients in 312 wards. The 2010 audit obtained data from 90 trusts, involving 22,017 from 1026 wards. The 2011 audit collected data from 156 trusts, involving 41,009 patients in 1919 wards.

In 2008, 32% of patients who were using oxygen had some sort of written order for oxygen use. In 2011, this figure had risen to 48% of patients.

A summary of the main elements of the audits over the past 4 years is given in Table 1.

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A summary of the results of the annual implementation audit is given in Table 2.

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<tr>
<td>Oxygen Policy Implemented</td>
<td>6%</td>
<td>21%</td>
<td>37%</td>
<td>89%</td>
</tr>
<tr>
<td>Printed Oxygen Prescription</td>
<td>9%</td>
<td>28%</td>
<td>51%</td>
<td>72%</td>
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<tr>
<td>O2 on Monitoring Chart</td>
<td>7%</td>
<td>34%</td>
<td>33%</td>
<td>58%</td>
</tr>
<tr>
<td>Nurse Training Implemented</td>
<td>7%</td>
<td>13%</td>
<td>18%</td>
<td>31%</td>
</tr>
<tr>
<td>Doctor training implemented</td>
<td>4%</td>
<td>10%</td>
<td>11%</td>
<td>31%</td>
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</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 2011 and there is some evidence that clinical staff may not always respond appropriately to patients with high or low oxygen saturation levels.

The 2012 National Emergency Oxygen Audit takes in August - November 2012 and further details are available on the BTS audit system at:

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

October 2012
Paediatric Asthma Audit Report 2011

Audit Period: 1 - 30 November 2011

Dr James Paton

The BTS Paediatric Asthma Audit has now been running for 15 years. Each November, data on every child with wheezing or asthma over 1 year of age admitted into participating hospitals for more than 4 hours is submitted. It benchmarks a unit’s clinical performance in 5 domains (basic demographic information; initial hospital assessment; initial hospital treatment; discharge planning; and follow-up) against aggregated national data. Since November is generally a busy month for respiratory illness in children, the audits have provided a snapshot of the management of acutely wheezy children at a time when paediatric units are busy.

For the last three years, the paediatric asthma audit (along with the BTS audit of paediatric pneumonia) has been included on the list of National audits approved for inclusion in Department of Health Quality Accounts. This has led to sharp increases in the number of units participating.

This year, 128 participating hospitals entered 3148 cases, the highest number ever and a substantial increase on the previous year (97 Trusts, 2174 cases). Although Quality Accounts only apply to England and Wales data continues to come from all other parts of the UK and one unit overseas.

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Vital signs at initial assessment are also very similar to last year, suggesting the severity of disease at presentation is stable (see table, left).

Essentially all children continue to receive the initial treatments recommended in BTS/SIGN asthma guidelines. So 98 percent received beta agonist bronchodilators with a quarter treated by nebulizer alone, and just over third by spacer alone, and just over third treated by a combination of nebuliser and other devices.

Half the children also received ipratropium. Eighty two percent received corticosteroids.

Vital signs at initial assessment - Median values

<table>
<thead>
<tr>
<th>Resps</th>
<th>2010</th>
<th>2011</th>
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</thead>
<tbody>
<tr>
<td>1-2yrs</td>
<td>44bpm</td>
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For most children, initial treatment is clearly highly effective with short lengths stay of a day or less. The proportion of children receiving second line treatment remained stable with around 3% receiving IV aminophylline, 3% IV Magnesium and % IV Salbutamol and 4% being admitted to ICU.

From the data for 2011, and as noted previously, the area where care remains least well done is around discharge planning.

Thus only 44% of children are recorded as having their device use checked and only 41% are recorded as being given a written discharge plan.

Variability Persists

Like many audits, the asthma audit shows evidence of substantial variation between centres. The two graphs below show the percentage of children in each centre given corticosteroids. For children, 5 years or over where the guideline evidence is clear it can be seen that most centres manage to give all the children they manage corticosteroids. For children under 5 years, where the evidence is evolving and the place of corticosteroids more uncertain, fewer children receive corticosteroids.
One change in this year’s audit was the inclusion of a request for qualitative feedback about what action had been taken previously.

Discharge planning decreases future admissions. This is an area that many units might target for improvement. The evidence of variation here is large – for example, the proportion of children recorded as receiving a written asthma plan or being given one previously varied from 0% to 100%. Since the evidence suggests that good discharge planning decreases future admissions, this is an area that many units might target for improvement.

Evidence suggests that only 10–12% of children presenting with wheezing/asthma should have a CXR. In 2011, 30% of children were X-rayed. Compared with 2009, the graphs suggest that the proportion of children being X-rayed is slowly decreasing.

Previously it was shown that whether a child was X-rayed influenced whether they were then given an antibiotic. Here the data for 2011, are quite striking.

Thus it is clear that the proportion given an antibiotic continues to differ markedly depending on whether the child was X-rayed or not.

It was noted above that discharge planning was an area where improvement needs to be targeted. The evidence of variation here is large – for example, the proportion of children recorded as receiving a written asthma plan or being given one previously varied from 0% to 100%. Since the evidence suggests that good discharge planning decreases future admissions, this is an area that many units might target for improvement.

Qualitative feedback

One change in this year’s audit was the inclusion of a request for qualitative feedback about what action had been taken previously with audit findings. It was pleasing to find that some units had used the data to develop initiatives to improve care.

A particularly striking example came from the Royal Belfast Hospital for Sick Children in Northern Ireland who reported that:

“We now have 2 asthma nurses (previously had none) employed. They have just started (after completion of training) before this month’s audit BUT had begun to see these patients prior to discharge.”
In addition, due to many years of doing this audit and identifying the same issues but not being able to effect change we have designed an Acute Asthma Care Pathway - we plan to put this into operation in all units treating children with Asthma in N Ireland in the near future and we are looking at ways of also implementing it in the 7 acute ‘Out of Hours’ centres in N Ireland.”

In the future, we hope more units will use the data to drive quality improvement. Units should be aware that the asthma audit tool can be used throughout the year for local short cycle audits that can be used to as part of quality improvement initiatives.

**Improving the audit**

Through the period of the audit, we receive feedback with questions or problems. We take these seriously and try to get an answer back to you quickly. We regularly review every item and have changed ranges and limits to improve data quality in future years.

We also receive suggestions for new questions to include. One question that will be included in future is whether a child was ventilated or not.

The principal challenge is back to the individual units – how can you use the information to improve asthma care in your unit? From this year’s evidence the biggest gains are likely to come from focusing on discharge planning.

I would again like to thank everyone at the BTS (Chris Routh, Sally Welham and Kerry Reid) for their continuing hard work in bringing audit in paediatric respiratory medicine into the main stream. If you have comments or suggestions I would be very pleased to hear from you (james.paton@glasgow.ac.uk).

July 2012

**References**

Paediatric Pneumonia Audit Report 2011-12

Audit Period: 1 November 2011 - 31 January 2012

Dr Anne Thomson

The 2011-2012 paediatric pneumonia audit occurred shortly after the update of the British Thoracic Society Guidelines for the management of community acquired pneumonia in children were published. Encouragingly 101 institutions submitted data (up from 77 in 2011) reporting over 2800 cases (male 52.9%). The age distribution was very similar to that of previous years with 45% under the age of three years and 71% under the age of five. Duration of admission was short with 45% staying less than 48 hours (40% 2010-2011) and 85% less than five days.

On admission 99.1% of children had their oxygen saturation recorded in air and nearly 40% were hypoxic (oxygen saturation less than 92%). 30% of children had a fever greater than 39 degrees centigrade. Wheeze was noted in 40% of those under the age of five and 24% of older children.

Blood cultures are no longer mandated in the guidelines and the number of children having blood cultures decreased to 52% from 57% in 2010-2011. Further microbiological tests were done in 28% and overall a causative organism found in 13.5% of children. As always viruses predominated with RSV accounting for 46% of those where a cause was found. In keeping with a rather unusual winter season, flu accounted for only 6% as opposed to 32% in 2010-2011. Streptococcus pneumoniae was the commonest bacterial cause and found in 17%.

The 2011 guidelines emphasise that blood tests including white blood count and C reactive protein are not useful in helping define aetiology but despite this they were performed in 63% and 62% of children respectively. Chest X-rays were performed in 90%, were abnormal in 81% and showed lobar consolidation in 40% of children (Figure 1).

When it came to treatment 43% of children were given a bronchodilator, 28% had intravenous fluids and 52% had some intravenous antibiotics. The commonest intravenous antibiotic was Augmentin, then Cefuroxime both given for one to two days. Overall antibiotic choice did not change between 2010-2011 and 2011-2012 with Augmentin being the most popular antibiotic in both time periods. Despite macrolides being suggested as only second line antibiotics in the 2011 guidelines, macrolide use increased to 27.2% of antibiotics given in 2011-12 compared with 20% in 2010-2011.

Physiotherapy is not recommended in the management of pneumonia but 17% of children nevertheless received it (15% 2010-2011). Despite only three children in 2011-2012 having a significant complication, some 33% of children received an appointment for hospital follow-up and 11% had a chest X-ray repeated at follow-up. This would appear on an unnecessary high use of secondary care resources.

Twenty nine sites responded to a request for information on how they responded to the 2010-2011 audits. All but one had discussed the results of the audit with clinicians involved in the service, 18 had discussed the results with managers responsible for the service and 16 had made changes as a result of the audit. The main changes reported were decrease in the number of the chest X-rays requested, particularly at follow-up, decrease in the use of physiotherapy and using oral Amoxil as first-line antibiotic. All three of these changes are strongly supported by the 2011 guideline.

It is very encouraging that increasing numbers of paediatric centres are prepared to enter data for this audit and that there is evidence of change being made to local protocols as a result. The updated guidelines may not have reached all parts of the system in time for this audit round and it will be interesting to see if there has been further change in practice for the 2012-13 winter season.

References

Latest News

The new national COPD audit will be introduced later in 2013 – please look out for the latest news on this audit on the BTS website.

New audits for adult bronchoscopy and paediatric emergency oxygen are likely to be introduced during 2013 – more details will be available on the BTS website in due course.

From 2013/14 some national audits will move to a 2-year cycle and more information on the 2013/14 programme will be made available on the BTS website.

Audit Programme for 2012/13

<table>
<thead>
<tr>
<th>Audit Programme</th>
<th>Dates</th>
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<td>National Emergency Oxygen Audit:</td>
<td>1 August 2012 – 1 November 2012</td>
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<td>Data entry:</td>
<td>1 August 2012 - 1 November 2012</td>
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<td>National Adult Asthma Audit:</td>
<td>1 September – 31 October 2012</td>
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<td>1 September 2012 to 15 January 2013</td>
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<td>National Bronchiectasis Audit:</td>
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