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## **An Audit of British Thoracic Society Asthma Discharge Care Bundle in a Teaching Hospital**

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### **Key points:**

- 1- It is crucial that healthcare professionals are aware of and competent in using the asthma discharge care bundle.

- 2- Completing the asthma care bundle should be the responsibility of relevant healthcare professionals and not only of the respiratory clinical nurse specialists.
- 3- Good record keeping is a vital part of effective communication in nursing and integral to promoting safety and continuity of care for asthma patients.
- 4- Healthcare professionals should consider every asthma admission as an opportunity to educate patients on their condition.

### **Reflective questions**

- 1- How often should healthcare professionals discuss inhaler technique with asthma patients?
- 2- What are some of the challenges in assessing asthma patients' adherence to medications?
- 3- What is the importance of written asthma actions plans for patients?
- 4- Why is it essential to include occupation as a risk factor when taking history in asthma patients?
- 5- What are the barriers of implementing the asthma discharge care bundle?

### **Abstract**

**Background:** The United Kingdom (UK) asthma mortality rate has risen by 33% over a decade. The national enquiry into 195 asthma related deaths revealed that most of these deaths were preventable. The Asthma Care Bundle is recommended to be used for discharging patients with an acute asthma attack and/or exacerbation.

**Aim:** To review the implementation of the British Thoracic Society's asthma discharge care bundle in a teaching hospital.

**Methods:** A twelve month retrospective audit was conducted on 86 adult patients treated for asthma attacks.

**Findings:** The results of the audit indicated that the hospital has complied with the British Thoracic Society's Asthma Discharge Care Bundle. In total, 85% of patients had their inhaler

technique checked but 62% of them were not provided with any written inhaler use instructions. The respiratory clinical nurse specialists were more compliant with most of the bundle statements than the medical team.

**Conclusion:** The findings highlighted the need for asthma education sessions for all healthcare professionals with emphasis on record keeping skills.

**Keywords:** Audit, asthma care bundle, discharge, respiratory specialists

## **Introduction**

Asthma is a chronic airway inflammatory condition, diagnosed at any age, and it leads to airways hyperresponsiveness (Smith *et al.*, 2015). Patients with asthma usually have the following respiratory symptoms: variable cough in terms of intensity and onset, chest tightness, wheeze, shortness of breath and nocturnal disturbance (GINA, 2020). Asthma still kills although most asthma related deaths are preventable (GINA, 2020). In England and Wales, there has been a 33% rise in asthma deaths over a decade (Lacobucci, 2019). Consequently, caring for asthma patients costs the National Health Service (NHS) around 1 billion pounds a year (Asthma UK, 2021).

The main aims of asthma management are to alleviate symptoms, if not eradicate them, and prevent exacerbations and hospital admissions in patients (GINA, 2020). For a better outcome strategy in asthma patients, a group of healthcare professionals and patient bodies performed a systematic National Review of Asthma Deaths (NRAD), "Why Asthma Still Kills", of 195 cases over a year (Royal College of Physicians (RCP), 2014). An earlier enquiry, which investigated 90 adults' asthma deaths in two regions of England (British Thoracic Association (BTA), 1982), revealed similar issues as the recent one: failure of healthcare professionals to appreciate the importance of adequate objective assessment and take prompt emergency action. In order to tackle the challenges raised by these two reviews, the British Thoracic Society (BTS, 2016) initiated the asthma discharge care bundle (ACB) (figure 1). The ACB

represents a cohesive unit of five evidence-based practices, where all the elements are expected to be used together to improve standards of care for asthma patients before and after discharge (BTS, 2016). The aim of the ACB is to replicate the successful implementation of their COPD and their community acquired pneumonia care bundles in the UK acute hospitals.

Care bundles proved to have reduced the hospital mortality rate to 18.5% in 13 diagnoses (BTS, 2016). The individual asthma interventions of the ACB are:

1. All patients (or family members/carers administering medicines) should have their inhaler technique assessed prior to discharge.
2. All patients should have their medications assessed. The importance of medication adherence to good asthma control should be reinforced to patients (and/or any family members or carers administering medicines) prior to discharge.
3. A written asthma action plan for how to manage care should be provided to patients and families/carers.
4. Triggering and exacerbating factors in the patient's overall environment should be considered.
5. Follow-up in the community to be arranged within 2 working days plus specialist care according to specified criteria within 2 weeks.

These five statements are being audited in this study.

### **Aims of the audit**

-To identify whether each of the ACB statements has been implemented in adult patients admitted with asthma attacks to hospital.

-To identify which healthcare professionals implement each of the bundle statements.

-To inform local recommendations for promoting the ACB implementation policy.

## **Methodology**

Healthcare organisations use clinical audits to measure their current clinical performance against explicit criteria of established standards. Clinical audits are recommended in certain chronic conditions, including asthma, as they represent a systematic and valuable mechanism to review the daily health interventions provided to patients (NICE, 2020). This is a retrospective audit conducted on all adult patients admitted in an acute teaching hospital for an asthma exacerbation over 12 consecutive months (from 1<sup>st</sup> of November 2018 until 31<sup>st</sup> of October 2019). For this audit, admission refers to patients who were treated for four hours or more following their transfer from the emergency department to other wards. Patients who were 16 and over included, while patients discharged from the emergency department were excluded from the audit. A population of 127 patients was initially considered from the existing electronic National Asthma and COPD Audit Programme database (NACAP) and a sample of 86 patients was manually retrieved for this audit according to the inclusion criteria.

Two tools were used to collect data which was entered into a Microsoft Excel spreadsheet for this audit. The first tool, 'Adult Asthma Secondary Care Clinical Dataset' (RCP, 2018), was used to identify patients discharged from the local hospital following an acute asthma treatment. The second tool, which is the Asthma Discharge Care Bundle (BTS, 2016), was used to explore the implementation of the five statements of the bundle in the hospital. The data analysis was done via Excel spreadsheet using simple descriptive statistics such as percentages. The requirement of ethical approval was not sought as this audit represents a mandatory national audit for which the local hospital has acquired the relevant Information Governance approval from the Data Protection Office. Permission was obtained from the Trust audit office and the Trust's asthma lead was informed about this audit. Moreover, the Royal College of Physicians (RCP, 2018) has sought ethical approval from the Health Research Authority's (HRAs) & Confidentiality Advisory Group (CAG) to collect patients' identifiable data without obtaining patient consent. Patients' confidentiality was maintained throughout the audit.

## **Results**

Table 1 shows the demographics of the patients in this audit. There were 27 males (31%) and 59 females (69%). The largest categories in age were both the '30 and under' and the '51-70' (29%) followed by '31-50' age group (26%) with the '71 and above' being the least category with 16%. The majority of patients were non-smokers (48%) followed by current smokers (35%). There were 13 (15%) ex-smokers and two of the patients did not have their smoking status recorded.

[Insert table 1 here](#)

[Insert table 2 here](#)

Table 2 shows the five asthma bundle statements. Bundle one looks at inhaler technique assessed prior to discharge. Out of the 86 patients involved in the audit, 85% of them had their inhaler technique checked but 62% of them were not provided with any written evidence of the verbal instructions for inhaler use. Bundle two looks at patient's medications assessment. 94% of the patients' medication classes were reviewed while 7% of them had no review of their medication doses and 10% of them did not have documentation for their medication's adherence discussion. Bundle three looks at a written asthma action plan for the patients. 62% of the patients were given an action plan during their admission, 19% did not and 19% already had a plan. Bundle four looks at the triggering and exacerbating factors. In total 74% of the patients in the audit did not have documentation relating to non-steroidal anti-inflammatory drugs (NSAIDs) discussion. Only 17% of the patients had discussion about occupation being a potential asthma trigger. In total, 27% of the patients were elderly, retired or not able to work due to health reasons so the discussion of occupational exposure as a trigger was not applicable. However, nearly all the patients (98%) had a discussion documented about smoke exposure in their environment. Bundle five looks at the follow up in the community. 78% of patients were referred to their GPs within 48 hours post discharge and

nearly all the patients (98%) were referred to the asthma specialists for review 4 weeks post discharge. Two patients did not have a GP review or a specialist follow-up organised post-discharge because one resided outside the UK, and the other one did not have a GP at the time of the discharge. However, advice was given for both for follow up. In total, 15 of the patients had scheduled outpatient appointments with their asthma specialists before their hospital admissions.

[Insert table 3 here](#)

Table 3 shows the completion of bundle 1, 2 and 4 statement according to different healthcare professionals. The bundle statements implemented by different healthcare professionals (HCP) namely: the respiratory clinical nurse specialists (CNS), the respiratory medical team (RMT) (consultants, registrars, senior house officers) and the non-respiratory medical team (NRMT) who usually clerk the patients in the emergency department. In the Bundle 1, inhaler technique was checked and inhaler use instruction provided (95% and 94%) by the respiratory CNS. In Bundle 2, the medication classes were reviewed (83%), medication doses were reviewed (88%) and medication adherence discussed (79%) with the patients mostly by the respiratory CNS. HCPs also liaised with the ward pharmacists regarding medication review but there were no records from them. In Bundle 4, most of the discussions around asthma triggers were held by the respiratory CNS with 81% for 'NSAIDs', 69% for 'other triggers' and 60% for 'smoke exposure at home'. Discussions around occupations by the NRMT during clerking were performed in 58% of patients.

### **Discussion:**

The majority of patients audited were female (69%) as shown in table 1. This reflects the statistics reported by the British Lung Foundation (BLF) that between 2004 and 2012 more women had asthma than men (BLF, 2012). Compared to men adult women have increased asthma prevalence, are more likely to have severe asthma and a later onset of asthma. For example, a longitudinal study from Finland reported that amongst hospitalised patients



prevalence in women was much higher than in men ( $p < 0.001$ ) (Pelkonen *et al.*, 2018). Although the mechanism is not clear ovarian hormones increased and testosterone decreased airway inflammation in asthma (Fuseini and Newcomb, 2017).

Pelkonen *et al.*, (2018) also reported that patients over 70 years old had the lowest hospital admissions rate for asthma and this is similar to the result of this audit (16%). Our audit showed almost half of the patients were lifetime non-smokers which is similar to the Pekonen *et al.* (2018) study finding. The other half are active smokers or ex-smokers. These patients are at risk of developing more severe symptoms and worse asthma specific quality of life with a huge impact on healthcare resources due to frequent hospital admissions (GINA, 2020).

The results of the audit indicated that the hospital has complied with the British Thoracic Society's asthma discharge care bundle. Table 2 shows most of the statements have been achieved above 50% except for the discussion of NSAIDs (24%) and the provision of inhaler use instruction (38%). With respect to bundle one statement, 85% of patients' inhaler technique were checked and instructions were provided for 62% of the patients. Auditing this particular statement was challenging as the British Thoracic Society Asthma Care Bundle (BTS ACB) document recommends repetition of inhaler technique discussion but it is not clear enough whether the instruction should be verbal or written. The audit only recorded the intervention as compliant when an instruction leaflet was provided. However, good record keeping is a vital part of effective communication in nursing and integral to promoting safety and continuity of care for patients.

Nursing staff need to be clear about their responsibilities for record keeping in whatever format records are kept (RCN, 2017). Similar findings were reported in a study by Melani *et al.* (2011) on 1664 patients; one third of whom had written instruction, another third only verbal instruction and the other third had received practical demonstration using a placebo inhaler. The study also reported a relationship between poor inhaler technique and emergency admissions ( $p < 0.001$ ), and high risk of hospital admissions and high level of illiteracy ( $p = 0.001$ ). Similarly, a high level of education was the only significant factor which seemed to

affect the asthma control level of participants studied by Basheti *et al.* (2016). Therefore, this bundle statement should be adhered to and recorded without fail.

Bundle two statement which is the medication review before the discharge (94%) was one of the highest achieving ones in this audit (table 2). However, this contradicts the data that 74% of the patients in the audit did not have documentation relating to NSAIDs discussion as a trigger factor in bundle four. This result parallels with findings from another audit which indicated that not much attention was paid to the discussion of NSAIDs by healthcare professionals (McCreanor *et al.*, 2012). As NSAID is a trigger for an asthma attack, it is important to extensively discuss any previous adverse reactions to medications. The low results of the compliance of NSAIDs in this audit analysis could be due to the fact that only explicit documentation under NSAIDs was acknowledged. This calls for the careful interpretation of the BTS asthma discharge care bundle as NSAIDs could have been discussed under general asthma triggers or under drug allergies. Conversely, Pace-Bardon *et al.* (2017) reported that the implementation of the asthma discharge care bundle (ACB) made no difference to the compliance with this intervention.

Bundle three statement is written asthma action plans providing written instructions to patients regarding self-management of the condition. This is an integral part of asthma management. A written asthma action plan represents a written summary of all the relevant instructions asthma patients require to live their lives with a minimal level of symptoms (Asthma UK, 2021). It is a requirement which should be fulfilled by all HCP involved in asthma management (BTS and SIGN, 2019; NICE, 2020). Our audit showed almost 81% of the patients have a written plan with 62% of them being initiated during admissions by the respiratory CNS. Research shows that generated electronic asthma action plans can reduce asthma exacerbations when incorporated into patients' medical records at the point of care (Kuhn *et al.*, 2015).

The bundle four statement is that asthma education should cover identification and avoidance of patients' individual exacerbating factors or and triggers to prevent asthma attacks, emergency and hospital admissions as well to avoid complications related to adverse drug reactions (Asthma UK, 2021). The bundle four statement looked at the common triggers such as NSAIDs, smoking, occupation and others. Considering more than quarter of the patients were retired or not able to work due to health reason, discussion around occupational triggers was not applicable in this audit. Asthma UK (2021) reported that 10% of adult-onset asthma is caused by patients' employment though this type of asthma can sometimes be ignored (GINA, 2020). For example, a prospective study was performed on 441 participants training in bakery, hair dressing and pastry cooking by Wild *et al.* (2017) at the end of their two years of training. All the apprentices developed a higher sensitisation to the raw materials they were exposed to during their training. It was alarming to find that 35% of the patients studied by this current research were current smokers and 15% were ex-smokers. This percentage is concerning because smoking leads to a decline in lung function which may in turn lead to remodelling in asthmatic lungs which is when the lungs of asthmatic patients who have had extensive asthma attacks have rigid rather than flexible lungs (Inwald *et al.*, 2001). Sims *et al.* (2013) revealed in their national longitudinal study that 1900 annual asthma emergency admissions were prevented by the national smoking ban in workplaces in England. They found that smoke free legislation was associated with an immediate reduction in emergency admissions for asthma in the adult population. This implies that approximately 1900 emergency admissions for asthma were prevented in each of the first 3 years after legislation was introduced.

This audit showed that smoke exposure is discussed with almost all patients which is a strong finding. Regarding medical team performance, there was an obvious trend showing that most discussions around asthma exacerbating factors were performed by the non-respiratory medical team during clerking in the emergency department. For instance, none of the NSAIDs discussion was covered by the respiratory medical team. Moreover, regarding the discussion

of medication adherence, the NMRT team performed twice as well as the RMT (14% versus 7% respectively). It could be argued that this difference in performance may be due to lack of confidence in taking asthma exacerbating factors' history as 20% of the pulmonologists reported a failure to take the workplace exposure history from asthma patients (Holness *et al.*, 2007).

Bundle five statement is that post discharge reviews ensure patients' symptoms do not deteriorate further and offer specialists' input to patients as is recommended by the asthma BTS and SIGN guideline (2019). In this study, 98% of discharged patients were referred to asthma specialist clinics and 78% had their follow ups arranged within 2 working days with their GPs by the CNS. This is a similar finding to that from McCreanor *et al.* (2012) who reported that using the ACB allowed 93.3% of their discharged patients to be referred into the specialist clinics for their asthma review. Research shows that patients who are reviewed by respiratory nurses are more likely to have an outpatient follow up with their asthma (Osman *et al.*, 2002). On the contrary Nathan *et al.* (2006) reported that the follow up clinic reviews within two weeks following acute asthma discharge either by respiratory nurse specialists or by respiratory doctors had no effect on the exacerbation rates in asthma patients in their RCT with 154 patients. However, lack of these follow ups within twenty-eight days of discharge, was a possible cause of asthma related deaths in 10% of the cases investigated by the Royal College of Physicians (2014). Overall, monitoring the recovery of patients either by their GPs or by asthma specialists or having both reviews following discharge will reassure patients and will also prevent a readmission (GINA, 2020). The report suggests that some early studies indicated that follow up by specialists is associated with fewer subsequent emergency department visits or hospitalisation.

It is important that healthcare professionals should work together when providing patient care. As shown in table 3, this audit also looked at which healthcare professionals implemented the

ACB statements. Overall, the respiratory CNS completed most of the statements. However, Melani *et al.* (2011), in their cross sectional and observational study in Italy, found that respiratory physicians delivered the highest percentage of the inhaler instructions (54%), followed by the general practitioners (18%), then nurses (15%) and finally, the pharmacists who gave 3% of them. This variation may come from a differently structured healthcare service and number of healthcare professionals (for example, in Italy the ratio of doctors to the population is higher than the EU average whilst the density of nurses is relatively low (OECD, 2017)).

Our audit also revealed that only 7% of the discussion of medication adherence by the RMT and 14% by the NRMT. By contrast, most respiratory physicians reported in a study by Peláez *et al.* (2014) that they were solely responsible for ensuring patient adherence to their asthma inhalers. They acknowledged that their responsibility was to prescribe the medication and to check the patients' response to their treatments. All allied HCPs (respiratory technicians, pharmacists, nurses or asthma educators) in their study viewed medication adherence in a more holistic way. They thought they needed to ensure patients were able to take the prescribed inhalers correctly. Allied HCPs also acknowledged playing the role of patient advocates and bridging any therapeutic gap between doctors and the patients (Peláez *et al.* 2014).

## **Conclusion and Recommendations**

The audit findings revealed that the discussion of smoke exposure in patients' homes and the referral of patients to asthma specialists were the most compliant statements of the BTS asthma discharge care bundle in the hospital studied. The least compliant statement was the discussion of NSAIDs as a potential asthma trigger. Most of the bundle statements were implemented by the respiratory CNS on the admission wards. The audit results also revealed that the non-respiratory doctors were more compliant with most of the asthma care bundle

statements than the respiratory doctors and they usually discussed these statements when clerking patients in the emergency department.

Every asthma admission should be considered as an opportunity to implement the BTS ACB through a multi-disciplinary approach. There is also a need for continuous asthma knowledge and skills education including appropriate history taking and record keeping for all HCP involved in asthma management. On discharge, it is important to give written information about inhalers for those patients who need it; this information can also be given electronically and where appropriate in different languages. Additionally, it would be appropriate to incorporate the asthma ACB into the local hospital protocols electronically. Finally, further research needs to be conducted to focus on the implementation of the ACB in the emergency department and short stay admission wards as the current national audit (NACAP) does not look at the care provided in these care settings. It is important that patients admitted to hospital through the emergency department receive the same ACB as those admitted through other routes. This is important in order to understand the existing care pathway for these asthma patients and to ensure they are properly diagnosed, well supported and managed by the right HCP following their discharge. Multi-disciplinary team training is essential for all HCPs involved in treating asthma patients and in particular tailored training for emergency department staff is essential. More broadly hospital education co-ordinators could be involved in the wider rollout of this training across trusts.

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**Table 1. Demographics of the patients**

	<b>N</b>	<b>%</b>
<b>Gender</b>		
Male	<b>27</b>	31
Female	<b>59</b>	69
<b>Age</b>		
30 and under		29
31-50		26
51-70		29
71+		16
<b>Smoking status</b>		
Current smoker	<b>30</b>	35
Ex-smoker	<b>13</b>	15
Never smoked	<b>41</b>	48
Not recorded	<b>2</b>	2

**Table 2- Asthma Care Bundle**

<b>Bundle statement 1</b> All patients (or family members/carers administering medicines) should have their inhaler technique assessed prior to discharge.	<b>Inhaler technique checked</b>		<b>Inhaler use instruction provided</b>					
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>				
Yes	73	85	33	38				
No	13	15	53	62				
<b>Total</b>	<b>N= 86</b>	<b>100.0 %</b>	<b>N= 86</b>	<b>100.0%</b>				
<b>Bundle Statement 2</b> All patients should have their medications assessed. The importance of medication adherence to good asthma control should be reinforced to patients (and/or any family members or carers administering medicines) prior to discharge.	<b>Medication classes reviewed</b>		<b>Medication doses reviewed</b>		<b>Medication adherence discussed</b>			
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>n</b>	<b>%</b>		
Yes	81	94	80	93	77	90		
No	5	6	6	7	9	10		
<b>Total</b>	<b>N= 86</b>	<b>100.0%</b>	<b>N= 86</b>	<b>100.0%</b>	<b>N= 86</b>	<b>100.0%</b>		
<b>Bundle statement 3</b> A written asthma action plan for how to manage care should be provided to patients and families/carers.	<b>N</b>	<b>%</b>						
Yes	54	62						
No	16	19						
<b>Already has a plan</b>	16	19						
<b>Total</b>	<b>N=86</b>	<b>100%</b>						
<b>Bundle statement 4</b> Triggering and exacerbating factors in the patient's overall environment should be considered.	<b>NSAIDs</b>		<b>Occupational</b>		<b>Other triggers</b>		<b>Smoke exposure at home</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>N</b>	<b>%</b>
Yes	21	24	48	56	67	78	84	98
No	64	74	15	17	19	22	2	2
Uncertain	1	2	0	0	0	0	0	0
N/A	0	0	23	27	0	0	0	0
	<b>N= 86</b>	<b>100.0%</b>	<b>N= 86</b>	<b>100.0%</b>	<b>N= 86</b>	<b>100.0%</b>	<b>N=86</b>	<b>100.0%</b>
<b>Bundle 5 statement</b> Follow-up in the community to be arranged within 2 working days plus specialist care according to criteria* within 2 weeks.	<b>Community/GP follow up</b>		<b>Specialist follow up</b>					
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>				
Yes	67	78	84	98				
No	19	22	2	2				
<b>Total</b>	<b>N=86</b>	<b>100%</b>	<b>N=86</b>	<b>100%</b>				

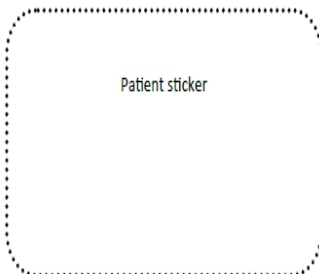
**Figure 1: BTS asthma discharge care bundle**



**BTS Asthma Discharge Care Bundle: 2016**

This care bundle describes 5 high impact actions to ensure the best clinical outcome for patients attending hospital with an acute asthma attack. The aim is to reduce the number of patients who are readmitted following discharge and to ensure that all aspects of the patient's asthma care are considered. This bundle applies to patients from age 2 onwards (but may not always be suitable for patients under 5).

- In patients under 5 and older patients (particularly those with a smoking history) ensure that a correct diagnosis of asthma is established (see the BTS Asthma Guideline for diagnosis information).
- Optimal preventer therapy for children aged 2 to 5 with recurrent episodes of acute 'viral wheeze' and minimal interval symptoms is unknown. As a group, children with viral wheeze do not respond to inhaled corticosteroid preventer treatment.
- Children under 5 with frequent and/or severe wheeze attacks requiring hospital attendance should have a specialist review.



<b>COMPLETE FOR DISCHARGES WITH ASTHMA ATTACK</b>	<p><b>1. ALL PATIENTS (OR FAMILY MEMBERS/CARERS ADMINISTERING MEDICINES) SHOULD HAVE THEIR INHALER TECHNIQUE ASSESSED PRIOR TO DISCHARGE</b>  <i>Correct use of inhalers is associated with improved outcomes for patients including a reduction in risk of exacerbations and hospital admission. Repeated instruction is required to ensure that inhaler technique is optimised. Every opportunity must be taken to promote good inhaler technique in order to ensure adequate delivery of therapy.</i></p> <p>Inhaler technique checked? YES <input type="checkbox"/> NO <input type="checkbox"/>      Inhaler use instruction provided? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	Signature
	<p><b>2. ALL PATIENTS SHOULD HAVE THEIR MEDICATIONS ASSESSED. THE IMPORTANCE OF MEDICATION ADHERENCE TO GOOD ASTHMA CONTROL SHOULD BE REINFORCED TO PATIENTS (AND / OR ANY FAMILY MEMBERS OR CARERS ADMINISTERING MEDICINES) PRIOR TO DISCHARGE</b>  <i>Review of medication is vital following a hospital attendance or admission as intentional and unintentional non-adherence to preventer therapies (principally inhaled corticosteroids) frequently causes deterioration in asthma control.</i></p> <p>Medication classes reviewed? YES <input type="checkbox"/> NO <input type="checkbox"/>      Doses reviewed (increasing/decreasing as necessary)? YES <input type="checkbox"/> NO <input type="checkbox"/>      Was the importance of adherence to preventer medication discussed with the patient/family? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	Signature
	<p><b>3. A WRITTEN ASTHMA ACTION PLAN FOR HOW TO MANAGE CARE SHOULD BE PROVIDED TO PATIENTS AND FAMILIES/CARERS</b>  <i>Self-management/action plans for asthma provide information for patients and their families on how to carry out disease specific elements of self-care. There is strong evidence that providing written action plans, in addition to verbal information, is associated with improved patient/carer understanding of asthma and thereby reduces risk of further attack and hospitalisation. Examples of asthma action plans and further information on self-management can be found at <a href="http://www.asthma.org.uk">www.asthma.org.uk</a>.</i></p> <p>A written action plan has been provided? YES <input type="checkbox"/> NO <input type="checkbox"/> Already has a plan <input type="checkbox"/></p>	Signature
	<p><b>4. TRIGGERING AND EXACERBATING FACTORS IN THE PATIENT'S OVERALL ENVIRONMENT SHOULD BE CONSIDERED</b>  <i>Attacks may have an identifiable trigger which should be recognised in order to minimise exposure and reduce risk of further asthma attacks. Trigger factors include NSAIDs, smoking/smoke exposure in the home, psychosocial instability and other issues such as pets. Explicit attention should be paid to potential occupational factors. Recognition of these and other potential causes was identified as an important factor in the NRAD report.</i></p> <p>Have trigger factors* with the patient's environment been considered?</p> <p>NSAIDs? YES <input type="checkbox"/> NO <input type="checkbox"/> Uncertain <input type="checkbox"/> NA <input type="checkbox"/>      Smoking/smoke exposure in the home? YES <input type="checkbox"/> NO <input type="checkbox"/> Uncertain <input type="checkbox"/> NA <input type="checkbox"/>      * 'proving' triggers e.g. occupational exposure, pets, NSAIDs may require further investigation at follow-up.</p> <p>Occupational? YES <input type="checkbox"/> NO <input type="checkbox"/> NA <input type="checkbox"/>      Other? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	Signature
	<p><b>5. SUBSEQUENT CARE: FOLLOW-UP IN THE COMMUNITY TO BE ARRANGED WITHIN 2 WORKING DAYS PLUS SPECIALIST CARE ACCORDING TO CRITERIA WITHIN 2 WEEKS</b>  <i>National guidance clearly recommends early primary care follow up to improve outcomes. Local discussions may need to be held in order to fit this into local systems and care pathways.</i></p> <p>Community follow up arranged within 2 working days? YES <input type="checkbox"/> NO <input type="checkbox"/>      Specialist follow up arranged within 2 weeks? YES <input type="checkbox"/> NO <input type="checkbox"/></p>	Signature

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Health Care Professionals	Bundle 1				Bundle 2						Bundle 4							
	Inhaler technique checked		Inhaler use instruction provided		Medication classes reviewed		Medication doses reviewed		Medication adherence discussed		NSAIDs		Occupational		Other triggers		Smoke exposure at home	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Respiratory Clinical Nurse Specialist	69	95	31	94	67	83	70	88	61	79	17	81	18	38	46	69	50	60
Respiratory Medical team	3	4	1	3	9	11	6	7	5	7	0	0	2	4	2	3	20	24
Non-respiratory team	1	1	1	3	5	6	4	5	11	14	4	19	28	58	19	28	14	16
<b>Total</b>	<b>N= 73</b>	<b>100%</b>	<b>N= 33</b>	<b>100%</b>	<b>N= 81</b>	<b>100%</b>	<b>N= 80</b>	<b>100%</b>	<b>N= 77</b>	<b>100%</b>	<b>N=21</b>	<b>100%</b>	<b>N=48</b>	<b>100%</b>	<b>N=67</b>	<b>100%</b>	<b>N=84</b>	<b>100%</b>

**Table 3: Completion of bundle 1, 2 and 4 statement according to different healthcare professionals**