British Thoracic Society
Adult Asthma Audit Report
National Audit Period: 1 September – 31 October 2016
Dr Stephen Scott, on behalf of the British Thoracic Society

Number of records submitted: 4258
Number of participants: Part 1 = 171 hospitals (136 trusts); Part 2 = 165 hospitals (132 trusts)

Summary/Abstract

The 2016 British Thoracic Society Adult Asthma Audit was the largest to date including 171 hospitals (136 trusts) with data available for 4258 patients. The audit focused on hospital admissions with acute asthma, specifically looking at initial assessment, management and follow-up. The 2016 audit introduced additional questions, including on treatment in critical care in an attempt to capture practice in an area with little evidenced based information available.

Key Findings

1. Only 59% of hospitals had a specialist asthma service and only 56% had a designated clinical lead for asthma services
2. 31% of patients had no previous admissions and 17% of patients had previously been admitted to critical care.
3. 14% of admissions were severe enough to warrant a critical care team review. 4% of patients were admitted to critical care during this admission (with 1% receiving intubation).
4. 89% had a previous diagnosis of asthma, and only 42% of those had a diagnosis supported by objective testing.
5. Only 80% of patients had a Peak Expiratory Flow reading taken on admission, and only 76% prior to discharge.
6. Smoking rates among patients admitted with asthma (27%) were significantly higher than among the general population (16%).
7. Only 68% of patients were on regular inhaled corticosteroids before the admission and 9% were on ICS but were poorly concordant. A further 15% were commenced on ICS prior to discharge.
8. 28% of patients received any care bundle and 16% received a discharge care bundle.
9. Contrary to current Guidelines, 8% were discharged without the key management intervention of inhaled corticosteroids.

National Improvement Objectives:

1. All hospitals to have a specialist asthma service with a named medical lead
2. 95% of patients to receive a dedicated asthma discharge care bundle
3. 95% of patients to have a recorded peak expiratory flow performed on admission including post bronchodilator peak flow
4. 95% of patients admitted to hospital with an asthma attack to be discharged on inhaled corticosteroids

Timeframe: to be achieved by the time of local re-audit in 3 years

Evidence Base

The standards for this audit were drawn from the BTS/SIGN British guideline on the management of asthma (2014, updated in 2016)[1] and the NICE quality standard for asthma (2013)[2]. The audit also addressed recommendations from the 2014 National Review of Asthma Deaths[3].

Background

The first British Thoracic Society adult asthma audit took place in 2009, following publication of the first BTS/SIGN British guideline on the management of asthma in 2008. The audit has been repeated five times since 2009 and participation increased significantly in 2016.

Year	Trusts	Hospitals	Records
2009	90	110	2385
2010	70	87	1932
2011	94	114	2093
2012	95	118	2484
2016	136	171	4258

Table 1: BTS Adult Asthma Audit participation

Developments since last audit

Since the last audit in 2012, the British Thoracic Society published an asthma discharge care bundle[4] to provide standardised documentation to help hospitals to improve the process of care for those admitted to hospital. This bundle addressed a number of issues identified by the National Review of Asthma Deaths published in 2014. Although the bundle was published in 2016 it may be too early to see an effect in this audit and we may need to await an increase in uptake by hospitals adopting the bundle.

There have been further editions of the BTS/SIGN Asthma Guideline with significant updates in some areas such as the diagnosis section. NICE also published its asthma quality standards in 2013.

Finally, NHS England has established severe difficult to control asthma as an area for specialist commissioning with the intention of ensuring the availability of specialist services for those with the most severe disease[5]. It is hoped that this will help drive standards of care for this set of patients who consume a significant amount of healthcare resources and are at a higher risk of attacks.

Aims and Objectives

The aim of each audit has been to examine the quality of care received by patients admitted for acute asthma, as well as the organisation of this care, to determine to what extent national standards are being met. The audit questions cover assessment, management and discharge arrangements, and were updated in 2016 to align more closely to the latest BTS/SIGN Guideline and the BTS Asthma Care Bundle. The care bundle includes five actions relating to discharge and follow-up that were selected as the most likely to improve care and produce an improvement in outcomes. As little is known about those patients that require treatment over and above standard treatment further questions on critical care were included to capture information on this aspect of asthma care.

The key objectives were:

1. To determine provision of services for asthma in UK hospitals to allow benchmarking for individual hospitals.
2. To ensure that national standards for acute care of asthma patients are met on admission. I.e. initial assessment of severity, timeliness of treatment and appropriate treatment is provided.
3. To ensure that adequate discharge arrangements are made in accordance to national guidelines and determine use of an asthma care bundle.
4. To assess the best practice and variance in practice of treatment of the most severely ill asthmatic patients to guide standardisation or sharing of best practice in critical care areas.

Methodology

The audit applied to all adult patients admitted for acute asthma during the audit period, excluding those seen in ED only (Part 1). Participating institutions were also asked to submit information on asthma services, and details of previous audit participation and quality improvement (Part 2).

Instructions and data collection questionnaires were made available on the BTS audit website before the start of the audit, and data entry was via the secure online BTS audit tool.

For some categories data were missing or nonsensical, possibly as a result of transcription error or misunderstanding of requirements. For consistency, data were analysed using the denominator of all patients entered onto the database, including those where data were missing, i.e. cases with missing data or where 'not known' was selected are included in the denominator unless otherwise stated.

Results

As previous audits have consistently shown there is a female preponderance of admissions for asthma in 2016: 69%. The reason remains unclear.

Length of stay was variable with a mean stay of 3 days and a mode of 1 day. There were a significant number of patients discharged within 24 hours. The longest length of stay was 53 days.

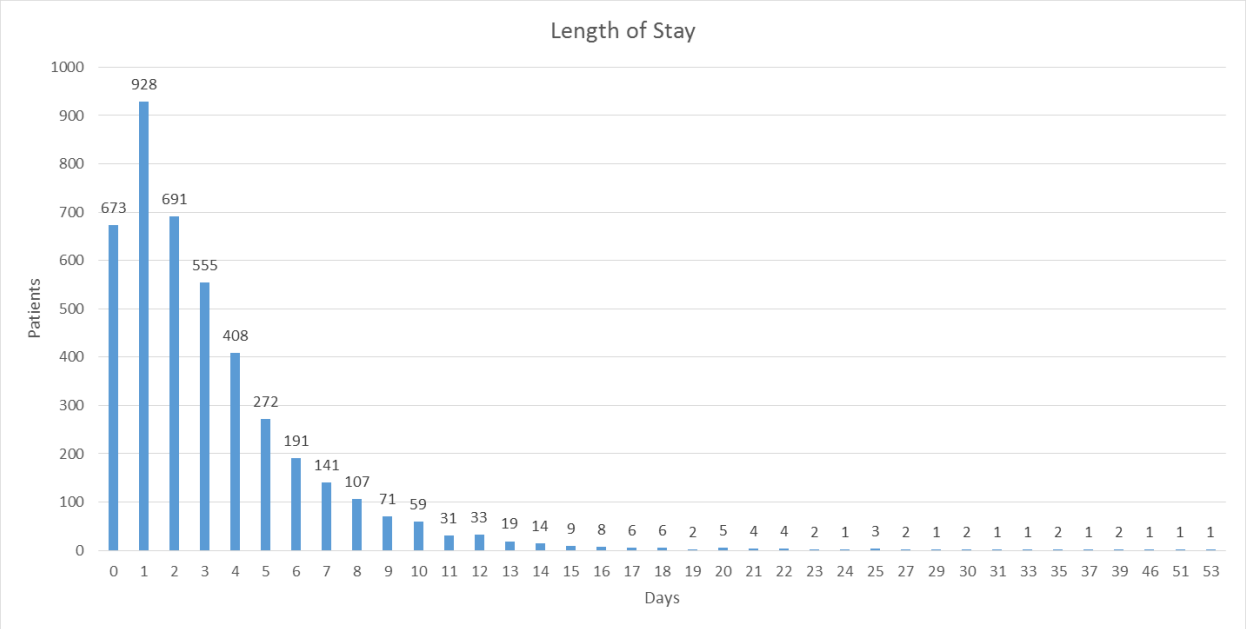

Figure 1: Length of stay

Previous admissions

There were significant numbers of readmissions as noted in previous years. 9% (364) were readmitted within 1 month, which is slightly worse than 8% (203) in 2012. 8% (333) were readmitted between 1 to 3 months, which is again slightly higher than the 7% (186) reported in 2012. 13% (572) had been admitted between 3 months and 1 year, also no change from 2012 (13%, 318). As in 2012, the majority of patients in 2016 either had no previous admission (31%, 1309) or had not been admitted in the previous year (24%, 1036), but this represents a reduction from the combined rate of 65% (1625) in 2012.

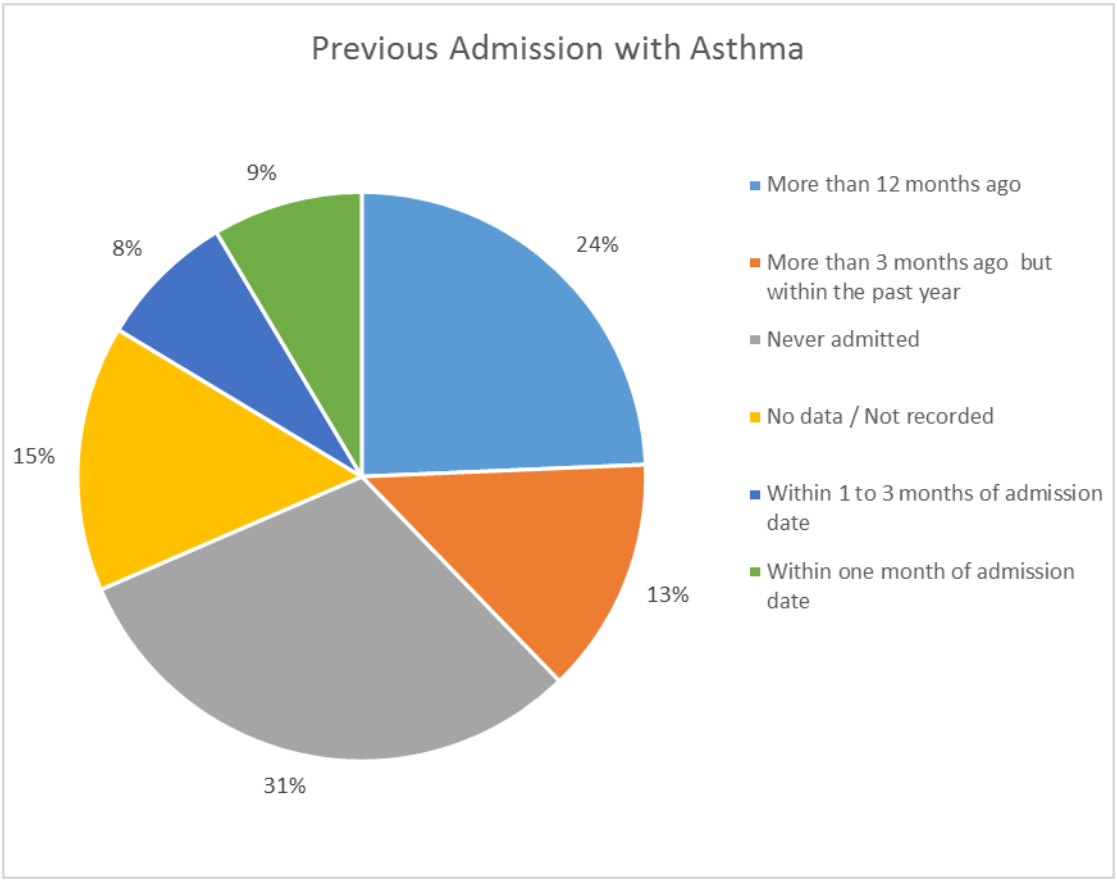

Figure 2: Previous admission with asthma

Readmission figures can be seen as an overall barometer 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. The BTS Asthma Care Bundle is a national document available to trusts along with guidance on its use via the BTS website. It should be completed prior to discharge in all patients and formalises documentation to ensure that elements of care most likely to improve outcomes are completed. The aim is to improve care and reduce readmissions.

17% of those admitted had previously been admitted to intensive care for their asthma.

Assessment at admission

A quarter of patients (1054) admitted with asthma had documentation of adverse psychological or behavioural factors associated with a future risk of developing near fatal or fatal asthma. Again, this highlights the importance of intervention with education and a clear asthma management plan on discharge.

It is hoped that the introduction in 2016 of the BTS Asthma Care Bundle will help to formalise this and ensure consistency between trusts in the audit. It is encouraging to note that a care bundle was used in 28% of patients, although there is clearly room for improvement here.

First Peak Expiratory Flow (PEF) was recorded as part of initial assessment in 80% (3396) and of those, 34% were post bronchodilation which is similar to 2012 (81% and 38% respectively). It was recommended in the 2012 report that the PEF measurement informs the decision to admit and is a core variable in assessing a patient for severity and subsequent treatment. It was disappointing that these figures have not improved and further work is required in acute areas of hospitals to ensure these measures are implemented such as standardised asthma assessment tools that prompt the admitting clinician to carry out these readings to guide management.

Oxygen saturation measurements were available in 97% of patients at admission. Again, as reported in previous audits, it is surprising that this is not 100% as this is a standard assessment that can be easily performed and is usually present on a standard set of patient observations. This could be due to transcription error and data loss in documentation. Of those assessed 12% had oxygen saturations lower than 92% and of these, 81% went on to have arterial blood gas (ABG) analysis, an improvement on 2012 figures. Oxygen was administered to 36% of patients. Of those that had an ABG on account of low oxygen saturations, 24% had evidence of hypercapnoea which is an increase since 2012 (11.9%). ABG analysis was also done for patients with oxygen saturations >92% suggesting a possible over use of this investigation unless there were other concerns prompting this test. The mean inspired oxygen was 40%. The latest BTS/SIGN Asthma Guideline recommends controlled oxygen therapy and this is an area for improvement.

Eosinophil count on admission was available in 91% with a mean value of 0.36. This could suggest suboptimal control with steroids and raised eosinophils have been linked to an increased risk of exacerbations. This is expected in a population of asthmatics presenting with an attack but is an important signal nonetheless.

Of those admitted, 27% were current smokers and a further 19% were ex-smokers (ONS figures for 2016 put smoking prevalence in adults at 16%). 9% did not have smoking status recorded and 1% were using e-cigarettes only. This is a new phenomenon the relevance of which is yet to be determined.

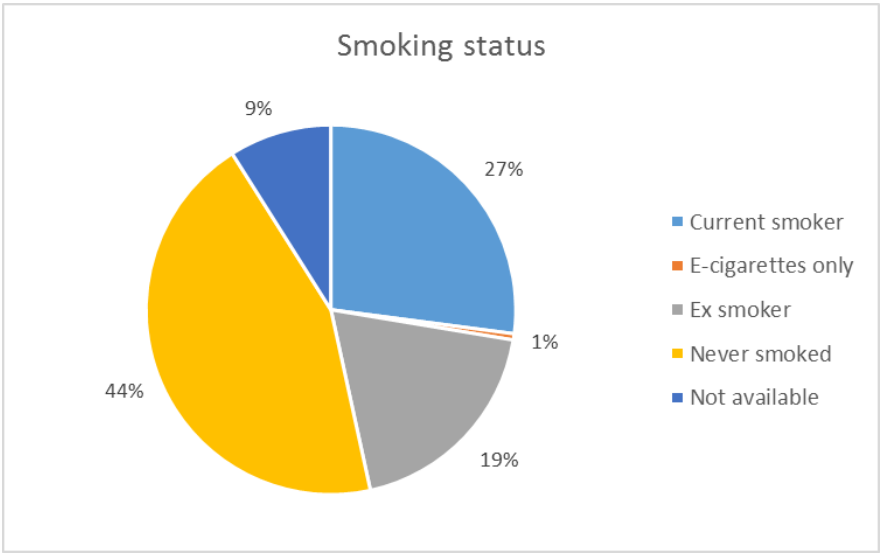

Figure 3: Smoking status

There was evidence of a previous diagnosis of asthma in 89% and of those there was evidence of objective testing to support the diagnosis in only 42%. This is a useful measure and although it may very well represent difficulties obtaining this information from patient health records, does suggest that more needs to be done to ensure that a diagnosis of asthma is made on an objective basis. Previous studies have suggested that asthma may not be present in up to 30% of diagnosed patients[6] and as long term treatment may be started or adjusted on this basis it is important to ensure that the diagnosis is secure.

Management in Hospital

Systemic steroids were not given in 4% of patients with no data in 5%. Of the rest, the timing of giving systemic steroids is shown in the following chart**.**

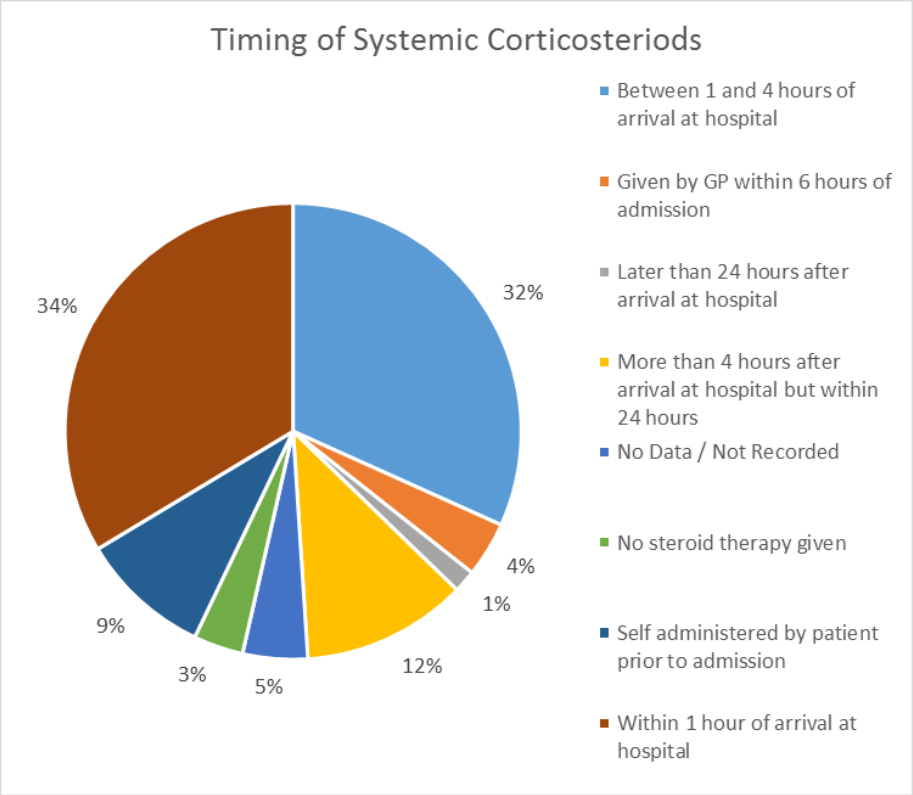

Figure 4: Timing of systemic corticosteroids

A significant number of patients (567, 13%) were given systemic steroids more than 4 hours after arrival at hospital which is something that needs to be addressed in acute areas.

Pre-discharge peak flow was performed in 76% of patients. As an important indicator of stability prior to discharge this figure would be expected to be higher.

Critical Care

A significant proportion of patients were reviewed by a member of the critical care team: 14% (594). Of those that were reviewed, no action was required in 14%, advice given in 50%, 31% were admitted to critical care and 9% required intubation. Out of all patients audited, 4% were admitted to critical care and 1% were intubated.

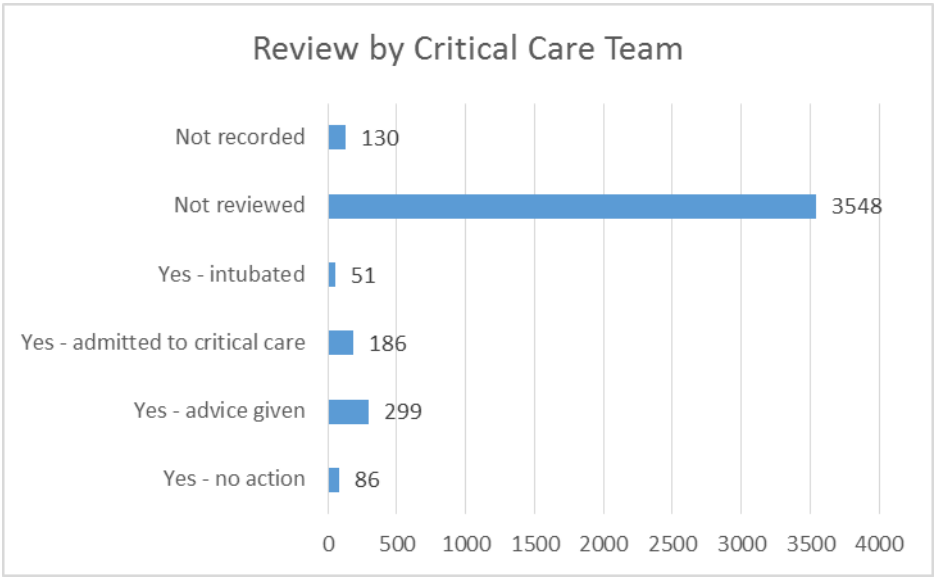

Figure 5: review by critical care team

141 patients were documented as receiving treatment above standard therapy. Ketamine was administered to 19 patients, volatile anaesthetic agents to 9 and IV salbutamol to 35 with 98 patients receiving other agents. There does appear to be variance in how patients are treated in these areas and there is need for research to clarify and standardise approaches to the treatment of severe asthma beyond standard therapy as noted in the latest BTS/SIGN Asthma Guideline.

Drug/intervention	Frequency
IV salbutamol	35
Magnesium	28
Ketamine	19
Aminophylline	15
Aminophylline and magnesium	10
Volatile anaesthetic agents	9
Adrenaline	7
Assisted ventilation	5
Extracorporeal Membrane Oxygenation (ECMO)	3
Montelukast	3
Theophyline	3
Triamcinolone	3
Propofol	2
Fentanyl	2
Others	25
Not treated for asthma	4
Refused standard therapy	1

Table 2: Non-standard therapy

Discharge from Hospital

The audit asked whether patients were already taking inhaled corticosteroids (ICS) regularly before admission. 68% (2901) of patients were reported to be taking regular ICS; 6% (254) were new diagnoses of asthma, which is reduced from 2012; and no data were recorded for 3% (132).

17% of the newly-diagnosed asthmatics were discharged without having been commenced on inhaled corticosteroid therapy, which represents a slight reduction from the previous audit, when the figure was 20%. Furthermore, 25% of those admitted on beta agonist only (and in whom it was indicated) were not commenced on inhaled corticosteroids at discharge. This remains an area of concern that patients who have presented with acute asthma are not being discharged on the appropriate anti-inflammatory treatment and again this may be an area to target to reduce readmissions.

9% of patients were judged to be non-concordant with regular ICS treatment, which is unchanged from previously. Of those felt to be non-adherent, 65% of those applicable had the reasons for poor adherence discussed with them and addressed.

85% of patients were sent home on oral steroids and of those who weren't (556), 49% had already received 5 days of oral steroids prior to discharge.

An asthma care bundle was used in 28% of cases. Comprising of 12% on admission, 16% on discharge and 4% classified as other. This is encouraging, and although it is early to expect a high uptake at this point, it is an aspiration that all patients should have a care bundle completed. BTS introduced an asthma discharge care bundle in 2016 and the use of such bundles may help to standardise treatment across the UK.

Of those parts of a typical care bundle: Inhaler technique review was completed in 49%, medication assessment completed in 54%, written personal asthma action plan was provided in 31% (10% already had a plan) and triggers and exacerbating factors considered in 59%. Although these figures are low it would be hoped that this will be improved with the uptake of the national asthma care bundle and its use must be encouraged in Trusts around the country. Hopefully the endorsement of a care bundle by a respected national society such as BTS will have widespread acceptance by general (internal) medical non-respiratory specialists involved in non-selected takes and by acute physicians.

Of those patients who had inhaler technique checked, only 49% had good inhaler technique. Reassuringly this could be improved by education in 29% and 6% required a change in inhaler.

A clinic review appointment was scheduled in 64% of admissions and of those 64% were arranged to occur within 4 weeks of discharge

Sadly there were 33 deaths reported following admission with acute asthma in this audit which shows that despite advances in our understanding of this common chronic disease there is still room for improvement.

Organisation of Care

There has been an increase in hospitals taking part in the audit in 2016 with 171 hospitals submitting individual patient data, and data on the organisation of services available from 165 hospitals. The mean number of patient records per hospital was 39.

The mean bed occupancy was 91%. A breakdown of the organisation and availability of asthma services are outlined in the table below.

Audit question	Response
Is there a separate respiratory take from the rest of acute medicine?	Yes 20/165 hospitals
Is there an admissions ward?	Yes 164/165 hospitals
Is there an ICU outreach service?	Yes 147/165 hospitals
Is there a designated named clinical lead for asthma services?	Yes 135/165 hospitals
If yes, is this person responsible for formal training in the management of acute asthma?	Yes 90/135 hospitals
Is there a specialist asthma service?	Yes 98/165 hospitals
Is there a designated lead for the asthma service?	Yes 93/165 hospitals
Written Personal Asthma Action Plan (PAAP) provision?	Yes 142/165 hospitals
Routine use of a validated measure for asthma control (e.g. ACQ)?	Yes 83/165 hospitals
Access to measures to monitor airway inflammation (e.g. FeNO)?	Yes 106/165 hospitals
Access to a local multidisciplinary team for asthma care?	Yes 98/165 hospitals
Integration of hospital and community services for asthma patients?	Always/mostly 35/165 hospitals Sometimes 56/165 hospitals
Availability of smoking cessation services?	On site 88/165 hospitals Community 116/165 hospitals Other 8/165 hospitals None 10/165 hospitals

Table 3: Organisation and availability of asthma services

Conclusions and Observations

It has been 4 years since the last BTS national adult asthma audit and the outcomes appear to be largely unchanged despite the availability of easy to access national guidelines and the report of the National Review of Asthma Deaths in 2014.

It is encouraging to see an increase in the number of participants taking part in the audit and this will hopefully increase the reliability and accuracy of data on the state of asthma care in the UK to allow us to target areas where help may be required to drive up standards overall. These data can also be used by individual hospitals to support initiatives to improve asthma services where resources are required.

The publication of the Royal College Report on the National Review of Asthma Deaths (NRAD) found widespread issues with the quality of care amongst those who died and should have stimulated an increased awareness and championing of the standards for asthma care. This audit has shown that despite the NRAD recommendations there is still room for considerable improvement in asthma care in the UK. Tools such as the BTS Asthma Care Bundle can be used as a template for trusts to implement change locally and it will be interesting to see if this does have an impact in future audits. As noted above, although it was published in 2016 it may be too early to see an improvement in the facets of the bundle as it may be premature to expect a widespread uptake in its use at the time of the audit data collection. Full details and advice on its development and use can be found on the British Thoracic Society website including copies of the documentation for the bundle itself [4].

The BTS/SIGN Asthma Guideline updated its guidance on the diagnosis of asthma since the last audit. It is interesting that there were low numbers of patients with documentation of objective confirmation of a diagnosis of asthma. There is evidence that patients may be both undertreated and over-treated, and it is therefore important that the assessment of asthma diagnosis and control be improved outside of an asthma attack.

It is troubling that in the 2-month period of the audit there were 33 deaths recorded due to asthma and there were significant numbers of patients with severe attacks needing critical care input. This is an area of asthma care that has a relatively small evidence base to guide management and this was reflected in some of the variance seen in treatment recorded in these patients. This is an area in need of further research to see which treatments are most effective at this level of severity.

Some areas of asthma care on admission remain worryingly unchanged since the last audit such as the measurement of peak flow, which is a relatively easy test to perform and informs further management. Also the numbers of patients discharged without inhaled corticosteroids (ICS) is concerning at 8%. The latest BTS/SIGN Asthma Guideline indicates that there are few instances where patients diagnosed with asthma should not be using regular ICS and this should be addressed.

The section on the organisation of care is encouraging with a large proportion of hospitals having an asthma service. We would like to encourage more hospitals to develop such services and as asthma is one of the most common chronic medical conditions with a prevalence of up to 12% in the UK[7] it is essential that there is a dedicated service for people with a condition that still results in deaths in up to 1468 people per year (Asthma UK)[8].

It is promising that the use of up to date investigations such as inflammometry through measuring exhaled nitric oxide is now available in 64% of hospitals. This is a good indication that asthma care is current and up to date with innovations in managing airway inflammation.

Finally, it is important to point out that this audit has shown that excellent practice is widespread throughout the UK in participating hospitals. Although it is a requirement of audits to look for areas for improvement it is also an opportunity to champion the great work that all those who care for patients with asthma put in every day and this audit highlights many areas to be proud of.

28 September 2017

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Clinical Audit Action Plan

Project title	

Action plan lead	Name:	Title:	Contact:

Ensure that the recommendations detailed in the action plan mirror those recorded in the “Recommendations” section of the report. The “Actions required” should specifically state what needs to be done to achieve the recommendation.

Recommendation	**Actions required** *(specify “None”, if none required)*	**Action by date**	**Person responsible** *(Name and grade)*	**Evidence required to show recommendation has been implemented** (Training log, minutes, new documentation)