



# National Respiratory Audits

Audit Newsletter **November 2011**

## Welcome to the fourth Newsletter from the British Thoracic Society Audit Programme

Dr Christine Bucknall and the BTS Audit Team

This issue of the newsletter features reports on the 2010/2011 adult and paediatric community acquired pneumonia audits as well as a report from on the second national adult NIV audit which took place in February/March 2011.

We are delighted to announce that there will be a special session at the 2011 BTS Winter Meeting featuring reports from a

number of recent national audits, including the latest results from the European COPD audit. The session will also focus on "Making improvement a reality following audit". Following the session, members of the BTS Audit programme will be available to answer individual queries from delegates regarding their own experience of audit and quality improvement. Full details of the session are given below.

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### Friday 9 December 2011

#### 10.45 - 12.30pm SYMPOSIUM: THE BEST OF BTS AUDIT

Chaired by: Dr Christine Bucknall, BTS Audit Programme Director

Introduction

Dr Christine Bucknall (Glasgow)

National adult NIV audit

Dr Craig Davidson (London)

National bronchiectasis audit

Dr Adam Hill (Edinburgh)

ERS COPD audit update

Professor Michael Roberts (London)

Making improvement a reality following audit

Dr James Calvert (Bristol)

Mrs Catherine Blackaby (NHS Improvement)

BTS audit and quality improvement - future plans

Dr Christine Bucknall (Glasgow)

#### 12.30pm – 1.30pm: BTS Audit Drop in Session:

The BTS Audit team will be available at the BTS stand in the Benjamin Britten Lounge.

Registration and access to the BTS Audit Tools is available at: <https://audits.brit-thoracic.org.uk>

For all enquiries regarding the audit tools please write to: [audittools@brit-thoracic.org.uk](mailto:audittools@brit-thoracic.org.uk)

# 2010/11 Adult Community Acquired Pneumonia Audit *Dr Wei Shen Lim*

The 2010/2011 BTS CAP audit captured data on over 3500 patients from 72 institutions, thus surpassing last year's record. A striking finding is that much of the data from the 2010/11 audit are similar to the 2009/10 audit. The consistency across 2 years, together with the size of the audit, adds to the confidence that the audit is capturing 'real-life' CAP as encountered in routine clinical practice. It also suggests little has changed nationally in the overall management of CAP.

## Patient profile and outcome

The mean age of cases was 68 years; 63% were aged 65 years and above. Admission from a residential or nursing home was documented in 462 (13%) cases. Based on the CURB65 score, 46% of patients had low severity CAP (score 0 to 1), 27% moderate severity CAP (score 2) and 26% high severity CAP (score 3 to 5).

The median length of stay was 5 days and critical care admission was required in 8%.

Overall, 730 (20.4%) patients died while an in-patient.

## Processes of care & antibiotic use

The time from hospital admission to a chest x-ray was generally short; within 4 hours for 78% of patients. However, the subsequent interval from CXR to the first dose of antibiotics was > 4 hours in a substantial minority (21%).

The first dose of antibiotics was given < 4 hours after admission in 55% (see Figure 1).

Antibiotics were given in accordance with local CAP guidelines in only 52% of cases. Overall, initial empirical antibiotics were given intravenously (IV) in 75% (n=2663) of cases. A beta-lactam + macrolide combination was given in 48% of cases with low severity CAP, 53% with moderate severity CAP and 59% with high severity CAP.

## Summary

Overall, figures were very similar across the last 2 audits. Adherence to local CAP guidelines continues to be poor. This is probably reflected in the overuse of IV antibiotics empirically, and the mismatch in use of empirical combination antibiotics according to CAP severity. The importance of this aspect of care lies in the growing evidence that adherence to CAP guidelines together with good antibiotic stewardship is associated with improved patient outcomes.(1)

In addition, appropriate early treatment is also associated with improved outcomes. The time interval from hospital admission to CXR (and thus hopefully an accurate diagnosis) was encouragingly short for most patients. However, only 55% of patients received their antibiotics within 4 hours of admission.

A major challenge facing many respiratory

units is that of influencing practice in emergency and acute medicine departments, especially in the first 6 hours of admission when optimal management of CAP is most important. In recognition of this, as one of its quality improvement initiatives the BTS is in the process of developing a CAP Care Bundle and of identifying partners and resources to support its implementation both locally and nationally.

**Acknowledgements:** Many thanks to Sally Welham, Chris Routh, Kerry Reid and Christine Bucknall for all their help and invaluable efforts in running the audit.

## References:

(1) Bosso JA, Drew RH. Application of antimicrobial stewardship to optimise management of community acquired pneumonia. *Int J Clin Pract.* 2011 Jul;65(7):775-83. doi: 10.1111/j.1742-1241.2011.02704.x.

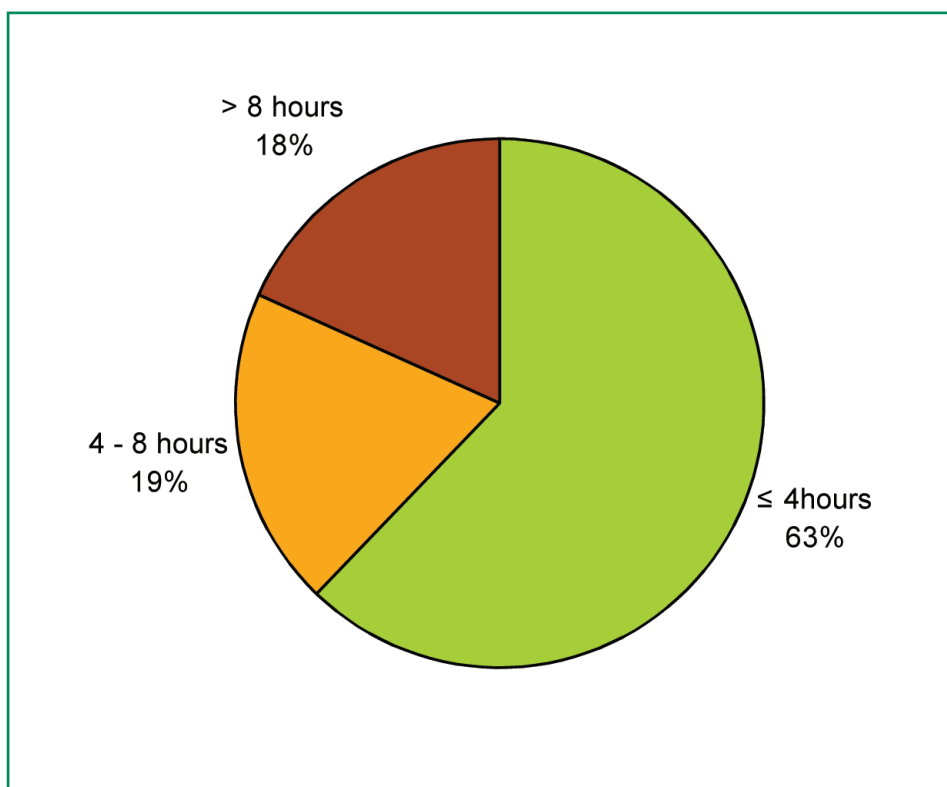


Figure 1: Time from hospital admission to first antibiotic: proportions of patients treated (based on 3173 patients)

# 2010/11 Paediatric Pneumonia Audit

Dr Anne Thomson

There was an excellent response to the 2010/2011 paediatric pneumonia audit with a record number of 2,200 cases from 77 institutions. Data overall was remarkably consistent with 2009/10 (891 cases) suggesting little change in case mix or management. Near 50% of cases were aged < 3 years and 52% cases were male. One third of patients had been given antibiotics before admission for a median of 4 days.

At admission 55% of children < 1 year had a respiratory rate of between 50 and 70 breaths/min and 10% > 70 breaths/min. In the older children approx 25% had a respiratory rate > 50 breaths/minute. Intercostal recession was present in 52% and 8% were grunting. Overall one third of children had a high temperature (> 39C) and 37.5% were hypoxic (SaO<sub>2</sub><92% in air.) Wheezing was noted in 35% of preschool children and 20% of those >5 years old.

A CXR was abnormal in 86% with lobar consolidation present in 42% of cases. Investigations for aetiology were largely limited to blood cultures (57%) and nasopharyngeal aspirates (18%) but a causative aetiology was identified in 305

cases (21%). Not surprisingly common viruses accounted for 260 cases with Influenza taking the lead (Flu A 21 cases; Flu B 27 cases and H1N1 51 cases) and RSV in second place (74 cases -3%). Overall influenza contributed more than in the 2009/10 season when it was only identified in 1% (12 cases). Streptococcus pneumoniae was the most frequent bacterial isolation in 44 cases (2%).

Clinical management is largely reflective of signs and symptoms at presentation with 46% of children receiving oxygen therapy; 3% assisted ventilation and 41% bronchodilators. Nasogastric feeds were given in 6% but 32% were given intravenous fluids and one suspects most of these were treated with intravenous antibiotics. Since the 2002 guidelines there has been new evidence supporting the use of oral antibiotics for pneumonia and the recently published guideline revision 2011 makes new recommendations (1). Perhaps we shall see a change in the 2011-12 audit.

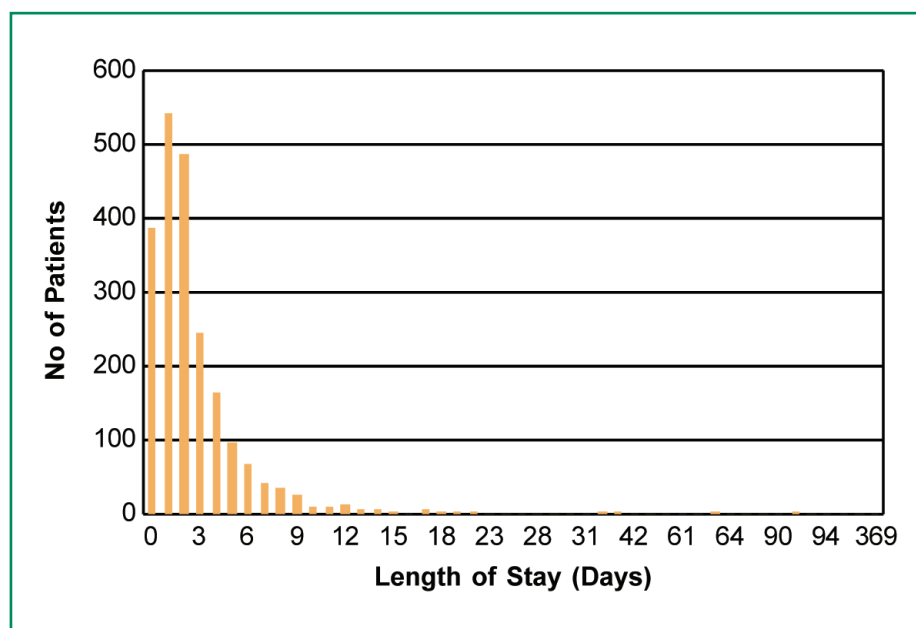
Choice of antibiotic may also change with the new guidelines. In 2010-11 Augmentin was the top antibiotic choice for children

(34.5% aged <5 years and 29.4% aged > 5 years) with a macrolide in second place (20.1% <5 years and 27.2% >5 years), followed by Amoxicillin (17.6% <5 years, 10.4% >5 years). The new guidelines strongly support amoxicillin as first line treatment.

The joy of looking after children is that they get better quickly and the median duration of admission was 1 day with <10% staying in hospital for >5 days (Figure 1). Complications occurred in 7.1% with empyema in 4.4% and lung abscess in 0.9%. Despite this a surprisingly large number of children had hospital follow-up 32.5% with 13.6% having a CXR at follow up. These figures are similar to last year but are considerably higher than the recommendations in either the 2002 or 2011 guidelines. Here is a real opportunity to save some money for the cash strapped NHS.

The 2011/12 audit tool has been changed slightly to reflect the new guideline but most questions will permit comparison with previous data. I hope that everyone who took part in 2010/11 will do so again and encourage other units to join in.

Figure 1: 1. BTS Guidelines for the Management of Community Acquired Pneumonia in Children: Update 2011, Thorax, 2011, Vol 66, Supplement 2.



# 2011 Adult Non Invasive Ventilation (NIV) audit

*Dr Craig Davidson*

The second BTS national audit of acute NIV provision was even more successful than last year. Patients and hospitals contributing more than doubled to 2187 and 122 respectively. The majority were from England (114 hospitals) but the geographical location and type of institution was otherwise diverse.

The main patient characteristics and outcomes were similar to 2010. The mean age in 2011 was 71yrs with generally poor performance status (70% limited/very limited, 7.5% chair/bed bound). Admissions occurred out of hours in 50%. AECOPD was the indication in most (70%), obesity hypoventilation in 9% and cardio-genic pulmonary oedema in 8.5%. (Figure 1). Patients with probable pneumonia as the precipitant for hospital admission continue to be treated by NIV (38% had consolidation on X-ray) but the audit could not establish if this affected outcome. Trial evidence suggests it does and this was reported in the 2008 NCROP audit (1) in which pneumonia was present in 21% of NIV treated patients with a mortality 30% versus 24% without x-ray changes. As in our previous audit, admission gases indicate that many had chronic hypercapnic respiratory failure with  $\text{HCO}_3^- > 30$  in 50% and at least 25% having been treated by NIV in a previous admission. Worryingly, we again found this year that no hospital follow up was recorded in 30% despite the need for NIV indicating a high readmission risk and < 50% 1 year survival.

Oxygen associated hypercapnia (oxygen toxicity) remains common. This was also found in the NCROP audit (1). The fact that 92% of respondents answered the question suggests these clinicians are alert to the problem. In 21% of cases it was thought oxygen toxicity caused or contributed to hypercapnia. This was felt to have occurred less frequently in ambulance transit in 2011 than 2010 (29% v 39%) and as a result the proportion thought to be related to hospital therapy increased (62% v 49%). This is disappointing given the recent strong evidence on the mortality

risk of high concentration oxygen (2). The recommendation to employ universal precautions by ambulance services (28% O<sub>2</sub> in acutely unwell COPD patients unless in extremis) may have contributed to a fall in occurrence on the way to hospital but more action is required to reduce it happening in hospital is needed. We enquired about the use of oxygen alert cards or other strategies to protect patients this year. Unfortunately no data was recorded in 40% and only 10% of respondents who had identified oxygen toxicity as occurring took action to reduce future recurrence. Clearly more work is needed to reduce oxygen toxicity, particularly in hospital.

The median pCO<sub>2</sub> at the start of NIV was 10.1 and fell to 7.3 kPa at discharge (in the survivors). As in 2010, a few patients appeared to have been treated for a metabolic acidosis with pCO<sub>2</sub> <6 in 5% and < 4.5 in just over 2%. In the NCROP audit, the co-existence of metabolic and respiratory acidosis increased mortality, as did the late development of acidosis. There are a variety of causes for metabolic acidosis complicating AECOPD, such as type B lactic acidosis indicating significant cardiac failure or sepsis and acidosis relating to renal failure or diabetic keto-acidosis. It may also be iatrogenic relating to excessive B2 stimulant use (3) and this, in my experience, is not commonly recognised.

Pressure settings remain modest at best with a median IPAP at 1 hour of 15 (range 8-29) and with less than 20% of cases managed with an IPAP >20. Despite this, overall success, defined as overall improvement, was similar to trial data and 67% of patients treated by NIV being discharged from hospital. Of these 7% were given domiciliary NIV and 33% LTOT. Of the 33% who died during admission this was attributed to respiratory failure in 25% and non respiratory causes in 8%.

Management plans relating to failure of NIV were available in 73% cases - to proceed to intubation in 22%, to view NIV as ceiling

therapy in 66% and in 9% to only employ NIV as "palliative" or for symptom control. However, only 83 of the total cohort of 2187 patients were subsequently managed by invasive mechanical ventilation. (Figures 2 and 3). This represents 3.8% of all patients. Is this a significant increase from 2.3% in 2010? One can hope so although the reason(s) for this cannot be determined from the audit. As case discussion with the ICU was only reported in 33%, part of the explanation may be lack of referral. Patients or relatives were more likely to be informed or involved in decision making regarding NIV at 47% (v 39% in 2010) but the use of advance directives remains rare (4%)

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**"In the writer's opinion this (NIV) should be a commissioned performance measure in COPD patient care"**

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despite many patients having had previous and, presumably, sometimes frequent admissions. Of concern, care plans appear to have been decided upon by very junior trainees (FY2/ST1/2) in 6% of cases and in discussion with a consultant in only 36% and unfortunately further questions relating to this issue were unanswered in 24%. These findings are similar to the NCROP audit where 11% of "no escalation" plans were made by juniors below ST3 level and 50% by ST3 and above. In our audit, the speciality of doctor making the decisions was respiratory in 41%, acute or general internal medicine in 40% and intensivist in 13%. The audit has again demonstrated that actual treatment provided does not reflect proposed management plans and suggests insufficient involvement of consultants and ICU staff in decision making. The results may also reflect inappropriate placement of the more severe patients eg those with more severe acidosis who because they might be expected to fail NIV should be admitted to ICU to receive NIV. Finally,

it may reflect inadequate ICU provision or continued nihilism for aggressive management of patients with acute hypercapnic respiratory failure (4).

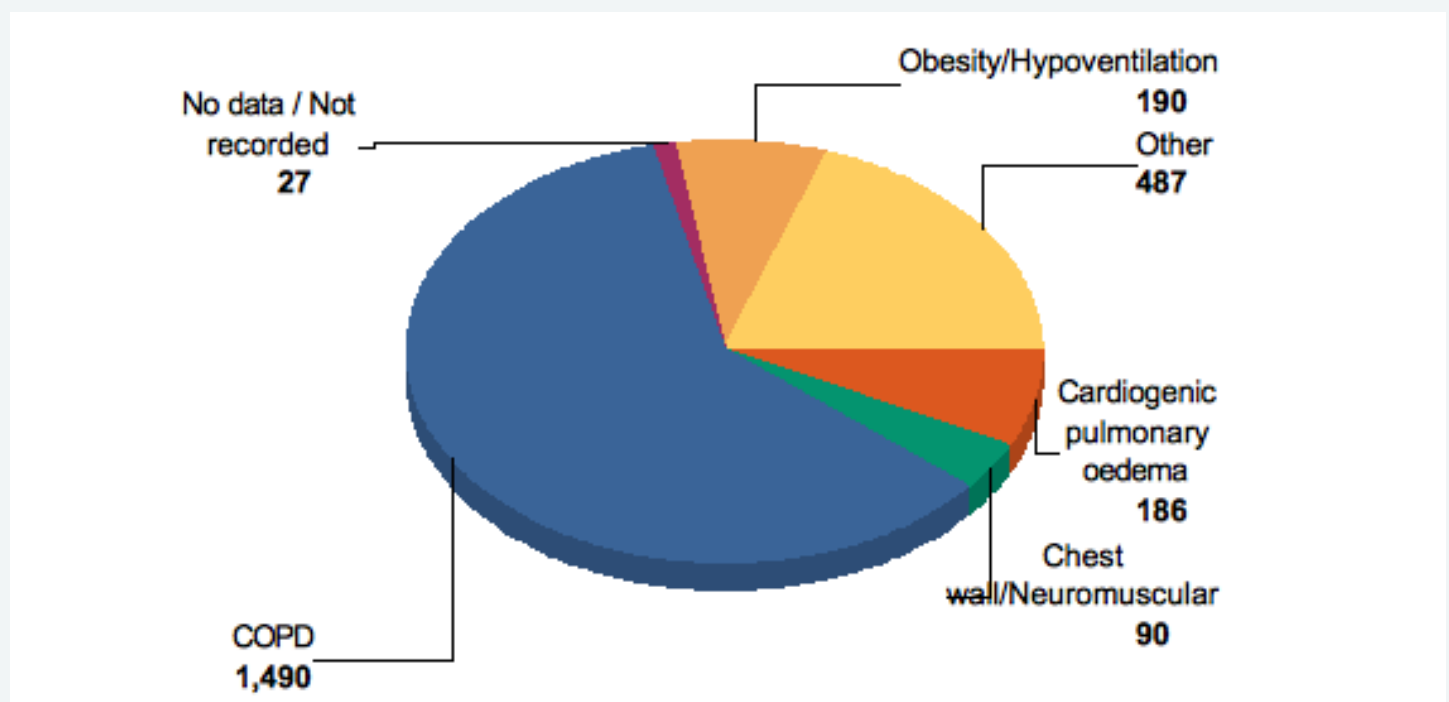
This year, information on mode of ventilation, reasons for failure and use of sedation was requested. Pressure support (PS) with a back-up rate (BUR) <16 was the most commonly employed mode (64%), PS BUR>16 was used in 8% and pressure control in 14% (with no data in 14%). Of 640 records responding to a question on cause of NIV failure, "general intolerance" was thought causative in 33% and patient deterioration despite NIV in 54%. This suggests a problem of failing to take appropriate action when NIV is failing rather than insurmountable issues as excessive secretions, inability to control leak or specific mask intolerance were regarded as rarely of importance. The audit did not provide evidence on what action was taken by staff providing NIV when it failed as this question was only answered by 111 respondents. Of these, 97 indicated sedation was given, 10 changed to the pressure control mode and in 7 cases a helmet or total facemask

was employed. Whether such a limited response to these questions indicates a lack of knowledge of the options available, inadequate information being provided in local guidelines or both is unknown.

On a more positive note, the 2010 audit of acute NIV appears to be of value to respiratory physicians. It had been discussed with clinical colleagues by 55% of respondents, with managers in 64% and 70% claimed a change in service provision had been made as a result. Examples included two cases of the establishment of an acute NIV unit and in one of instigating a 24/7 nurse led service. Other benefits included increased teaching and funding, review of NIV performance and creation of care bundles, completion of incidents forms for oxygen toxicity, establishing a named on call respiratory consultant for NIV and, finally, of more aggressive ramping up of IPAP.

The NCROP audit published in 2011 provides additional evidence of a failure or delay in delivery NIV to hypercapnic COPD patients. It also found that persisting and, even more significantly, developing

acidosis increases the risk of death. It raised concerns that mortality of NIV treated patients during the period of the audit (2008-9) was not lower than those apparently equally severe patients managed without NIV. The cause of this unexpected outcome is unknown but may relate to the quality of service provision and together these audits issue a challenge to the respiratory community to improve the delivery of NIV in our hospitals. It is now time for a continuous review of performance in NIV feeding into cycles of improvement in service delivery. In the writer's opinion this should be a commissioned performance measure in COPD patient care. The introduction of mandatory reporting of NIV outcome, as is required of patients intubated for respiratory failure in the ICU, would be in the interest of patients and respiratory teams trying to provide a quality service. The 2011 audit tool remains available on the BTS website for units to bench mark their performance. Let us get ready to make the 2012 audit even more comprehensive in terms of hospital coverage and may we hope to demonstrate improved service delivery?



**Figure 1:** Respiratory diagnoses

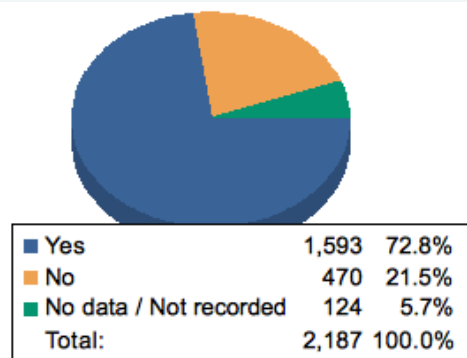
(1) Roberts CM et al Acidosis, non –invasive ventilation and mortality in hospitalised COPD exacerbations. Thorax 2011; 66: 43-48

(2) Austin MA et al Effect of high flow oxygen on mortality in COPD in pre-hospital setting : an RCT. BMJ 2010; 341:c5462

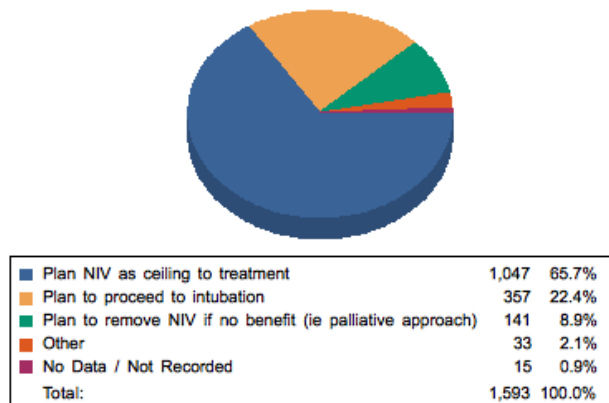
(3) Manthous CA Lactic acidosis in status asthmaticus : 3 cases and review of the literature. Chest 2001; 119: 1599-1602.

(4) Wildman MJ, Sanderson MJ, Groves J et al. Implications of prognostic pessimism in patients with COPD or asthma admitted to intensive care in the UK : multi-centre observational COHORT study. BMJ 2007; 335: 1132-34.

**Figure 2:**  
Do the medical records document a plan if NIV fails?



**Figure 3:**  
If yes – what plan was made



# National Review of Asthma Deaths (NRAD)

The British Thoracic Society is a member of the consortium of asthma professional and patient bodies, led by the Royal College of Physicians, which will look into the circumstances surrounding deaths from asthma.

For a twelve-month period from the 1 February 2012, every death from asthma in the UK will be reviewed systematically and will be subject to an in-depth multidisciplinary confidential enquiry. By engaging with health professionals and family members the project will explore the individual circumstances surrounding the death – for example the medical care received, the environmental conditions, the involvement of workplace and school.

## Call for confidential enquiry panel assessors

The NRAD team are currently recruiting consultants with a special interest in respiratory medicine, GPs, and respiratory nurse specialists to be confidential enquiry panel assessors. Panel assessors must currently be in clinical practice or have retired within the previous five years. You will be asked to commit to attending at least 2 full day panel meetings over the course of 15 months. Further information on the role of panel assessors can be found at [www.rcplondon.ac.uk/nrad](http://www.rcplondon.ac.uk/nrad)

## Call for local coordinators

The NRAD team are also seeking a lead coordinator within each secondary care organisation to be the principal contact for the project and to encourage engagement from the wider clinical community. If you are able to take on this role please contact the NRAD team via the details below.

**Please see the NRAD webpage for further information [www.rcplondon.ac.uk/nrad](http://www.rcplondon.ac.uk/nrad). Alternatively please can contact the team via email at [nrad@rcplondon.ac.uk](mailto:nrad@rcplondon.ac.uk) or phone +44 (0) 20 3075 1522.**